**3GPP TSG-RAN WG2 Meeting #119-e *R2-2208869***

**Electronic Meeting, 17th – 29th Aug, 2022**

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| *CR-Form-v12.2* | | | | | | | | |
| **CHANGE REQUEST** | | | | | | | | |
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|  | **38.331** | **CR** | **3348** | **rev** | **2** | **Current version:** | **17.1.0** |  |
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| *For* [***HE******LP***](http://www.3gpp.org/3G_Specs/CRs.htm#_blank)*on using this form: comprehensive instructions can be found at* [*http://www.3gpp.org/Change-Requests*](http://www.3gpp.org/Change-Requests)*.* | | | | | | | | |
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| ***Proposed change affects:*** | UICC apps |  | ME | **X** | Radio Access Network | **X** | Core Network |  |

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| ***Title:*** | Miscellaneous corrections on TS 38.331 for SL enhancements | | | | | | | | | |
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| ***Source to WG:*** | Huawei, HiSilicon (Rapporteur) | | | | | | | | | |
| ***Source to TSG:*** | R2 | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Work item code:*** | NR\_SL\_enh-Core | | | | |  | ***Date:*** | | | 2022-09-02 |
|  |  | | | |  | |  | | |  |
| ***Category:*** | ***F*** |  | | | | | ***Release:*** | | | *Rel-17* |
|  | *Use one of the following categories:* ***F*** *(correction)* ***A*** *(mirror corresponding to a change in an earlier release)* ***B*** *(addition of feature),* ***C*** *(functional modification of feature)* ***D*** *(editorial modification)*  Detailed explanations of the above categories can be found in 3GPP [TR 21.900](http://www.3gpp.org/ftp/Specs/html-info/21900.htm). | | | | | | | | *Use one of the following releases: Rel-8 (Release 8) Rel-9 (Release 9) Rel-10 (Release 10) Rel-11 (Release 11) … Rel-16 (Release 16) Rel-17 (Release 17) Rel-18 (Release 18) Rel-19 (Release 19)* | |
|  |  | | | | | | | | | |
| ***Reason for change:*** | | 1. In clause 5.8.3.1, description on UE is configured with sl-ScheduledConfig is missing 2. In clause 5.8.3.2, the description on the initiation condition of one TX UE reporting sidelink DRX configuration reject information is missing. 3. In clause 5.8.3.3, the description on the procedure of one TX UE reporting sidelink DRX configuration reject information and DRX on/off indication are missing. 4. Clarification on definition of field related to higher layer parameters (priorityScheme1CoordInfoExplicit, priorityScheme1CoordInfoCondition and priorityScheme1Request) is needed. 5. Clarification on IUC MAC CE and IUC request MAC CE priority value is needed. 6. In 5.8.3.2, the “3> if the UE is performing NR sidelink groupcast reception and if sl-DRX-ConfigCommonGC-BC is included in SIB12-IEs: 4> initiate transmission of the SidelinkUEInformationNR message to report the Destination Layer-2 ID and sidelink DRX on/off indication for the corresponding destination in accordance with 5.8.3.3;” is under the condition of “if configured by upper layers to receive NR sidelink communication on the frequency included in sl-FreqInfoList in SIB12 of the PCell:”, i.e., the transmission related reporting is under reception-based triggering condition, which is an error. 7. In 5.8.3.3, the reporting of sl-RxInterestedGC-BC-DestList, its field sl-DestinationIdentity is missing. 8. In 5.8.3.3, the description is “4> if configured by upper layers to perform NR sidelink reception and configured with sl-ScheduledConfig: 5> include sl-TxResourceReqList and/or sl-TxResourceReqListCommRelay-r17 and set its fields (if needed) as follows for each destination for which it reports to network:” i.e., the transmission related reporting is under reception-based triggering condition, which is an error. 9. In 6.2.2, the field description of sl-RxInterestedFreqListDisc is missing, and sl-RxInterestedQoS-InfoList is put in the SL-RxDRX-Report, but sl-RxInterestedQoS-InfoList is not an sub-field of SL-RxDRX-Report. 10. In the field description, for sl-DRX-GC-HARQ-RTT-Timer1, sl-DRX-GC-HARQ-RTT-Timer2, it mentions “HARQ enabled / disabled transmission” yet there is no such “HARQ enabled/disabled” but just “feedback enabled/disabled” 11. In the field description of sl-TriggerConditionCoordInfo, it says “Indicates the trigger condition of inter-UE coordination information from UE-A to UE-B”, it is misleading 1) this flag is for condition-based scheme-1 but not request-based scheme-1 IUC, and 2) when it applies to condition-based scheme-1, it is not used directly as the trigger of IUC, but applied as an additional condition/restriction for UE-A to send IUC-information, i.e., the configured trigger condition (e.g., RSRP threshold) is still to be used. As shown in the RAN1 agreement: Agreement made in RAN1#107bis-e: For inter-UE coordination triggered by a condition rather than request reception in Scheme 1, A resource pool level (pre-)configuration can enable one of the following alternatives: Alt 1: it is up to UE-A’s implementation whether or not to trigger the inter-UE coordination information generation. Alt 2: the inter-UE coordination information generation can be triggered only when UE-A has data to be transmitted together with the inter-UE coordination information to UE-B. 12. In the current specification, the introduction of sl-PBPS-CPS-Config-r17 seems applicable to normal and exceptional pool, yet it is not supposed to be applicable to exceptional pool, i.e., partial-sensing is not supposed to be used in exceptional pool. 13. In the current specification, exceptional pool configuration can be present not only in sl-BWP-PoolConfig/sl-BWP-PoolConfigCommon, but also in sl-BWP-PoolConfigPS/sl-BWP-PoolConfigCommonPS, it would cause ambiguity / issue that which pool to use. 14. Due to the change of RP-221563, some change in R2-2206378 is missing. 15. In 5.8.3.2, for the branch of “2> if configured by upper layers to perform NR sidelink reception on the frequency included in sl-FreqInfoList in SIB12 of the PCell”, it missed the condition of sl-DRX-ConfigCommonGC-BC presence, i.e., currently the DRX related reporting is regardless of network capability of SL-DRX, which is against the R2#117 agreement of “For gNB not supporting SL-DRX, Tx-UE does not report assistance information or DRX configuration reject information, and Rx-UE does not report DRX configuration information for UC or QoS information for GC/BC.”. And same issue for the branch of “if configured by upper layers to perform NR sidelink transmission on the frequency included in sl-FreqInfoList in SIB12 of the PCell” 16. For the branch of “2> if configured by upper layers to perform NR sidelink transmission on the frequency included in sl-FreqInfoList in SIB12 of the PCell”, the R2#117 agreement of “3:For gNB supporting SL-DRX, Tx-UE report assistance information only in mode-1.” and “11: For gNB supporting SL-DRX, Tx-UE report DRX configuration reject information only in mode-1.” failed to be captured, i.e., the current procedural text would lead to SUI initiation even in case of mode-2. 17. In clause 6.6.2 for IE "RRCReconfigurationCompleteSidelink", the field " sl-DRX-ConfigReject-r17" was mistakenly made madatory field. 18. In the legacy spec of SUI initiation in clause 5.8.3.2, there are always cases for SUI initiation, i.e., 1) SUI not transmitted before, “3> if the UE did not transmit a SidelinkUEInformationNR message since last entering RRC\_CONNECTED state; or” 2) SUI transmitted but the UE undergo an incapable gNB “3> if since the last time the UE transmitted a SidelinkUEInformationNR message the UE connected to a PCell not providing SIB12 including sl-ConfigCommonNR; or”, 3) SUI content change “3> if the last transmission of the SidelinkUEInformationNR message did not include sl-RxInterestedFreqList; or if the frequency configured by upper layers to receive NR sidelink communication on has changed since the last transmission of the SidelinkUEInformationNR message:”, and 4) UE not interested in the related action any more “2> else: 3> if the last transmission of the SidelinkUEInformationNR message included sl-RxInterestedFreqList:”. These 4 conditions are missing for the reporting initiation of sl-RxDRX-ReportList, sl-RxInterestedGC-BC-DestList. 19. In clause 6.3.5，for field sl-OptionForCondition2-A-1-r17 within IE SL-InterUE-CoordinationScheme2-r17, it is not clearly specified what threshold values to be used when sl-OptionForCondition2-A-1-r17 is "0". The threshold delta value deltaRSRPThresh as specified in TS 38.213 is missing in TS 38.331 for the case when sl-OptionForCondition2-A-1-r17 is "1". 20. RAN1 defined open loop power control parameters are not captured. 21. Various editorial errors. | | | | | | | | |
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| ***Summary of change:*** | | 1. In clause 5.8.3.1, add description on UE is configured with sl-ScheduledConfig 2. Add the description on the condition of one TX UE reporting sidelink DRX configuration reject information. 3. Add the description on the procedure of one TX UE reporting sidelink DRX configuration reject information and DRX On/Off indication. 4. Modified field description related to higher layer parameters (priorityScheme1CoordInfoExplicit, priorityScheme1CoordInfoCondition and priorityScheme1Request) according to RAN1 LS R1-2203042 (R2-2203695). Add clarification on priority value of IUC MAC CE and IUC request MAC CE. 5. In 5.8.3.2, relocate “3> if the UE is performing NR sidelink groupcast transmission and if sl-DRX-ConfigCommonGC-BC is included in SIB12-IEs: 4> initiate transmission of the SidelinkUEInformationNR message to report the Destination Layer-2 ID and sidelink DRX on/off indication for the corresponding destination in accordance with 5.8.3.3;” to the condition of “2> if configured by upper layers to perform NR sidelink transmission on the frequency included in sl-FreqInfoList in SIB12 of the PCell:”, i.e., together with other DRX-related procedural text. 6. In 5.8.3.3, Add the reporting of sl-RxInterestedGC-BC-DestList, its field sl-DestinationIdentity. 7. In 5.8.3.3, correct “3> if the UE is performing NR sidelink groupcast reception and if sl-DRX-ConfigCommonGC-BC is included in SIB12-IEs: 4> initiate transmission of the SidelinkUEInformationNR message to report the Destination Layer-2 ID and sidelink DRX on/off indication for the corresponding destination in accordance with 5.8.3.3;” is under the condition of “if configured by upper layers to receive NR sidelink communication on the frequency included in sl-FreqInfoList in SIB12 of the PCell:” to “3> if the UE is performing NR sidelink groupcast transmission and if sl-DRX-ConfigCommonGC-BC is included in SIB12-IEs: 4> initiate transmission of the SidelinkUEInformationNR message to report the Destination Layer-2 ID and sidelink DRX on/off indication for the corresponding destination in accordance with 5.8.3.3;” is under the condition of “if configured by upper layers to receive NR sidelink communication on the frequency included in sl-FreqInfoList in SIB12 of the PCell:” 8. In 6.2.2, add the field description of sl-RxInterestedFreqListDisc is missing, and put sl-RxInterestedQoS-InfoList as a separate table for SL-RxInterestedGC-BC-Dest. 9. In the field description, for sl-DRX-GC-HARQ-RTT-Timer1, sl-DRX-GC-HARQ-RTT-Timer2, change from “HARQ enabled / disabled Sidelink transmission” to “feedback enabled/disabled Sidelink HARQ transmission” 10. In the field description, indicate this IE is applicable to condition-based scheme-1 IUC only, and clarify the description to align with RAN1 agreement, i.e., “For inter-UE coordination information triggered by a condition rather than request reception in Scheme 1”. 11. In the field description of sl-PBPS-CPS-Config-r17, clarify it is not supposed to be used for exceptional pool. 12. In the field description of sl-BWP-PoolConfigPS/sl-BWP-PoolConfigCommonPS, clarify that the exceptional pool is not to be present as a sub-field. 13. Add back the change in R2-2206378 on top of the change from RP-221563. 14. For the two branches, “2> if configured by upper layers to perform NR sidelink reception on the frequency included in sl-FreqInfoList in SIB12 of the PCell”, and “if configured by upper layers to perform NR sidelink transmission on the frequency included in sl-FreqInfoList in SIB12 of the PCell”, add condition of network support of SL-DRX as “and if sl-DRX-ConfigCommonGC-BC is included in SIB12-IEs”. 15. For the branch of “if configured by upper layers to perform NR sidelink transmission on the frequency included in sl-FreqInfoList in SIB12 of the PCell”, add the condition of “and if the UE is configured with sl-ScheduledConfig” to limit to mode-1. 16. In the current specification, upon reception of the sl-DRX-ConfigReject, TX UE considers no sidelink DRX to be applied for the corresponding sidelink unicast communication. However, the corresponding behaviour of the RX UE upon transmission of the sl-DRX-ConfigReject is missing and should be added. 17. Field " sl-DRX-ConfigReject-r17" is made dummy, a new field " sl-DRX-ConfigReject-v17xy" is created as "optional" field within the extended IE "RRCReconfigurationCompleteSidelink-v17xy-IEs ". 18. Clarify upon transmission of the sl-DRX-ConfigReject, RX UE considers no sidelink DRX to be applied for the corresponding sidelink unicast communication. 19. For the reporting initiation of sl-RxDRX-ReportList, sl-RxInterestedGC-BC-DestList, add the similar conditions of 1) SUI not transmitted before, “3> if the UE did not transmit a SidelinkUEInformationNR message since last entering RRC\_CONNECTED state; or” 2) SUI transmitted but the UE undergo an incapable gNB “3> if since the last time the UE transmitted a SidelinkUEInformationNR message the UE connected to a PCell not providing SIB12 including sl-ConfigCommonNR; or”, 3) SUI content change “3> if the last transmission of the SidelinkUEInformationNR message did not include sl-RxInterestedFreqList; or if the frequency configured by upper layers to receive NR sidelink communication on has changed since the last transmission of the SidelinkUEInformationNR message:”, and 4) UE not interested in the related action any more “2> else: 3> if the last transmission of the SidelinkUEInformationNR message included sl-RxInterestedFreqList:”. 20. Add in FD of "*sl-OptionForCondition2-A-1*", " UE uses thresholds *sl-Thres-RSRP-List*, in its resource pool configuration *sl-UE-SelectedConfigRP*, for *ThresPSSCH-RSRP-List* specified in clause 16.3.0 of TS 38.213 [13]. " for the case when *sl-OptionForCondition2-A-1-r17* is "0"; For the case when *sl-OptionForCondition2-A-1-r17* is "1", a new parameter " *sl-DeltaRSRP-Thresh-v17xy* " is defined. 21. Add open loop power control parameters *dl-P0-PSSCH-PSCCH-r17, sl-P0-PSSCH-PSCCH-r17, dl-P0- PSBCH-r17, dl-P0-PSFCH-r17.* 22. Correct editorial errors including moving FD alphabetic locations, small changes on FDs, minor changes on procedural texts.   **Impact analysis**  **Impacted 5G architecture options:**  NR SA, NR-DC, NE-DC, (NG)EN-DC  **Impacted functionality:**  Sidelink  **Inter-operability:**  1. For the change on TX UE reporting DRX configuration reject information  If the network is implemented according to this CR while the UE is not, there is no inter-operability issue.  If the UE is implemented according to this CR while the network is not, there is no inter-operability issue.  If one UE is implemented according to this CR while the other UE is not, there is no inter-operability issue.  2. For the change on TX UE reporting DRX on/off indication  If the network is implemented according to this CR while the UE is not, UE will not report the DRX on/off indication, there will be mismatch of understanding on Tx profile of one certain destination ID between gNB and Tx UE hence inter-operability issue.  If the UE is implemented according to this CR while the network is not, network will not understand the reported DRX on/off indication and there will be inter-operability issue.  If one UE is implemented according to this CR while the other UE is not, there is no inter-operability issue between two UEs.  3. For the change on IUC RSRP thresholds and threshold delta value  If the network is implemented according to this CR while the UE is not, UE will not understand the configured thresholds and threshold delta value and UE IUC behaviour is unspecified.  If the UE is implemented according to this CR while the network is not, network will not configure the threshold delta value, UE IUC behaviour is partially unspecified when the threshold delta value is to be used.  If one UE is implemented according to this CR while the other UE is not, there is no inter-operability issue between two UEs if UE B in IUC is not implemented according to this CR; UE IUC behaviour is unspecified if UE A in IUC is not implemented according to this CR.  4. For the change on IUC RSRP thresholds and threshold delta value  If the network is implemented according to this CR while the UE is not, UE will not understand the configured thresholds and threshold delta value and UE IUC behavior is unspecified.  If the UE is implemented according to this CR while the network is not, network will not configure the threshold delta value, UE IUC behavior is partially unspecified when the threshold delta value is to be used.  If one UE is implemented according to this CR while the other UE is not, there is no inter-operability issue between two UEs if UE B in IUC is not implemented according to this CR; UE IUC behavior is unspecified if UE A in IUC is not implemented according to this CR.  5. For other changes, no inter-operability issues found. | | | | | | | | |
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| ***Consequences if not approved:*** | | 1. The procedural texts for TX UE reporting DRX configuration reject information are not captured. 2. IUC function cannot work properly as the threshold values and threshold delta values, with which UE determines preferred and non-preferred resources, are not clearly specified. 3. Ambiguity exists on definition of higher layer parameters (priorityScheme1CoordInfoExplicit, priorityScheme1CoordInfoCondition and priorityScheme1Request) and on priority value of IUC MAC CE and IUC request MAC CE. 4. The UE has to perform transmission-related SUI reporting although only configured to perform reception. 5. Missing part of the SUI field in procedural text, which will cause ambiguity to UE implementation. 6. The UE has to perform transmission-related SUI reporting although only configured to perform reception. 7. Misunderstanding this is to indicate one separate trigger condition for IUC information. 8. The misunderstanding that sl-PBPS-CPS-Config-r17 may be applied to the exceptional pool as well. 9. Confusion to UE about which exception pool to use, either in sl-BWP-PoolConfig/sl-BWP-PoolConfigCommon, or in sl-BWP-PoolConfigPS/sl-BWP-PoolConfigCommonPS. 10. The agreed changes in R2-2206378 are missing. 11. RAN2 agreement failed to be captured. 12. Deviation from the legacy SUI message initiation conditions. 13. IUC function cannot work properly as the threshold values and threshold delta values, with which UE determines preferred and non-preferred resources, are not clearly specified. 14. Rel-17 open loop power control for sidelink may not function properly. 15. Various editorial errors still exist. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Clauses affected:*** | | 5.8.3.1, 5.8.3.2, 5.8.3.3, 5.8.9.1.3, 6.2.2, 6.3.1, 6.3.2, 6.3.5 | | | | | | | | |
|  | |  | | | | | | | | |
|  | | **Y** | **N** |  | | | |  | | |
| ***Other specs*** | |  | **X** | Other core specifications | | | | TS/TR ... CR ... | | |
| ***affected:*** | |  | **X** | Test specifications | | | | TS/TR ... CR ... | | |
| ***(show related CRs)*** | |  | **X** | O&M Specifications | | | | TS/TR ... CR ... | | |
|  | |  | | | | | | | | |
| ***Other comments:*** | |  | | | | | | | | |
|  | |  | | | | | | | | |
| ***This CR's revision history:*** | |  | | | | | | | | |

## Start of Changes

## 5.8 Sidelink

### 5.8.1 General

NR sidelink communication consists of unicast, groupcast and broadcast. For unicast, the PC5-RRC connection is a logical connection between a pair of a Source Layer-2 ID and a Destination Layer-2 ID in the AS. The PC5-RRC signalling, as specified in clause 5.8.9, can be initiated after its corresponding PC5 unicast link establishment (TS 23.287 [55]). The PC5-RRC connection and the corresponding sidelink SRBs and sidelink DRB(s) are released when the PC5 unicast link is released as indicated by upper layers.

For each PC5-RRC connection of unicast, one sidelink SRB (i.e. SL-SRB0) is used to transmit the PC5-S message(s) before the PC5-S security has been established. One sidelink SRB (i.e. SL-SRB1) is used to transmit the PC5-S messages to establish the PC5-S security. One sidelink SRB (i.e. SL-SRB2) is used to transmit the PC5-S messages after the PC5-S security has been established, which is protected. One sidelink SRB (i.e. SL-SRB3) is used to transmit the PC5-RRC signalling, which is protected and only sent after the PC5-S security has been established. One sidelink SRB (i.e. SL-SRB4) is used to transmit/receive the NR sidelink discovery messages.

For unicast of NR sidelink communication, AS security comprises of integrity protection of PC5 signalling (SL-SRB1, SL-SRB2 and SL-SRB3) and user data (SL-DRBs), and it further comprises of ciphering of PC5 signaling (SL-SRB1 only for the Direct Link Security Mode Complete message as specified in TS 24.587 [57] for V2X service or TS 24.554 [72] for Proximity-services, SL-SRB2 and SL-SRB3) and user data (SL-DRBs). The ciphering and integrity protection algorithms and parameters for a PC5 unicast link are exchanged by PC5-S messages in the upper layers as specified in TS 33.536 [60], and apply to the corresponding PC5-RRC connection in the AS. Once AS security is activated for a PC5 unicast link in the upper layers as specified in TS 33.536 [60], all messages on SL-SRB2 and SL-SRB3 and/or user data on SL-DRBs of the corresponding PC5-RRC connection are integrity protected and/or ciphered by the PDCP.

For unicast of NR sidelink communication, if the change of the key is indicated by the upper layers as specified in TS 24.587 [57], UE re-establishes the PDCP entity of the SL-SRB1, SL-SRB2, SL-SRB3 and SL-DRBs on the corresponding PC5-RRC connection.

NOTE 1: In case the configurations for NR sidelink communication are acquired via the E-UTRA, the configurations for NR sidelink communication in *SIB12* and *sl-ConfigDedicatedNR* within *RRCReconfiguration* used in clause 5.8 are provided by the configurations in *SystemInformationBlockType28* and *sl-ConfigDedicatedForNR* within *RRCConnectionReconfiguration* as specified in TS 36.331 [10], respectively.

NOTE 2: In this release, there is one-to-one correspondence between the PC5-RRC connection and the PC5 unicast link as specified in TS 38.300[2].

NOTE 3: All SL-DRBs related to the same PC5-RRC connection have the same activation/deactivation setting for ciphering and the same activation/deactivation setting for integrity protection as specified in TS 33.536 [60].

NOTE 4: When integrity check failure concerning SL-SRB1 for a specific destination is detected, the UE sends an indication to the upper layers [57].

### 5.8.2 Conditions for NR sidelink communication operation

The UE shall perform NR sidelink communication operation only if the conditions defined in this clause are met:

1> if the UE's serving cell is suitable (RRC\_IDLE or RRC\_INACTIVE or RRC\_CONNECTED); and if either the selected cell on the frequency used for NR sidelink communication operation belongs to the registered or equivalent PLMN as specified in TS 24.587 [57] or the UE is out of coverage on the frequency used for NR sidelink communication operation as defined in TS 38.304 [20] and TS 36.304 [27]; or

1> if the UE's serving cell (RRC\_IDLE or RRC\_CONNECTED) fulfils the conditions to support NR sidelink communication in limited service state as specified in TS 23.287 [55]; and if either the serving cell is on the frequency used for NR sidelink communication operation or the UE is out of coverage on the frequency used for NR sidelink communication operation as defined in TS 38.304 [20] and TS 36.304 [27]; or

1> if the UE has no serving cell (RRC\_IDLE);

### 5.8.3 Sidelink UE information for NR sidelink communication

#### 5.8.3.1 General



Figure 5.8.3.1-1: Sidelink UE information for NR sidelink communication

The purpose of this procedure is to inform the network that the UE:

- is interested or no longer interested to receive or transmit NR sidelink communication,

- is requesting assignment or release of transmission resource for NR sidelink communication,

- is reporting QoS parameters and QoS profile(s) related to NR sidelink communication,

- is reporting that a sidelink radio link failure or sidelink RRC reconfiguration failure has been detected,

- is reporting the sidelink UE capability information of the associated peer UE for unicast communication,

- is reporting the RLC mode information of the sidelink data radio bearer(s) received from the associated peer UE for unicast communication,

- is reporting the accepted sidelink DRX configuration received from the associated peer UE for NR sidelink unicast reception,

- is reporting the sidelink DRX assistance information received from the associated peer UE for NR sidelink unicast transmission, when the UE is configured with *sl-ScheduledConfig*,

- is reporting, for NR sidelink groupcast transmission, the sidelink DRX on/off indication for the associated Destination Layer-2 ID,

- is reporting, for NR sidelink groupcast or broadcast reception, the Destination Layer-2 ID and QoS profile(s) associated with its interested services to which sidelink DRX is applied,

- is reporting DRX configuration reject information from its associated peer UE for NR sidelink unicast transmission, when the UE is configured with *sl-ScheduledConfig*,

- is reporting parameters related to U2N relay operation.

#### 5.8.3.2 Initiation

A UE capable of NR sidelink communication or NR sidelink discovery or NR sidelink U2N relay operation that is in RRC\_CONNECTED may initiate the procedure to indicate it is (interested in) receiving or transmitting NR sidelink communication or NR sidelink discovery or NR sidelink U2N relay operation in several cases including upon successful connection establishment or resuming, upon change of interest, upon changing QoS profiles, upon receiving *UECapabilityInformationSidelink* from the associated peer UE, upon RLC mode information updated from the associated peer UE or upon change to a PCell providing *SIB12* including *sl-ConfigCommonNR*. A UE capable of NR sidelink communication may initiate the procedure to request assignment of dedicated sidelink DRB configuration and transmission resources for NR sidelink communication transmission. A UE capable of NR sidelink communication may initiate the procedure to report to the network that a sidelink radio link failure or sidelink RRC reconfiguration failure has been declared. A UE capable of NR sidelink discovery may initiate the procedure to request assignment of dedicated resources for sidelink discovery transmission or sidelink discovery reception. A UE capable of U2N relay operation may initiate the procedure to report/update parameters for acting as U2N Relay UE or U2N Remote UE (including L2 Remote UE's source L2 ID).

A UE capable of NR sidelink operation that is in RRC\_CONNECTED may initiate the procedure to report the sidelink DRX configuration received from the associated peer UE for NR sidelink unicast reception, upon accepting the sidelink DRX configuration from the associated peer UE. A UE capable of NR sidelink communication that is in RRC\_CONNECTED and is performing sidelink unicast transmission with resource allocation mode 1 may initiate the procedure to report the sidelink DRX assistance information or the sidelink DRX configuration reject information received from the associated peer UE, upon receiving either of them from the associated peer UE. A UE capable of NR sidelink communication that is performing sidelink groupcast transmission may initiate the procedure to report the sidelink DRX on/off indication for the associated Destination Layer-2 ID.

A UE capable of NR sidelink operation that is in RRC\_CONNECTED may initiate the procedure to report the Destination Layer-2 ID and QoS profile associated with its interested services that sidelink DRX is applied, for NR sidelink groupcast or broadcast reception.

Upon initiating this procedure, the UE shall:

1> if *SIB12* including *sl-ConfigCommonNR* is provided by the PCell:

2> ensure having a valid version of *SIB12* for the PCell;

2> if configured by upper layers to receive NR sidelink communication on the frequency included in *sl-FreqInfoList* in *SIB12* of the PCell:

3> if the UE did not transmit a *SidelinkUEInformationNR* message since last entering RRC\_CONNECTED state; or

3> if since the last time the UE transmitted a *SidelinkUEInformationNR* message the UE connected to a PCell not providing *SIB12* including *sl-ConfigCommonNR*; or

3> if the last transmission of the *SidelinkUEInformationNR* message did not include *sl-RxInterestedFreqList*; or if the frequency configured by upper layers to receive NR sidelink communication on has changed since the last transmission of the *SidelinkUEInformationNR* message:

4> initiate transmission of the *SidelinkUEInformationNR* message to indicate the NR sidelink communication reception frequency of interest in accordance with 5.8.3.3;

2> else:

3> if the last transmission of the *SidelinkUEInformationNR* message included *sl-RxInterestedFreqList*:

4> initiate transmission of the *SidelinkUEInformationNR* message to indicate it is no longer interested in NR sidelink communication reception in accordance with 5.8.3.3;

2> if configured by upper layers to transmit non-relay NR sidelink communication on the frequency included in *sl-FreqInfoList* in *SIB12* of the PCell:

3> if the UE did not transmit a *SidelinkUEInformationNR* message since last entering RRC\_CONNECTED state; or

3> if since the last time the UE transmitted a *SidelinkUEInformationNR* message the UE connected to a PCell not providing *SIB12* including *sl-ConfigCommonNR*; or

3> if the last transmission of the *SidelinkUEInformationNR* message did not include *sl-TxResourceReqList*; or if the information carried by the *sl-TxResourceReqList* has changed since the last transmission of the *SidelinkUEInformationNR* message:

4> initiate transmission of the *SidelinkUEInformationNR* message to indicate the NR sidelink communication transmission resources required by the UE in accordance with 5.8.3.3;

2> else:

3> if the last transmission of the *SidelinkUEInformationNR* message included *sl-TxResourceReqList*:

4> initiate transmission of the *SidelinkUEInformationNR* message to indicate it no longer requires NR sidelink communication transmission resources in accordance with 5.8.3.3.

2> if configured by upper layer to receive NR sidelink non-relay discovery messages on the frequency included in *sl-FreqInfoList* in *SIB12* of the PCell including *sl-NonRelayDiscovery*:

3> if the UE did not transmit a *SidelinkUEInformationNR* message since last entering RRC\_CONNECTED state; or

3> if since the last time the UE transmitted a *SidelinkUEInformationNR* message the UE connected to a PCell not providing *SIB12* including *sl-ConfigCommonNR* or connected to a PCell providing *SIB12* but not including *sl-NonRelayDiscovery*; or

3> if the last transmission of the *SidelinkUEInformationNR* message did not include *sl-RxInterestedFreqListDisc*; or if the frequency configured by upper layers to receive NR sidelink discovery messages on has changed since the last transmission of the *SidelinkUEInformationNR* message:

4> initiate transmission of the *SidelinkUEInformationNR* message to indicate the NR sidelink discovery reception frequency of interest in accordance with 5.8.3.3;

2> else:

3> if the last transmission of the *SidelinkUEInformationNR* message included *sl-RxInterestedFreqListDisc*:

4> initiate transmission of the *SidelinkUEInformationNR* message to indicate it is no longer interested in NR sidelink discovery messages reception in accordance with 5.8.3.3;

2> if configured by upper layer to receive NR sidelink L2 U2N relay discovery messages on the frequency included in *sl-FreqInfoList* in *SIB12* of the PCell including *sl-L2U2N-Relay*; or if configured by upper layer to receive NR sidelink L3 U2N relay discovery messages on the frequency included in *sl-FreqInfoList* in *SIB12* of the PCell including *sl-L3U2N-RelayDiscovery*:

3> if the UE did not transmit a *SidelinkUEInformationNR* message since last entering RRC\_CONNECTED state; or

3> if since the last time the UE transmitted a *SidelinkUEInformationNR* message the UE connected to a PCell not providing *SIB12* including *sl-ConfigCommonNR* or connected to a PCell providing *SIB12* but not including *sl-L2U2N-Relay* in case of L2 U2N relay operation or connected to a PCell providing *SIB12* but not including *sl-L3U2N-RelayDiscovery* in case of L3 U2N relay operation; or

3> if the last transmission of the *SidelinkUEInformationNR* message did not include *sl-RxInterestedFreqListDisc*; or if the frequency configured by upper layers to receive NR sidelink discovery messages on has changed since the last transmission of the *SidelinkUEInformationNR* message:

4> if the UE is capable of U2N Relay UE, and if *SIB12* includes *sl-RelayUE-ConfigCommon*, and if the U2N Relay UE threshold conditions as specified in 5.8.14.2 are met; or

4> if the UE is selecting a U2N Relay UE / has a selected U2N Relay UE, and if *SIB12* includes *sl-RemoteUE-ConfigCommon*, and if the U2N Remote UE threshold conditions as specified in 5.8.15.2 are met:

5> initiate transmission of the *SidelinkUEInformationNR* message to indicate the NR sidelink discovery reception frequency of interest in accordance with 5.8.3.3;

2> else:

3> if the last transmission of the *SidelinkUEInformationNR* message included *sl-RxInterestedFreqListDisc*:

4> initiate transmission of the *SidelinkUEInformationNR* message to indicate it is no longer interested in NR sidelink discovery messages reception in accordance with 5.8.3.3;

2> if configured by upper layer to transmit NR sidelink non-relay discovery messages on the frequency included in *sl-FreqInfoList* in *SIB12* of the PCell including *sl-NonRelayDiscovery*:

3> if the UE did not transmit a *SidelinkUEInformationNR* message since last entering RRC\_CONNECTED state; or

3> if since the last time the UE transmitted a *SidelinkUEInformationNR* message the UE connected to a PCell not providing *SIB12* including *sl-ConfigCommonNR* or connected to a PCell providing *SIB12* but not including *sl-NonRelayDiscovery*; or

3> if the last transmission of the *SidelinkUEInformationNR* message did not include *sl-TxResourceReqListDisc*; or if the information carried by the *sl-TxResourceReqListDisc* has changed since the last transmission of the *SidelinkUEInformationNR* message:

4> initiate transmission of the *SidelinkUEInformationNR* message to indicate the NR sidelink non-relay discovery messages resources required by the UE in accordance with 5.8.3.3;

2> else:

3> if the last transmission of the *SidelinkUEInformationNR* message included *sl-TxResourceReqListDisc*:

4> initiate transmission of the *SidelinkUEInformationNR* message to indicate it no longer requires NR sidelink non-relay discovery messages resources in accordance with 5.8.3.3;

2> if configured by upper layer to transmit NR sidelink L2 U2N relay discovery messages on the frequency included in *sl-FreqInfoList* in *SIB12* of the PCell including *sl-L2U2N-Relay*; or if configured by upper layer to transmit NR sidelink L3 U2N relay discovery messages on the frequency included in *sl-FreqInfoList* in *SIB12* of the PCell including *sl-L3U2N-RelayDiscovery*:

3> if the UE did not transmit a *SidelinkUEInformationNR* message since last entering RRC\_CONNECTED state; or

3> if since the last time the UE transmitted a *SidelinkUEInformationNR* message the UE connected to a PCell not providing *SIB12* including *sl-ConfigCommonNR* or connected to a PCell providing *SIB12* but not including *sl-L2U2N-Relay* in case L2 U2N relay operation or connected to a PCell providing *SIB12* but not including *sl-L3U2N-RelayDiscovery* in case of L3 U2N relay operation; or

3> if the last transmission of the *SidelinkUEInformationNR* message did not include *sl-TxResourceReqListDisc*; or if the information carried by the *sl-TxResourceReqListDisc* has changed since the last transmission of the *SidelinkUEInformationNR* message:

4> if the UE is capable of U2N Relay UE, and if *SIB12* includes *sl-RelayUE-ConfigCommon*, and if the U2N Relay UE threshold conditions as specified in 5.8.14.2 are met; or

4> if the UE is selecting a U2N Relay UE / has a selected U2N Relay UE, and if *SIB12* includes *sl-RemoteUE-ConfigCommon*, and if the U2N Remote UE threshold conditions as specified in 5.8.15.2 are met:

5> initiate transmission of the *SidelinkUEInformationNR* message to indicate the NR sidelink relay discovery messages resources required by the UE in accordance with 5.8.3.3;

2> else:

3> if the last transmission of the *SidelinkUEInformationNR* message included *sl-TxResourceReqListDisc*:

4> initiate transmission of the *SidelinkUEInformationNR* message to indicate it no longer requires NR sidelink relay discovery messages resources in accordance with 5.8.3.3;

2> if configured by upper layer to transmit NR sidelink L2 U2N relay communication on the frequency included in *sl-FreqInfoList* in *SIB12* of the PCell including *sl-L2U2N-Relay* or if configured by upper layer to transmit NR sidelink L3 U2N relay communication on the frequency included in *sl-FreqInfoList* in *SIB12* of the PCell including *sl-L3U2N-RelayDiscovery*:

3> if the UE did not transmit a *SidelinkUEInformationNR* message since last entering RRC\_CONNECTED state; or

3> if since the last time the UE transmitted a *SidelinkUEInformationNR* message the UE connected to a PCell not providing *SIB12* including *sl-ConfigCommonNR* or connected to a PCell providing *SIB12* but not including *sl-L2U2N-Relay* in case L2 U2N relay operation or connected to a PCell providing *SIB12* but not including *sl-L3U2N-RelayDiscovery* in case of L3 U2N relay operation; or

3> if the last transmission of the *SidelinkUEInformationNR* message did not include *sl-TxResourceReqL2U2N-Relay*; or if the information carried by the *sl-TxResourceReqL2U2N-Relay* has changed since the last transmission of the *SidelinkUEInformationNR* message:

4> if the UE is capable of U2N Relay UE, and if *SIB12* includes *sl-RelayUE-ConfigCommon*, and if the U2N Relay UE threshold conditions as specified in 5.8.14.2 are met; or

4> if the UE is selecting a U2N Relay UE / has a selected U2N Relay UE, and if *SIB12* includes *sl-RemoteUE-ConfigCommon*, and if the U2N Remote UE threshold conditions as specified in 5.8.15.2 are met:

5> initiate transmission of the *SidelinkUEInformationNR* message to indicate the NR sidelink relay discovery messages resources required by the UE in accordance with 5.8.3.3;

2> else:

3> if the last transmission of the *SidelinkUEInformationNR* message included *sl-TxResourceReqListDisc*:

4> initiate transmission of the *SidelinkUEInformationNR* message to indicate it no longer requires NR sidelink relay discovery messages resources in accordance with 5.8.3.3;

2> if configured by upper layers to perform NR sidelink reception on the frequency included in *sl-FreqInfoList* in *SIB12* of the PCell and if *sl-DRX-ConfigCommonGC-BC* is included in *SIB12-IEs*:

3> if the UE received a sidelink DRX configuration in the *RRCReconfigurationSidelink* message for NR sidelink unicast reception from the associated peer UE and the UE accepted the sidelink DRX configuration:

4> if the UE did not transmit a *SidelinkUEInformationNR* message since last entering RRC\_CONNECTED state; or

4> if since the last time the UE transmitted a *SidelinkUEInformationNR* message the UE connected to a PCell not providing *SIB12* including *sl-DRX-ConfigCommonGC-BC*; or

4> if the last transmission of the *SidelinkUEInformationNR* message did not include *sl-RxDRX-ReportList*; or if the information carried by *sl-RxDRX-ReportList* has changed since the last transmission of the *SidelinkUEInformationNR* message:

5> initiate transmission of the *SidelinkUEInformationNR* message to report the sidelink DRX configuration in accordance with 5.8.3.3;

3> else:

4> if the last transmission of the *SidelinkUEInformationNR* message included *sl-RxDRX-ReportList*:

5> initiate transmission of the *SidelinkUEInformationNR* message to indicate the sidelink DRX configuration is no longer used in accordance with 5.8.3.3;

3> if the UE is performing NR sidelink groupcast or broadcast reception and is interested in a service that sidelink DRX is applied:

4> if the UE did not transmit a *SidelinkUEInformationNR* message since last entering RRC\_CONNECTED state; or

4> if since the last time the UE transmitted a *SidelinkUEInformationNR* message the UE connected to a PCell not providing *SIB12* including *sl-DRX-ConfigCommonGC-BC*; or

4> if the last transmission of the *SidelinkUEInformationNR* message did not include *sl-RxInterestedGC-BC-DestList*; or if the information carried by *sl-RxInterestedGC-BC-DestList* has changed since the last transmission of the *SidelinkUEInformationNR* message:

5> initiate transmission of the *SidelinkUEInformationNR* message to report the Destination Layer-2 ID and QoS profile associated with the service in accordance with 5.8.3.3;

3> else:

4> if the last transmission of the *SidelinkUEInformationNR* message included *sl-RxInterestedGC-BC-DestList*:

5> initiate transmission of the *SidelinkUEInformationNR* message to indicate it is no longer interested in the service that sidelink DRX is applied in accordance with 5.8.3.3;

2> if configured by upper layers to perform NR sidelink transmission on the frequency included in *sl-FreqInfoList* in *SIB12* of the PCell and *if sl-DRX-ConfigCommonGC-BC* is included in *SIB12-IEs* andif the UE is configured with *sl-ScheduledConfig*:

3> if the UE received a sidelink DRX assistance information or a sidelink DRX configuration reject information from the associated peer UE for NR sidelink unicast transmission:

4> initiate transmission of the *SidelinkUEInformationNR* message to report the sidelink DRX assistance information or the sidelink DRX configuration reject information in accordance with 5.8.3.3;

3> if the UE is performing NR sidelink groupcast transmission:

4> initiate transmission of the *SidelinkUEInformationNR* message to report sidelink DRX on/off indication for the corresponding destination in accordance with 5.8.3.3;

#### 5.8.3.3 Actions related to transmission of *SidelinkUEInformationNR* message

The UE shall set the contents of the *SidelinkUEInformationNR* message as follows:

1> if the UE initiates the procedure to indicate it is (no more) interested to receive NR sidelink communication or to request (configuration/ release) of NR sidelink communication transmission resources or to report to the network that a sidelink radio link failure or sidelink RRC reconfiguration failure has been declared or to report to the network the sidelink DRX configuration for NR sidelink unicast reception or to report to the network the sidelink DRX assistance information or the sidelink DRX configuration reject information for NR sidelink unicast transmission or to report to the network the Destination Layer-2 ID and QoS profile associated with its interested services that sidelink DRX is applied for NR sidelink groupcast or broadcast reception or to report to the network the Destination Layer-2 ID and the sidelink DRX on/off indication for the corresponding destination for NR sidelink groupcast transmission or to indicate it is (no more) interested to receive NR sidelink discovery messages or to request (configuration/ release) of NR sidelink discovery messages transmission resources or to request (configuration/ release) of NR sidelink U2N relay communication transmission resources (i.e. UE includes all concerned information, irrespective of what triggered the procedure):

2> if *SIB12* including *sl-ConfigCommonNR* is provided by the PCell:

3> if configured by upper layers to receive NR sidelink communication:

4> include *sl-RxInterestedFreqList* and set it to the frequency for NR sidelink communication reception;

3> if configured by upper layers to transmit non-relay NR sidelink communication:

4> include *sl-TxResourceReqList* and set its fields (if needed) as follows for each destination for which it requests network to assign NR sidelink communication resource:

5> set *sl-DestinationIdentity* to the destination identity configured by upper layer for NR sidelink communication transmission;

5> set *sl-CastType* to the cast type of the associated destination identity configured by the upper layer for the NR sidelink communication transmission;

5> set *sl-RLC-ModeIndication* to include the RLC mode(s) and optionally QoS profile(s) of the sidelink QoS flow(s) of the associated RLC mode(s), if the associated bi-directional sidelink DRB has been established due to the configurationby *RRCReconfigurationSidelink*;

5> set *sl-QoS-InfoList* to include QoS profile(s) of the sidelink QoS flow(s) of the associated destination configured by the upper layer for the NR sidelink communication transmission;

5> set *sl-InterestedFreqList* to indicate the frequency of the associated destination for NR sidelink communication transmission;

5> set *sl-TypeTxSyncList* to the current synchronization reference type used on the associated *sl-InterestedFreqList* for NR sidelink communication transmission.

5> set *sl-CapabilityInformationSidelink* to include *UECapabilityInformationSidelink* message, if any, received from the associated peer UE.

4> if a sidelink radio link failure or a sidelink RRC reconfiguration failure has been declared, according to clauses 5.8.9.3 and 5.8.9.1.8, respectively;

5> include *sl-FailureList* and set its fields as follows for each destination for which it reports the NR sidelink communication failure:

6> set *sl-DestinationIdentity* to the destination identity configured by upper layer for NR sidelink communication transmission;

6> if the sidelink RLF is detected as specified in clause 5.8.9.3:

7> set *sl-Failure* as *rlf* for the associated destination for the NR sidelink communication transmission;

6> else if *RRCReconfigurationFailureSidelink* is received:

7> set *sl-Failure* as *configFailure* for the associated destination for the NR sidelink communication transmission;

3> if *SIB12* including *sl-NonRelayDiscovery* and if configured by upper layers to receive NR sidelink non-relay discovery messages, or if *SIB12* including *sl-L2U2N-Relay* and if configured by upper layers to receive NR sidelink L2 U2N relay discovery messages, or if *SIB12* including *sl-L3U2N-RelayDiscovery* and if configured by upper layers to receive NR sidelink L3 U2N relay discovery messages:

4> include *sl-RxInterestedFreqListDisc* and set it to the frequency for NR sidelink discovery messages reception;

4> if the UE is capable of L2 U2N remote UE:

5> include *sl-SourceIdentityRemoteUE* and set it to the source identity configured by upper layer for NR sidelink L2 U2N relay communication transmission;

3> if *SIB12* including *sl-NonRelayDiscovery* and if configured by upper layers to transmit NR sidelink non-relay discovery messages, or if *SIB12* including *sl-L2U2N-Relay* and if configured by upper layers to transmit NR sidelink L2 U2N relay discovery messages, or if *SIB12* including *sl-L3U2N-RelayDiscovery* and if configured by upper layers to transmit NR sidelink L3 U2N relay discovery messages:

4> include *sl-TxResourceReqListDisc* and set its fields (if needed) as follows for each destination for which it requests network to assign NR sidelink discovery messages resource:

5> set *sl-DestinationIdentityDisc* to the destination identity configured by upper layer for NR sidelink discoverymessages transmission;

5> if the UE is acting as L2 U2N Relay UE:

6> set *sl-SourceIdentityRelayUE* to the source identity configured by upper layer for NR sidelink L2 U2N relay discovery messages transmission;

5> set *sl-CastTypeDisc* to the cast type of the associated destination identity configured by the upper layer for the NR sidelink discovery messages transmission;

5> set *sl-TxInterestedFreqListDisc* to indicate the frequency of the associated destination for NR sidelink discovery messages transmission;

5> set *sl-TypeTxSyncListDisc* to the current synchronization reference type used on the associated *sl-InterestedFreqList* for NR sidelink discovery messages transmission;

5> set *sl-DiscoveryType* to the current discovery type of the associated destination identity configured by the upper layer for NR sidelink discovery messages transmission;

3> if *SIB12* including *sl-L2U2N-Relay* and if configured by upper layers to transmit NR sidelink L2 U2N relay communication and the UE is acting as L2 U2N Relay UE:

4> include *sl-TxResourceReqL2U2N-Relay* in *sl-TxResourceReqListCommRelay* and set its fields (if needed) as follows for each destination for which it requests network to assign NR sidelink L2 U2N relay communication resource:

5> set *sl-DestinationIdentityL2U2N* to the destination identity configured by upper layer for NR sidelink L2 U2N relay communication transmission;

5> set *sl-TxInterestedFreqListL2U2N* to indicate the frequency of the associated destination for NR sidelink L2 U2N relay communication transmission;

5> set *sl-TypeTxSyncListL2U2N* to the current synchronization reference type used on the associated *sl-InterestedFreqListL2U2N* for NR sidelink L2 U2N relay communication transmission;

5> set *sl-LocalID-Request* to request local ID for L2 U2N Remote UE;

5> set *sl-PagingIdentityRemoteUE* to the paging UE ID received from peer L2 U2N Remote UE;

5> set *sl-CapabilityInformationSidelink* to include *UECapabilityInformationSidelink* message, if any, received from peer UE.

4> include *ue-Type* and set it to *relayUE*;

3> if *SIB12* including *sl-L2U2N-Relay* and if configured by upper layers to transmit NR sidelink L2 U2N relay communication and the UE has a selected L2 U2N Relay UE:

4> include *sl-TxResourceReqL2U2N-Relay* in *sl-TxResourceReqListCommRelay* and set its fields (if needed) as follows to request network to assign NR sidelink L2 U2N relay communication resource:

5> set *sl-TxInterestedFreqListL2U2N* to indicate the frequency of the associated destination for NR sidelink L2 U2N relay communication transmission;

5> set *sl-TypeTxSyncListL2U2N* to the current synchronization reference type used on the associated *sl-InterestedFreqListL2U2N* for NR sidelink L2 U2N relay communication transmission;

5> set *sl-CapabilityInformationSidelink* to include *UECapabilityInformationSidelink* message, if any, received from peer UE.

4> include *ue-Type* and set it to *remoteUE*;

3> if *SIB12* including *sl-L3U2N-RelayDiscovery* and if configured by upper layers to transmit NR sidelink L3 U2N relay communication:

4> include *sl-TxResourceReqL3U2N-Relay* in *sl-TxResourceReqListCommRelay* and set its fields (if needed) as follows for each destination for which it requests network to assign NR sidelink L3 U2N relay communication resource:

5> set *sl-DestinationIdentity* to the destination identity configured by upper layer for NR sidelink L3 U2N relay communication transmission;

5> set *sl-CastType* to the cast type of the associated destination identity configured by the upper layer for the NR sidelink L3 U2N relay communication transmission;

5> set *sl-RLC-ModeIndication* to include the RLC mode(s) and optionally QoS profile(s) of the sidelink QoS flow(s) of the associated RLC mode(s), if the associated bi-directional sidelink DRB has been established due to the configurationby *RRCReconfigurationSidelink*;

5> set *sl-QoS-InfoList* to include QoS profile(s) of the sidelink QoS flow(s) of the associated destination configured by the upper layer for the NR sidelink L3 U2N relay communication transmission;

5> set *sl-TxInterestedFreqList* to indicate the frequency of the associated destination for NR sidelink L3 U2N relay communication transmission;

5> set *sl-TypeTxSyncList* to the current synchronization reference type used on the associated *sl-InterestedFreqList* for NR sidelink L3 U2N relay communication transmission.

5> set *sl-CapabilityInformationSidelink* to include *UECapabilityInformationSidelink* message, if any, received from peer UE.

4> include *ue-Type* and set it to *relayUE* if the UE is acting as NR sidelink L3 U2N Relay UE or to *remoteUE* otherwise;

3> if *sl-DRX-ConfigCommonGC-BC* is included in *SIB12-IEs*:

4> if configured by upper layers to perform NR sidelink reception:

5> include *sl-RxDRX-ReportList* and set its fields (if needed) as follows for each destination for which it reports to network:

6> set *sl-DRX-ConfigFromTx* to include the accepted sidelink DRX configuration of the associated destination for NR sidelink unicast communication, if received from the associated peer UE;

5> include *sl-RxInterestedGC-BC-DestList* and set its fields (if needed) as follows for each Destination Layer-2 ID for which it reports to network:

6> set *sl-RxInterestedQoS-InfoList* to include the QoS profile of its interested service(s) that sidelink DRX is applied for the associated destination for NR sidelink groupcast or broadcast reception;

6> set *sl-DestinationIdentity* to the associated destination identity configured by upper layer for NR sidelink groupcast or broadcast reception;

4> if configured by upper layers to perform NR sidelink transmission and configured with *sl-ScheduledConfig*:

5> include *sl-TxResourceReqList* and/or *sl-TxResourceReqListCommRelay* and set its fields (if needed) as follows for each destination for which it reports to network:

6> set *sl-DRX-InfoFromRxList* to include the sidelink DRX assistance information of the associated destination, if any, received from the associated peer UE;

6> if the *RRCReconfigurationCompleteSidelink* message includes the *sl-DRX-ConfigReject*:

7> set *sl-Failure* as *drxReject-v1710* for the associated destination for the NR sidelink communication transmission;

6> set *sl-DRX-Indication* to include the sidelink DRX on/off indication for the associated destination for NR sidelink groupcast transmission;

1> if the UE initiates the procedure while connected to an E-UTRA PCell:

2> submit the *SidelinkUEInformationNR* to lower layers via SRB1, embedded in E-UTRA RRC message *ULInformationTransferIRAT* as specified in TS 36.331 [10], clause 5.6.28;

1> else:

2> submit the *SidelinkUEInformationNR* message to lower layers for transmission.

### 5.8.4 Void

### 5.8.5 Sidelink synchronisation information transmission for NR sidelink communication

#### 5.8.5.1 General



Figure 5.8.5.1-1: Synchronisation information transmission for NR sidelink communication, in (partial) coverage



Figure 5.8.5.1-2: Synchronisation information transmission for NR sidelink communication, out of coverage

The purpose of this procedure is to provide synchronisation information to a UE. This procedure also applies to NR sidelink discovery.

#### 5.8.5.2 Initiation

A UE capable of NR sidelink communication and SLSS/PSBCH transmission shall, when transmitting NR sidelink communication, and if the conditions for NR sidelink communication operation are met and when the following conditions are met:

1> if in coverage on the frequency used for NR sidelink communication, as defined in TS 38.304 [20]; and has selected GNSS or the cell as synchronization reference as defined in 5.8.6.3; or

1> if out of coverage on the frequency used for NR sidelink communication, and the frequency used to transmit NR sidelink communication is included in *sl-FreqInfoToAddModList* in *sl-ConfigDedicatedNR* within *RRCReconfiguration* message or includedin *sl-FreqInfoList* within *SIB12*; and has selected GNSS or the cell as synchronization reference as defined in 5.8.6.3:

2> if in RRC\_CONNECTED; and if *networkControlledSyncTx* is configured and set to *on*; or

2> if *networkControlledSyncTx* is not configured; and for the concerned frequency *syncTxThreshIC* is configured; and the RSRP measurement of the reference cell, selected as defined in 5.8.6.3, for NR sidelink communication transmission is below the value of *syncTxThreshIC*:

3> transmit sidelink SSB on the frequency used for NR sidelink communication in accordance with 5.8.5.3 and TS 38.211 [16], including the transmission of SLSS as specified in 5.8.5.3 and transmission of *MasterInformationBlockSidelink* as specified in 5.8.9.4.3;

1> else:

2> for the frequency used for NR sidelink communication, if *syncTxThreshOoC* is included in *SidelinkPreconfigNR*; and the UE is not directly synchronized to GNSS, and the UE has no selected SyncRef UE or the PSBCH-RSRP measurement result of the selected SyncRef UE is below the value of *syncTxThreshOoC*; or

2> for the frequency used for NR sidelink communication, if the UE selects GNSS as the synchronization reference source:

3> transmit sidelink SSB on the frequency used for NR sidelink communication in accordance with TS 38.211 [16] , including the transmission of SLSS as specified in 5.8.5.3 and transmission of *MasterInformationBlockSidelink* as specified in 5.8.9.4.3;

#### 5.8.5.3 Transmission of SLSS

The UE shall select the SLSSID and the slot in which to transmit SLSS as follows:

1> if triggered by NR sidelink communication and in coverage on the frequency used for NR sidelink communication, as defined in TS 38.304 [20]; or

1> if triggered by NR sidelink communication, and out of coverage on the frequency used for NR sidelink communication, and the concerned frequency is included in *sl-FreqInfoToAddModList* in *sl-ConfigDedicatedNR* within *RRCReconfiguration* message or includedin *sl-FreqInfoList* within *SIB12*:

2> if the UE has selected GNSS as synchronization reference in accordance with 5.8.6.2:

3> select SLSSID 0;

3> use *sl-SSB-TimeAllocation1* included in the entry of configured *sl-SyncConfigList* corresponding to the concerned frequency, that includes *txParameters* and *gnss-Sync*;

3> select the slot(s) indicated by *sl-SSB-TimeAllocation1*;

2> if the UE has selected a cell as synchronization reference in accordance with 5.8.6.2:

3> select the SLSSID included in the entry of configured *sl-SyncConfigList* corresponding to the concerned frequency, that includes *txParameters* and does not include *gnss-Sync*;

3> select the slot(s) indicated by *sl-SSB-TimeAllocation1*;

1> else if triggered by NR sidelink communication and the UE has GNSS as the synchronization reference:

2> select SLSSID 0;

2> if *sl-SSB-TimeAllocation3* is configured for the frequency used in *SidelinkPreconfigNR:*

3> select the slot(s) indicated by *sl-SSB-TimeAllocation3*;

2> else:

3> select the slot(s) indicated by *sl-SSB-TimeAllocation1*;

1> else:

2> select the synchronisation reference UE (i.e. SyncRef UE) as defined in 5.8.6;

2> if the UE has a selected SyncRef UE and *inCoverage* in the *MasterInformationBlockSidelink* message received from this UE is set to *true*; or

2> if the UE has a selected SyncRef UE and *inCoverage* in the *MasterInformationBlockSidelink* message received from this UE is set to *false* while the SLSS from this UE is part of the set defined for out of coverage, see TS 38.211 [16]:

3> select the same SLSSID as the SLSSID of the selected SyncRef UE;

3> select the slot in which to transmit the SLSS according to the *sl-SSB-TimeAllocation1* or *sl-SSB-TimeAllocation2* included in the preconfigured sidelink parameters corresponding to the concerned frequency, such that the timing is different from the SLSS of the selected SyncRef UE;

2> else if the UE has a selected SyncRef UE and the SLSS from this UE was transmitted on the slot(s) indicated *sl-SSB-TimeAllocation3*, whichis configured for the frequency used in *SidelinkPreconfigNR*:

3> select SLSSID 337;

3> select the slot(s) indicated by *sl-SSB-TimeAllocation2*;

2> else if the UE has a selected SyncRef UE:

3> select the SLSSID from the set defined for out of coverage having an index that is 336 more than the index of the SLSSID of the selected SyncRef UE, see TS 38.211 [16];

3> select the slot in which to transmit the SLSS according to *sl-SSB-TimeAllocation1* or *sl-SSB-TimeAllocation2* included in the preconfigured sidelink parameters corresponding to the concerned frequency, such that the timing is different from the SLSS of the selected SyncRef UE;

2> else (i.e. no SyncRef UE selected):

3> if the UE has not randomly selected an SLSSID:

4> randomly select, using a uniform distribution, an SLSSID from the set of sequences defined for out of coverage except SLSSID 336 and 337, see TS 38.211 [16];

4> select the slot in which to transmit the SLSS according to the *sl-SSB-TimeAllocation1* or *sl-SSB-TimeAllocation2* (arbitrary selection between these) included in the preconfigured sidelink parameters in *SidelinkPreconfigNR* corresponding to the concerned frequency;

### 5.8.5a Sidelink synchronisation information transmission for V2X sidelink communication

#### 5.8.5a.1 General



Figure 5.8.5a.1-1: Synchronisation information transmission for V2X sidelink communication, in (partial) coverage



Figure 5.8.5a.1-2: Synchronisation information transmission for V2X sidelink communication, out of coverage

The purpose of this procedure is to provide synchronisation information to a UE.

#### 5.8.5a.2 Initiation

A UE capable of V2X sidelink communication initiates the transmission of SLSS and *MasterInformationBlock-SL-V2X* according to the conditions and the procedures specified for V2X sidelink communication in clause 5.10.7 of TS 36.331 [10].

NOTE 1: When applying the procedure in this clause, *SIB13* and *SIB14* correspond to *SystemInformationBlockType21* and *SystemInformationBlockType26* specified in TS 36.331 [10] respectively

### 5.8.6 Sidelink synchronisation reference

#### 5.8.6.1 General

The purpose of this procedure is to select a synchronisation reference and used when transmitting NR sidelink communication. This procedure also applies to NR sidelink discovery.

#### 5.8.6.2 Selection and reselection of synchronisation reference

The UE shall:

1> if the frequency used for NR sidelink communication is included in *sl-FreqInfoToAddModList* in *sl-ConfigDedicatedNR* within *RRCReconfiguration* message or includedin *sl-ConfigCommonNR* within *SIB12*, and *sl-SyncPriority* is configured for the concerned frequency and set to *gnbEnb*:

2> select a cell as the synchronization reference source as defined in 5.8.6.3:

1> else if the frequency used for NR sidelink communication is included in *sl-FreqInfoToAddModList* in *sl-ConfigDedicatedNR* within *RRCReconfiguration* message or includedin *sl-ConfigCommonNR* within *SIB12*, and *sl-SyncPriority* for the concerned frequency is not configured or is set to *gnss*, and GNSS is reliable in accordance with TS 38.101-1 [15] and TS 38.133 [14]:

2> select GNSS as the synchronization reference source;

1> else if the frequency used for NR sidelink communication is included in *SL-PreconfigurationNR*, and *sl-SyncPriority* in *SidelinkPreconfigNR* is set to *gnss* and GNSS is reliable in accordance with TS 38.101-1 [15] and TS 38.133 [14]:

2> select GNSS as the synchronization reference source;

1> else:

2> perform a full search (i.e. covering all subframes and all possible SLSSIDs) to detect candidate SLSS, in accordance with TS 38.133 [14]

2> when evaluating the one or more detected SLSSIDs, apply layer 3 filtering as specified in 5.5.3.2 using the preconfigured *sl-filterCoefficient*, before using the PSBCH-RSRP measurement results;

2> if the UE has selected a SyncRef UE:

3> if the PSBCH-RSRP of the strongest candidate SyncRef UE exceeds the minimum requirement TS 38.133 [14] by *sl-SyncRefMinHyst* and the strongest candidate SyncRef UE belongs to the same priority group as the current SyncRef UE and the PSBCH-RSRP of the strongest candidate SyncRef UE exceeds the PSBCH-RSRP of the current SyncRef UE by *syncRefDiffHyst*; or

3> if the PSBCH-RSRP of the candidate SyncRef UE exceeds the minimum requirement TS 38.133 [14] by *sl-SyncRefMinHyst* and the candidate SyncRef UE belongs to a higher priority group than the current SyncRef UE; or

3> if GNSS becomes reliable in accordance with TS 38.101-1 [15] and TS 38.133 [14], and GNSS belongs to a higher priority group than the current SyncRef UE; or

3> if a cell is detected and gNB/eNB (if *sl-NbAsSync* is set to *true*) belongs to a higher priority group than the current SyncRef UE; or

3> if the PSBCH-RSRP of the current SyncRef UE is less than the minimum requirement defined in TS 38.133 [14]:

4> consider no SyncRef UE to be selected;

2> if the UE has selected GNSS as the synchronization reference for NR sidelink communication:

3> if the PSBCH-RSRP of the candidate SyncRef UE exceeds the minimum requirement defined in TS 38.133 [14] by *sl-SyncRefMinHyst* and the candidate SyncRef UE belongs to a higher priority group than GNSS; or

3> if GNSS becomes not reliable in accordance with TS 38.101-1 [15] and TS 38.133 [14]:

4> consider GNSS not to be selected;

2> if the UE has selected cell as the synchronization reference for NR sidelink communication:

3> if the PSBCH-RSRP of the candidate SyncRef UE exceeds the minimum requirement defined in TS 38.133 [14] by *sl-SyncRefMinHyst* and the candidate SyncRef UE belongs to a higher priority group than gNB/eNB; or

3> if the selected cell is not detected:

4> consider the cell not to be selected;

2> if the UE has not selected any synchronization reference:

3> if the UE detects one or more SLSSIDs for which the PSBCH-RSRP exceeds the minimum requirement defined in TS 38.133 [14] by *sl-SyncRefMinHyst* and for which the UE received the corresponding *MasterInformationBlockSidelink* message (candidate SyncRef UEs), or if the UE detects GNSS that is reliable in accordance with TS 38.101-1 [15] and TS 38.133 [14], or if the UE detects a cell, select a synchronization reference according to the following priority group order:

4> if *sl-SyncPriority* corresponding to the concerned frequency is set to *gnbEnb*:

5> UEs of which SLSSID is part of the set defined for in coverage, and *inCoverage*, included in the *MasterInformationBlockSidelink* message received from this UE, is set to *true*, starting with the UE with the highest PSBCH-RSRP result (priority group 1);

5> UE of which SLSSID is part of the set defined for in coverage, and *inCoverage*, included in the *MasterInformationBlockSidelink* message received from this UE, is set to *false*, starting with the UE with the highest PSBCH-RSRP result (priority group 2);

5> GNSS that is reliable in accordance with TS 38.101-1 [15] and TS 38.133 [14] (priority group 3);

5> UEs of which SLSSID is 0, and *inCoverage*, included in the *MasterInformationBlockSidelink* message received from this UE, is set to *true,* or of which SLSSID is 0 and SLSS is transmitted on slot(s) indicated by *sl-SSB-TimeAllocation3*, starting with the UE with the highest PSBCH-RSRP result (priority group 4);

5> UEs of which SLSSID is 0 and SLSS is not transmitted on slot(s) indicated by *sl-SSB-TimeAllocation3*, and *inCoverage*, included in the *MasterInformationBlockSidelink* message received from this UE, is set to *false*, starting with the UE with the highest PSBCH-RSRP result (priority group 5);

5> UEs of which SLSSID is 337 and *inCoverage*, included in the *MasterInformationBlockSidelink* message received from this UE, is set to *false*, starting with the UE with the highest PSBCH-RSRP result (priority group 5);

5> Other UEs, starting with the UE with the highest PSBCH-RSRP result (priority group 6);

4> if *sl-SyncPriority* corresponding to the concerned frequency is set to *gnss*, and *sl-NbAsSync* is set to *true:*

5> UEs of which SLSSID is 0, and *inCoverage*, included in the *MasterInformationBlockSidelink* message received from this UE, is set to *true*,or of which SLSSID is 0 and SLSS is transmitted on slot(s) indicated by *sl-SSB-TimeAllocation3*, starting with the UE with the highest PSBCH-RSRP result (priority group 1);

5> UEs of which SLSSID is 0 and SLSS is not transmitted on slot(s) indicated by *sl-SSB-TimeAllocation3*, and *inCoverage*, included in the *MasterInformationBlockSidelink* message received from this UE, is set to *false*, starting with the UE with the highest PSBCHS-RSRP result (priority group 2);

5> UEs of which SLSSID is 337 and *inCoverage*, included in the *MasterInformationBlockSidelink* message received from this UE, is set to *false*, starting with the UE with the highest PSBCH-RSRP result (priority group 2);

5> the cell detected by the UE as defined in 5.8.6.3 (priority group 3);

5> UEs of which SLSSID is part of the set defined for in coverage, and *inCoverage*, included in the *MasterInformationBlockSidelink* message received from this UE, is set to *true*, starting with the UE with the highest PSBCH-RSRP result (priority group 4);

5> UE of which SLSSID is part of the set defined for in coverage, and *inCoverage*, included in the *MasterInformationBlockSidelink* message received from this UE, is set to *false*, starting with the UE with the highest PSBCH-RSRP result (priority group 5);

5> Other UEs, starting with the UE with the highest S-RSRP result (priority group 6);

4> if *sl-SyncPriority* corresponding to the concerned frequency is set to *gnss*, and *sl-NbAsSync* is set to *false:*

5> UEs of which SLSSID is 0, and *inCoverage*, included in the *MasterInformationBlockSidelink* message received from this UE, is set to *true*, or of which SLSSID is 0 and SLSS is transmitted on slot(s) indicated by *sl-SSB-TimeAllocation3*, starting with the UE with the highest PSBCH-RSRP result (priority group 1);

5> UEs of which SLSSID is 0 and SLSS is not transmitted on slot(s) indicated by *sl-SSB-TimeAllocation3*, and *inCoverage*, included in the *MasterInformationBlockSidelink* message received from this UE, is set to *false*, starting with the UE with the highest PSBCHS-RSRP result (priority group 2);

5> UEs of which SLSSID is 337 and *inCoverage*, included in the *MasterInformationBlockSidelink* message received from this UE, is set to *false*, starting with the UE with the highest PSBCH-RSRP result (priority group 2);

5> Other UEs, starting with the UE with the highest PSBCH-RSRP result (priority group 3);

NOTE: How the UE achieves subframe boundary alignment between V2X sidelink communication and NR sidelink communication (if both are performed by the UE) is as specified in TS 38.213, clause 16.7.

#### 5.8.6.3 Sidelink communication transmission reference cell selection

A UE capable of NR sidelink communication that is configured by upper layers to transmit NR sidelink communication shall:

1> for the frequency used to transmit NR sidelink communication, select a cell to be used as reference for synchronization in accordance with the following:

2> if the frequency concerns the primary frequency:

3> use the PCell or the serving cell as reference;

2> else if the frequency concerns a secondary frequency:

3> use the concerned SCell as reference;

2> else if the UE is in coverage of the concerned frequency:

3> use the DL frequency paired with the one used to transmit NR sidelink communication as reference;

2> else (i.e., out of coverage on the concerned frequency):

3> use the PCell or the serving cell as reference, if needed;

### 5.8.7 Sidelink communication reception

A UE capable of NR sidelink communication that is configured by upper layers to receive NR sidelink communication shall:

1> if the conditions for NR sidelink communication operation as defined in 5.8.2 are met:

2> if the frequency used for NR sidelink communication is included in *sl-FreqInfoToAddModList* in *RRCReconfiguration* message or *sl-FreqInfoList* included in *SIB12*:

3> if the UE is configured with *sl-RxPool* included in *RRCReconfiguration* message with *reconfigurationWithSync* (i.e. handover):

4> configure lower layers to monitor sidelink control information and the corresponding data using the pool of resources indicated by *sl-RxPool*;

3> else if the cell chosen for NR sidelink communication provides *SIB12*:

4> configure lower layers to monitor sidelink control information and the corresponding data using the pool of resources indicated by *sl-RxPool in SIB12*;

2> else:

3> configure lower layers to monitor sidelink control information and the corresponding data using the pool of resources that were preconfigured by *sl-RxPool* in *SL-PreconfigurationNR*, asdefined in clause 9.3;

### 5.8.8 Sidelink communication transmission

A UE capable of NR sidelink communication that is configured by upper layers to transmit NR sidelink communication and has related data to be transmitted shall:

1> if the conditions for NR sidelink communication operation as defined in 5.8.2 are met:

2> if the frequency used for NR sidelink communication is included in *sl-FreqInfoToAddModList* in *sl-ConfigDedicatedNR* within *RRCReconfiguration* message or includedin *sl-ConfigCommonNR* within *SIB12*:

3> if the UE is in RRC\_CONNECTED and uses the frequency included in *sl-ConfigDedicatedNR* within *RRCReconfiguration* message:

4> if the UE is configured with *sl-ScheduledConfig*:

5> if T310 for MCG or T311 is running; and if *sl-TxPoolExceptional* is included in *sl-FreqInfoList* for the concerned frequency in *SIB12* or included in *sl-ConfigDedicatedNR* in *RRCReconfiguration*; or

5> if T301 is running and the cell on which the UE initiated RRC connection re-establishment provides *SIB12* including *sl-TxPoolExceptional* for the concerned frequency; or

5> if T304 for MCG is running and the UE is configured with *sl-TxPoolExceptional* included in *sl-ConfigDedicatedNR* for the concerned frequency in *RRCReconfiguration*:

6> configure lower layers to perform the sidelink resource allocation mode 2 based on random selection using the pool of resources indicated by *sl-TxPoolExceptional* as defined in TS 38.321 [3];

5> else:

6> configure lower layers to perform the sidelink resource allocation mode 1 for NR sidelink communication;

5> if T311 is running, configure the lower layers to release the resources indicated by *rrc-ConfiguredSidelinkGrant* (if any);

4> if the UE is configured with *sl-UE-SelectedConfig*:

5> if a result of sensing on the resources configured in *sl-TxPoolSelectedNormal* for the concerned frequency included in *sl-ConfigDedicatedNR* within *RRCReconfiguration* is not available in accordance with TS 38.214 [19];

6> if *sl-TxPoolExceptional* for the concerned frequency is included in *RRCReconfiguration*; or

6> if the PCell provides *SIB12* including *sl-TxPoolExceptional* in *sl-FreqInfoList* for the concerned frequency:

7> configure lower layers to perform the sidelink resource allocation mode 2 based on random selection using the pool of resources indicated by *sl-TxPoolExceptional* as defined in TS 38.321 [3];

5> else, if the *sl-TxPoolSelectedNormal* for the concerned frequency is included in the *sl-ConfigDedicatedNR* within *RRCReconfiguration*:

6> configure lower layers to perform the sidelink resource allocation mode 2 based on resource selection operation according to *sl-AllowedResourceSelectionConfig* (as defined in TS 38.321 [3] and TS 38.214 [19]) using the pools of resources indicated by *sl-TxPoolSelectedNormal* for the concerned frequency;

3> else:

4> if the cell chosen for NR sidelink communication transmission provides *SIB12*:

5> if *SIB12* includes *sl-TxPoolSelectedNormal* for the concerned frequency,and a result of sensing on the resources configured in the *sl-TxPoolSelectedNormal* is available in accordance with TS 38.214 [19]:

6> configure lower layers to perform the sidelink resource allocation mode 2 based on resource selection operation according to *sl-AllowedResourceSelectionConfig* using the pools of resources indicated by *sl-TxPoolSe lectedNormal* for the concerned frequency as defined in TS 38.321 [3];

5> else if *SIB12* includes *sl-TxPoolExceptional* for the concerned frequency:

6> from the moment the UE initiates RRC connection establishment or RRC connection resume, until receiving an *RRCReconfiguration* including *sl-ConfigDedicatedNR*, or receiving an *RRCRelease* or an *RRCReject*; or

6> if a result of sensing on the resources configured in *sl-TxPoolSelectedNormal* for the concerned frequency in *SIB12* is not available in accordance with TS 38.214 [19]:

7> configure lower layers to perform the sidelink resource allocation mode 2 based on random selection (as defined in TS 38.321 [3]) using one of the pools of resources indicated by *sl-TxPoolExceptional* for the concerned frequency;

2> else:

3> configure lower layers to perform the sidelink resource allocation mode 2 based on sensing (as defined in TS 38.321 [3] and TS 38.213 [13]) using the pools of resources indicated by *sl-TxPoolSelectedNormal* in *SidelinkPreconfigNR* for the concerned frequency.

NOTE 1: The UE continues to use resources configured in *rrc-ConfiguredSidelinkGrant* (while T310 is running) until it is released (i.e. until T310 has expired). The UE does not use sidelink configured grant type 2 resources while T310 is running.

NOTE 2: In case of RRC reconfiguration with sync, the UE uses resources configured in *rrc-ConfiguredSidelinkGrant* (while T304 on the MCG is running) if provided by the target cell.

NOTE 3: It is up to UE implementation to determine, in accordance with TS 38.321[3], which resource pool to use if multiple resource pools are configured, and which resource allocation scheme is used in the AS based on UE capability (for a UE in RRC\_IDLE/RRC\_INACTIVE) and the allowed resource schemes *sl-allowedResourceSelectionConfig* in the resource pool configuration.

If configured to perform sidelink resource allocation mode 2, the UE capable of NR sidelink communication that is configured by upper layers to transmit NR sidelink communication shall perform resource selection operation according to *sl-AllowedResourceSelectionConfig* on all pools of resources which may be used for transmission of the sidelink control information and the corresponding data. The pools of resources are indicated by *SidelinkPreconfigNR*, *sl-TxPoolSelectedNormal* in *sl-ConfigDedicatedNR*, or *sl-TxPoolSelectedNormal* in *SIB12* for the concerned frequency, as configured above.

### 5.8.9 Sidelink RRC procedure

#### 5.8.9.1 Sidelink RRC reconfiguration

##### 5.8.9.1.1 General



Figure 5.8.9.1.1-1: Sidelink RRC reconfiguration, successful



Figure 5.8.9.1.1-2: Sidelink RRC reconfiguration, failure

The purpose of this procedure is to modify a PC5-RRC connection, e.g. to establish/modify/release sidelink DRBs or PC5 Relay RLC channels, to (re-)configure NR sidelink measurement and reporting, to (re-)configure sidelink CSI reference signal resources, to (re)configure CSI reporting latency bound, to (re)configure sidelink DRX, and to (re-)configure the latency bound of SL Inter-UE coordination report.

The UE may initiate the sidelink RRC reconfiguration procedure and perform the operation in clause 5.8.9.1.2 on the corresponding PC5-RRC connection in following cases:

- the release of sidelink DRBs associated with the peer UE, as specified in clause 5.8.9.1a.1;

- the establishment of sidelink DRBs associated with the peer UE, as specified in clause 5.8.9.1a.2;

- the modification for the parameters included in *SLRB-Config* of sidelink DRBs associated with the peer UE, as specified in clause 5.8.9.1a.2;

- the release of PC5 Relay RLC channels for L2 U2N Relay UE and Remote UE, as specified in clause 5.8.9.7.1;

- the establishment of PC5 Relay RLC channels for L2 U2N Relay UE and Remote UE, as specified in clause 5.8.9.7.2;

- the modification for the parameters included in *SL-RLC-ChannelConfigPC5* of PC5 Relay RLC channels for L2 U2N Relay UE and Remote UE, as specified in clause 5.8.9.7.2;

- the (re-)configuration of the peer UE to perform NR sidelink measurement and report.

- the (re-)configuration of the sidelink CSI reference signal resources and CSI reporting latency bound;

- the (re-)configuration of the peer UE to perform sidelink DRX;

- the (re-)configuration of the latency bound of SL Inter-UE coordination report.

In RRC\_CONNECTED, the UE applies the NR sidelink communications parameters provided in *RRCReconfiguration* (if any). In RRC\_IDLE or RRC\_INACTIVE, the UE applies the NR sidelink communications parameters provided in system information (if any). For other cases, UEs apply the NR sidelink communications parameters provided in *SidelinkPreconfigNR* (if any). When UE performs state transition between above three cases, the UE applies the NR sidelink communications parameters provided in the new state, after acquisition of the new configurations. Before acquisition of the new configurations, UE continues applying the NR sidelink communications parameters provided in the old state.

##### 5.8.9.1.2 Actions related to transmission of *RRCReconfigurationSidelink* message

The UE shall set the contents of *RRCReconfigurationSidelink* message as follows:

1> for each sidelink DRB that is to be released, according to clause 5.8.9.1a.1.1, due to configuration by *sl-ConfigDedicatedNR,* *SIB12*, *SidelinkPreconfigNR* or by upper layers:

2> set the *SLRB-PC5-ConfigIndex* included in the *slrb-ConfigToReleaseList* corresponding to the sidelink DRB;

1> for each sidelink DRB that is to be established or modified, according to clause 5.8.9.1a.2.1, due to receiving *sl-ConfigDedicatedNR,* *SIB12* or *SidelinkPreconfigNR*:

2> set the *SLRB-Config* included in the *slrb-ConfigToAddModList*, according to the received *sl-RadioBearerConfig* and *sl-RLC-BearerConfig* corresponding to the sidelink DRB;

1> set the *sl-MeasConfig* as follows:

2> If the frequency used for NR sidelink communication is included in *sl-FreqInfoToAddModList* in *sl-ConfigDedicatedNR* within *RRCReconfiguration* message or included in *sl-ConfigCommonNR* within SIB12:

3> if UE is in RRC\_CONNECTED:

4> set the *sl-MeasConfig* according to stored NR sidelink measurement configuration information for this destination;

3> if UE is in RRC\_IDLE or RRC\_INACTIVE:

4> set the *sl-MeasConfig* according to stored NR sidelink measurement configuration received from *SIB12*;

2> else:

3> set the *sl-MeasConfig* according to the *sl-MeasPreconfig* in *SidelinkPreconfigNR*;

1> set the *sl-LatencyBoundIUC-Report;*

1> start timer T400 for the destination;

1> set the *sl-CSI-RS-Config*;

1> set the *sl-LatencyBoundCSI-Report*,

NOTE 1: How to set the parameters included in *sl-CSI-RS-Config* and *sl-LatencyBoundCSI-Report* is up to UE implementation.

1> set the *sl-DRX-ConfigUC-PC5* as follows:

2> If the frequency used for NR sidelink communication is included in *sl-FreqInfoToAddModList* in *sl-ConfigDedicatedNR* within *RRCReconfiguration* message or included in *sl-ConfigCommonNR* within *SIB12*:

3> if UE is in RRC\_CONNECTED and if *sl-ScheduledConfig* is included in *sl-ConfigDedicatedNR* within *RRCReconfiguration*:

4> set the *sl-DRX-ConfigUC-PC5* according to stored NR sidelink DRX configuration information for this destination.

NOTE 2: If UE is in RRC\_IDLE or in RRC\_INACTIVE or out of coverage, or in RRC\_CONNECTED and *sl-UE-SelectedConfig* is included in *sl-ConfigDedicatedNR* within *RRCReconfiguration*, it is up to UE implementation to set the *sl-DRX-ConfigUC-PC5*.

1> for each PC5 Relay RLC channel that is to be released due to configuration by *sl-ConfigDedicatedNR*:

2> set the *SL-RLC-ChannelID* corresponding to the PC5 Relay RLC channel in the *sl-RLC-ChannelToReleaseListPC5*;

1> for each PC5 Relay RLC channel that is to be established or modified due to receiving *sl-ConfigDedicatedNR*:

2> set the *SL-RLC-ChannelConfigPC5* included in the *sl-RLC-ChannelToAddModListPC5*, according to the received *sl-RLC-ChannelConfig* corresponding to the PC5 Relay RLC channel;

The UE shall submit the *RRCReconfigurationSidelink* message to lower layers for transmission.

##### 5.8.9.1.3 Reception of an *RRCReconfigurationSidelink* by the UE

The UE shall perform the following actions upon reception of the *RRCReconfigurationSidelink*:

1> if the *RRCReconfigurationSidelink* includes the *sl-ResetConfig*:

2> perform the sidelink reset configuration procedure as specified in 5.8.9.1.10;

1> if the *RRCReconfigurationSidelink* includes the *slrb-ConfigToReleaseList*:

2> for each *SLRB-PC5-ConfigIndex* value included in the *slrb-ConfigToReleaseList* that is part of the current UE sidelink configuration;

3> perform the sidelink DRB release procedure, according to clause 5.8.9.1a.1;

1> if the *RRCReconfigurationSidelink* includes the *slrb-ConfigToAddModList*:

2> for each *slrb-PC5-ConfigIndex* value included in the *slrb-ConfigToAddModList* that is not part of the current UE sidelink configuration:

3> if *sl-MappedQoS-FlowsToAddList* is included:

4> apply the *SL-PQFI* included in *sl-MappedQoS-FlowsToAddList*;

3> perform the sidelink DRB addition procedure, according to clause 5.8.9.1a.2;

2> for each *slrb-PC5-ConfigIndex* value included in the *slrb-ConfigToAddModList* that is part of the current UE sidelink configuration:

3> if *sl-MappedQoS-FlowsToAddList* is included:

4> add the *SL-PQFI* included in *sl-MappedQoS-FlowsToAddList* to the corresponding sidelink DRB;

3> if *sl-MappedQoS-FlowsToReleaseList* is included:

4> remove the *SL-PQFI* included in *sl-MappedQoS-FlowsToReleaseList* from the corresponding sidelink DRB;

3> if the sidelink DRB release conditions as described in clause 5.8.9.1a.1.1 are met:

4> perform the sidelink DRB release procedure according to clause 5.8.9.1a.1.2;

3> else if the sidelink DRB modification conditions as described in clause 5.8.9.1a.2.1 are met:

4> perform the sidelink DRB modification procedure according to clause 5.8.9.1a.2.2;

1> if the *RRCReconfigurationSidelink* message includes the *sl-MeasConfig*:

2> perform the sidelink measurement configuration procedure as specified in 5.8.10;

1> if the *RRCReconfigurationSidelink* message includes the *sl-CSI-RS-Config*:

2> apply the sidelink CSI-RS configuration;

1> if the *RRCReconfigurationSidelink* message includes the *sl-LatencyBoundCSI-Report*:

2> apply the configured sidelink CSI report latency bound;

1> if the *RRCReconfigurationSidelink* includes the *sl-RLC-ChannelToReleaseListPC5*:

2> for each *SL-RLC-ChannelID* value included in the *sl-RLC-ChannelToReleaseListPC5* that is part of the current UE sidelink configuration;

3> perform the PC5 Relay RLC channel release procedure, according to clause 5.8.9.7.1;

1> if the *RRCReconfigurationSidelink* includes the *sl-RLC-ChannelToAddModListPC5*:

2> for each *sl-RLC-ChannelID-PC5* value included in the *sl-RLC-ChannelToAddModListPC5* that is not part of the current UE sidelink configuration:

3> perform the sidelink RLC channel addition procedure, according to clause 5.8.9.7.2;

2> for each *sl-RLC-ChannelID-PC5* value included in the *sl-RLC-ChannelToAddModListPC5* that is part of the current UE sidelink configuration:

3> perform the PC5 Relay RLC channel modification procedure according to clause 5.8.9.7.2;

1> if the *RRCReconfigurationSidelink* message includes the *sl-DRX-ConfigUC-PC5*, and

1> if the UE accepts the *sl-DRX-ConfigUC-PC5*:

2> configure lower layers to perform sidelink DRX operation according to *sl-DRX-ConfigUC-PC5* for the associated destination as defined in TS 38.321 [3];

1> if the *RRCReconfigurationSidelink* message includes the *sl-LatencyBoundIUC-Report*:

2> apply the configured sidelink IUC report latency bound;

1> if the UE is unable to comply with (part of) the configuration included in the *RRCReconfigurationSidelink* (i.e. sidelink RRC reconfiguration failure):

2> continue using the configuration used prior to the reception of the *RRCReconfigurationSidelink* message;

2> set the content of the *RRCReconfigurationFailureSidelink* message;

3> submit the *RRCReconfigurationFailureSidelink* message to lower layers for transmission;

1> else:

2> set the content of the *RRCReconfigurationCompleteSidelink* message;

3> if the UE rejects the sidelink DRX configuration *sl-DRX-ConfigUC-PC5* received from the peer UE:

4> include the *sl-DRX-ConfigReject* in the *RRCReconfigurationCompleteSidelink* message;

4> consider no sidelink DRX to be applied for the corresponding sidelink unicast communication.

3> submit the *RRCReconfigurationCompleteSidelink* message to lower layers for transmission;

NOTE 1: When the same logical channel is configured with different RLC mode by another UE, the UE handles the case as sidelink RRC reconfiguration failure.

NOTE 2: It is up to the UE whether or not to indicate the rejection to the peer UE for a received sidelink DRX configuration.

##### 5.8.9.1.4 Void

##### 5.8.9.1.5 Void

##### 5.8.9.1.6 Void

##### 5.8.9.1.7 Void

##### 5.8.9.1.8 Reception of an *RRCReconfigurationFailureSidelink* by the UE

The UE shall perform the following actions upon reception of the *RRCReconfigurationFailureSidelink*:

1> stop timer T400 for the destination, if running;

1> continue using the configuration used prior to corresponding *RRCReconfigurationSidelink* message;

1> if UE is in RRC\_CONNECTED:

2> perform the sidelink UE information for NR sidelink communication procedure, as specified in 5.8.3.3 or clause 5.10.15 in TS 36.331 [10];

##### 5.8.9.1.9 Reception of an *RRCReconfigurationCompleteSidelink* by the UE

The UE shall perform the following actions upon reception of the *RRCReconfigurationCompleteSidelink*:

1> stop timer T400 for the destination, if running;

1> consider the configurations in the corresponding *RRCReconfigurationSidelink* message to be applied.

2> if the *RRCReconfigurationCompleteSidelink* message includes the *sl-DRX-ConfigReject:*

3> consider no sidelink DRX to be applied for the corresponding sidelink unicast communication.

5.8.9.1.10 Sidelink reset configuration

The UE shall:

1> release/clear current sidelink radio configuration of this destination received in the *RRCReconfigurationSidelink*;

1> release the sidelink DRBs of this destination, in according to clause 5.8.9.1a.1;

1> reset the sidelink specific MAC of this destination.

NOTE 1: Sidelink radio configuration is not just the resource configuration but may include other configurations included in the *RRCReconfigurationSidelink* message except the sidelink DRBs of this destination.

NOTE 2: After the sidelink DRB release procedure, UE may perform the sidelink DRB addition according to the current sidelink configuration of this destination, received in *sl-ConfigDedicatedNR,* *SIB12* and *SidelinkPreconfigNR*, according to clause 5.8.9.1a.2.

#### 5.8.9.1a Sidelink radio bearer management

##### 5.8.9.1a.1 Sidelink DRB release

5.8.9.1a.1.1 Sidelink DRB release conditions

For NR sidelink communication, a sidelink DRB release is initiated in the following cases:

1> for groupcast, broadcast and unicast, if *slrb-Uu-ConfigIndex* (if any) of the sidelink DRB isincluded in *sl-RadioBearerToReleaseList* in *sl-ConfigDedicatedNR*; or

1> for groupcast and broadcast, if no sidelink QoS flow with data indicated by upper layers is mapped to the sidelink DRB for transmission, which is (re)configured by receiving *SIB1*2 or *SidelinkPreconfigNR*; or

1> for groupcast, broadcast and unicast, if *SL-RLC-BearerConfigIndex* (if any) of the sidelink DRB is included in *sl-RLC-BearerToReleaseList* in *sl-ConfigDedicatedNR*; or

1> for unicast, if no sidelink QoS flow with data indicated by upper layers is mapped to the sidelink DRB for transmission, which is (re)configured by receiving *SIB12* or *SidelinkPreconfigNR*, and if no sidelink QoS flow mapped to the sidelink DRB, which is (re)configured by receiving *RRCReconfigurationSidelink*, has data; or

1> for unicast, if *SLRB-PC5-ConfigIndex* (if any) of the sidelink DRB isincluded in *slrb-ConfigToReleaseList* in *RRCReconfigurationSidelink* or if *sl-ResetConfig* is included in *RRCReconfigurationSidelink*; or

1> for unicast, when the corresponding PC5-RRC connection is released due to sidelink RLF being detected, according to clause 5.8.9.3; or

1> for unicast, when the corresponding PC5-RRC connection is released due to upper layer request according to clause 5.8.9.5.

5.8.9.1a.1.2 Sidelink DRB release operations

For each sidelink DRB, whose sidelink DRB release conditions are met as in clause 5.8.9.1a.1.1, the UE capable of NR sidelink communication that is configured by upper layers to perform NR sidelink communication shall:

1> for groupcast and broadcast; or

1> for unicast, if the sidelink DRB release was triggered after the reception of the *RRCReconfigurationSidelink* message; or

1> for unicast, after receiving the *RRCReconfigurationCompleteSidelink* message, if the sidelink DRB release was triggered due to the configuration received within the *sl-ConfigDedicatedNR,* *SIB12*, *SidelinkPreconfigNR* or indicated by upper layers:

2> release the PDCP entity for NR sidelink communication associated with the sidelink DRB;

2> if SDAP entity for NR sidelink communication associated with this sidelink DRB is configured:

3> indicate the release of the sidelink DRB to the SDAP entity associated with this sidelink DRB (TS 37.324 [24], clause 5.3.3);

2> release SDAP entities for NR sidelink communication, if any, that have no associated sidelink DRB as specified in TS 37.324 [24] clause 5.1.2;

1> for groupcast and broadcast; or

1> for unicast, after receiving the *RRCReconfigurationCompleteSidelink* message, if the sidelink DRB release was triggered due to the configuration received within the *sl-ConfigDedicatedNR*:

2> for each *sl-RLC-BearerConfigIndex* included in the received *sl-RLC-BearerToReleaseList* that is part of the current UE sidelink configuration:

3> release the RLC entity and the corresponding logical channel for NR sidelink communication, associated with the *sl-RLC-BearerConfigIndex*.

1> for unicast, if the sidelink DRB release was triggered due to the reception of the *RRCReconfigurationSidelink* message; or

1> for unicast, after receiving the *RRCReconfigurationCompleteSidelink* message, if the sidelink DRB release was triggered due to the configuration received within the *SIB12*, *SidelinkPreconfigNR* or indicated by upper layers:

2> release the RLC entity and the corresponding logical channel for NR sidelink communication associated with the sidelink DRB;

2> perform the sidelink UE information procedure in clause 5.8.3 for unicast if needed.

1> if the sidelink radio link failure is detected for a specific destination:

2> release the PDCP entity, RLC entity and the logical channel of the sidelink DRB for the specific destination.

##### 5.8.9.1a.2 Sidelink DRB addition/modification

5.8.9.1a.2.1 Sidelink DRB addition/modification conditions

For NR sidelink communication, a sidelink DRB addition is initiated only in the following cases:

1> if any sidelink QoS flow is (re)configured by *sl-ConfigDedicatedNR*, *SIB12*, *SidelinkPreconfigNR* and is to be mapped to one sidelink DRB*,* which is not established; or

1> if any sidelink QoS flow is (re)configured by *RRCReconfigurationSidelink* and isto be mapped to a sidelink DRB, which is not established;

For NR sidelink communication, a sidelink DRB modification is initiated only in the following cases:

1> if any of the sidelink DRB related parameters is changed by *sl-ConfigDedicatedNR*, *SIB12*, *SidelinkPreconfigNR* or *RRCReconfigurationSidelink* for one sidelink DRB*,* which is established;

5.8.9.1a.2.2 Sidelink DRB addition/modification operations

For the sidelink DRB, whose sidelink DRB addition conditions are met as in clause 5.8.9.1a.2.1, the UE capable of NR sidelink communication that is configured by upper layers to perform NR sidelink communication shall:

1> for groupcast and broadcast; or

1> for unicast, if the sidelink DRB addition was trigggered due to the reception of the *RRCReconfigurationSidelink* message; or

1> for unicast, after receiving the *RRCReconfigurationCompleteSidelink* message, if the sidelink DRB addition was triggered due to the configuration received within the *sl-ConfigDedicatedNR,* *SIB12*, *SidelinkPreconfigNR* or indicated by upper layers:

2> if an SDAP entity for NR sidelink communication associated with the destination and the cast type of the sidelink DRB does not exist:

3> establish an SDAP entity for NR sidelink communication as specified in TS 37.324 [24] clause 5.1.1;

2> (re)configure the SDAP entity in accordance with the *sl-SDAP-ConfigPC5* received in the *RRCReconfigurationSidelink* or *sl-SDAP-Config* received in *sl-ConfigDedicatedNR*, *SIB12*, *SidelinkPreconfigNR*, associated with the sidelink DRB;

2> establish a PDCP entity for NR sidelink communication and configure it in accordance with the *sl-PDCP-ConfigPC5* received in the *RRCReconfigurationSidelink* or *sl-PDCP-Config* received in *sl-ConfigDedicatedNR,* *SIB12*, *SidelinkPreconfigNR*, associated with the sidelink DRB;

2> establish a RLC entity for NR sidelink communication and configure it in accordance with the *sl-RLC-ConfigPC5* received in the *RRCReconfigurationSidelink* or *sl-RLC-Config* received in *sl-ConfigDedicatedNR,* *SIB12*, *SidelinkPreconfigNR*, associated with sidelink DRB;

2> if this procedure was due to the reception of a *RRCReconfigurationSidelink* message:

3> configure the MAC entity with a logical channel in accordance with the *sl-MAC-LogicalChannelConfigPC5* received in the *RRCReconfigurationSidelink* associated with the sidelink DRB, and perform the sidelink UE information procedure in clause 5.8.3 for unicast if need;

2> else:

3> configure the MAC entity with a logical channel associated with the sidelink DRB, by assigning a new logical channel identity, in accordance with the *sl-MAC-LogicalChannelConfig* received in the *sl-ConfigDedicatedNR*, *SIB12*, *SidelinkPreconfigNR*.

NOTE 1: When a sidelink DRB addition is due to the configurationby *RRCReconfigurationSidelink*, it is up to UE implementation to select the sidelink DRB configuration as necessary transmitting parameters for the sidelink DRB, from the received *sl-ConfigDedicatedNR* (if in RRC\_CONNECTED), *SIB12* (if in RRC\_IDLE/INACTIVE), *SidelinkPreconfigNR* (if out of coverage) with the same RLC mode as the one configured in *RRCReconfigurationSidelink*.

For the sidelink DRB, whose sidelink DRB modification conditions are met as in clause 5.8.9.1a.2.1, the UE capable of NR sidelink communication that is configured by upper layers to perform NR sidelink communication shall:

1> for groupcast and broadcast; or

1> for unicast, if the sidelink DRB modification was triggered due to the reception of the *RRCReconfigurationSidelink* message; or

1> for unicast, after receiving the *RRCReconfigurationCompleteSidelink* message, if the sidelink DRB modification was triggered due to the configuration received within the *sl-ConfigDedicatedNR,* *SIB12* or *SidelinkPreconfigNR*:

2> reconfigure the SDAP entity of the sidelink DRB, in accordance with the *sl-SDAP-ConfigPC5* received in the *RRCReconfigurationSidelink* or *sl-SDAP-Config* received in *sl-ConfigDedicatedNR,* *SIB12*, *SidelinkPreconfigNR*, if included;

2> reconfigure the PDCP entity of the sidelink DRB, in accordance with the *sl-PDCP-ConfigPC5* received in the *RRCReconfigurationSidelink* or *sl-PDCP-Config* received in *sl-ConfigDedicatedNR,* *SIB12*, *SidelinkPreconfigNR*, if included;

2> reconfigure the RLC entity of the sidelink DRB, in accordance with the *sl-RLC-ConfigPC5* received in the *RRCReconfigurationSidelink* or *sl-RLC-Config* received in *sl-ConfigDedicatedNR,* *SIB12*, *SidelinkPreconfigNR*, if included;

2> reconfigure the logical channel of the sidelink DRB, in accordance with the *sl-MAC-LogicalChannelConfigPC5* received in the *RRCReconfigurationSidelink* or *sl-MAC-LogicalChannelConfig* received in *sl-ConfigDedicatedNR,* *SIB12*, *SidelinkPreconfigNR*, if included.

##### 5.8.9.1a.3 Sidelink SRB release

The UE shall:

1> if a PC5-RRC connection release for a specific destination is requested by upper layers or AS layer; or

1> if the sidelink radio link failure is detected for a specific destination:

2> release the PDCP entity, RLC entity and the logical channel of the sidelink SRB for PC5-RRC message of the specific destination;

2> consider the PC5-RRC connection is released for the destination.

1> if PC5-S transmission for a specific destination is terminated in upper layers:

2> release the PDCP entity, RLC entity and the logical channel of the sidelink SRB(s) for PC5-S message of the specific destination;

1> if discovery transmission for a specific destination is terminated in upper layers:

2> release the PDCP entity, RLC entity and the logical channel of the sidelink SRB4 for discovery message of the specific destination;

##### 5.8.9.1a.4 Sidelink SRB addition

The UE shall:

1> if transmission of PC5-S message for a specific destination is requested by upper layers for sidelink SRB:

2> establish PDCP entity, RLC entity and the logical channel of a sidelink SRB for PC5-S message, as specified in clause 9.1.1.4;

1> if transmission of discovery message for a specific destination is requested by upper layers for sidelink SRB:

2> establish PDCP entity, RLC entity and the logical channel of a sidelink SRB4 for discovery message, as specified in clause 9.1.1.4;

1> if a PC5-RRC connection establishment for a specific destination is indicated by upper layers:

2> establish PDCP entity, RLC entity and the logical channel of a sidelink SRB for PC5-RRC message of the specific destination, as specified in clause 9.1.1.4;

2> consider the PC5-RRC connection is established for the destination.

#### 5.8.9.2 Sidelink UE capability transfer

#### 5.8.9.2.1 General

This clause describes how the UE compiles and transfers its sidelink UE capability information for unicast to the initiating UE.



Figure 5.8.9.2.1-1: Sidelink UE capability transfer

#### 5.8.9.2.2 Initiation

The UE may initiate the sidelink UE capability transfer procedure upon indication from upper layer when it needs (additional) UE radio access capability information.

#### 5.8.9.2.3 Actions related to transmission of the *UECapabilityEnquirySidelink* by the UE

The initiating UE shall set the contents of *UECapabilityEnquirySidelink* message as follows:

1> include in UE radio access capabilities for sidelink within *ue-CapabilityInformationSidelink*, if needed;

NOTE 1: It is up to initiating UE to decide whether *ue-CapabilityInformationSidelink* should be included.

1> set *frequencyBandListFilterSidelink* to include frequency bands for which the peer UE is requested to provide supported bands and band combinations;

NOTE 2: The initiating UE is not allowed to send the *UECapabilityEnquirySidelink* message without including the field *frequencyBandListFilterSidelink.*

1> submit the *UECapabilityEnquirySidelink* message to lower layers for transmission.

#### 5.8.9.2.4 Actions related to reception of the *UECapabilityEnquirySidelink* by the UE

The peer UE shall set the contents of *UECapabilityInformationSidelink* message as follows:

1> include UE radio access capabilities for sidelink within *ue-CapabilityInformationSidelink*;

1> compile a list of "candidate band combinations" only consisting of bands included in *frequencyBandListFilterSidelink*, and prioritized in the order of *frequencyBandListFilterSidelink* (i.e. first include band combinations containing the first-listed band, then include remaining band combinations containing the second-listed band, and so on).

1> include into *supportedBandCombinationListSidelinkNR* as many band combinations as possible from the list of "candidate band combinations", starting from the first entry;

1> include the received *frequencyBandListFilterSidelink* in the field *appliedFreqBandListFilter* of the requested UE capability;

1> submit the *UECapabilityInformationSidelink* message to lower layers for transmission.

NOTE: If the UE cannot include all band combinations due to message size or list size constraints, it is up to UE implementation which band combinations it prioritizes.

#### 5.8.9.3 Sidelink radio link failure related actions

The UE shall:

1> upon indication from sidelink RLC entity that the maximum number of retransmissions for a specific destination has been reached; or

1> upon T400 expiry for a specific destination; or

1> upon indication from MAC entity that the maximum number of consecutive HARQ DTX for a specific destination has been reached; or

1> upon integrity check failure indication from sidelink PDCP entity concerning SL-SRB2 or SL-SRB3 for a specific destination:

2> consider sidelink radio link failure to be detected for this destination;

2> release the DRBs of this destination, according to clause 5.8.9.1a.1;

2> release the SRBs of this destination, according to clause 5.8.9.1a.3;

2> release the PC5 Relay RLC channels of this destination if configured, in according to clause 5.8.9.7.1;

2> discard the NR sidelink communication related configuration of this destination;

2> reset the sidelink specific MAC of this destination;

2> consider the PC5-RRC connection is released for the destination;

2> indicate the release of the PC5-RRC connection to the upper layers for this destination (i.e. PC5 is unavailable);

2> if UE is in RRC\_CONNECTED:

3> if the UE is acting as L2 U2N Remote UE:

4> initiate the RRC connection re-establishment procedure as specified in 5.3.7.

3> else:

4> perform the sidelink UE information for NR sidelink communication procedure, as specified in 5.8.3.3;

NOTE: It is up to UE implementation on whether and how to indicate to upper layers to maintain the keep-alive procedure [55].

#### 5.8.9.4 Sidelink common control information

##### 5.8.9.4.1 General

The sidelink common control information is carried by *MasterInformationBlockSidelink*. The sidelink common control information may change at any transmission, i.e. neither a modification period nor a change notification mechanism is used. This procedure also applies to sidelink discovery.

A UE configured to receive or transmit NR sidelink communication/discovery shall:

1> if the UE has a selected SyncRef UE, as specified in 5.8.6:

2> ensure having a valid version of the *MasterInformationBlockSidelink* message of that SyncRef UE;

##### 5.8.9.4.2 Actions related to reception of *MasterInformationBlockSidelink* message

Upon receiving *MasterInformationBlockSidelink*, the UE shall:

1> apply the values included in the received *MasterInformationBlockSidelink* message.

##### 5.8.9.4.3 Transmission of *MasterInformationBlockSidelink* message

The UE shall set the contents of the *MasterInformationBlockSidelink* message as follows:

1> if in coverage on the frequency used for the NR sidelink communication as defined in TS 38.304 [20].

2> set *inCoverage* to *true*;

2> if *tdd-UL-DL-ConfigurationCommon* is included in the received *SIB1*:

3> set *sl-TDD-Config* to the value representing the same meaning as that is included in *tdd-UL-DL-ConfigurationCommon,* as described in TS 38.213, clause 16.1 [13];

2> else:

3> set *sl-TDD-Config* to the value as specified in TS 38.213 [13], clause 16.1;

2> if *syncInfoReserved* is included in an entry of configured *sl-SyncConfigList* corresponding to the concerned frequency from the received *SIB12:*

3> set *reservedBits* to the value of *syncInfoReserved* in the received *SIB12*;

2> else*:*

3> set all bits in *reservedBits* to 0;

1> else if out of coverage on the frequency used for NR sidelink communication as defined in TS 38.304 [20]; and the concerned frequency is included in *sl-FreqInfoToAddModList* in *RRCReconfiguration* or in *sl-FreqInfoList* within *SIB12*:

2> set *inCoverage* to *true*;

2> set *reservedBits* to the value of the corresponding field included in the preconfigured sidelink parameters (i.e. *sl-PreconfigGeneral* in *SidelinkPreconfigNR* defined in 9.3);

2> set *sl-TDD-Config* to the value representing the same meaning as that is included in the corresponding field included in the preconfigured sidelink parameters (i.e. *sl-PreconfigGeneral* in *SL-PreconfigurationNR* defined in 9.3) as described in TS 38.213, clause 16.1 [13];

1> else if out of coverage on the frequency used for NR sidelink communication as defined in TS 38.304 [20]; and the UE selects GNSS as the synchronization reference and *sl-SSB-TimeAllocation3* is not configured for the frequency used in *SidelinkPreconfigNR*:

2> set *inCoverage* to *true*;

2> set *reservedBits* to the value of the corresponding field included in the preconfigured sidelink parameters (i.e. *sl-PreconfigGeneral* in *SidelinkPreconfigNR* defined in 9.3);

2> set *sl-TDD-Config* to the value representing the same meaning as that is included in the corresponding field included in the preconfigured sidelink parameters (i.e. *sl-PreconfigGeneral* in *SL-PreconfigurationNR* defined in 9.3) as described in TS 38.213, clause 16.1 [13];

1> else if the UE has a selected SyncRef UE (as defined in 5.8.6):

2> set *inCoverage* to *false*;

2> set *sl-TDD-Config* and *reservedBits* to the value of the corresponding field included in the received *MasterInformationBlockSidelink*;

1> else:

2> set *inCoverage* to *false*;

2> set *reservedBits* to the value of the corresponding field included in the preconfigured sidelink parameters (i.e. *sl-PreconfigGeneral* in *SidelinkPreconfigNR* defined in 9.3);

2> set *sl-TDD-Config* to the value representing the same meaning as that is included in the corresponding field included in the preconfigured sidelink parameters (i.e. *sl-PreconfigGeneral* in *SL-PreconfigurationNR* defined in 9.3) as described in TS 38.213, clause 16.1 [13];

1> set *directFrameNumber* and *slotIndex* according to the slot used to transmit the SLSS, as specified in 5.8.5.3;

1> submit the *MasterInformationBlockSidelink* to lower layers for transmission upon which the procedure ends;

#### 5.8.9.5 Actions related to PC5-RRC connection release requested by upper layers or AS layer

The UE initiates the procedure when upper layers request the release of the PC5-RRC connection as specified in TS 24.587 [57] or when AS layer releases the PC5-RRC connection as specified in 5.3.5.5.2, 5.3.5.16.2, 5.3.7.2, and 5.8.9.10.4. The UE shall not initiate the procedure for power saving purposes.

The UE shall:

1> if the PC5-RRC connection release for the specific destination is requested by upper layers:

2> discard the NR sidelink communication related configuration of this destination;

2> release the DRBs of this destination if configured, in according to clause 5.8.9.1a.1;

2> release the SRBs of this destination, in according to clause 5.8.9.1a.3;

2> release the PC5 Relay RLC channels if configured, in according to clause 5.8.9.7.1;

2> reset the sidelink specific MAC of this destination.

2> consider the PC5-RRC connection is released for the destination;

1> if the PC5-RRC connection release is initiated at the AS:

2> indicate the upper layers the PC5-RRC connection is released for the destination;

#### 5.8.9.6 Sidelink UE assistance information

##### 5.8.9.6.1 General



Figure 5.8.9.6.1-1: Sidelink UE assistance information

The purpose of this procedure is for a UE to inform its peer UE of the sidelink DRX assistance information used to determine the sidelink DRX configuration for unicast communication.

For sidelink unicast, a UE may include its desired sidelink DRX configurations in the *UEAssistanceInformationSidelink* as the sidelink DRX assistance information which is transmitted to its peer UE.

NOTE: It is up to UE implementation to determine its desired sidelink DRX configurations for unicast communication.

##### 5.8.9.6.2 Initiation

For sidelink unicast, if both a RX UE and its peer TX UE for a direction of sidelink communication are capable of sidelink DRX, the RX UE that is interested in sending the sidelink DRX assistance information may send the *UEAssistanceInformationSidelink* as the sidelink DRX assistance information to its peer UE when the sidelink DRX assistance information has not been sent previously or when the previously transmitted sidelink DRX assistance information has changed.

##### 5.8.9.6.3 Actions related to reception of *UEAssistanceInformationSidelink* message

For sidelink unicast, when a UE is in RRC\_CONNECTED and is performing sidelink operation with resource allocation mode 1, it may report the sidelink DRX assistance information received within the *UEAssistanceInformationSidelink* from its peer UE to the network as specified in 5.8.3. For sidelink unicast, when a UE is in RRC\_CONNECTED and is performing sidelink operation with resource allocation mode 2 or is in RRC\_IDLE or RRC\_INACTIVE or out of coverage, regardless of whether the UE has obtained the sidelink DRX assistance information from the *UEAssistanceInformationSidelink* transmitted from its peer UE or not, it may determine the sidelink DRX configuration *SL-DRX-ConfigUC* for its peer UE.

NOTE: When UE determines the sidelink DRX configuration for its peer UE, it may take the sidelink DRX assistance information received from its peer UE into account.

5.8.9.7 PC5 Relay RLC channel management for L2 U2N relay

5.8.9.7.1 PC5 Relay RLC channel release

The UE shall:

1> if the PC5 Relay RLC channel release was triggered after the reception of the *RRCReconfigurationSidelink* message; or

1> after receiving the *RRCReconfigurationCompleteSidelink* message, if the PC5 Relay RLC channel release was triggered due to the configuration received within the *sl-ConfigDedicatedNR*:

2> for each *sl-RLC-ChannelID* in *sl-RLC-ChannelToReleaseList* received in *sl-ConfigDedicatedNR* within *RRCReconfiguration* or for each *sl-RLC-ChannelID-PC5* included in the received *sl-RLC-ChannelToReleaseListPC5* that is part of the current UE sidelink configuration:

3> release the RLC entity and the corresponding logical channel associated with the *sl-RLC-ChannelID* or *sl-RLC-ChannelID-PC5*;

5.8.9.7.2 PC5 Relay RLC channel addition/modification

Upon PC5-RRC connection establishment between the L2 U2N Relay UE and L2 U2N Remote UE, the L2 U2N Relay UE shall:

1> apply RLC specified configuration of SL-RLC0 as specified in clause 9.1.1.4:

1> apply RLC default configuration of SL-RLC1 as specified in clause 9.2.4 if the L2 U2N Relay UE is in RRC\_IDLE/INACTIVE state;

The UE shall:

1> if the PC5 Relay RLC channel addition/modification was trigggered due to the reception of the *RRCReconfigurationSidelink* message; or

1> after receiving the *RRCReconfigurationCompleteSidelink* message, if the PC5 Relay RLC channel addition/modification was triggered due to the configuration received within the *sl-ConfigDedicatedNR*:

2> if the current configuration contains a PC5 Relay RLC channel with the received *sl-RLC-ChannelID* or *sl-RLC-ChannelID-PC5*:

3> reconfigure the sidelink RLC entity in accordance with the received *sl-RLC-Config* or *sl-RLC-ConfigPC5*;

3> reconfigure the sidelink MAC entity with a logical channel in accordance with the received *sl-MAC-LogicalChannelConfig* or *sl-MAC-LogicalChannelConfigPC5*;

2> else (a PC5 Relay RLC channel with the received *sl-RLC-ChannelID* or *sl-RLC-ChannelID-PC5* was not configured before):

3> establish a sidelink RLC entity in accordance with the received *sl-RLC-Config* or *sl-RLC-ConfigPC5*;

3> configure the sidelink MAC entity with a logical channel in accordance with the received *sl-MAC-LogicalChannelConfig* or *sl-MAC-LogicalChannelConfigPC5*.

#### 5.8.9.8 Remote UE information

##### 5.8.9.8.1 General



Figure 5.8.9.8.1-1: Remote UE information

This procedure is used by the L2 U2N Remote UE in RRC\_IDLE/RRC\_INACTIVE to inform about the required SIB(s) and provide Paging related information to the connected L2 U2N Relay UE.

NOTE: MIB is not required by a L2 U2N Remote UE.

##### 5.8.9.8.2 Actions related to transmission of *RemoteUEInformationSidelink* message

When entering RRC\_IDLE or RRC\_INACTIVE, or upon change in any of the information in the *RemoteUEInformationSidelink* while in RRC\_IDLE or RRC\_INACTIVE, the L2 U2N Remote UE shall:

1> if the UE has not stored a valid version of a SIB, in accordance with clause 5.2.2.2.1, of one or several required SIB(s) in accordance with clause 5.2.2.1 and the requested SIB has not been indicated in *RemoteUEInformationSidelink* message to the L2 U2N Relay UE before:

2> include *sl-RequestedSI-List* in the *RemoteUEInformationSidelink* to indicate the requested SIB(s);

1> if the UE has not sent *sl-PagingInfo-RemoteUE* in the *RemoteUEInformationSidelink* message to the L2 U2N Relay UE before,set *sl-PagingInfo-RemoteUE* as follows:

2> if the L2 U2N Remote UE is in RRC\_IDLE:

3> include *ng-5G-S-TMSI* in the *sl-PagingIdentityRemoteUE*;

3> if the UE specific DRX cycle is configured by upper layer, set *sl-PagingCycleRemoteUE* to the value of UE specific Uu DRX cycle configured by upper layer*;*

2> else if the L2 U2N Remote UE is in RRC\_INACTIVE:

3> include *ng-5G-S-TMSI* and *fullI-RNTI* in the *sl-PagingIdentityRemoteUE*;

3> if the UE specific DRX cycle is configured by upper layer,

4> set *sl-PagingCycleRemoteUE* to the minimum value of UE specific Uu DRX cycles (configured by upper layer and configured by RRC)*;*

3> else:

4> set *sl-PagingCycleRemoteUE* to the value of UE specific DRX cycle configured by RRC;

1> submit the *RemoteUEInformationSidelink* message to lower layers for transmission;

When entering RRC\_CONNECTED, if L2 U2N remote UE had sent *sl-RequestedSIB-List* and/or *sl-PagingInfo-RemoteUE,* the L2 U2N Remote UE shall:

1> set the *sl-RequestedSIB-List* to the value *release* if requested before;

1> set the *sl-PagingInfo-RemoteUE* to the value *release* if sent before;

1> submit the *RemoteUEInformationSidelink* message to lower layers for transmission;

##### 5.8.9.8.3 Reception of *RemoteUEInformationSidelink* message by the L2 U2N Relay UE

The L2 U2N Relay UE shall:

1> if the *RemoteUEInformationSidelink* includes the *sl-PagingInfo-RemoteUE*:

2> if the UE is in RRC\_CONNECTED on an active BWP with common search space configured including *pagingSearchSpace*; or

2> if the UE is in RRC\_IDLE or RRC\_INACTIVE:

3> if the *sl-PagingInfo-RemoteUE* is set to *setup*:

4> monitor the *Paging* message at the L2 U2N Remote UE's paging occasion calculated according to *sl-PagingIdentityRemoteUE* and *sl-PagingCycleRemoteUE* included in *sl-PagingInfo-RemoteUE*;

3> else (the *sl-PagingInfo-RemoteUE* is set to *release*):

4> stop monitoring the *Paging* message at the L2 U2N Remote UE's paging occasion;

4> release the received paging information in *sl-PagingInfo-RemoteUE*;

2> else (the UE is in RRC\_CONNECTED on an active BWP without *pagingSearchSpace* configured):

3> if the *sl-PagingInfo-RemoteUE* is set to *setup*:

4> include the received *sl-PagingIdentityRemoteUE* in *SidelinkUEInformationNR* message and perform Sidelink UE information transmission in accordance with 5.8.3;

3> else (the *sl-PagingInfo-RemoteUE* is set to *release*):

4> initiate transmission of the *SidelinkUEInformationNR* message to release the *sl-PagingIdentityRemoteUE* in *SidelinkUEInformationNR* message in accordance with 5.8.3;

4> release the received paging information in *sl-PagingInfo-RemoteUE*;

1> if the *RemoteUEInformationSidelink* includes the *sl-RequestedSIB-List*:

2> if the *sl-RequestedSIB-List* is set to *setup*:

3> if the L2 U2N Relay UE has not stored a valid version of SIB(s) indicated in *sl-RequestedSIB-List*:

4> perform acquisition of the system information indicated in *sl-RequestedSIB-List* in accordance with 5.2.2;

3> else:

4> perform the Uu message transfer procedure in accordance with 5.8.9.9;

2> if the *sl-RequestedSIB-List* is set to *release*:

3> release received SIB request in *sl-RequestedSIB-List*.

#### 5.8.9.9 Uu message transfer in sidelink

##### 5.8.9.9.1 General



Figure 5.8.9.9.1-1: Uu message transfer in sidelink

The purpose of this procedure is to transfer *Paging* message and System Information from the L2 U2N Relay UE to the L2 U2N Remote UE in RRC\_IDLE/RRC\_INACTIVE.

##### 5.8.9.9.2 Actions related to transmission of *UuMessageTransferSidelink* message

The L2 U2N Relay UE initiates the Uu message transfer procedure when at least one of the following conditions is met:

1> upon receiving *Paging* message related to the connected L2 U2N Remote UE from network (including *Paging* message within *RRCReconfiguration* message);

1> upon acquisition of the SIB(s) requested by the connected L2 U2N Remote UE (as indicated in *sl-RequestedSIB-List* in the *RemoteUEInformationSidelink*) or upon receiving the updated SIB(s) from network which has been requested by the connected L2 U2N Remote UE;

1> upon unsolicited SIB1 forwarding to the connected L2 U2N Remote UE or upon receiving the updated *SIB1* from network;

The L2 U2N Relay UE shall set the contents of *UuMessageTransferSidelink* message as follows:

1> include *sl-PagingDelivery* if the *Paging* message received from network containing the associated *ue-Identity* of the L2 U2N Remote UE;

1> include *sl-SystemInformationDelivery* if any of the conditions for initiating Uu message transfer procedure related to System Information are met;

1> submit the *UuMessageTransferSidelink* message to lower layers for transmission.

NOTE: The L2 U2N Relay UE may perform unsolicited forwarding of SIB1 to the L2 U2N Remote UE based on UE implementation.

##### 5.8.9.9.3 Reception of the *UuMessageTransferSidelink*

Upon receiving the *UuMessageTransferSidelink* message, the L2 U2N Remote UE shall:

1> if *sl-PagingDelivery* is included:

2> perform the paging reception procedure as specified in clause 5.3.2.3;

1> if *sl-SystemInformationDelivery* and/or *sl-SIB1-Delivery* is included:

2> perform the actions specified in clause 5.2.2.4.

#### 5.8.9.10 Notification Message

##### 5.8.9.10.1 General



Figure 5.8.9.8.1-1: Notification message in sidelink

This procedure is used by a U2N Relay UE to send notification to the connected U2N Remote UE.

##### 5.8.9.10.2 Initiation

The U2N Relay UE may initiate the procedure when one of the following conditions is met:

1> upon Uu RLF as specified in 5.3.10;

1> upon reception of an *RRCReconfiguration* including the *reconfigurationWithSync*;

1> upon cell reselection;

1> upon L2 U2N Relay UE's RRC connection failure including RRC connection reject as specified in 5.3.3.5 and 5.3.13.10, and T300 expiry as specified in 5.3.3.7, and RRC resume failure as specified in 5.3.13.5;

##### 5.8.9.10.3 Actions related to transmission of *NotificationMessageSidelink* message

The U2N Relay UE shall set the indication type as follows:

1> if the UE initiates transmission of the *NotificationMessageSidelink* message due to Uu RLF:

2> set the *indicationType* as *relayUE-Uu-RLF*;

1> else if the UE initiates transmission of the *NotificationMessageSidelink* message due to reconfiguration with sync:

2> set the *indicationType* as *relayUE-HO*;

1> else if the UE initiates transmission of the *NotificationMessageSidelink* message due to cell reselection:

2> set the *indicationType* as *relayUE-CellReselection*;

1> if the UE initiates transmission of the *NotificationMessageSidelink* message due to Uu RRC connection establishment/Resume failure:

2> set the *indicationType* as *relayUE-Uu-RRC-Failure*;

##### 5.8.9.10.4 Actions related to reception of *NotificationMessageSidelink* message

Upon receiving the *NotificationMessageSidelink*, the U2N Remote UE shall:

1> if the *indicationType* is included:

2> if the UE is L2 U2N Remote UE in RRC\_CONNECTED:

3> initiate the RRC connection re-establishment procedure as specified in 5.3.7;

2> else (the UE is L3 U2N Remote UE, or L2 U2N Remote UE in RRC\_IDLE or RRC\_INACTIVE):

3> if the PC5-RRC connection with the U2N Relay UE is determined to be released:

4> perform the PC5-RRC connection release as specified in 5.8.9.5.

3> else:

4> maintain the PC5-RRC connection;

4> if the UE is L2 U2N Remote UE and the *indicationType* is *relayUE-HO or relayUE-CellReselection*:

5> consider cell re-selection occurs;

NOTE: For L3 U2N Remote UE, or L2 U2N Remote UE in RRC\_IDLE or RRC\_INACTIVE, it is up to Remote UE implementation whether to release or keep the PC5 unicast link.

### 5.8.10 Sidelink measurement

#### 5.8.10.1 Introduction

The UE may configure the associated peer UE to perform NR sidelink measurement and report on the corresponding PC5-RRC connection in accordance with the NR sidelink measurement configuration for unicast by *RRCReconfigurationSidelink* message.

The NR sidelink measurement configuration includes the following parameters for a PC5-RRC connection:

**1. NR sidelink measurement objects:** Object(s) on which the associated peer UE shall perform the NR sidelink measurements.

- For NR sidelink measurement, a NR sidelink measurement object indicates the NR sidelink frequency of reference signals to be measured.

**2. NR sidelink reporting configurations:** NR sidelink measurement reporting configuration(s) where there can be one or multiple NR sidelink reporting configurations per NR sidelink measurement object. Each NR sidelink reporting configuration consists of the following:

- Reporting criterion: The criterion that triggers the UE to send a NR sidelink measurement report. This can either be periodical or a single event description.

- RS type: The RS that the UE uses for NR sidelink measurement results. In this release, only DMRS is supported for NR sidelink measurement.

- Reporting format: The quantities that the UE includes in the measurement report. In this release, only RSRP measurement is supported.

**3. NR sidelink measurement identities:** A list of NR sidelink measurement identities where each NR sidelink measurement identity links one NR sidelink measurement object with one NR sidelink reporting configuration. By configuring multiple NR sidelink measurement identities, it is possible to link more than one NR sidelink measurement object to the same NR sidelink reporting configuration, as well as to link more than one NR sidelink reporting configuration to the same NR sidelink measurement object. The NR sidelink measurement identity is also included in the NR sidelink measurement report that triggered the reporting, serving as a reference to the network.

**4. NR sidelink quantity configurations:** The NR sidelink quantity configuration defines the NR sidelink measurement filtering configuration used for all event evaluation and related reporting, and for periodical reporting of that NR sidelink measurement. In each configuration, different filter coefficients can be configured for different NR sidelink measurement quantities.

Both UEs of the PC5-RRC connection maintains a NR sidelink measurement object list, a NR sidelink reporting configuration list, and a NR sidelink measurement identities list according to signalling and procedures in this specification.

#### 5.8.10.2 Sidelink measurement configuration

##### 5.8.10.2.1 General

The UE shall:

1> if the received *sl-MeasConfig* includes the *sl-MeasObjectToRemoveList* in the *RRCReconfigurationSidelink*:

2> perform the sidelink measurement object removal procedure as specified in 5.8.10.2.4;

1> if the received *sl-MeasConfig* includes the *sl-MeasObjectToAddModList* in the *RRCReconfigurationSidelink*:

2> perform the sidelink measurement object addition/modification procedure as specified in 5.8.10.2.5;

1> if the received *sl-MeasConfig* includes the *sl-ReportConfigToRemoveList* in the *RRCReconfigurationSidelink*:

2> perform the sidelink reporting configuration removal procedure as specified in 5.8.10.2.6;

1> if the received *sl-MeasConfig* includes the *sl-ReportConfigToAddModList* in the *RRCReconfigurationSidelink*:

2> perform the sidelink reporting configuration addition/modification procedure as specified in 5.8.10.2.7;

1> if the received *sl-MeasConfig* includes the *sl-QuantityConfig* in the *RRCReconfigurationSidelink*:

2> perform the sidelink quantity configuration procedure as specified in 5.8.10.2.8;

1> if the received *sl-MeasConfig* includes the *sl-MeasIdToRemoveList* in the *RRCReconfigurationSidelink*:

2> perform the sidelink measurement identity removal procedure as specified in 5.8.10.2.2;

1> if the received *sl-MeasConfig* includes the *sl-MeasIdToAddModList* in the *RRCReconfigurationSidelink*:

2> perform the sidelink measurement identity addition/modification procedure as specified in 5.8.10.2.3;

##### 5.8.10.2.2 Sidelink measurement identity removal

The UE shall:

1> for each *sl-MeasId* included in the received *sl-MeasIdToRemoveList* that is part of the current UE configuration in *VarMeasConfigSL*:

2> remove the entry with the matching *sl-MeasId* from the *sl-MeasIdList* within the *VarMeasConfigSL*;

2> remove the NR sidelink measurement reporting entry for this *sl-MeasId* from the *VarMeasReportListSL*, if included;

2> stop the periodical reporting timer and reset the associated information (e.g. *sl-TimeToTrigger*) for this *sl-MeasId*.

NOTE: The UE does not consider the message as erroneous if the *sl-MeasIdToRemoveList* includes any *sl-MeasId* value that is not part of the current UE configuration.

##### 5.8.10.2.3 Sidelink measurement identity addition/modification

The UE shall:

1> for each *sl-MeasId* included in the received *sl-MeasIdToAddModList*:

2> if an entry with the matching *sl-MeasId* exists in the *sl-MeasIdList* within the *VarMeasConfigSL*:

3> replace the entry with the value received for this *sl-MeasId*;

2> else:

3> add a new entry for this *sl-MeasId* within the *VarMeasConfigSL*;

2> remove the measurement reporting entry for this *sl-MeasId* from the *VarMeasReportListSL*, if included;

2> stop the periodical reporting timer and reset the associated information (e.g. *sl-TimeToTrigger*) for this *sl-MeasId*;

##### 5.8.10.2.4 Sidelink measurement object removal

The UE shall:

1> for each sl-MeasObjectId included in the received sl-MeasObjectToRemoveList that is part of sl-MeasObjectList in VarMeasConfigSL:

2> remove the entry with the matching *sl-MeasObjectId* from the *sl-MeasObjectList* within the *VarMeasConfigSL*;

2> remove all *sl-MeasId* associated with this *sl-MeasObjectId* from the *sl-MeasIdList* within the *VarMeasConfigSL*, if any;

2> if a *sl-MeasId* is removed from the *sl-MeasIdList*:

3> remove the measurement reporting entry for this *sl-MeasId* from the *VarMeasReportListSL*, if included;

3> stop the periodical reporting timer and reset the associated information (e.g. *sl-TimeToTrigger*) for this *sl-MeasId*.

NOTE: The UE does not consider the message as erroneous if the *sl-MeasObjectToRemoveList* includes any *sl-MeasObjectId* value that is not part of the current UE configuration.

##### 5.8.10.2.5 Sidelink measurement object addition/modification

The UE shall:

1> for each *sl-MeasObjectId* included in the received *sl-MeasObjectToAddModList*:

2> if an entry with the matching *sl-MeasObjectId* exists in the *sl-MeasObjectList* within the *VarMeasConfigSL*, for this entry:

3> for each *sl-MeasId* associated with this *sl-MeasObjectId* included in the *sl-MeasIdList* within the *VarMeasConfigSL*, if any:

4> remove the measurement reporting entry for this *sl-MeasId* from the *VarMeasReportListSL*, if included;

4> stop the periodical reporting timer and reset the associated information (e.g. *sl-TimeToTrigger*) for this *sl-MeasId*;

3> reconfigure the entry with the value received for this *sl-MeasObject*;

2> else:

3> add a new entry for the received *sl-MeasObject* to the *sl-MeasObjectList* within *VarMeasConfigSL*.

##### 5.8.10.2.6 Sidelink reporting configuration removal

The UE shall:

1> for each *sl-ReportConfigId* included in the received *sl-ReportConfigToRemoveList* that is part of the current UE configuration in *VarMeasConfigSL*:

2> remove the entry with the matching *sl-ReportConfigId* from the *sl-ReportConfigList* within the *VarMeasConfigSL*;

2> remove all *sl-MeasId* associated with the *sl-ReportConfigId* from the *sl-MeasIdList* within the *VarMeasConfigSL*, if any;

2> if a *sl-MeasId* is removed from the *sl-MeasIdList*:

3> remove the measurement reporting entry for this *sl-MeasId* from the *VarMeasReportListSL*, if included;

3> stop the periodical reporting timer and reset the associated information (e.g. *sl-TimeToTrigger*) for this *sl-MeasId*.

NOTE: The UE does not consider the message as erroneous if the *sl-ReportConfigToRemoveList* includes any *sl-ReportConfigId* value that is not part of the current UE configuration.

##### 5.8.10.2.7 Sidelink reporting configuration addition/modification

The UE shall:

1> for each sl-ReportConfigId included in the received sl-ReportConfigToAddModList:

2> if an entry with the matching *sl-ReportConfigId* exists in the *sl-ReportConfigList* within the *VarMeasConfigSL*, for this entry:

3> reconfigure the entry with the value received for this *sl-ReportConfig*;

3> for each *sl-MeasId* associated with this *sl-ReportConfigId* included in the *sl-MeasIdList* within the *VarMeasConfigSL*, if any:

4> remove the measurement reporting entry for this *sl-MeasId* from the *VarMeasReportListSL*, if included;

4> stop the periodical reporting timer and reset the associated information (e.g. *sl-TimeToTrigger*) for this *sl-MeasId*;

2> else:

3> add a new entry for the received *sl-ReportConfig* to the *sl-ReportConfigList* within the *VarMeasConfigSL*.

##### 5.8.10.2.8 Sidelink quantity configuration

The UE shall:

1> for each received *sl-QuantityConfig*:

2> set the corresponding parameter(s) in *sl-QuantityConfig* within *VarMeasConfigSL* to the value of the received *sl-QuantityConfig* parameter(s);

1> for each *sl-MeasId* included in the *sl-MeasIdList* within *VarMeasConfigSL*:

2> remove the measurement reporting entry for this *sl-MeasId* from the *VarMeasReportListSL*, if included;

2> stop the periodical reporting timer and reset the associated information (e.g. *sl-TimeToTrigger*) for this *sl-MeasId*.

#### 5.8.10.3 Performing NR sidelink measurements

##### 5.8.10.3.1 General

A UE shall derive NR sidelink measurement results by measuring one or multiple DMRS associated per PC5-RRC connection as configured by the peer UE associated, as described in 5.8.10.3.2. For all NR sidelink measurement results the UE applies the layer 3 filtering as specified in clause 5.5.3.2, before using the measured results for evaluation of reporting criteria and measurement reporting. In this release, only NR sidelink RSRP can be configured as trigger quantity and reporting quantity.

The UE shall:

1> for each *sl-MeasId* included in the *sl-MeasIdList* within *VarMeasConfigSL*:

2> if the *sl-MeasObject* is associated to NR sidelink and the *sl-RS-Type* is set to *dmrs*:

3> derive the layer 3 filtered NR sidelink measurement result based on DMRS for the trigger quantity and each measurement quantity indicated in *sl-ReportQuantity* using parameters from the associated *sl-MeasObject*, as described in 5.8.10.3.2.

2> perform the evaluation of reporting criteria as specified in 5.8.10.4.

##### 5.8.10.3.2 Derivation of NR sidelink measurement results

The UE may be configured by the peer UE associated to derive NR sidelink RSRP measurement results per PC5-RRC connection associated to the NR sidelink measurement objects based on parameters configured in the *sl-MeasObject* and in the *sl-ReportConfig*.

The UE shall:

1> for each NR sidelink measurement quantity to be derived based on NR sidelink DMRS:

2> derive the corresponding measurement of NR sidelink frequency indicated quantity based on DMRS as described in TS 38.215 [9] in the concerned *sl-MeasObject*;

2> apply layer 3 filtering as described in 5.5.3.2;

#### 5.8.10.4 Sidelink measurement report triggering

##### 5.8.10.4.1 General

The UE shall:

1> for each *sl-MeasId* included in the *sl-MeasIdList* within *VarMeasConfigSL*:

2> if the *sl-ReportType* is set to *sl-EventTriggered* and if the entry condition applicable for this event, i.e. the event corresponding with the *sl-EventId* of the corresponding *sl-ReportConfig* within *VarMeasConfigSL*, is fulfilled for NR sidelink frequency for all NR sidelink measurements after layer 3 filtering taken during *sl-TimeToTrigger* defined for this event within the *VarMeasConfigSL*, while the *VarMeasReportListSL* does not include a NR sidelink measurement reporting entry for this *sl-MeasId* (a first NR sidelink frequency triggers the event):

3> include a NR sidelink measurement reporting entry within the *VarMeasReportListSL* for this *sl-MeasId*;

3> set the *sl-NumberOfReportsSent* defined within the *VarMeasReportListSL* for this *sl-MeasId* to 0;

3> include the concerned NR sidelink frequency in the *sl-FrequencyTriggeredList* defined within the *VarMeasReportListSL* for this *sl-MeasId*;

3> initiate the NR sidelink measurement reporting procedure, as specified in 5.8.10.5;

2> else if the *sl-ReportType* is set to *sl-EventTriggered* and if the entry condition applicable for this event, i.e. the event corresponding with the *sl-EventId* of the corresponding *sl-ReportConfig* within *VarMeasConfigSL*, is fulfilled for NR sidelink frequency not included in the *sl-FrequencyTriggeredList* for all NR sidelink measurements after layer 3 filtering taken during *sl-TimeToTrigger* defined for this event within the *VarMeasConfigSL* (a subsequent NR sidelink frequency triggers the event):

3> set the *sl-NumberOfReportsSent* defined within the *VarMeasReportListSL* for this *sl-MeasId* to 0;

3> include the concerned NR sidelink frequency in the *sl-FrequencyTriggeredList* defined within the *VarMeasReportListSL* for this *sl-MeasId*;

3> initiate the NR sidelink measurement reporting procedure, as specified in 5.8.10.5;

2> else if the *sl-ReportType* is set to *sl-EventTriggered* and if the leaving condition applicable for this event is fulfilled for NR sidelink frequency included in the *sl-FrequencyTriggeredList* defined within the *VarMeasReportListSL* for this *sl-MeasId* for all NR sidelink measurements after layer 3 filtering taken during *sl-TimeToTrigger* defined within the *VarMeasConfigSL* for this event:

3> remove the concerned NR sidelink frequency in the *sl-FrequencyTriggeredList* defined within the *VarMeasReportListSL* for this *sl-MeasId*;

3> if *sl-ReportOnLeave* is set to *true* for the corresponding reporting configuration:

4> initiate the NR sidelink measurement reporting procedure, as specified in 5.8.10.5;

3> if the *sl-FrequencyTriggeredList* defined within the *VarMeasReportListSL* for this *sl-MeasId* is empty:

4> remove the NR sidelink measurement reporting entry within the *VarMeasReportListSL* for this *sl-MeasId*;

4> stop the periodical reporting timer for this *sl-MeasId*, if running;

2> if *sl-ReportType* is set to *sl-Periodical* and if a (first) NR sidelink measurement result is available:

3> include a NR sidelink measurement reporting entry within the *VarMeasReportListSL* for this *sl-MeasId*;

3> set the *sl-NumberOfReportsSent* defined within the *VarMeasReportListSL* for this *sl-MeasId* to 0;

3> initiate the NR sidelink measurement reporting procedure, as specified in 5.8.10.5, immediately after the quantity to be reported becomes available for the NR sidelink frequency:

2> upon expiry of the periodical reporting timer for this *sl-MeasId*:

3> initiate the NR sidelink measurement reporting procedure, as specified in 5.8.10.5.

##### 5.8.10.4.2 Event S1 (Serving becomes better than threshold)

The UE shall:

1> consider the entering condition for this event to be satisfied when condition S1-1, as specified below, is fulfilled;

1> consider the leaving condition for this event to be satisfied when condition S1-2, as specified below, is fulfilled;

1> for this NR sidelink measurement, consider the NR sidelink frequency corresponding to the associated *sl-MeasObject* associated with this event.

Inequality S1-1 (Entering condition)

*Ms – Hys > Thresh*

Inequality S1-2 (Leaving condition)

*Ms + Hys < Thresh*

The variables in the formula are defined as follows:

***Ms*** is the NR sidelink measurement result of the NR sidelink frequency, not taking into account any offsets.

***Hys*** is the hysteresis parameter for this event (i.e. *sl-Hysteresis* as defined within *sl-ReportConfig* for this event).

***Thresh*** is the threshold parameter for this event (i.e. *s1-Threshold* as defined within *sl-ReportConfig* for this event).

***Ms*** is expressed in dBm in case of RSRP.

***Hys*** is expressed in dB.

***Thresh*** is expressed in the same unit as ***Ms***.

##### 5.8.10.4.3 Event S2 (Serving becomes worse than threshold)

The UE shall:

1> consider the entering condition for this event to be satisfied when condition S2-1, as specified below, is fulfilled;

1> consider the leaving condition for this event to be satisfied when condition S2-2, as specified below, is fulfilled;

1> for this NR sidelink measurement, consider the NR sidelink frequency indicated by the *sl-MeasObject* associated to this event.

Inequality S2-1 (Entering condition)

*Ms + Hys < Thresh*

Inequality S2-2 (Leaving condition)

*Ms – Hys > Thresh*

The variables in the formula are defined as follows:

***Ms*** is the NR sidelink measurement result of the NR sidelink frequency, not taking into account any offsets.

***Hys*** is the hysteresis parameter for this event (i.e. *sl-Hysteresis* as defined within *sl-ReportConfig* for this event).

***Thresh*** is the threshold parameter for this event (i.e. *s2-Threshold* as defined within *sl-ReportConfig* for this event).

***Ms*** is expressed in dBm in case of RSRP.

***Hys*** is expressed in dB.

***Thresh*** is expressed in the same unit as ***Ms***.

#### 5.8.10.5 Sidelink measurement reporting

##### 5.8.10.5.1 General



Figure 5.8.10.5.1-1: NR sidelink measurement reporting

The purpose of this procedure is to transfer measurement results from the UE to the peer UE associated.

For the *sl-MeasId* for which the NR sidelink measurement reporting procedure was triggered, the UE shall set the *sl-MeasResults* within the *MeasurementReportSidelink* message as follows:

1> set the *sl-MeasId* to the measurement identity that triggered the NR sidelink measurement reporting;

1> if the *sl-ReportConfig* associated with the *sl-MeasId* that triggered the NR sidelink measurement reporting is set to *sl-EventTriggered* or *sl-Periodical*:

2> set *sl-ResultDMRS* within *sl-MeasResult* to include the NR sidelink DMRS based quantity indicated in the *sl-ReportQuantity* within the concerned *sl-ReportConfig*;

1> increment the *sl-NumberOfReportsSent* as defined within the *VarMeasReportListSSL* for this *sl-MeasId* by 1;

1> stop the periodical reporting timer, if running;

1> if the *sl-NumberOfReportsSent* as defined within the *VarMeasReportListSL* for this *sl-MeasId* is less than the *sl-ReportAmount* as defined within the corresponding *sl-ReportConfig* for this *sl-MeasId*:

2> start the periodical reporting timer with the value of *sl-ReportInterval* as defined within the corresponding *sl-ReportConfig* for this *sl-MeasId*;

1> else:

2> if the *sl-ReportType* is set to *sl-Periodical*:

3> remove the entry within the *VarMeasReportListSL* for this *sl-MeasId*;

3> remove this *sl-MeasId* from the *sl-MeasIdList* within *VarMeasConfigSL*;

1> submit the *MeasurementReportSidelink* message to lower layers for transmission, upon which the procedure ends.

### 5.8.11 Zone identity calculation

The UE shall determine an identity of the zone (i.e. Zone\_id) in which it is located using the following formulae, if *sl-ZoneConfig* is configured:

*x*1= Floor (*x* / *L*) Mod 64;

*y*1= Floor (*y* / *L*) Mod 64;

Zone\_id = *y*1 \* 64 + *x*1.

The parameters in the formulae are defined as follows:

**L** is the value of *sl-ZoneLength* included in *sl-ZoneConfig*;

**x** is the geodesic distance in longitude between UE's current location and geographical coordinates (0, 0) according to WGS84 model [58] and it is expressed in meters;

**y** is the geodesic distance in latitude between UE's current location and geographical coordinates (0, 0) according to WGS84 model [58] and it is expressed in meters.

NOTE: How the calculated zone\_id is used is specified in TS 38.321 [3].

### 5.8.12 DFN derivation from GNSS

When the UE selects GNSS as the synchronization reference source, the DFN, the subframe number within a frame and slot number within a frame used for NR sidelink communication/discovery are derived from the current UTC time, by the following formulae:

*DFN*= Floor (0.1\*(*Tcurrent* –*Tref–OffsetDFN*)) mod 1024

*SubframeNumber*= Floor (*Tcurrent* –*Tref–OffsetDFN*) mod 10

*SlotNumber*= Floor ((*Tcurrent* –Tref–*OffsetDFN*)\*2μ) mod (10\*2μ)

Where:

***Tcurrent*** is the current UTC time obtained from GNSS. This value is expressed in milliseconds;

***Tref*** is the reference UTC time 00:00:00 on Gregorian calendar date 1 January, 1900 (midnight between Thursday, December 31, 1899 and Friday, January 1, 1900). This value is expressed in milliseconds;

***OffsetDFN*** is the value *sl-OffsetDFN* if configured, otherwise it is zero. This value is expressed in milliseconds.

μ=0/1/2/3 corresponding to the 15/30/60/120 kHz of SCS for SL, respectively.

NOTE 1: In case of leap second change event, how UE obtains the scheduled time of leap second change to adjust *Tcurrent* correspondingly is left to UE implementation. How UE handles to avoid the sudden discontinuity of DFN is left to UE implementation.

NOTE 2: Void.

5.8.13 NR sidelink discovery

5.8.13.1 General

The purpose of this procedure is to perform sidelink discovery as specified in TS 23.304 [65].

5.8.13.2 Sidelink discovery monitoring

A UE capable of sidelink discovery that is configured by upper layers to monitor NR sidelink discovery messages shall:

1> if the frequency used for NR sidelink discovery is included in *sl-FreqInfoToAddModList* in *RRCReconfiguration* message and *sl-DiscConfig* is included in *RRCReconfiguration*; or if the frequency used for NR sidelink discovery is includedin *sl-FreqInfoList* included in *SIB12* and *sl-DiscConfigCommon* is included in *SIB12*:

2> if the UE is configured with *sl-DiscRxPool* for NR sidelink discovery reception included in *RRCReconfiguration* message with *reconfigurationWithSync* (i.e. handover):

3> configure lower layers to monitor sidelink control information and the corresponding data using the resource pool indicated by *sl-DiscRxPool* for NR sidelink discovery reception in *RRCReconfiguration*;

2> else if the UE is configured with *sl-RxPool* for NR sidelink discovery reception included in *RRCReconfiguration* message with *reconfigurationWithSync* (i.e. handover):

3> configure lower layers to monitor sidelink control information and the corresponding data using the resource pool indicated by *sl-RxPool* for NR sidelink discovery reception in *RRCReconfiguration*;

2> else if the cell chosen for NR sidelink discovery reception provides *SIB12*:

3> if *sl-DiscRxPool* for NR sidelink is included in *SIB12*:

4> configure lower layers to monitor sidelink control information and the corresponding data using the resource pool indicated by *sl-DiscRxPool* for NR sidelink discovery reception *in SIB12*;

3> else if *sl-RxPool* for NR sidelink is included in *SIB12*:

4> configure lower layers to monitor sidelink control information and the corresponding data using the resource pool indicated by *sl-RxPool* for NR sidelink discovery reception *in SIB12*;

1> else:

2> if out of coverage on the concerned frequency for NR sidelink discovery:

3> if *sl-DiscRxPool* was preconfigured:

4> configure lower layers to monitor sidelink control information and the corresponding data using the resource pool that was preconfigured by *sl-DiscRxPool* for NR sidelink discovery reception in *SL-PreconfigurationNR*, asdefined in clause 9.3;

3> else:

4> configure lower layers to monitor sidelink control information and the corresponding data using the resource pool that was preconfigured by *sl-RxPool* for NR sidelink discovery reception in *SL-PreconfigurationNR*, asdefined in clause 9.3;

NOTE: If *sl-DiscRxPool* and *sl-RxPool* are both include in SIB12 or preconfigured, it is up to UE implementation whether to monitor sidelink control information and the corresponding data using the resource pool indicated by *sl-RxPool* for NR sidelink discovery reception.

5.8.13.3 Sidelink discovery transmission

A UE capable of sidelink discovery that is configured by upper layer to transmit NR sidelink discovery message shall:

1> if the frequency used for NR sidelink discovery is included in *sl-FreqInfoToAddModList* in *sl-ConfigDedicatedNR* within *RRCReconfiguration* message and *sl-DiscConfig* is included in *RRCReconfiguration*; or if the frequency used for NR sidelink discovery is includedin *sl-FreqInfoList* within *SIB12* and *sl-DiscConfigCommon* is included in *SIB12*:

2> if the UE is in RRC\_CONNECTED and uses the frequency included in *sl-ConfigDedicatedNR* within *RRCReconfiguration* message:

3> if the UE is acting as NR sidelink U2N Relay UE, and if the NR sidelink U2N Relay UE threshold conditions as specified in 5.8.14.2 are met based on *sl-RelayUE-Config*; or

3> if the UE is selecting NR sidelink U2N Relay UE / has a selected NR sidelink U2N Relay UE, and if the NR sidelink U2N Remote UE threshold conditions as specified in 5.8.15.2 are met based on *sl-RemoteUE-Config*; or

3> if the UE is performing NR sidelink non-relay discovery:

4> if the UE is configured with *sl-ScheduledConfig*:

5> if T310 for MCG or T311 is running; and if *sl-TxPoolExceptional* is included in *sl-FreqInfoList* for the concerned frequency in *SIB12* or included in *sl-ConfigDedicatedNR* in *RRCReconfiguration*; or

5> if T301 is running and the cell on which the UE initiated RRC connection re-establishment provides *SIB12* including *sl-TxPoolExceptional* for the concerned frequency; or

5> if T304 for MCG is running and the UE is configured with *sl-TxPoolExceptional* included in *sl-ConfigDedicatedNR* for the concerned frequency in *RRCReconfiguration*:

6> configure lower layers to perform the sidelink resource allocation mode 2 based on random selection using the resource pool indicated by *sl-TxPoolExceptional* as defined in TS 38.321 [3];

5> else:

6> configure lower layers to perform the sidelink resource allocation mode 1 using the resource pool indicated by *sl-DiscTxPoolScheduling* or *sl-TxPoolScheduling* for NR sidelink discovery transmission on the concerned frequency in *RRCReconfiguration*;

5> if T311 is running, configure the lower layers to release the resources indicated by *rrc-ConfiguredSidelinkGrant* (if any);

4> if the UE is configured with *sl-UE-SelectedConfig*:

5> if the *sl-DiscTxPoolSelected* for NR sidelink discovery transmission on the concerned frequency is included in the *sl-ConfigDedicatedNR* within *RRCReconfiguration*, and if a result of sensing on the resources configured in *sl-DiscTxPoolSelected* for NR sidelink discovery transmission on the concerned frequency included in *sl-ConfigDedicatedNR* within *RRCReconfiguration* is not available in accordance with TS 38.214 [19]; or

5> if the *sl-DiscTxPoolSelected* for NR sidelink discovery transmission on the concerned frequency is not included in the *sl-ConfigDedicatedNR* within *RRCReconfiguration*, and a result of sensing on the resources configured in *sl-TxPoolSelectedNormal* for NR sidelink discovery transmission on the concerned frequency included in *sl-ConfigDedicatedNR* within *RRCReconfiguration* is not available in accordance with TS 38.214 [19];

6> if *sl-TxPoolExceptional* for the concerned frequency is included in *RRCReconfiguration*; or

6> if the PCell provides *SIB12* including *sl-TxPoolExceptional* in *sl-FreqInfoList* for the concerned frequency:

7> configure lower layers to perform the sidelink resource allocation mode 2 based on random selection using the resource pool indicated by *sl-TxPoolExceptional* as defined in TS 38.321 [3];

5> else, if the *sl-DiscTxPoolSelected* for NR sidelink discovery transmission on the concerned frequency is included in the *sl-ConfigDedicatedNR* within *RRCReconfiguration*:

6> configure lower layers to perform the sidelink resource allocation mode 2 based on sensing (as defined in TS 38.321 [3] and TS 38.214 [19]) using the pools of resources indicated by *sl-DiscTxPoolSelected* for NR sidelink discovery transmission on the concerned frequency in *RRCReconfiguration*;

5> else, if the *sl-TxPoolSelectedNormal* for NR sidelink discovery transmission on the concerned frequency is included in the *sl-ConfigDedicatedNR* within *RRCReconfiguration*:

6> configure lower layers to perform the sidelink resource allocation mode 2 based on sensing (as defined in TS 38.321 [3] and TS 38.214 [19]) using the pools of resources indicated by *sl-TxPoolSelectedNormal* for NR sidelink discovery transmission on the concerned frequency in *RRCReconfiguration*;

2> else if the cell chosen for NR sidelink discovery transmission provides *SIB12*:

3> if the UE is acting as NR sidelink U2N Relay UE and if the NR sidelink U2N Relay UE threshold conditions as specified in 5.8.14.2 are met based on *sl-RelayUE-ConfigCommon* in *SIB12*; or

3> if the UE is selecting NR sidelink U2N Relay UE / has a selected NR sidelink U2N Relay UE and if the NR sidelink U2N Remote UE threshold conditions as specified in 5.8.15.2 are met based on *sl-RemoteUE-ConfigCommon* in *SIB12*; or

3> if the UE is performing NR sidelink non-relay discovery:

4> if *SIB12* includes *sl-DiscTxPoolSelected* or for NR sidelink discovery transmission on the concerned frequency,and a result of sensing on the resources configured in the *sl-DiscTxPoolSelected* or *sl-TxPoolSelectedNormal* for NR sidelink discovery transmission is available in accordance with TS 38.214 [19]:

5> configure lower layers to perform the sidelink resource allocation mode 2 based on sensing using the pools of resources indicated by *sl-DiscTxPoolSelected* for NR sidelink discovery transmission on the concerned frequency in *SIB12* as defined in TS 38.321 [3];

4> else if *SIB12* includes *sl-TxPoolSelectedNormal* for NR sidelink discovery transmission on the concerned frequency,and a result of sensing on the resources configured in the *sl-TxPoolSelectedNormal* for NR sidelink discovery transmission is available in accordance with TS 38.214 [19]:

5> configure lower layers to perform the sidelink resource allocation mode 2 based on sensing using the pools of resources indicated by *sl-TxPoolSelectedNormal* for NR sidelink discovery transmission on the concerned frequency in *SIB12* as defined in TS 38.321 [3];

4> else if *SIB12* includes *sl-TxPoolExceptional* for the concerned frequency:

5> from the moment the UE initiates RRC connection establishment or RRC connection resume, until receiving an *RRCReconfiguration* including *sl-ConfigDedicatedNR*, or receiving an *RRCRelease* or an *RRCReject*; or

5> if a result of sensing on the resources configured in *sl-DiscTxPoolSelected* for NR sidelink discovery transmission on the concerned frequency in *SIB12* is not available in accordance with TS 38.214 [19]; or

5> if *sl-DiscTxPoolSelected* for NR sidelink discovery transmission on the concerned frequency is not included in *SIB12* andif a result of sensing on the resources configured in *sl-TxPoolSelectedNormal* for NR sidelink discovery transmission on the concerned frequency in *SIB12* is not available in accordance with TS 38.214 [19]:

6> configure lower layers to perform the sidelink resource allocation mode 2 based on random selection (as defined in TS 38.321 [3]) using one of the pools of resources indicated by *sl-TxPoolExceptional* for the concerned frequency;

1> else if out of coverage on the concerned frequency for NR sidelink discovery:

2> if the UE is acting as L3 U2N Relay UE and if the NR sidelink U2N Relay UE threshold conditions as specified in 5.8.14.2 are met based on *sl-RelayUE-ConfigCommon* in *SidelinkPreconfigNR*; or

2> if the UE is selecting NR sidelink U2N Relay UE / has a selected NR sidelink U2N Relay UE and if the NR sidelink U2N Remote UE threshold conditions as specified in 5.8.15.2 are met based on *sl-RemoteUE-ConfigCommon* in *SidelinkPreconfigNR*; or

2> if the UE is performing NR sidelink non-relay discovery:

3> configure lower layers to perform the sidelink resource allocation mode 2 based on sensing (as defined in TS 38.321 [3] and TS 38.213 [13]) using the pools of resources indicated in *sl-DiscTxPoolSelected* or *sl-TxPoolSelectedNormal* for NR sidelink discovery transmission on the concerned frequency in *SidelinkPreconfigNR*.

5.8.14 NR sidelink U2N Relay UE operation

5.8.14.1 General

This procedure is used by a UE supporting NR sidelink U2N Relay UE operation configured by upper layers to receive/ transmit NR sidelink discovery messages to evaluate AS layer conditions.

5.8.14.2 NR sidelink U2N Relay UE threshold conditions

A UE capable of NR sidelink U2N Relay UE operation shall:

1> if the threshold conditions specified in this clause were previously not met:

2> if *threshHighRelay* is not configured; or the RSRP measurement of the PCell, or the cell on which the UE camps, is below *threshHighRelay* by *hystMaxRelay* if configured; and

2> if *threshLowRelay* is not configured; or the RSRP measurement of the PCell, or the cell on which the UE camps, is above *threshLowRelay* by *hystMinRelay* if configured:

3> consider the threshold conditions to be met (entry);

1> else:

2> if the RSRP measurement of the PCell, or the cell on which the UE camps, is above *threshHighRelay* if configured; or

2> if the RSRP measurement of the PCell, or the cell on which the UE camps, is below *threshLowRelay* if configured;

3> consider the threshold conditions not to be met (leave);

5.8.15 NR sidelink U2N Remote UE operation

5.8.15.1 General

This procedure is used by a UE supporting NR sidelink U2N Remote UE operation configured by upper layers to receive/ transmit NR sidelink discovery message to evaluate AS layer conditions.

5.8.15.2 NR Sidelink U2N Remote UE threshold conditions

A UE capable of NR sidelink U2N Remote UE operation shall:

1> if the threshold conditions specified in this clause were previously not met:

2> if *threshHighRemote* is not configured; or the RSRP measurement of the PCell, or the cell on which the UE camps, is below *threshHighRemote* by *hystMaxRemote* if configured, or

2> if the UE has no serving cell:

3> consider the threshold conditions to be met (entry);

1> else:

2> if the RSRP measurement of the PCell, or the cell on which the UE camps, is above *threshHighRemote* if configured:

3> consider the threshold conditions not to be met (leave);

5.8.15.3 Selection and reselection of NR sidelink U2N Relay UE

A UE capable of NR sidelink U2N Remote UE operation that is configured by upper layers to search for a NR sidelink U2N Relay UE shall:

1> if the UE has no serving cell; or

1> if the RSRP measurement of the cell on which the UE camps (for L2 and L3 U2N Remote UE in RRC\_IDLE or RRC\_INACTIVE)/ the PCell (for L3 U2N Remote UE in RRC\_CONNECTED) is below *threshHighRemote* within *sl-remoteUE-Config*:

2> if the UE does not have a selected NR sidelink U2N Relay UE; or

2> if the UE has a selected NR sidelink U2N Relay UE, and SL-RSRP of the currently selected NR sidelink U2N Relay UE is available and is below *sl-RSRP-Thresh*; or

2> if the UE has a selected NR sidelink U2N Relay UE, and SL-RSRP of the currently selected NR sidelink U2N Relay UE is not available, and SD-RSRP of the currently selected U2N Relay UE is below *sl-RSRP-Thresh*; or

NOTE 1: U2N Remote UE uses SL-RSRP measurements for relay reselection trigger evaluation when there is data transmission from U2N Relay UE to U2N Remote UE, and it is left to UE implementation whether to use SL-RSRP or SD-RSRP for relay reselection trigger evaluation in case of no data transmission from U2N Relay UE to U2N Remote UE. If SD-RSRP is used, the discovery procedure will be performed between the U2N Remote UE and the selected U2N Relay UE.

2> if the UE has a selected NR sidelink U2N Relay UE, and upper layers indicate not to use the currently selected NR sidelink U2N Relay UE; or

2> if the UE has a selected NR sidelink U2N Relay UE, and upper layers request the release of the PC5-RRC connection or when AS layer releases the PC5-RRC connection with the currently selected U2N Relay UE as specified in clause 5.8.9.5; or

2> if the UE has a selected NR sidelink U2N Relay UE, and sidelink radio link failure is detected on the PC5-RRC connection with the current U2N Relay UE as specified in clause 5.8.9.3:

3> perform NR sidelink discovery procedure as specified in clause 5.8.13 in order to search for candidate NR sidelink U2N Relay UEs;

4> when evaluating the one or more detected NR sidelink U2N Relay UEs, apply layer 3 filtering as specified in 5.5.3.2 across measurements that concern the same U2N Relay UE ID and using the *sl-FilterCoefficientRSRP* in *SystemInformationBlockType12* (if in RRC\_IDLE/INACTIVE), the *sl-FilterCoefficientRSRP* in *sl-ConfigDedicatedNR* (if in RRC\_CONNECTED) or the preconfigured *sl-FilterCoefficientRSRP* as defined in 9.3 (out of coverage), before using the SD-RSRP measurement results;

4> consider a candidate NR sidelink U2N Relay UE for which SD-RSRP exceeds *sl-RSRP-Thresh* by *sl-HystMin* has met the AS criteria;

4> consider one of the available suitable NR sidelink U2N relay UE(s) can be selected;

NOTE 2: A candidate NR sidelink U2N Relay UE which meets all AS layer criteria defined in 5.8.15.3 and higher layer criteria defined in TS 23.304 [65] can be regarded as suitable NR sidelink U2N Relay UE by the NR sidelink U2N Remote UE. If multiple suitable NR sidelink U2N Relay UEs are available, it is up to Remote UE implementation to choose one NR sidelink U2N Relay UE. The details of the interaction with upper layers are up to UE implementation.

NOTE 3: For L2 U2N Remote UEs in RRC\_IDLE/INACTIVE and L3 U2N Remote UEs, the cell (re)selection procedure and relay (re)selection procedure run independently. If both suitable cells and suitable NR sidelink U2N Relay UEs are available, it is up to NR sidelink U2N Remote UE implementation to select either a cell or a NR sidelink U2N Relay UE. Furthermore, L3 U2N Remote UE's selection on both cell and NR sidelink U2N Relay UE is also based on UE implementation.

3> if the UE did not detect any candidate NR sidelink U2N Relay UE for which SD-RSRP exceeds *sl-RSRP-Thresh* by *sl-HystMin*:

4> consider no NR sidelink U2N Relay UE to be selected.

## <<<<<<<<<<<<<<<<Unchanged parts skipped>>>>>>>>>>>>>>>>>>>>>>

## 6.2 RRC messages

### 6.2.1 General message structure

#### *– NR-RRC-Definitions*

This ASN.1 segment is the start of the NR RRC PDU definitions.

-- ASN1START

-- TAG-NR-RRC-DEFINITIONS-START

NR-RRC-Definitions DEFINITIONS AUTOMATIC TAGS ::=

BEGIN

-- TAG-NR-RRC-DEFINITIONS-STOP

-- ASN1STOP

#### *– BCCH-BCH-Message*

The *BCCH-BCH-Message* class is the set of RRC messages that may be sent from the network to the UE via BCH on the BCCH logical channel.

-- ASN1START

-- TAG-BCCH-BCH-MESSAGE-START

BCCH-BCH-Message ::= SEQUENCE {

message BCCH-BCH-MessageType

}

BCCH-BCH-MessageType ::= CHOICE {

mib MIB,

messageClassExtension SEQUENCE {}

}

-- TAG-BCCH-BCH-MESSAGE-STOP

-- ASN1STOP

#### *– BCCH-DL-SCH-Message*

The *BCCH-DL-SCH-Message* class is the set of RRC messages that may be sent from the network to the UE via DL-SCH on the BCCH logical channel.

-- ASN1START

-- TAG-BCCH-DL-SCH-MESSAGE-START

BCCH-DL-SCH-Message ::= SEQUENCE {

message BCCH-DL-SCH-MessageType

}

BCCH-DL-SCH-MessageType ::= CHOICE {

c1 CHOICE {

systemInformation SystemInformation,

systemInformationBlockType1 SIB1

},

messageClassExtension SEQUENCE {}

}

-- TAG-BCCH-DL-SCH-MESSAGE-STOP

-- ASN1STOP

#### – *DL-CCCH-Message*

The *DL-CCCH-Message* class is the set of RRC messages that may be sent from the Network to the UE on the downlink CCCH logical channel.

-- ASN1START

-- TAG-DL-CCCH-MESSAGE-START

DL-CCCH-Message ::= SEQUENCE {

message DL-CCCH-MessageType

}

DL-CCCH-MessageType ::= CHOICE {

c1 CHOICE {

rrcReject RRCReject,

rrcSetup RRCSetup,

spare2 NULL,

spare1 NULL

},

messageClassExtension SEQUENCE {}

}

-- TAG-DL-CCCH-MESSAGE-STOP

-- ASN1STOP

#### *– DL-DCCH-Message*

The *DL-DCCH-Message* class is the set of RRC messages that may be sent from the network to the UE on the downlink DCCH logical channel.

-- ASN1START

-- TAG-DL-DCCH-MESSAGE-START

DL-DCCH-Message ::= SEQUENCE {

message DL-DCCH-MessageType

}

DL-DCCH-MessageType ::= CHOICE {

c1 CHOICE {

rrcReconfiguration RRCReconfiguration,

rrcResume RRCResume,

rrcRelease RRCRelease,

rrcReestablishment RRCReestablishment,

securityModeCommand SecurityModeCommand,

dlInformationTransfer DLInformationTransfer,

ueCapabilityEnquiry UECapabilityEnquiry,

counterCheck CounterCheck,

mobilityFromNRCommand MobilityFromNRCommand,

dlDedicatedMessageSegment-r16 DLDedicatedMessageSegment-r16,

ueInformationRequest-r16 UEInformationRequest-r16,

dlInformationTransferMRDC-r16 DLInformationTransferMRDC-r16,

loggedMeasurementConfiguration-r16 LoggedMeasurementConfiguration-r16,

spare3 NULL, spare2 NULL, spare1 NULL

},

messageClassExtension SEQUENCE {}

}

-- TAG-DL-DCCH-MESSAGE-STOP

-- ASN1STOP

#### *– MCCH-Message*

The *MCCH-Message* class is the set of RRC messages that may be sent from the network to the UE on the MCCH logical channel.

-- ASN1START

-- TAG-MCCH-MESSAGE-START

MCCH-Message-r17 ::= SEQUENCE {

message MCCH-MessageType-r17

}

MCCH-MessageType-r17 ::= CHOICE {

c1 CHOICE {

mbsBroadcastConfiguration-r17 MBSBroadcastConfiguration-r17,

spare1 NULL

},

messageClassExtension SEQUENCE {}

}

-- TAG-MCCH-MESSAGE-STOP

-- ASN1STOP

#### *– PCCH-Message*

The *PCCH-Message* class is the set of RRC messages that may be sent from the Network to the UE on the PCCH logical channel.

-- ASN1START

-- TAG-PCCH-PCH-MESSAGE-START

PCCH-Message ::= SEQUENCE {

message PCCH-MessageType

}

PCCH-MessageType ::= CHOICE {

c1 CHOICE {

paging Paging,

spare1 NULL

},

messageClassExtension SEQUENCE {}

}

-- TAG-PCCH-PCH-MESSAGE-STOP

-- ASN1STOP

#### – *UL-CCCH-Message*

The *UL-CCCH-Message* class is the set of 48-bits RRC messages that may be sent from the UE to the Network on the uplink CCCH logical channel.

-- ASN1START

-- TAG-UL-CCCH-MESSAGE-START

UL-CCCH-Message ::= SEQUENCE {

message UL-CCCH-MessageType

}

UL-CCCH-MessageType ::= CHOICE {

c1 CHOICE {

rrcSetupRequest RRCSetupRequest,

rrcResumeRequest RRCResumeRequest,

rrcReestablishmentRequest RRCReestablishmentRequest,

rrcSystemInfoRequest RRCSystemInfoRequest

},

messageClassExtension SEQUENCE {}

}

-- TAG-UL-CCCH-MESSAGE-STOP

-- ASN1STOP

#### *– UL-CCCH1-Message*

The *UL-CCCH1-Message* class is the set of 64-bits RRC messages that may be sent from the UE to the Network on the uplink CCCH1 logical channel.

-- ASN1START

-- TAG-UL-CCCH1-MESSAGE-START

UL-CCCH1-Message ::= SEQUENCE {

message UL-CCCH1-MessageType

}

UL-CCCH1-MessageType ::= CHOICE {

c1 CHOICE {

rrcResumeRequest1 RRCResumeRequest1,

spare3 NULL,

spare2 NULL,

spare1 NULL

},

messageClassExtension SEQUENCE {}

}

-- TAG-UL-CCCH1-MESSAGE-STOP

-- ASN1STOP

#### *– UL-DCCH-Message*

The *UL-DCCH-Message* class is the set of RRC messages that may be sent from the UE to the network on the uplink DCCH logical channel.

-- ASN1START

-- TAG-UL-DCCH-MESSAGE-START

UL-DCCH-Message ::= SEQUENCE {

message UL-DCCH-MessageType

}

UL-DCCH-MessageType ::= CHOICE {

c1 CHOICE {

measurementReport MeasurementReport,

rrcReconfigurationComplete RRCReconfigurationComplete,

rrcSetupComplete RRCSetupComplete,

rrcReestablishmentComplete RRCReestablishmentComplete,

rrcResumeComplete RRCResumeComplete,

securityModeComplete SecurityModeComplete,

securityModeFailure SecurityModeFailure,

ulInformationTransfer ULInformationTransfer,

locationMeasurementIndication LocationMeasurementIndication,

ueCapabilityInformation UECapabilityInformation,

counterCheckResponse CounterCheckResponse,

ueAssistanceInformation UEAssistanceInformation,

failureInformation FailureInformation,

ulInformationTransferMRDC ULInformationTransferMRDC,

scgFailureInformation SCGFailureInformation,

scgFailureInformationEUTRA SCGFailureInformationEUTRA

},

messageClassExtension CHOICE {

c2 CHOICE {

ulDedicatedMessageSegment-r16 ULDedicatedMessageSegment-r16,

dedicatedSIBRequest-r16 DedicatedSIBRequest-r16,

mcgFailureInformation-r16 MCGFailureInformation-r16,

ueInformationResponse-r16 UEInformationResponse-r16,

sidelinkUEInformationNR-r16 SidelinkUEInformationNR-r16,

ulInformationTransferIRAT-r16 ULInformationTransferIRAT-r16,

iabOtherInformation-r16 IABOtherInformation-r16,

mbsInterestIndication-r17 MBSInterestIndication-r17,

uePositioningAssistanceInfo-r17 UEPositioningAssistanceInfo-r17,

measurementReportAppLayer-r17 MeasurementReportAppLayer-r17,

spare6 NULL, spare5 NULL, spare4 NULL, spare3 NULL, spare2 NULL, spare1 NULL

},

messageClassExtensionFuture-r16 SEQUENCE {}

}

}

-- TAG-UL-DCCH-MESSAGE-STOP

-- ASN1STOP

### 6.2.2 Message definitions

#### – *CounterCheck*

The *CounterCheck* message is used by the network to indicate the current COUNT MSB values associated to each DRB and to request the UE to compare these to its COUNT MSB values and to report the comparison results to the network.

Signalling radio bearer: SRB1

RLC-SAP: AM

Logical channel: DCCH

Direction: Network to UE

*CounterCheck message*

-- ASN1START

-- TAG-COUNTERCHECK-START

CounterCheck ::= SEQUENCE {

rrc-TransactionIdentifier RRC-TransactionIdentifier,

criticalExtensions CHOICE {

counterCheck CounterCheck-IEs,

criticalExtensionsFuture SEQUENCE {}

}

}

CounterCheck-IEs ::= SEQUENCE {

drb-CountMSB-InfoList DRB-CountMSB-InfoList,

lateNonCriticalExtension OCTET STRING OPTIONAL,

nonCriticalExtension SEQUENCE {} OPTIONAL

}

DRB-CountMSB-InfoList ::= SEQUENCE (SIZE (1..maxDRB)) OF DRB-CountMSB-Info

DRB-CountMSB-Info ::= SEQUENCE {

drb-Identity DRB-Identity,

countMSB-Uplink INTEGER(0..33554431),

countMSB-Downlink INTEGER(0..33554431)

}

-- TAG-COUNTERCHECK-STOP

-- ASN1STOP

|  |
| --- |
| *CounterCheck-IEs* field descriptions |
| ***drb-CountMSB-InfoList***  Indicates the MSBs of the COUNT values of the DRBs. |

|  |
| --- |
| *DRB-CountMSB-Info* field descriptions |
| ***countMSB-Downlink***  Indicates the value of 25 MSBs from RX\_NEXT – 1 (specified in TS 38.323 [5]) associated to this DRB. |
| ***countMSB-Uplink***  Indicates the value of 25 MSBs from TX\_NEXT – 1 (specified in TS 38.323 [5]) associated to this DRB. |

#### – *CounterCheckResponse*

The *CounterCheckResponse* message is used by the UE to respond to a *CounterCheck* message.

Signalling radio bearer: SRB1

RLC-SAP: AM

Logical channel: DCCH

Direction: UE to Network

*CounterCheckResponse message*

-- ASN1START

-- TAG-COUNTERCHECKRESPONSE-START

CounterCheckResponse ::= SEQUENCE {

rrc-TransactionIdentifier RRC-TransactionIdentifier,

criticalExtensions CHOICE {

counterCheckResponse CounterCheckResponse-IEs,

criticalExtensionsFuture SEQUENCE {}

}

}

CounterCheckResponse-IEs ::= SEQUENCE {

drb-CountInfoList DRB-CountInfoList,

lateNonCriticalExtension OCTET STRING OPTIONAL,

nonCriticalExtension SEQUENCE {} OPTIONAL

}

DRB-CountInfoList ::= SEQUENCE (SIZE (0..maxDRB)) OF DRB-CountInfo

DRB-CountInfo ::= SEQUENCE {

drb-Identity DRB-Identity,

count-Uplink INTEGER(0..4294967295),

count-Downlink INTEGER(0..4294967295)

}

-- TAG-COUNTERCHECKRESPONSE-STOP

-- ASN1STOP

|  |
| --- |
| *CounterCheckResponse-IEs* field descriptions |
| ***drb-CountInfoList***  Indicates the COUNT values of the DRBs. |

|  |
| --- |
| *DRB-CountInfo* field descriptions |
| ***count-Downlink***  Indicates the value of RX\_NEXT – 1 (specified in TS 38.323 [5]) associated to this DRB. |
| ***count-Uplink***  Indicates the value of TX\_NEXT – 1 (specified in TS 38.323 [5]) associated to this DRB. |

#### – *DedicatedSIBRequest*

The *DedicatedSIBRequest* message is used to request SIB(s) required by the UE in RRC\_CONNECTED as specified in clause 5.2.2.3.5.

Signalling radio bearer: SRB1

RLC-SAP: AM

Logical channel: DCCH

Direction: UE to Network

*DedicatedSIBRequest message*

-- ASN1START

-- TAG-DEDICATEDSIBREQUEST-START

DedicatedSIBRequest-r16 ::= SEQUENCE {

criticalExtensions CHOICE {

dedicatedSIBRequest-r16 DedicatedSIBRequest-r16-IEs,

criticalExtensionsFuture SEQUENCE {}

}

}

DedicatedSIBRequest-r16-IEs ::= SEQUENCE {

onDemandSIB-RequestList-r16 SEQUENCE {

requestedSIB-List-r16 SEQUENCE (SIZE (1..maxOnDemandSIB-r16)) OF SIB-ReqInfo-r16 OPTIONAL,

requestedPosSIB-List-r16 SEQUENCE (SIZE (1..maxOnDemandPosSIB-r16)) OF PosSIB-ReqInfo-r16 OPTIONAL

} OPTIONAL,

lateNonCriticalExtension OCTET STRING OPTIONAL,

nonCriticalExtension SEQUENCE {} OPTIONAL

}

SIB-ReqInfo-r16 ::= ENUMERATED { sib12, sib13, sib14, sib20-v1700, sib21-v1700, spare3, spare2, spare1 }

PosSIB-ReqInfo-r16 ::= SEQUENCE {

gnss-id-r16 GNSS-ID-r16 OPTIONAL,

sbas-id-r16 SBAS-ID-r16 OPTIONAL,

posSibType-r16 ENUMERATED { posSibType1-1, posSibType1-2, posSibType1-3, posSibType1-4, posSibType1-5, posSibType1-6,

posSibType1-7, posSibType1-8, posSibType2-1, posSibType2-2, posSibType2-3, posSibType2-4,

posSibType2-5, posSibType2-6, posSibType2-7, posSibType2-8, posSibType2-9, posSibType2-10,

posSibType2-11, posSibType2-12, posSibType2-13, posSibType2-14, posSibType2-15,

posSibType2-16, posSibType2-17, posSibType2-18, posSibType2-19, posSibType2-20,

posSibType2-21, posSibType2-22, posSibType2-23, posSibType3-1, posSibType4-1,

posSibType5-1, posSibType6-1, posSibType6-2, posSibType6-3,..., posSibType1-9-v1710,

posSibType1-10-v1710, posSibType2-24-v1710, posSibType2-25-v1710,

posSibType6-4-v1710, posSibType6-5-v1710, posSibType6-6-v1710 }

}

-- TAG-DEDICATEDSIBREQUEST-STOP

-- ASN1STOP

|  |
| --- |
| *DedicatedSIBRequest field descriptions* |
| ***requestedSIB-List***  Contains a list of SIB(s) the UE requests while in RRC\_CONNECTED. |
| ***requestedPosSIB-List***  Contains a list of posSIB(s) the UE requests while in RRC\_CONNECTED. |

|  |
| --- |
| *PosSIB-ReqInfo* field descriptions |
| ***gnss-id***  The presence of this field indicates that the request positioning SIB type is for a specific GNSS. Indicates a specific GNSS (see also TS 37.355 [49]) |
| ***sbas-id***  The presence of this field indicates that the request positioning SIB type is for a specific SBAS. Indicates a specific SBAS (see also TS 37.355 [49]). |

#### – *DLDedicatedMessageSegment*

The *DLDedicatedMessageSegment* message is used to transfer one segment of the *RRCResume* or *RRCReconfiguration* messages.

Signalling radio bearer: SRB1

RLC-SAP: AM

Logical channel: DCCH

Direction: Network to UE

*DLDedicatedMessageSegment message*

-- ASN1START

-- TAG-DLDEDICATEDMESSAGESEGMENT-START

DLDedicatedMessageSegment-r16 ::= SEQUENCE {

criticalExtensions CHOICE {

dlDedicatedMessageSegment-r16 DLDedicatedMessageSegment-r16-IEs,

criticalExtensionsFuture SEQUENCE {}

}

}

DLDedicatedMessageSegment-r16-IEs ::= SEQUENCE {

segmentNumber-r16 INTEGER(0..4),

rrc-MessageSegmentContainer-r16 OCTET STRING,

rrc-MessageSegmentType-r16 ENUMERATED {notLastSegment, lastSegment},

lateNonCriticalExtension OCTET STRING OPTIONAL,

nonCriticalExtension SEQUENCE {} OPTIONAL

}

-- TAG-DLDEDICATEDMESSAGESEGMENT-STOP

-- ASN1STOP

|  |
| --- |
| *DLDedicatedMessageSegment* field descriptions |
| ***segmentNumber***  Identifies the sequence number of a segment within the encoded DL DCCH message. The network transmits the segments with continuously increasing *segmentNumber* order so that the UE's RRC layer may expect to obtain them from lower layers in the correct order. Hence, the UE is not required to perform segment re-ordering on RRC level. |
| ***rrc-MessageSegmentContainer***  Includes a segment of the encoded DL DCCH message. The size of the included segment in this container should be small enough so the resulting encoded RRC message PDU is less than or equal to the PDCP SDU size limit. |
| ***rrc-MessageSegmentType***  Indicates whether the included DL DCCH message segment is the last segment of the message or not. |

#### – *DLInformationTransfer*

The *DLInformationTransfer* message is used for the downlink transfer of NAS dedicated information, timing information for the 5G internal system clock, or IAB-DU specific F1-C related information.

Signalling radio bearer: SRB2 or SRB1 (only if SRB2 not established yet. If SRB2 is suspended, the network does not send this message until SRB2 is resumed. If only *dedicatedInfoF1c* is included, SRB2 is used).

RLC-SAP: AM

Logical channel: DCCH

Direction: Network to UE

*DLInformationTransfer* message

-- ASN1START

-- TAG-DLINFORMATIONTRANSFER-START

DLInformationTransfer ::= SEQUENCE {

rrc-TransactionIdentifier RRC-TransactionIdentifier,

criticalExtensions CHOICE {

dlInformationTransfer DLInformationTransfer-IEs,

criticalExtensionsFuture SEQUENCE {}

}

}

DLInformationTransfer-IEs ::= SEQUENCE {

dedicatedNAS-Message DedicatedNAS-Message OPTIONAL, -- Need N

lateNonCriticalExtension OCTET STRING OPTIONAL,

nonCriticalExtension DLInformationTransfer-v1610-IEs OPTIONAL

}

DLInformationTransfer-v1610-IEs ::= SEQUENCE {

referenceTimeInfo-r16 ReferenceTimeInfo-r16 OPTIONAL, -- Need N

nonCriticalExtension DLInformationTransfer-v1700-IEs OPTIONAL

}

DLInformationTransfer-v1700-IEs ::= SEQUENCE {

dedicatedInfoF1c-r17 DedicatedInfoF1c-r17 OPTIONAL, -- Need N

rxTxTimeDiff-gNB-r17 RxTxTimeDiff-r17 OPTIONAL, -- Need N

ta-PDC-r17 ENUMERATED {activate,deactivate} OPTIONAL, -- Need N

sib9Fallback-r17 ENUMERATED {true} OPTIONAL, -- Need N

nonCriticalExtension SEQUENCE {} OPTIONAL

}

-- TAG-DLINFORMATIONTRANSFER-STOP

-- ASN1STOP

|  |
| --- |
| *DLInformationTransfer* field descriptions |
| ***rxTxTimeDiff-gNB***  Indicates the Rx-Tx time difference measurement at the gNB (see clause 5.2.3, TS 38.215 [9]). Upon receiving this field, the UE calculates the propagation delay based on the RTT-method. The network does not configure this field, if the UE is configured with *ta-PDC* with value *activate*. |
| ***sib9Fallback***  Indicates that the UE fallbacks to receive *referenceTimeInfo* in SIB9. |
| ***ta-PDC***  Indicates whether the UE-side TA-based propagation delay compensation (PDC) is activated or de-activated. The network does not configure this field with *activate,* if the field *rxTxTimeDiff-gNB* is configured. |

#### *– DLInformationTransferMRDC*

The *DLInformationTransferMRDC* message is used for the downlink transfer of RRC messages during fast MCG link recovery.

Signalling radio bearer: SRB3

RLC-SAP: AM

Logical channel: DCCH

Direction: Network to UE

*DLInformationTransferMRDC message*

-- ASN1START

-- TAG-DLINFORMATIONTRANSFERMRDC-START

DLInformationTransferMRDC-r16 ::= SEQUENCE {

criticalExtensions CHOICE {

c1 CHOICE {

dlInformationTransferMRDC-r16 DLInformationTransferMRDC-r16-IEs,

spare3 NULL, spare2 NULL, spare1 NULL

},

criticalExtensionsFuture SEQUENCE {}

}

}

DLInformationTransferMRDC-r16-IEs::= SEQUENCE {

dl-DCCH-MessageNR-r16 OCTET STRING OPTIONAL, -- Need N

dl-DCCH-MessageEUTRA-r16 OCTET STRING OPTIONAL, -- Need N

lateNonCriticalExtension OCTET STRING OPTIONAL,

nonCriticalExtension SEQUENCE {} OPTIONAL

}

-- TAG-DLINFORMATIONTRANSFERMRDC-STOP

-- ASN1STOP

| *DLInformationTransferMRDC* field descriptions |
| --- |
| ***dl-DCCH-MessageNR***  Includes the *DL-DCCH-Message*. In this version of the specification, the field is only used to transfer the NR *RRCReconfiguration,* *RRCRelease,* and *MobilityFromNRCommand* messages. |
| ***dl-DCCH-MessageEUTRA***  Includes the *DL-DCCH-Message*. In this version of the specification, the field is only used to transfer the E-UTRA *RRCConnectionReconfiguration,* *RRCConnectionRelease*, and *MobilityFromEUTRACommand* messages as specified in TS 36.331 [10]. |

#### – *FailureInformation*

The *FailureInformation* message is used to inform the network about a failure detected by the UE.

Signalling radio bearer: SRB1 or SRB3

RLC-SAP: AM

Logical channel: DCCH

Direction: UE to network

*FailureInformation message*

-- ASN1START

-- TAG-FAILUREINFORMATION-START

FailureInformation ::= SEQUENCE {

criticalExtensions CHOICE {

failureInformation FailureInformation-IEs,

criticalExtensionsFuture SEQUENCE {}

}

}

FailureInformation-IEs ::= SEQUENCE {

failureInfoRLC-Bearer FailureInfoRLC-Bearer OPTIONAL,

lateNonCriticalExtension OCTET STRING OPTIONAL,

nonCriticalExtension FailureInformation-v1610-IEs OPTIONAL

}

FailureInfoRLC-Bearer ::= SEQUENCE {

cellGroupId CellGroupId,

logicalChannelIdentity LogicalChannelIdentity,

failureType ENUMERATED {rlc-failure, spare3, spare2, spare1}

}

FailureInformation-v1610-IEs ::= SEQUENCE {

failureInfoDAPS-r16 FailureInfoDAPS-r16 OPTIONAL,

nonCriticalExtension SEQUENCE {} OPTIONAL

}

FailureInfoDAPS-r16 ::= SEQUENCE {

failureType-r16 ENUMERATED {daps-failure, spare3, spare2, spare1}

}

-- TAG-FAILUREINFORMATION-STOP

-- ASN1STOP

#### – *IABOtherInformation*

The *IABOtherInformation* message is used by IAB-MT to request the network to allocate IP addresses for the collocated IAB-DU or inform the network about IP addresses allocated to the collocated IAB-DU.

Signalling radio bearer: SRB1 or SRB3

RLC-SAP: AM

Logical channel: DCCH

Direction: IAB-MT to Network

*IABOtherInformation* message

-- ASN1START

-- TAG-IABOTHERINFORMATION-START

IABOtherInformation-r16 ::= SEQUENCE {

rrc-TransactionIdentifier RRC-TransactionIdentifier,

criticalExtensions CHOICE {

iabOtherInformation-r16 IABOtherInformation-r16-IEs,

criticalExtensionsFuture SEQUENCE {}

}

}

IABOtherInformation-r16-IEs ::= SEQUENCE {

ip-InfoType-r16 CHOICE {

iab-IP-Request-r16 SEQUENCE {

iab-IPv4-AddressNumReq-r16 IAB-IP-AddressNumReq-r16 OPTIONAL,

iab-IPv6-AddressReq-r16 CHOICE {

iab-IPv6-AddressNumReq-r16 IAB-IP-AddressNumReq-r16,

iab-IPv6-AddressPrefixReq-r16 IAB-IP-AddressPrefixReq-r16,

...

} OPTIONAL

},

iab-IP-Report-r16 SEQUENCE {

iab-IPv4-AddressReport-r16 IAB-IP-AddressAndTraffic-r16 OPTIONAL,

iab-IPv6-Report-r16 CHOICE {

iab-IPv6-AddressReport-r16 IAB-IP-AddressAndTraffic-r16,

iab-IPv6-PrefixReport-r16 IAB-IP-PrefixAndTraffic-r16,

...

} OPTIONAL

},

...

},

lateNonCriticalExtension OCTET STRING OPTIONAL,

nonCriticalExtension SEQUENCE {} OPTIONAL

}

IAB-IP-AddressNumReq-r16 ::= SEQUENCE {

all-Traffic-NumReq-r16 INTEGER (1..8) OPTIONAL,

f1-C-Traffic-NumReq-r16 INTEGER (1..8) OPTIONAL,

f1-U-Traffic-NumReq-r16 INTEGER (1..8) OPTIONAL,

non-F1-Traffic-NumReq-r16 INTEGER (1..8) OPTIONAL,

...

}

IAB-IP-AddressPrefixReq-r16 ::= SEQUENCE {

all-Traffic-PrefixReq-r16 ENUMERATED {true} OPTIONAL,

f1-C-Traffic-PrefixReq-r16 ENUMERATED {true} OPTIONAL,

f1-U-Traffic-PrefixReq-r16 ENUMERATED {true} OPTIONAL,

non-F1-Traffic-PrefixReq-r16 ENUMERATED {true} OPTIONAL,

...

}

IAB-IP-AddressAndTraffic-r16 ::= SEQUENCE {

all-Traffic-IAB-IP-Address-r16 SEQUENCE (SIZE(1..8)) OF IAB-IP-Address-r16 OPTIONAL,

f1-C-Traffic-IP-Address-r16 SEQUENCE (SIZE(1..8)) OF IAB-IP-Address-r16 OPTIONAL,

f1-U-Traffic-IP-Address-r16 SEQUENCE (SIZE(1..8)) OF IAB-IP-Address-r16 OPTIONAL,

non-F1-Traffic-IP-Address-r16 SEQUENCE (SIZE(1..8)) OF IAB-IP-Address-r16 OPTIONAL

}

IAB-IP-PrefixAndTraffic-r16 ::= SEQUENCE {

all-Traffic-IAB-IP-Address-r16 IAB-IP-Address-r16 OPTIONAL,

f1-C-Traffic-IP-Address-r16 IAB-IP-Address-r16 OPTIONAL,

f1-U-Traffic-IP-Address-r16 IAB-IP-Address-r16 OPTIONAL,

non-F1-Traffic-IP-Address-r16 IAB-IP-Address-r16 OPTIONAL

}

-- TAG-IABOTHERINFORMATION-STOP

-- ASN1STOP

|  |
| --- |
| *IABOtherInformation-IEs* field descriptions |
| ***iab-IPv4-AddressNumReq***  This field is used to request the numbers of IPv4 address per specific usage. The specific usages include F1-C traffic, F1-U traffic, non-F1 traffic and all traffic. |
| ***iab-IPv4-AddressReport***  This field is used to report the IPv4 address per specific usage assigned by OAM for IAB-DU. The specific usages include F1-C traffic, F1-U traffic, non-F1 traffic and all traffic. |
| ***iab-IPv6-AddressNumReq***  This field is used to request the numbers of IPv6 address per specific usage. The specific usages include F1-C traffic, F1-U traffic, non-F1 traffic and all traffic. |
| ***iab-IPv6-AddressPrefixReq***  This field is used to request the prefix of IPv6 address per specific usage. The specific usages include F1-C traffic, F1-U traffic, non-F1 traffic and all traffic. |
| ***iab-IPv6-AddressReport***  This field is used to report the IPv6 address per specific usage assigned by OAM for IAB-DU. The specific usages include F1-C traffic, F1-U traffic, non-F1 traffic and all traffic. |
| ***iab-IPv6-PrefixReport***  This field is used to report the prefix of IPv6 address per specific usage assigned by OAM for IAB-DU. The specific usages include F1-C traffic, F1-U traffic, non-F1 traffic and all traffic. |

|  |
| --- |
| *IAB-IP-AddressNumReq-IEs field descriptions* |
| ***all-Traffic-NumReq***  This field is used to request the numbers of IP address for all traffic. |
| ***f1-C-Traffic-NumReq***  This field is used to request the numbers of IP address for F1-C traffic. |
| ***f1-U-Traffic-NumReq***  This field is used to request the numbers of IP address for F1-U traffic. |
| ***non-F1-Traffic-NumReq***  This field is used to request the numbers of IP address for non-F1 traffic. |

|  |
| --- |
| *IAB-IP-AddressPrefixReq-IEs field descriptions* |
| ***all-Traffic-PrefixReq***  This field is used to request the IPv6 address prefix for all traffic. The length of allocated IPv6 prefix is fixed to 64. |
| ***f1-C-Traffic-PrefixReq***  This field is used to request the IPv6 address prefix for F1-C traffic. The length of allocated IPv6 prefix is fixed to 64. |
| ***f1-U-Traffic-PrefixReq***  This field is used to request the IPv6 address prefix for F1-U traffic. The length of allocated IPv6 prefix is fixed to 64. |
| ***non-F1-Traffic-PrefixReq***  This field is used to request the IPv6 address prefix for non-F1 traffic. The length of allocated IPv6 prefix is fixed to 64. |

|  |
| --- |
| *IAB-IP-AddressAndTraffic-IEs field descriptions* |
| ***all-Traffic-IAB-IP-Address***  This field is used to report to IAB-donor-CU the IP address(es) or IPv6 address prefix for all traffic. |
| ***f1-C-Traffic-IP-Address***  This field is used to report to IAB-donor-CU the IP address(es) or IPv6 address prefix for F1-C traffic. |
| ***f1-U-Traffic-IP-Address***  This field is used to report to IAB-donor-CU the IP address(es) or IPv6 address prefix for F1-U traffic. |
| ***non-F1-Traffic-IP-Address***  This field is used to report to IAB-donor-CU the IP address(es) or IPv6 address prefix for non-F1 traffic. |

#### – *LocationMeasurementIndication*

The *LocationMeasurementIndication* message is used to indicate that the UE is going to either start or stop location related measurement which requires measurement gaps.

Signalling radio bearer: SRB1

RLC-SAP: AM

Logical channel: DCCH

Direction: UE to Network

*LocationMeasurementIndication message*

-- ASN1START

-- TAG-LOCATIONMEASUREMENTINDICATION-START

LocationMeasurementIndication ::= SEQUENCE {

criticalExtensions CHOICE {

locationMeasurementIndication LocationMeasurementIndication-IEs,

criticalExtensionsFuture SEQUENCE {}

}

}

LocationMeasurementIndication-IEs ::= SEQUENCE {

measurementIndication SetupRelease {LocationMeasurementInfo},

lateNonCriticalExtension OCTET STRING OPTIONAL,

nonCriticalExtension SEQUENCE{} OPTIONAL

}

-- TAG-LOCATIONMEASUREMENTINDICATION-STOP

-- ASN1STOP

#### – *LoggedMeasurementConfiguration*

The *LoggedMeasurementConfiguration* message is used to perform logging of measurement results while in RRC\_IDLE or RRC\_INACTIVE. It is used to transfer the logged measurement configuration for network performance optimisation.

Signalling radio bearer: SRB1

RLC-SAP: AM

Logical channel: DCCH

Direction: Network to UE

*LoggedMeasurementConfiguration message*

-- ASN1START

-- TAG-LOGGEDMEASUREMENTCONFIGURATION-START

LoggedMeasurementConfiguration-r16 ::= SEQUENCE {

criticalExtensions CHOICE {

loggedMeasurementConfiguration-r16 LoggedMeasurementConfiguration-r16-IEs,

criticalExtensionsFuture SEQUENCE {}

}

}

LoggedMeasurementConfiguration-r16-IEs ::= SEQUENCE {

traceReference-r16 TraceReference-r16,

traceRecordingSessionRef-r16 OCTET STRING (SIZE (2)),

tce-Id-r16 OCTET STRING (SIZE (1)),

absoluteTimeInfo-r16 AbsoluteTimeInfo-r16,

areaConfiguration-r16 AreaConfiguration-r16 OPTIONAL, --Need R

plmn-IdentityList-r16 PLMN-IdentityList2-r16 OPTIONAL, --Need R

bt-NameList-r16 SetupRelease {BT-NameList-r16} OPTIONAL, --Need M

wlan-NameList-r16 SetupRelease {WLAN-NameList-r16} OPTIONAL, --Need M

sensor-NameList-r16 SetupRelease {Sensor-NameList-r16} OPTIONAL, --Need M

loggingDuration-r16 LoggingDuration-r16,

reportType CHOICE {

periodical LoggedPeriodicalReportConfig-r16,

eventTriggered LoggedEventTriggerConfig-r16,

...

},

lateNonCriticalExtension OCTET STRING OPTIONAL,

nonCriticalExtension LoggedMeasurementConfiguration-v1700-IEs OPTIONAL

}

LoggedMeasurementConfiguration-v1700-IEs ::= SEQUENCE {

sigLoggedMeasType-r17 ENUMERATED {true} OPTIONAL, -- Need R

earlyMeasIndication-r17 ENUMERATED {true} OPTIONAL, -- Need R

areaConfiguration-v1700 AreaConfiguration-v1700 OPTIONAL, --Need R

nonCriticalExtension SEQUENCE {} OPTIONAL

}

LoggedPeriodicalReportConfig-r16 ::= SEQUENCE {

loggingInterval-r16 LoggingInterval-r16,

...

}

LoggedEventTriggerConfig-r16 ::= SEQUENCE {

eventType-r16 EventType-r16,

loggingInterval-r16 LoggingInterval-r16,

...

}

EventType-r16 ::= CHOICE {

outOfCoverage NULL,

eventL1 SEQUENCE {

l1-Threshold MeasTriggerQuantity,

hysteresis Hysteresis,

timeToTrigger TimeToTrigger

},

...

}

-- TAG-LOGGEDMEASUREMENTCONFIGURATION-STOP

-- ASN1STOP

| *LoggedMeasurementConfiguration* field descriptions |
| --- |
| ***absoluteTimeInfo***  Indicates the absolute time in the current cell. |
| ***areaConfiguration***  Used to restrict the area in which the UE performs measurement logging to cells broadcasting either one of the included cell identities or one of the included tracking area codes/ frequencies. |
| ***earlyMeasIndication***  If included, the field indicates the UE is allowed to log measurements on early measurement related frequencies in logged measurements. |
| ***eventType***  The value outOfCoverage indicates the UE to perform logging of measurements when the UE enters any cell selection state, and the value eventL1 indicates the UE to perform logging of measurements when the triggering condition (similar as event A2 as specified in 5.5.4.3) as configured in the event is met for the camping cell in camped normally state. |
| ***plmn-IdentityList***  Indicates a set of PLMNs defining when the UE performs measurement logging as well as the associated status indication and information retrieval i.e. the UE performs these actions when the RPLMN is part of this set of PLMNs. |
| ***sigLoggedMeasType***  If included, the field indicates a signalling based logged measurements (See TS 37.320 [61]). |
| ***tce-Id***  Parameter Trace Collection Entity Id: See TS 32.422 [52]. |
| ***traceRecordingSessionRef***  Parameter Trace Recording Session Reference: See TS 32.422 [52]. |
| ***reportType***  Parameter configures the type of MDT configuration, specifically Periodic MDT configuration or Event Triggerd MDT configuration. |

#### *– MBSBroadcastConfiguration*

The *MBSBroadcastConfiguration* message contains the control information applicable for MBS broadcast services transmitted via broadcast MRB.

Signalling radio bearer: N/A

RLC-SAP: UM

Logical channel: MCCH

Direction: Network to UE

*MBSBroadcastConfiguration message*

-- ASN1START

-- TAG-MBSBROADCASTCONFIGURATION-START

MBSBroadcastConfiguration-r17 ::= SEQUENCE {

criticalExtensions CHOICE {

mbsBroadcastConfiguration-r17 MBSBroadcastConfiguration-r17-IEs,

criticalExtensionsFuture SEQUENCE {}

}

}

MBSBroadcastConfiguration-r17-IEs ::= SEQUENCE {

mbs-SessionInfoList-r17 MBS-SessionInfoList-r17 OPTIONAL, -- Need R

mbs-NeighbourCellList-r17 MBS-NeighbourCellList-r17 OPTIONAL, -- Need S

drx-ConfigPTM-List-r17 SEQUENCE (SIZE (1..maxNrofDRX-ConfigPTM-r17)) OF DRX-ConfigPTM-r17 OPTIONAL, -- Need R

pdsch-ConfigMTCH-r17 PDSCH-ConfigBroadcast-r17 OPTIONAL, -- Need S

mtch-SSB-MappingWindowList-r17 MTCH-SSB-MappingWindowList-r17 OPTIONAL, -- Need R

lateNonCriticalExtension OCTET STRING OPTIONAL,

nonCriticalExtension SEQUENCE {} OPTIONAL

}

-- TAG-MBSBROADCASTCONFIGURATION-STOP

-- ASN1STOP

| *MBSBroadcastConfiguration* field descriptions |
| --- |
| ***pdsch-ConfigMTCH***  Provides parameters for acquiring the PDSCH for MTCH. When this field is absent, the UE shall use parameters in *pdsch-ConfigMCCH* to acquire the PDSCH for MTCH. |
| ***mbs-SessionInfoList***  Provides the configuration of each MBS session provided by MBS broadcast in the current cell. |
| ***mbs-NeighbourCellList***  List of neighbour cells providing MBS broadcast services via broadcast MRB. This field is used by the UE together with *mtch-NeighbourCell* field signalled for each MBS session in the corresponding *MBS-SessionInfo*. When an empty *mbs-NeighbourCellList* list is signalled, the UE shall assume that MBS broadcast services signalled in *mbs-SessionInfoList* in the *MBSBroadcastConfiguration* message are not provided in any neighbour cell. When the field *mbs-NeighbourCellList* is absent, the current serving cell does not provide information about MBS broadcast services in the neighbouring cells, i.e. the UE cannot determine the presence or absence of an MBS service in neighbouring cells based on the absence of this field. |

#### *– MBSInterestIndication*

The *MBSInterestIndication* message is used to inform network that the UE is receiving/ interested to receive or no longer receiving/ interested to receive MBS broadcast service(s) via a broadcast MRB.

Signalling radio bearer: SRB1

RLC-SAP: AM

Logical channel: DCCH

Direction: UE to Network

*MBSInterestIndication message*

-- ASN1START

-- TAG-MBSINTERESTINDICATION-START

MBSInterestIndication-r17 ::= SEQUENCE {

criticalExtensions CHOICE {

mbsInterestIndication-r17 MBSInterestIndication-r17-IEs,

criticalExtensionsFuture SEQUENCE {}

}

}

MBSInterestIndication-r17-IEs ::= SEQUENCE {

mbs-FreqList-r17 CarrierFreqListMBS-r17 OPTIONAL,

mbs-Priority-r17 ENUMERATED {true} OPTIONAL,

mbs-ServiceList-r17 MBS-ServiceList-r17 OPTIONAL,

lateNonCriticalExtension OCTET STRING OPTIONAL,

nonCriticalExtension SEQUENCE {} OPTIONAL

}

-- TAG-MBSINTERESTINDICATION-STOP

-- ASN1STOP

| *MBSInterestIndication* field descriptions |
| --- |
| ***mbs-FreqList***  List of MBS frequencies on which the UE is receiving or interested to receive MBS broadcast service via a broadcast MRB. |
| ***mbs-Priority***  Indicates whether the UE prioritises MBS broadcast reception above unicast and MBS multicast reception. The field is present (i.e. value *true*), if the UE prioritises reception of broadcast services, on frequencies indicated in *mbs-FreqLis*t, above a reception of any of the unicast bearers and multicast MRBs. Otherwise the field is absent. |
| ***mbs-ServiceList***  List of MBS broadcast services which the UE is receiving or interested to receive. |

#### *– MCGFailureInformation*

The *MCGFailureInformation* message is used to provide information regarding NR MCG failures detected by the UE.

Signalling radio bearer: SRB1

RLC-SAP: AM

Logical channel: DCCH

Direction: UE to Network

*MCGFailureInformation* message

-- ASN1START

-- TAG-MCGFAILUREINFORMATION-START

MCGFailureInformation-r16 ::= SEQUENCE {

criticalExtensions CHOICE {

mcgFailureInformation-r16 MCGFailureInformation-r16-IEs,

criticalExtensionsFuture SEQUENCE {}

}

}

MCGFailureInformation-r16-IEs ::= SEQUENCE {

failureReportMCG-r16 FailureReportMCG-r16 OPTIONAL,

lateNonCriticalExtension OCTET STRING OPTIONAL,

nonCriticalExtension SEQUENCE {} OPTIONAL

}

FailureReportMCG-r16 ::= SEQUENCE {

failureType-r16 ENUMERATED {t310-Expiry, randomAccessProblem, rlc-MaxNumRetx,

t312-Expiry-r16, lbt-Failure-r16, beamFailureRecoveryFailure-r16,

bh-RLF-r16, spare1} OPTIONAL,

measResultFreqList-r16 MeasResultList2NR OPTIONAL,

measResultFreqListEUTRA-r16 MeasResultList2EUTRA OPTIONAL,

measResultSCG-r16 OCTET STRING (CONTAINING MeasResultSCG-Failure) OPTIONAL,

measResultSCG-EUTRA-r16 OCTET STRING OPTIONAL,

measResultFreqListUTRA-FDD-r16 MeasResultList2UTRA OPTIONAL,

...

}

MeasResultList2UTRA ::= SEQUENCE (SIZE (1..maxFreq)) OF MeasResult2UTRA-FDD-r16

MeasResult2UTRA-FDD-r16 ::= SEQUENCE {

carrierFreq-r16 ARFCN-ValueUTRA-FDD-r16,

measResultNeighCellList-r16 MeasResultListUTRA-FDD-r16

}

MeasResultList2EUTRA ::= SEQUENCE (SIZE (1..maxFreq)) OF MeasResult2EUTRA-r16

-- TAG-MCGFAILUREINFORMATION-STOP

-- ASN1STOP

| *MCGFailureInformation field descriptions* |
| --- |
| ***measResultFreqList***  The field contains available results of measurements on NR frequencies the UE is configured to measure by the *measConfig* associated with the MCG. |
| ***measResultFreqListEUTRA***  The field contains available results of measurements on E-UTRA frequencies the UE is configured to measure by *measConfig* associated with the MCG. |
| ***measResultFreqListUTRA-FDD***  The field contains available results of measurements on UTRA FDD frequencies the UE is configured to measure by measConfig associated with the MCG. |
| ***measResultSCG***  The field contains the *MeasResultSCG-Failure* IE which includes available measurement results on NR frequencies the UE is configured to measure by the *measConfig* associated with the SCG. |
| ***measResultSCG-EUTRA***  The field contains the EUTRA *MeasResultSCG-FailureMRDC* IE which includes available results of measurements on E-UTRA frequencies the UE is configured to measure by the E-UTRA *RRCConnectionReconfiguration* message as specified in TS 36.331 [10]. |

#### – *MeasurementReport*

The *MeasurementReport* message is used for the indication of measurement results.

Signalling radio bearer: SRB1, SRB3

RLC-SAP: AM

Logical channel: DCCH

Direction: UE to Network

*MeasurementReport message*

-- ASN1START

-- TAG-MEASUREMENTREPORT-START

MeasurementReport ::= SEQUENCE {

criticalExtensions CHOICE {

measurementReport MeasurementReport-IEs,

criticalExtensionsFuture SEQUENCE {}

}

}

MeasurementReport-IEs ::= SEQUENCE {

measResults MeasResults,

lateNonCriticalExtension OCTET STRING OPTIONAL,

nonCriticalExtension SEQUENCE{} OPTIONAL

}

-- TAG-MEASUREMENTREPORT-STOP

-- ASN1STOP

#### – *MeasurementReportAppLayer*

The *MeasurementReportAppLayer* message is used for sending application layer measurement report.

Signalling radio bearer: SRB4

RLC-SAP: AM

Logical channel: DCCH

Direction: UE to Network

*MeasurementReportAppLayer message*

-- ASN1START

-- TAG-MEASUREMENTREPORTAPPLAYER-START

MeasurementReportAppLayer-r17 ::= SEQUENCE {

criticalExtensions CHOICE {

measurementReportAppLayer-r17 MeasurementReportAppLayer-r17-IEs,

criticalExtensionsFuture SEQUENCE {}

}

}

MeasurementReportAppLayer-r17-IEs ::= SEQUENCE {

measurementReportAppLayerList-r17 MeasurementReportAppLayerList-r17,

lateNonCriticalExtension OCTET STRING OPTIONAL,

nonCriticalExtension SEQUENCE{} OPTIONAL

}

MeasurementReportAppLayerList-r17 ::= SEQUENCE (SIZE (1..maxNrofAppLayerMeas-r17)) OF MeasReportAppLayer-r17

MeasReportAppLayer-r17 ::= SEQUENCE {

measConfigAppLayerId-r17 MeasConfigAppLayerId-r17,

measReportAppLayerContainer-r17 OCTET STRING OPTIONAL,

appLayerSessionStatus-r17 ENUMERATED {started, stopped} OPTIONAL,

ran-VisibleMeasurements-r17 RAN-VisibleMeasurements-r17 OPTIONAL

}

RAN-VisibleMeasurements-r17 ::= SEQUENCE {

appLayerBufferLevelList-r17 SEQUENCE (SIZE (1..8)) OF AppLayerBufferLevel-r17 OPTIONAL,

playoutDelayForMediaStartup-r17 INTEGER (0..30000) OPTIONAL,

pdu-SessionIdList-r17 SEQUENCE (SIZE (1..maxNrofPDU-Sessions-r17)) OF PDU-SessionID OPTIONAL,

...

}

AppLayerBufferLevel-r17 ::= INTEGER (0..30000)

-- TAG-MEASUREMENTREPORTAPPLAYER-STOP

-- ASN1STOP

|  |
| --- |
| *MeasurementReportAppLayer* field descriptions |
| ***appLayerBufferLevelList***  The field indicates a list of application layer buffer levels, and each *AppLayerBufferLevel* indicates the application layer buffer level in ms. Value 0 corresponds to 0ms, value 1 corresponds to 10ms, value 2 corresponds to 20 ms and so on. If the buffer level is larger than the maximum value of 30000 (5 minutes), the UE reports 30000. |
| ***appLayerSessionStatus***  Indicates that an application layer measurement session in the application layer starts or ends. |
| ***playoutDelayForMediaStartup***  Indicates the application layer playout delay for media start-up in ms. Value 0 corresponds to 0ms, value 1 corresponds to 1ms, value 2 corresponds to 2 ms and so on. If the playout delay for media start-up is larger than the maximum value of 30000ms, the UE reports 30000. |
| ***measReportAppLayerContainer***  The field contains application layer measurement report, see Annex L (normative) in TS 26.247 [68], clause 16.5 in TS 26.114 [69] and TS 26.118 [70]. |
| ***pdu-SessionIdList***  Contains the identity of the PDU session, or the identities of the PDU sessions, used for application data flows subject to the RAN visible application layer measurements. |

#### – *MIB*

The *MIB* includes the system information transmitted on BCH.

Signalling radio bearer: N/A

RLC-SAP: TM

Logical channel: BCCH

Direction: Network to UE

*MIB*

-- ASN1START

-- TAG-MIB-START

MIB ::= SEQUENCE {

systemFrameNumber BIT STRING (SIZE (6)),

subCarrierSpacingCommon ENUMERATED {scs15or60, scs30or120},

ssb-SubcarrierOffset INTEGER (0..15),

dmrs-TypeA-Position ENUMERATED {pos2, pos3},

pdcch-ConfigSIB1 PDCCH-ConfigSIB1,

cellBarred ENUMERATED {barred, notBarred},

intraFreqReselection ENUMERATED {allowed, notAllowed},

spare BIT STRING (SIZE (1))

}

-- TAG-MIB-STOP

-- ASN1STOP

|  |
| --- |
| *MIB* field descriptions |
| ***cellBarred***  Value *barred* means that the cell is barred, as defined in TS 38.304 [20]. This field is ignored by IAB-MT. This field is ignored for connectivity to NTN. |
| ***dmrs-TypeA-Position***  Position of (first) DM-RS for downlink (see TS 38.211 [16], clause 7.4.1.1.2) and uplink (see TS 38.211 [16], clause 6.4.1.1.3). |
| ***intraFreqReselection***  Controls cell selection/reselection to intra-frequency cells when the highest ranked cell is barred, or treated as barred by the UE, as specified in TS 38.304 [20]. This field is ignored by IAB-MT. |
| ***pdcch-ConfigSIB1***  Determines a common *ControlResourceSet* (CORESET), a common search space and necessary PDCCH parameters. If the field *ssb-SubcarrierOffset* indicates that *SIB1* is absent, the field *pdcch-ConfigSIB1* indicates the frequency positions where the UE may find SS/PBCH block with *SIB1* or the frequency range where the network does not provide SS/PBCH block with *SIB1* (see TS 38.213 [13], clause 13). |
| ***ssb-SubcarrierOffset***  Corresponds to kSSB (see TS 38.213 [13]), which is the frequency domain offset between SSB and the overall resource block grid in number of subcarriers. (See TS 38.211 [16], clause 7.4.3.1). For operation with shared spectrum channel access (see 37.213 [48]), this field corresponds to , and kSSB is obtained from (see TS 38.211 [16], clause 7.4.3.1); the LSB of this field is used also for deriving the QCL relation between SS/PBCH blocks as specified in TS 38.213 [13], clause 4.1.  The value range of this field may be extended by an additional most significant bit encoded within PBCH as specified in TS 38.213 [13].  This field may indicate that this cell does not provide *SIB1* and that there is hence no CORESET#0 configured in *MIB* (see TS 38.213 [13], clause 13). In this case, the field *pdcch-ConfigSIB1* may indicate the frequency positions where the UE may (not) find a SS/PBCH with a control resource set and search space for *SIB1* (see TS 38.213 [13], clause 13). |
| ***subCarrierSpacingCommon***  Subcarrier spacing for *SIB1*, Msg.2/4 and MsgB for initial access, paging and broadcast SI-messages. If the UE acquires this *MIB* on an FR1 carrier frequency, the value *scs15or60* corresponds to 15 kHz and the value *scs30or120* corresponds to 30 kHz. If the UE acquires this *MIB* on an FR2 carrier frequency, the value *scs15or60* corresponds to 60 kHz and the value *scs30or120* corresponds to 120 kHz. For operation with shared spectrum channel access in FR1 (see 37.213 [48]) and for operation in FR2-2, the subcarrier spacing for *SIB1*, Msg.2/4 and MsgB for initial access, paging and broadcast SI-messages is same as that for the corresponding SSB. For operation with shared spectrum channel access, this field instead is used for deriving the QCL relation between SS/PBCH blocks as specified in TS 38.213 [13], clause 4.1. |
| ***systemFrameNumber***  The 6 most significant bits (MSB) of the 10-bit System Frame Number (SFN). The 4 LSB of the SFN are conveyed in the PBCH transport block as part of channel coding (i.e. outside the *MIB* encoding), as defined in clause 7.1 in TS 38.212 [17]. |

#### – *MobilityFromNRCommand*

The *MobilityFromNRCommand* message is used to command handover from NR to E-UTRA/EPC, E-UTRA/5GC or UTRA-FDD.

Signalling radio bearer: SRB1

RLC-SAP: AM

Logical channel: DCCH

Direction: Network to UE

*MobilityFromNRCommand* message

-- ASN1START

-- TAG-MOBILITYFROMNRCOMMAND-START

MobilityFromNRCommand ::= SEQUENCE {

rrc-TransactionIdentifier RRC-TransactionIdentifier,

criticalExtensions CHOICE {

mobilityFromNRCommand MobilityFromNRCommand-IEs,

criticalExtensionsFuture SEQUENCE {}

}

}

MobilityFromNRCommand-IEs ::= SEQUENCE {

targetRAT-Type ENUMERATED { eutra, utra-fdd-v1610, spare2, spare1, ...},

targetRAT-MessageContainer OCTET STRING,

nas-SecurityParamFromNR OCTET STRING OPTIONAL, -- Cond HO-ToEPCUTRAN

lateNonCriticalExtension OCTET STRING OPTIONAL,

nonCriticalExtension MobilityFromNRCommand-v1610-IEs OPTIONAL

}

MobilityFromNRCommand-v1610-IEs ::= SEQUENCE {

voiceFallbackIndication-r16 ENUMERATED {true} OPTIONAL, -- Need N

nonCriticalExtension SEQUENCE {} OPTIONAL

}

-- TAG-MOBILITYFROMNRCOMMAND-STOP

-- ASN1STOP

|  |
| --- |
| *MobilityFromNRCommand-IEs* field descriptions |
| ***nas-SecurityParamFromNR***  If *targetRAT-Type* is *eutra*, this field is used to deliver the key synchronisation and Key freshness for the NR to LTE/EPC handovers and a part of the downlink NAS COUNT as specified in TS 33.501 [11]. If *targetRAT-Type* is *utra-fdd*, this field is used to deliver the key synchronisation and Key freshness for the NR to FDD UTRAN handover and a part of the downlink NAS COUNT as specified in TS 33.501 [11]. |
| ***targetRAT-MessageContainer***  The field contains a message specified in another standard, as indicated by the *targetRAT-Type*, and carries information about the target cell identifier(s) and radio parameters relevant for the target radio access technology. A complete message is included, as specified in the other standard. See NOTE 1 |
| ***targetRAT-Type***  Indicates the target RAT type. |
| ***voiceFallbackIndication***  Indicates the handover is triggered by EPS fallback for IMS voice as specified in TS 23.502 [43]. |

NOTE 1: The correspondence between the value of the *targetRAT-Type*, the standard to apply, and the message contained within the *targetRAT-MessageContainer* is shown in the table below:

|  |  |  |
| --- | --- | --- |
| targetRAT-Type | Standard to apply | targetRAT-MessageContainer |
| *eutra* | TS 36.331 [10] (clause 5.4.2) | *DL-DCCH-Message* including the *RRCConnectionReconfiguration* |
| *utra-fdd* | TS 25.331 [45] (clause 10.2.16a) | *Handover TO UTRAN command* |

|  |  |
| --- | --- |
| Conditional Presence | Explanation |
| *HO-ToEPCUTRAN* | This field is mandatory present in case of inter system handover to "EPC" or "FDD UTRAN". Otherwise it is absent. |

#### – *Paging*

The *Paging* message is used for the notification of one or more UEs.

Signalling radio bearer: N/A

RLC-SAP: TM

Logical channel: PCCH

Direction: Network to UE

*Paging* message

-- ASN1START

-- TAG-PAGING-START

Paging ::= SEQUENCE {

pagingRecordList PagingRecordList OPTIONAL, -- Need N

lateNonCriticalExtension OCTET STRING OPTIONAL,

nonCriticalExtension Paging-v1700-IEs OPTIONAL

}

Paging-v1700-IEs ::= SEQUENCE {

pagingRecordList-v1700 PagingRecordList-v1700 OPTIONAL, -- Need N

pagingGroupList-r17 PagingGroupList-r17 OPTIONAL, -- Need N

nonCriticalExtension SEQUENCE {} OPTIONAL

}

PagingRecordList ::= SEQUENCE (SIZE(1..maxNrofPageRec)) OF PagingRecord

PagingRecordList-v1700 ::= SEQUENCE (SIZE(1..maxNrofPageRec)) OF PagingRecord-v1700

PagingGroupList-r17 ::= SEQUENCE (SIZE(1..maxNrofPageGroup-r17)) OF TMGI-r17

PagingRecord ::= SEQUENCE {

ue-Identity PagingUE-Identity,

accessType ENUMERATED {non3GPP} OPTIONAL, -- Need N

...

}

PagingRecord-v1700 ::= SEQUENCE {

pagingCause-r17 ENUMERATED {voice} OPTIONAL -- Need N

}

PagingUE-Identity ::= CHOICE {

ng-5G-S-TMSI NG-5G-S-TMSI,

fullI-RNTI I-RNTI-Value,

...

}

-- TAG-PAGING-STOP

-- ASN1STOP

|  |
| --- |
| *PagingRecord* field descriptions |
| ***accessType***  Indicates whether the *Paging* message is originated due to the PDU sessions from the non-3GPP access. |
| ***pagingRecordList***  If the network includes pagingRecordList-v1700, it includes the same number of entries, and listed in the same order, as in pagingRecordList (i.e. without suffix). |
| ***pagingCause***  Indicates whether the Paging message is originated due to IMS voice. If this field is present, it implies that the corresponding paging entry is for IMS voice. If upper layers indicate the support of paging cause and if this field is not present but pagingRecordList-v1700 is present, it implies that the corresponding paging entry is for a service other than IMS voice. Otherwise, paging cause is undetermined. |

#### – *RRCReestablishment*

The *RRCReestablishment* message is used to re-establish SRB1.

Signalling radio bearer: SRB1

RLC-SAP: AM

Logical channel: DCCH

Direction: Network to UE

*RRCReestablishment* message

-- ASN1START

-- TAG-RRCREESTABLISHMENT-START

RRCReestablishment ::= SEQUENCE {

rrc-TransactionIdentifier RRC-TransactionIdentifier,

criticalExtensions CHOICE {

rrcReestablishment RRCReestablishment-IEs,

criticalExtensionsFuture SEQUENCE {}

}

}

RRCReestablishment-IEs ::= SEQUENCE {

nextHopChainingCount NextHopChainingCount,

lateNonCriticalExtension OCTET STRING OPTIONAL,

nonCriticalExtension RRCReestablishment-v1700-IEs OPTIONAL

}

RRCReestablishment-v1700-IEs ::= SEQUENCE {

sl-L2RemoteUE-Config-r17 SetupRelease {SL-L2RemoteUE-Config-r17} OPTIONAL, -- Cond L2RemoteUE

nonCriticalExtension SEQUENCE {} OPTIONAL

}

-- TAG-RRCREESTABLISHMENT-STOP

-- ASN1STOP

|  |
| --- |
| *RRCReestablishment-IEs* field descriptions |
| ***sl-L2RemoteUE-Config***  Contains dedicated configurations used for L2 U2N relay related operation. The network configures only the SRAP configuration used for the SRB1. |

|  |  |
| --- | --- |
| Conditional Presence | Explanation |
| *L2RemoteUE* | The field is mandatory present for L2 U2N Remote UE; otherwise it is absent. |

#### – *RRCReestablishmentComplete*

The *RRCReestablishmentComplete* message is used to confirm the successful completion of an RRC connection re-establishment.

Signalling radio bearer: SRB1

RLC-SAP: AM

Logical channel: DCCH

Direction: UE to Network

*RRCReestablishmentComplete* message

-- ASN1START

-- TAG-RRCREESTABLISHMENTCOMPLETE-START

RRCReestablishmentComplete ::= SEQUENCE {

rrc-TransactionIdentifier RRC-TransactionIdentifier,

criticalExtensions CHOICE {

rrcReestablishmentComplete RRCReestablishmentComplete-IEs,

criticalExtensionsFuture SEQUENCE {}

}

}

RRCReestablishmentComplete-IEs ::= SEQUENCE {

lateNonCriticalExtension OCTET STRING OPTIONAL,

nonCriticalExtension RRCReestablishmentComplete-v1610-IEs OPTIONAL

}

RRCReestablishmentComplete-v1610-IEs ::= SEQUENCE {

ue-MeasurementsAvailable-r16 UE-MeasurementsAvailable-r16 OPTIONAL,

nonCriticalExtension SEQUENCE {} OPTIONAL

}

-- TAG-RRCREESTABLISHMENTCOMPLETE-STOP

-- ASN1STOP

#### – *RRCReestablishmentRequest*

The *RRCReestablishmentRequest* message is used to request the reestablishment of an RRC connection.

Signalling radio bearer: SRB0

RLC-SAP: TM

Logical channel: CCCH

Direction: UE to Network

*RRCReestablishmentRequest* message

-- ASN1START

-- TAG-RRCREESTABLISHMENTREQUEST-START

RRCReestablishmentRequest ::= SEQUENCE {

rrcReestablishmentRequest RRCReestablishmentRequest-IEs

}

RRCReestablishmentRequest-IEs ::= SEQUENCE {

ue-Identity ReestabUE-Identity,

reestablishmentCause ReestablishmentCause,

spare BIT STRING (SIZE (1))

}

ReestabUE-Identity ::= SEQUENCE {

c-RNTI RNTI-Value,

physCellId PhysCellId,

shortMAC-I ShortMAC-I

}

ReestablishmentCause ::= ENUMERATED {reconfigurationFailure, handoverFailure, otherFailure, spare1}

-- TAG-RRCREESTABLISHMENTREQUEST-STOP

-- ASN1STOP

|  |
| --- |
| *ReestabUE-Identity* field descriptions |
| ***physCellId***  The Physical Cell Identity of the PCell the UE was connected to prior to the failure. |

|  |
| --- |
| *RRCReestablishmentRequest-IEs* field descriptions |
| ***reestablishmentCause***  Indicates the failure cause that triggered the re-establishment procedure. gNB is not expected to reject a *RRCReestablishmentRequest* due to unknown cause value being used by the UE. |
| ***ue-Identity***  UE identity included to retrieve UE context and to facilitate contention resolution by lower layers. |

#### – *RRCReconfiguration*

The *RRCReconfiguration* message is the command to modify an RRC connection. It may convey information for measurement configuration, mobility control, radio resource configuration (including RBs, MAC main configuration and physical channel configuration) and AS security configuration.

Signalling radio bearer: SRB1 or SRB3

RLC-SAP: AM

Logical channel: DCCH

Direction: Network to UE

*RRCReconfiguration message*

-- ASN1START

-- TAG-RRCRECONFIGURATION-START

RRCReconfiguration ::= SEQUENCE {

rrc-TransactionIdentifier RRC-TransactionIdentifier,

criticalExtensions CHOICE {

rrcReconfiguration RRCReconfiguration-IEs,

criticalExtensionsFuture SEQUENCE {}

}

}

RRCReconfiguration-IEs ::= SEQUENCE {

radioBearerConfig RadioBearerConfig OPTIONAL, -- Need M

secondaryCellGroup OCTET STRING (CONTAINING CellGroupConfig) OPTIONAL, -- Cond SCG

measConfig MeasConfig OPTIONAL, -- Need M

lateNonCriticalExtension OCTET STRING OPTIONAL,

nonCriticalExtension RRCReconfiguration-v1530-IEs OPTIONAL

}

RRCReconfiguration-v1530-IEs ::= SEQUENCE {

masterCellGroup OCTET STRING (CONTAINING CellGroupConfig) OPTIONAL, -- Need M

fullConfig ENUMERATED {true} OPTIONAL, -- Cond FullConfig

dedicatedNAS-MessageList SEQUENCE (SIZE(1..maxDRB)) OF DedicatedNAS-Message OPTIONAL, -- Cond nonHO

masterKeyUpdate MasterKeyUpdate OPTIONAL, -- Cond MasterKeyChange

dedicatedSIB1-Delivery OCTET STRING (CONTAINING SIB1) OPTIONAL, -- Need N

dedicatedSystemInformationDelivery OCTET STRING (CONTAINING SystemInformation) OPTIONAL, -- Need N

otherConfig OtherConfig OPTIONAL, -- Need M

nonCriticalExtension RRCReconfiguration-v1540-IEs OPTIONAL

}

RRCReconfiguration-v1540-IEs ::= SEQUENCE {

otherConfig-v1540 OtherConfig-v1540 OPTIONAL, -- Need M

nonCriticalExtension RRCReconfiguration-v1560-IEs OPTIONAL

}

RRCReconfiguration-v1560-IEs ::= SEQUENCE {

mrdc-SecondaryCellGroupConfig SetupRelease { MRDC-SecondaryCellGroupConfig } OPTIONAL, -- Need M

radioBearerConfig2 OCTET STRING (CONTAINING RadioBearerConfig) OPTIONAL, -- Need M

sk-Counter SK-Counter OPTIONAL, -- Need N

nonCriticalExtension RRCReconfiguration-v1610-IEs OPTIONAL

}

RRCReconfiguration-v1610-IEs ::= SEQUENCE {

otherConfig-v1610 OtherConfig-v1610 OPTIONAL, -- Need M

bap-Config-r16 SetupRelease { BAP-Config-r16 } OPTIONAL, -- Need M

iab-IP-AddressConfigurationList-r16 IAB-IP-AddressConfigurationList-r16 OPTIONAL, -- Need M

conditionalReconfiguration-r16 ConditionalReconfiguration-r16 OPTIONAL, -- Need M

daps-SourceRelease-r16 ENUMERATED{true} OPTIONAL, -- Need N

t316-r16 SetupRelease {T316-r16} OPTIONAL, -- Need M

needForGapsConfigNR-r16 SetupRelease {NeedForGapsConfigNR-r16} OPTIONAL, -- Need M

onDemandSIB-Request-r16 SetupRelease { OnDemandSIB-Request-r16 } OPTIONAL, -- Need M

dedicatedPosSysInfoDelivery-r16 OCTET STRING (CONTAINING PosSystemInformation-r16-IEs) OPTIONAL, -- Need N

sl-ConfigDedicatedNR-r16 SetupRelease {SL-ConfigDedicatedNR-r16} OPTIONAL, -- Need M

sl-ConfigDedicatedEUTRA-Info-r16 SetupRelease {SL-ConfigDedicatedEUTRA-Info-r16} OPTIONAL, -- Need M

targetCellSMTC-SCG-r16 SSB-MTC OPTIONAL, -- Need S

nonCriticalExtension RRCReconfiguration-v1700-IEs OPTIONAL

}

RRCReconfiguration-v1700-IEs ::= SEQUENCE {

otherConfig-v1700 OtherConfig-v1700 OPTIONAL, -- Need M

sl-L2RelayUE-Config-r17 SetupRelease { SL-L2RelayUE-Config-r17 } OPTIONAL, -- Need M

sl-L2RemoteUE-Config-r17 SetupRelease { SL-L2RemoteUE-Config-r17 } OPTIONAL, -- Need M

dedicatedPagingDelivery-r17 OCTET STRING (CONTAINING Paging) OPTIONAL, -- Cond PagingRelay

needForGapNCSG-ConfigNR-r17 SetupRelease {NeedForGapNCSG-ConfigNR-r17} OPTIONAL, -- Need M

needForGapNCSG-ConfigEUTRA-r17 SetupRelease {NeedForGapNCSG-ConfigEUTRA-r17} OPTIONAL, -- Need M

musim-GapConfig-r17 SetupRelease {MUSIM-GapConfig-r17} OPTIONAL, -- Need M

ul-GapFR2-Config-r17 SetupRelease { UL-GapFR2-Config-r17 } OPTIONAL, -- Need M

scg-State-r17 ENUMERATED { deactivated } OPTIONAL, -- Need N

appLayerMeasConfig-r17 AppLayerMeasConfig-r17 OPTIONAL, -- Need M

ue-TxTEG-RequestUL-TDOA-Config-r17 SetupRelease {UE-TxTEG-RequestUL-TDOA-Config-r17} OPTIONAL, -- Need M

nonCriticalExtension SEQUENCE {} OPTIONAL

}

MRDC-SecondaryCellGroupConfig ::= SEQUENCE {

mrdc-ReleaseAndAdd ENUMERATED {true} OPTIONAL, -- Need N

mrdc-SecondaryCellGroup CHOICE {

nr-SCG OCTET STRING (CONTAINING RRCReconfiguration),

eutra-SCG OCTET STRING

}

}

BAP-Config-r16 ::= SEQUENCE {

bap-Address-r16 BIT STRING (SIZE (10)) OPTIONAL, -- Need M

defaultUL-BAP-RoutingID-r16 BAP-RoutingID-r16 OPTIONAL, -- Need M

defaultUL-BH-RLC-Channel-r16 BH-RLC-ChannelID-r16 OPTIONAL, -- Need M

flowControlFeedbackType-r16 ENUMERATED {perBH-RLC-Channel, perRoutingID, both} OPTIONAL, -- Need R

...

}

MasterKeyUpdate ::= SEQUENCE {

keySetChangeIndicator BOOLEAN,

nextHopChainingCount NextHopChainingCount,

nas-Container OCTET STRING OPTIONAL, -- Cond securityNASC

...

}

OnDemandSIB-Request-r16 ::= SEQUENCE {

onDemandSIB-RequestProhibitTimer-r16 ENUMERATED {s0, s0dot5, s1, s2, s5, s10, s20, s30}

}

T316-r16 ::= ENUMERATED {ms50, ms100, ms200, ms300, ms400, ms500, ms600, ms1000, ms1500, ms2000}

IAB-IP-AddressConfigurationList-r16 ::= SEQUENCE {

iab-IP-AddressToAddModList-r16 SEQUENCE (SIZE(1..maxIAB-IP-Address-r16)) OF IAB-IP-AddressConfiguration-r16 OPTIONAL, -- Need N

iab-IP-AddressToReleaseList-r16 SEQUENCE (SIZE(1..maxIAB-IP-Address-r16)) OF IAB-IP-AddressIndex-r16 OPTIONAL, -- Need N

...

}

IAB-IP-AddressConfiguration-r16 ::= SEQUENCE {

iab-IP-AddressIndex-r16 IAB-IP-AddressIndex-r16,

iab-IP-Address-r16 IAB-IP-Address-r16 OPTIONAL, -- Need M

iab-IP-Usage-r16 IAB-IP-Usage-r16 OPTIONAL, -- Need M

iab-donor-DU-BAP-Address-r16 BIT STRING (SIZE(10)) OPTIONAL, -- Need M

...

}

SL-ConfigDedicatedEUTRA-Info-r16 ::= SEQUENCE {

sl-ConfigDedicatedEUTRA-r16 OCTET STRING OPTIONAL, -- Need M

sl-TimeOffsetEUTRA-List-r16 SEQUENCE (SIZE (8)) OF SL-TimeOffsetEUTRA-r16 OPTIONAL -- Need M

}

SL-TimeOffsetEUTRA-r16 ::= ENUMERATED {ms0, ms0dot25, ms0dot5, ms0dot625, ms0dot75, ms1, ms1dot25, ms1dot5, ms1dot75,

ms2, ms2dot5, ms3, ms4, ms5, ms6, ms8, ms10, ms20}

UE-TxTEG-RequestUL-TDOA-Config-r17 ::= CHOICE {

oneShot-r17 NULL,

periodicReporting-r17 ENUMERATED { ms160, ms320, ms1280, ms2560, ms61440, ms81920, ms368640, ms737280 }

}

-- TAG-RRCRECONFIGURATION-STOP

-- ASN1STOP

|  |
| --- |
| *RRCReconfiguration-IEs* field descriptions |
| ***bap-Config***  This field is used to configure the BAP entity for IAB nodes. |
| ***bap-Address***  Indicates the BAP address of an IAB-node. The BAP address of an IAB-node cannot be changed once configured for the cell group to the BAP entity. |
| ***conditionalReconfiguration***  Configuration of candidate target SpCell(s) and execution condition(s) for conditional handover, conditional PSCell addition or conditional PSCell change. The field is absent if any DAPS bearer is configured or if the *masterCellGroup* includes *ReconfigurationWithSync* or if the *sl-L2RemoteUE-Config* or *sl-L2RelayUE-Config* is configured. For conditional PSCell change, the field is absent if the *secondaryCellGroup* includes *ReconfigurationWithSync*. The *RRCReconfiguration* message contained in *DLInformationTransferMRDC* cannot contain the field *conditionalReconfiguration* for conditional PSCell change or for conditional PSCell addition. |
| ***daps-SourceRelease***  Indicates to UE that the source cell part of DAPS operation is to be stopped and the source cell part of DAPS configuration is to be released. |
| ***dedicatedNAS-MessageList***  This field is used to transfer UE specific NAS layer information between the network and the UE. The RRC layer is transparent for each PDU in the list. |
| ***dedicatedPagingDelivery***  This field is used to transfer *Paging* message for the associated L2 U2N Remote UE to the L2 U2N Relay UE in RRC\_CONNECTED. |
| ***dedicatedPosSysInfoDelivery***  This field is used to transfer *SIBPos* to the UE in RRC\_CONNECTED. |
| ***dedicatedSIB1-Delivery***  This field is used to transfer *SIB1* to the UE (including L2 U2N Remote UE). The field has the same values as the corresponding configuration in *servingCellConfigCommon*. |
| ***dedicatedSystemInformationDelivery***  This field is used to transfer *SIB6*, *SIB7*, *SIB8, SIB19* to the UE with an active BWP with no common search space configured or the L2 U2N Remote UE in RRC\_CONNECTED. For UEs in RRC\_CONNECTED (including L2 U2N Remote UE), this field is used to transfer the SIBs requested on-demand. |
| ***defaultUL-BAP-RoutingID***  This field is used for IAB-node to configure the default uplink Routing ID, which is used by IAB-node during IAB-node bootstrapping*,* migration, IAB-MT RRC resume and IAB-MT RRC re-establishment for *F1-C* and *non-F1* traffic. The *defaultUL-BAP-RoutingID* can be (re-)configured when IAB-node IP address for *F1-C* related traffic changes. This field is mandatory only for IAB-node bootstrapping. |
| ***defaultUL-BH-RLC-Channel***  This field is used for IAB-nodes to configure the default uplink BH RLC channel*,* which is used by IAB-nodeduring IAB-node bootstrapping*,* migration, IAB-MT RRC resume and IAB-MT RRC re-establishment *for F1-C and non-F1 traffic*. The *defaultUL-BH-RLC-Channel* can be (re-)configured when IAB-node IP address for *F1-C* related traffic changes, and the new IP address is anchored at a different IAB-donor-DU. This field is mandatory for IAB-node bootstrapping. If the IAB-MT is operating in EN-DC, the default uplink BH RLC channel is referring to an RLC channel on the SCG; Otherwise, it is referring to an RLC channel either on the MCG or on the SCG depending on whether the MN or the SN configures this field. |
| ***flowControlFeedbackType***  This field is only used for IAB-node that support hop-by-hop flow control to configure the type of flow control feedback. Value *perBH-RLC-Channel* indicates that the IAB-node shall provide flow control feedback per BH RLC channel, value *perRoutingID* indicates that the IAB-node shall provide flow control feedback per routing ID, and value *both* indicates that the IAB-node shall provide flow control feedback both per BH RLC channel and per routing ID. |
| ***fullConfig***  Indicates that the full configuration option is applicable for the *RRCReconfiguration* message for intra-system intra-RAT HO. For inter-RAT HO from E-UTRA to NR, *fullConfig* indicates whether or not delta signalling of SDAP/PDCP from source RAT is applicable. This field is absent if any DAPS bearer is configured or when the *RRCReconfiguration* message is transmitted on SRB3, and in an *RRCReconfiguration* message for SCG contained in another *RRCReconfiguration* message (or *RRCConnectionReconfiguration* message, see TS 36.331 [10]) transmitted on SRB1. |
| ***iab-IP-Address***  This field is used to provide the IP address information for IAB-node. |
| ***iab-IP-AddressIndex***  This field is used to identify a configuration of an IP address. |
| ***iab-IP-AddressToAddModList***  List of IP addresses allocated for IAB-node to be added and modified. |
| ***iab-IP-AddressToReleaseList***  List of IP address allocated for IAB-node to be released. |
| ***iab-IP-Usage***  This field is used to indicate the usage of the assigned IP address. If this field is not configured, the assigned IP address is used for all traffic. |
| ***iab-donor-DU-BAP-Address***  This field is used to indicate the BAP address of the IAB-donor-DU where the IP address is anchored. |
| ***keySetChangeIndicator***  Indicates whether UE shall derive a new KgNB. If *reconfigurationWithSync* is included, value *true* indicates that a KgNB key is derived from a KAMF key taken into use through the latest successful NAS SMC procedure, or N2 handover procedure with KAMF change, as described in TS 33.501 [11] for KgNB re-keying. Value *false* indicates that the new KgNB key is obtained from the current KgNB key or from the NH as described in TS 33.501 [11]. |
| ***masterCellGroup***  Configuration of master cell group. |
| ***mrdc-ReleaseAndAdd***  This field indicates that the current SCG configuration is released and a new SCG is added at the same time. |
| ***mrdc-SecondaryCellGroup***  Includes an RRC message for SCG configuration in NR-DC or NE-DC. For NR-DC (nr-SCG), *mrdc-SecondaryCellGroup* contains the *RRCReconfiguration* message as generated (entirely) by SN gNB. In this version of the specification, the RRC message can only include fields *secondaryCellGroup, otherConfig, conditionalReconfiguration,* *measConfig,* *bap-Config* and *IAB-IP-AddressConfigurationList*.  For NE-DC (eutra-SCG), *mrdc-SecondaryCellGroup* includes the E-UTRA *RRCConnectionReconfiguration* message as specified in TS 36.331 [10]. In this version of the specification, the E-UTRA RRC message can only include the field *scg-Configuration*. |
| ***musim-GapConfig***  Indicates the MUSIM gap configuration and controls setup/release of MUSIM gaps. |
| ***nas-Container***  This field is used to transfer UE specific NAS layer information between the network and the UE. The RRC layer is transparent for this field, although it affects activation of AS security after inter-system handover to NR. The content is defined in TS 24.501 [23]. |
| ***needForGapsConfigNR***  Configuration for the UE to report measurement gap requirement information of NR target bands in the *RRCReconfigurationComplete* and *RRCResumeComplete* message. |
| ***needForGapNCSG-ConfigEUTRA***  Configuration for the UE to report measurement gap and NCSG requirement information of E‑UTRA target bands in the *RRCReconfigurationComplete* and *RRCResumeComplete* message. |
| ***needForGapNCSG-ConfigNR***  Configuration for the UE to report measurement gap and NCSG requirement information of NR target bands in the *RRCReconfigurationComplete* and *RRCResumeComplete* message. |
| ***nextHopChainingCount***  Parameter NCC: See TS 33.501 [11] |
| ***onDemandSIB-Request***  If the field is present, the UE is allowed to request SIB(s) on-demand while in RRC\_CONNECTED according to clause 5.2.2.3.5. |
| ***onDemandSIB-RequestProhibitTimer***  Prohibit timer for requesting SIB(s) on-demand while in RRC\_CONNECTED according to clause 5.2.2.3.5. Value in seconds. Value s0 means prohibit timer is set to 0 seconds, value s0dot5 means prohibit timer is set to 0.5 seconds, value s1 means prohibit timer is set to 1 second and so on. |
| ***otherConfig***  Contains configuration related to other configurations. When configured for the SCG, only fields *drx-PreferenceConfig, maxBW-PreferenceConfig, maxBW-PreferenceConfigFR2-2, maxCC-PreferenceConfig, maxMIMO-LayerPreferenceConfig*, *maxMIMO-LayerPreferenceConfigFR2-2*, *minSchedulingOffsetPreferenceConfig, minSchedulingOffsetPreferenceConfigExt, btNameList, wlanNameList, sensorNameList* and *obtainCommonLocation* can be included. |
| ***radioBearerConfig***  Configuration of Radio Bearers (DRBs, SRBs, multicast MRBs) including SDAP/PDCP. In EN-DC this field may only be present if the *RRCReconfiguration* is transmitted over SRB3. |
| ***radioBearerConfig2***  Configuration of Radio Bearers (DRBs, SRBs) including SDAP/PDCP. This field can only be used if the UE supports NR-DC or NE-DC. |
| ***scg-State***  Indicates that the SCG is in deactivated state. This field is not used in an *RRCReconfiguration* message received within *mrdc-SecondaryCellGroup*, E-UTRA *RRCConnectionReconfiguration* or E-UTRA *RRCConnectionResume* message or received via SRB3. The field is absent if CPA or CPC is configured for the UE, or if the *RRCReconfiguration* message is contained in *CondRRCReconfig*. |
| ***sl-L2RelayUE-Config***  Contains L2 U2N relay operation related configurations used by a UE acting as or to be acting as a L2 U2N Relay UE. The field is absent if *conditionalReconfiguration* is configured for CHO. |
| ***sl-L2RemoteUE-Config***  Contains L2 U2N relay operation related configurations used by a UE acting as or to be acting as a L2 U2N Remote UE. The field is absent if *conditionalReconfiguration* is configured for CHO. |
| ***secondaryCellGroup***  Configuration of secondary cell group ((NG)EN-DC or NR-DC). |
| ***sk-Counter***  A counter used upon initial configuration of S-KgNB or S-KeNB, as well as upon refresh of S-KgNB or S-KeNB. This field is always included either upon initial configuration of an NR SCG or upon configuration of the first RB with *keyToUse* set to *secondary*, whichever happens first. This field is absent if there is neither any NR SCG nor any RB with *keyToUse* set to *secondary*. |
| ***sl-ConfigDedicatedNR***  This field is used to provide the dedicated configurations for NR sidelink communication/discovery. |
| ***sl-ConfigDedicatedEUTRA-Info***  This field includes the E-UTRA *RRCConnectionReconfiguration* as specified in TS 36.331 [10]. In this version of the specification, the E-UTRA *RRCConnectionReconfiguration* can only includes sidelink related fields for V2X sidelink communication, i.e. *sl-V2X-ConfigDedicated*, *sl-V2X-SPS-Config*, *measConfig* and/or *otherConfig*. |
| ***sl-TimeOffsetEUTRA***  This field indicates the possible time offset to (de)activation of V2X sidelink transmission after receiving DCI format 3\_1 used for scheduling V2X sidelink communication. Value *ms0dpt75* corresponds to 0.75ms, *ms1* corresponds to 1ms and so on. The network includes this field only when *sl-ConfigDedicatedEUTRA* is configured. |
| ***targetCellSMTC-SCG***  The SSB periodicity/offset/duration configuration of target cell for NR PSCell addition and SN change. When UE receives this field, UE applies the configuration based on the timing reference of NR PCell for PSCell addition and PSCell change for the case of no reconfiguration with sync of MCG, and UE applies the configuration based on the timing reference of target NR PCell for the case of reconfiguration with sync of MCG. If both this field and the *smtc* in *secondaryCellGroup* -> *SpCellConfig* -> *reconfigurationWithSync* are absent, the UE uses the SMTC in the *measObjectNR* having the same SSB frequency and subcarrier spacing, as configured before the reception of the RRC message. |
| ***t316***  Indicates the value for timer T316 as described in clause 7.1. Value *ms50* corresponds to 50 ms, value *ms100* corresponds to 100 ms and so on. This field can be configured only if the UE is configured with split SRB1 or SRB3. |
| ***ue-TxTEG-RequestUL-TDOA-Config***  Configures the periodicity of UE reporting for the association between Tx TEG and SRS Positioning resources. When configured with *oneShot* UE reports the association only one time. When configured with *periodicReporting* UE reports the association periodically and the *periodicReporting* indicates the periodicity. Value *ms160* corresponds to 160ms, value *ms320* corresponds to 320ms and so on. |
| ***ul-GapFR2-Config***  Indicates the FR2 UL gap configuration to UE. In EN-DC and NGEN-DC, the SN decides and configures the FR2 UL gap pattern. In NE-DC, the MN decides and configures the FR2 UL gap pattern. In NR-DC without FR2-FR2 band combination, the network entity which is configured with FR2 serving cell(s) decides and configures the FR2 UL gap pattern. |

|  |  |
| --- | --- |
| Conditional Presence | Explanation |
| *nonHO* | The field is absent in case of reconfiguration with sync within NR or to NR; otherwise it is optionally present, need N. |
| *securityNASC* | This field is mandatory present in case of inter system handover. Otherwise the field is optionally present, need N. |
| *MasterKeyChange* | This field is mandatory present in case *masterCellGroup* includes *ReconfigurationWithSync* and *RadioBearerConfig* includes *SecurityConfig* with *SecurityAlgorithmConfig*, indicating a change of the AS security algorithms associated to the master key. If *ReconfigurationWithSync* is included for other cases, this field is optionally present, need N. Otherwise the field is absent. |
| *FullConfig* | The field is mandatory present in case of inter-system handover from E-UTRA/EPC to NR. It is optionally present, Need N, during reconfiguration with sync and also in first reconfiguration after reestablishment; or for intra-system handover from E-UTRA/5GC to NR. It is absent otherwise. |
| *SCG* | The field is mandatory present in:  - an *RRCReconfiguration* message contained in an *RRCResume* message (or in an *RRCConnectionResume* message, see TS 36.331 [10]),  - an *RRCReconfiguration* message contained in an *RRCConnectionReconfiguration* message, see TS 36.331 [10], which is contained in *DLInformationTransferMRDC* transmitted on SRB3 (as a response to *ULInformationTransferMRDC* including an *MCGFailureInformation*).  The field is optional present, Need M, in:  - an *RRCReconfiguration* message transmitted on SRB3,  - an *RRCReconfiguration* message contained in another *RRCReconfiguration* message (or in an *RRCConnectionReconfiguration* message, see TS 36.331 [10]) transmitted on SRB1  - an *RRCReconfiguration* message contained in another *RRCReconfiguration* message which is contained in *DLInformationTransferMRDC* transmitted on SRB3 (as a response to *ULInformationTransferMRDC* including an *MCGFailureInformation*)  Otherwise, the field is absent |
| *PagingRelay* | For L2 U2N Relay UE, the field is optionally present, Need N. Otherwise, it is absent. |

#### *– RRCReconfigurationComplete*

The *RRCReconfigurationComplete* message is used to confirm the successful completion of an RRC connection reconfiguration.

Signalling radio bearer: SRB1 or SRB3

RLC-SAP: AM

Logical channel: DCCH

Direction: UE to Network

*RRCReconfigurationComplete message*

-- ASN1START

-- TAG-RRCRECONFIGURATIONCOMPLETE-START

RRCReconfigurationComplete ::= SEQUENCE {

rrc-TransactionIdentifier RRC-TransactionIdentifier,

criticalExtensions CHOICE {

rrcReconfigurationComplete RRCReconfigurationComplete-IEs,

criticalExtensionsFuture SEQUENCE {}

}

}

RRCReconfigurationComplete-IEs ::= SEQUENCE {

lateNonCriticalExtension OCTET STRING OPTIONAL,

nonCriticalExtension RRCReconfigurationComplete-v1530-IEs OPTIONAL

}

RRCReconfigurationComplete-v1530-IEs ::= SEQUENCE {

uplinkTxDirectCurrentList UplinkTxDirectCurrentList OPTIONAL,

nonCriticalExtension RRCReconfigurationComplete-v1560-IEs OPTIONAL

}

RRCReconfigurationComplete-v1560-IEs ::= SEQUENCE {

scg-Response CHOICE {

nr-SCG-Response OCTET STRING (CONTAINING RRCReconfigurationComplete),

eutra-SCG-Response OCTET STRING

} OPTIONAL,

nonCriticalExtension RRCReconfigurationComplete-v1610-IEs OPTIONAL

}

RRCReconfigurationComplete-v1610-IEs ::= SEQUENCE {

ue-MeasurementsAvailable-r16 UE-MeasurementsAvailable-r16 OPTIONAL,

needForGapsInfoNR-r16 NeedForGapsInfoNR-r16 OPTIONAL,

nonCriticalExtension RRCReconfigurationComplete-v1640-IEs OPTIONAL

}

RRCReconfigurationComplete-v1640-IEs ::= SEQUENCE {

uplinkTxDirectCurrentTwoCarrierList-r16 UplinkTxDirectCurrentTwoCarrierList-r16 OPTIONAL,

nonCriticalExtension RRCReconfigurationComplete-v1700-IEs OPTIONAL

}

RRCReconfigurationComplete-v1700-IEs ::= SEQUENCE {

needForGapNCSG-InfoNR-r17 NeedForGapNCSG-InfoNR-r17 OPTIONAL,

needForGapNCSG-InfoEUTRA-r17 NeedForGapNCSG-InfoEUTRA-r17 OPTIONAL,

selectedCondRRCReconfig-r17 CondReconfigId-r16 OPTIONAL,

nonCriticalExtension SEQUENCE {} OPTIONAL

}

-- TAG-RRCRECONFIGURATIONCOMPLETE-STOP

-- ASN1STOP

|  |
| --- |
| *RRCReconfigurationComplete-IEs* field descriptions |
| ***needForGapsInfoNR***  This field is used to indicate the measurement gap requirement information of the UE for NR target bands. |
| ***needForGapNCSG-InfoEUTRA***  This field is used to indicate the measurement gap and NCSG requirement information of the UE for E‑UTRA target bands. |
| ***needForGapNCSG-InfoNR***  This field is used to indicate the measurement gap and NCSG requirement information of the UE for NR target bands. |
| ***scg-Response***  In case of NR-DC (*nr-SCG-Response*), this field includes the *RRCReconfigurationComplete* message. In case of NE-DC (*eutra-SCG-Response*), this field includes the E-UTRA *RRCConnectionReconfigurationComplete* message as specified in TS 36.331 [10]*.* |
| ***selectedCondRRCReconfig***  This field indicates the ID of the selected conditional reconfiguration the UE applied upon the execution of CPA or inter-SN CPC. |
| ***uplinkTxDirectCurrentList***  The Tx Direct Current locations for the configured serving cells and BWPs if requested by the NW (see *reportUplinkTxDirectCurrent* in *CellGroupConfig*). |
| ***uplinkTxDirectCurrentTwoCarrierList***  The Tx Direct Current locations for the configured uplink intra-band CA with two carriers if requested by the NW (see *reportUplinkTxDirectCurrentTwoCarrier-r16* in *CellGroupConfig*). |

#### – *RRCReject*

The *RRCReject* message is used to reject an RRC connection establishment or an RRC connection resumption.

Signalling radio bearer: SRB0

RLC-SAP: TM

Logical channel: CCCH

Direction: Network to UE

*RRCReject* message

-- ASN1START

-- TAG-RRCREJECT-START

RRCReject ::= SEQUENCE {

criticalExtensions CHOICE {

rrcReject RRCReject-IEs,

criticalExtensionsFuture SEQUENCE {}

}

}

RRCReject-IEs ::= SEQUENCE {

waitTime RejectWaitTime OPTIONAL, -- Need N

lateNonCriticalExtension OCTET STRING OPTIONAL,

nonCriticalExtension SEQUENCE{} OPTIONAL

}

-- TAG-RRCREJECT-STOP

-- ASN1STOP

|  |
| --- |
| *RRCReject-IEs* field descriptions |
| ***waitTime***  Wait time value in seconds. The field is always included. |

#### – *RRCRelease*

The *RRCRelease* message is used to command the release of an RRC connection or the suspension of the RRC connection.

Signalling radio bearer: SRB1

RLC-SAP: AM

Logical channel: DCCH

Direction: Network to UE

*RRCRelease* message

-- ASN1START

-- TAG-RRCRELEASE-START

RRCRelease ::= SEQUENCE {

rrc-TransactionIdentifier RRC-TransactionIdentifier,

criticalExtensions CHOICE {

rrcRelease RRCRelease-IEs,

criticalExtensionsFuture SEQUENCE {}

}

}

RRCRelease-IEs ::= SEQUENCE {

redirectedCarrierInfo RedirectedCarrierInfo OPTIONAL, -- Need N

cellReselectionPriorities CellReselectionPriorities OPTIONAL, -- Need R

suspendConfig SuspendConfig OPTIONAL, -- Need R

deprioritisationReq SEQUENCE {

deprioritisationType ENUMERATED {frequency, nr},

deprioritisationTimer ENUMERATED {min5, min10, min15, min30}

} OPTIONAL, -- Need N

lateNonCriticalExtension OCTET STRING OPTIONAL,

nonCriticalExtension RRCRelease-v1540-IEs OPTIONAL

}

RRCRelease-v1540-IEs ::= SEQUENCE {

waitTime RejectWaitTime OPTIONAL, -- Need N

nonCriticalExtension RRCRelease-v1610-IEs OPTIONAL

}

RRCRelease-v1610-IEs ::= SEQUENCE {

voiceFallbackIndication-r16 ENUMERATED {true} OPTIONAL, -- Need N

measIdleConfig-r16 SetupRelease {MeasIdleConfigDedicated-r16} OPTIONAL, -- Need M

nonCriticalExtension RRCRelease-v1650-IEs OPTIONAL

}

RRCRelease-v1650-IEs ::= SEQUENCE {

mpsPriorityIndication-r16 ENUMERATED {true} OPTIONAL, -- Cond Redirection2

nonCriticalExtension RRCRelease-v1710-IEs OPTIONAL

}

RRCRelease-v1710-IEs ::= SEQUENCE {

noLastCellUpdate-r17 ENUMERATED {true} OPTIONAL, -- Need S

nonCriticalExtension SEQUENCE {} OPTIONAL

}

RedirectedCarrierInfo ::= CHOICE {

nr CarrierInfoNR,

eutra RedirectedCarrierInfo-EUTRA,

...

}

RedirectedCarrierInfo-EUTRA ::= SEQUENCE {

eutraFrequency ARFCN-ValueEUTRA,

cnType ENUMERATED {epc,fiveGC} OPTIONAL -- Need N

}

CarrierInfoNR ::= SEQUENCE {

carrierFreq ARFCN-ValueNR,

ssbSubcarrierSpacing SubcarrierSpacing,

smtc SSB-MTC OPTIONAL, -- Need S

...

}

SuspendConfig ::= SEQUENCE {

fullI-RNTI I-RNTI-Value,

shortI-RNTI ShortI-RNTI-Value,

ran-PagingCycle PagingCycle,

ran-NotificationAreaInfo RAN-NotificationAreaInfo OPTIONAL, -- Need M

t380 PeriodicRNAU-TimerValue OPTIONAL, -- Need R

nextHopChainingCount NextHopChainingCount,

...,

[[

sl-UEIdentityRemote-r17 RNTI-Value OPTIONAL, -- Cond L2RemoteUE

sdt-Config-r17 SetupRelease { SDT-Config-r17 } OPTIONAL, -- Need M

srs-PosRRC-Inactive-r17 SetupRelease { SRS-PosRRC-Inactive-r17 } OPTIONAL, -- Need M

ran-ExtendedPagingCycle-r17 ExtendedPagingCycle-r17 OPTIONAL -- Cond RANPaging

]]

}

PeriodicRNAU-TimerValue ::= ENUMERATED { min5, min10, min20, min30, min60, min120, min360, min720}

CellReselectionPriorities ::= SEQUENCE {

freqPriorityListEUTRA FreqPriorityListEUTRA OPTIONAL, -- Need M

freqPriorityListNR FreqPriorityListNR OPTIONAL, -- Need M

t320 ENUMERATED {min5, min10, min20, min30, min60, min120, min180, spare1} OPTIONAL, -- Need R

...,

[[

freqPriorityListDedicatedSlicing-r17 FreqPriorityListDedicatedSlicing-r17 OPTIONAL -- Need M

]]

}

PagingCycle ::= ENUMERATED {rf32, rf64, rf128, rf256}

ExtendedPagingCycle-r17 ::= ENUMERATED {rf256, rf512, rf1024, spare1}

FreqPriorityListEUTRA ::= SEQUENCE (SIZE (1..maxFreq)) OF FreqPriorityEUTRA

FreqPriorityListNR ::= SEQUENCE (SIZE (1..maxFreq)) OF FreqPriorityNR

FreqPriorityEUTRA ::= SEQUENCE {

carrierFreq ARFCN-ValueEUTRA,

cellReselectionPriority CellReselectionPriority,

cellReselectionSubPriority CellReselectionSubPriority OPTIONAL -- Need R

}

FreqPriorityNR ::= SEQUENCE {

carrierFreq ARFCN-ValueNR,

cellReselectionPriority CellReselectionPriority,

cellReselectionSubPriority CellReselectionSubPriority OPTIONAL -- Need R

}

RAN-NotificationAreaInfo ::= CHOICE {

cellList PLMN-RAN-AreaCellList,

ran-AreaConfigList PLMN-RAN-AreaConfigList,

...

}

PLMN-RAN-AreaCellList ::= SEQUENCE (SIZE (1.. maxPLMNIdentities)) OF PLMN-RAN-AreaCell

PLMN-RAN-AreaCell ::= SEQUENCE {

plmn-Identity PLMN-Identity OPTIONAL, -- Need S

ran-AreaCells SEQUENCE (SIZE (1..32)) OF CellIdentity

}

PLMN-RAN-AreaConfigList ::= SEQUENCE (SIZE (1..maxPLMNIdentities)) OF PLMN-RAN-AreaConfig

PLMN-RAN-AreaConfig ::= SEQUENCE {

plmn-Identity PLMN-Identity OPTIONAL, -- Need S

ran-Area SEQUENCE (SIZE (1..16)) OF RAN-AreaConfig

}

RAN-AreaConfig ::= SEQUENCE {

trackingAreaCode TrackingAreaCode,

ran-AreaCodeList SEQUENCE (SIZE (1..32)) OF RAN-AreaCode OPTIONAL -- Need R

}

SDT-Config-r17 ::= SEQUENCE {

sdt-DRB-List-r17 SEQUENCE (SIZE (0..maxDRB)) OF DRB-Identity OPTIONAL, -- Need M

sdt-SRB2-Indication-r17 ENUMERATED {allowed} OPTIONAL, -- Need R

sdt-MAC-PHY-CG-Config-r17 SetupRelease {SDT-CG-Config-r17} OPTIONAL, -- Need M

sdt-DRB-ContinueROHC-r17 ENUMERATED { cell, rna } OPTIONAL -- Need S

}

SDT-CG-Config-r17 ::= OCTET STRING (CONTAINING SDT-MAC-PHY-CG-Config-r17)

SDT-MAC-PHY-CG-Config-r17 ::= SEQUENCE {

-- CG-SDT specific configuration

cg-SDT-ConfigLCH-RestrictionToAddModList-r17 SEQUENCE (SIZE(1..maxLC-ID)) OF CG-SDT-ConfigLCH-Restriction-r17 OPTIONAL, -- Need N

cg-SDT-ConfigLCH-RestrictionToReleaseList-r17 SEQUENCE (SIZE(1..maxLC-ID)) OF LogicalChannelIdentity OPTIONAL, -- Need N

cg-SDT-ConfigInitialBWP-NUL-r17 SetupRelease {BWP-UplinkDedicatedSDT-r17} OPTIONAL, -- Need M

cg-SDT-ConfigInitialBWP-SUL-r17 SetupRelease {BWP-UplinkDedicatedSDT-r17} OPTIONAL, -- Need M

cg-SDT-ConfigInitialBWP-DL-r17 BWP-DownlinkDedicatedSDT-r17 OPTIONAL, -- Need M

cg-SDT-TimeAlignmentTimer-r17 TimeAlignmentTimer OPTIONAL, -- Need M

cg-SDT-RSRP-ThresholdSSB-r17 RSRP-Range OPTIONAL, -- Need M

cg-SDT-TA-ValidationConfig-r17 SetupRelease { CG-SDT-TA-ValidationConfig-r17 } OPTIONAL, -- Need M

cg-SDT-CS-RNTI-r17 RNTI-Value OPTIONAL, -- Need M

...

}

CG-SDT-TA-ValidationConfig-r17 ::= SEQUENCE {

cg-SDT-RSRP-ChangeThreshold-r17 ENUMERATED { dB2, dB4, dB6, dB8, dB10, dB14, dB18, dB22,

dB26, dB30, dB34, spare5, spare4, spare3, spare2, spare1}

}

BWP-DownlinkDedicatedSDT-r17 ::= SEQUENCE {

pdcch-Config-r17 SetupRelease { PDCCH-Config } OPTIONAL, -- Need M

pdsch-Config-r17 SetupRelease { PDSCH-Config } OPTIONAL, -- Need M

...

}

BWP-UplinkDedicatedSDT-r17 ::= SEQUENCE {

pusch-Config-r17 SetupRelease { PUSCH-Config } OPTIONAL, -- Need M

configuredGrantConfigToAddModList-r17 ConfiguredGrantConfigToAddModList-r16 OPTIONAL, -- Need N

configuredGrantConfigToReleaseList-r17 ConfiguredGrantConfigToReleaseList-r16 OPTIONAL, -- Need N

...

}

CG-SDT-ConfigLCH-Restriction-r17 ::= SEQUENCE {

logicalChannelIdentity-r17 LogicalChannelIdentity,

configuredGrantType1Allowed-r17 ENUMERATED {true} OPTIONAL, -- Need R

allowedCG-List-r17 SEQUENCE (SIZE (0.. maxNrofConfiguredGrantConfigMAC-1-r16)) OF ConfiguredGrantConfigIndexMAC-r16

OPTIONAL -- Need R

}

SRS-PosRRC-Inactive-r17 ::= OCTET STRING (CONTAINING SRS-PosRRC-InactiveConfig-r17)

SRS-PosRRC-InactiveConfig-r17 ::= SEQUENCE {

srs-PosConfigNUL-r17 SRS-PosConfig-r17 OPTIONAL, -- Need R

srs-PosConfigSUL-r17 SRS-PosConfig-r17 OPTIONAL, -- Need R

bwp-NUL-r17 BWP OPTIONAL, -- Need S

bwp-SUL-r17 BWP OPTIONAL, -- Need S

inactivePosSRS-TimeAlignmentTimer-r17 TimeAlignmentTimer OPTIONAL, -- Need M

inactivePosSRS-RSRP-changeThreshold-r17 RSRP-ChangeThreshold-r17 OPTIONAL -- Need M

}

RSRP-ChangeThreshold-r17 ::= ENUMERATED {dB4, dB6, dB8, dB10, dB14, dB18, dB22, dB26, dB30, dB34, spare6, spare5, spare4, spare3, spare2, spare1}

SRS-PosConfig-r17 ::= SEQUENCE {

srs-PosResourceSetToReleaseList-r17 SEQUENCE (SIZE(1..maxNrofSRS-PosResourceSets-r16)) OF SRS-PosResourceSetId-r16 OPTIONAL,-- Need N

srs-PosResourceSetToAddModList-r17 SEQUENCE (SIZE(1..maxNrofSRS-PosResourceSets-r16)) OF SRS-PosResourceSet-r16 OPTIONAL,-- Need N

srs-PosResourceToReleaseList-r17 SEQUENCE (SIZE(1..maxNrofSRS-PosResources-r16)) OF SRS-PosResourceId-r16 OPTIONAL,-- Need N

srs-PosResourceToAddModList-r17 SEQUENCE (SIZE(1..maxNrofSRS-PosResources-r16)) OF SRS-PosResource-r16 OPTIONAL -- Need N

}

-- TAG-RRCRELEASE-STOP

-- ASN1STOP

|  |
| --- |
| *RRCRelease-IEs* field descriptions |
| ***cnType***  Indicate that the UE is redirected to EPC or 5GC. |
| ***deprioritisationReq***  Indicates whether the current frequency or RAT is to be de-prioritised. |
| ***deprioritisationTimer***  Indicates the period for which either the current carrier frequency or NR is deprioritised. Value *minN* corresponds to N minutes. |
| ***measIdleConfig***  Indicates measurement configuration to be stored and used by the UE while in RRC\_IDLE or RRC\_INACTIVE. |
| ***mpsPriorityIndication***  Indicates the UE can set the establishment cause to mps-PriorityAccess for a new connection to a new RAT following a redirect to NR. If the target RAT is E-UTRA, see TS 36.331 [10]. The gNB sets the indication only for UEs authorized to receive MPS treatment as indicated by ARP and/or QoS characteristics at the gNB, and it is applicable only for this instance of release with redirection to carrier/RAT included in the *redirectedCarrierInfo* field in the *RRCRelease* message. |
| ***noLastCellUpdate***  Presence of the field indicates that the last used cell for PEI shall not be updated. When the field is absent, the UE shall update its last used cell with the current cell. |
| ***srs-PosRRCInactiveConfig***  SRS for positioning confifuration during RRC\_INACTIVE State. |
| ***suspendConfig***  Indicates configuration for the RRC\_INACTIVE state. The network does not configure *suspendConfig* when the network redirect the UE to an inter-RAT carrier frequency or if the UE is configured with a DAPS bearer. |
| ***redirectedCarrierInfo***  Indicates a carrier frequency (downlink for FDD) and is used to redirect the UE to an NR or an inter-RAT carrier frequency, by means of cell selection at transition to RRC\_IDLE or RRC\_INACTIVE as specified in TS 38.304 [20]. Based on UE capability, the network may include *redirectedCarrierInfo* in *RRCRelease* message with *suspendConfig* if this message is sent in response to an *RRCResumeRequest* or an *RRCResumeRequest1* which is triggered by the NAS layer (see 5.3.1.4 in TS 24.501 [23]). |
| ***voiceFallbackIndication***  Indicates the RRC release is triggered by EPS fallback for IMS voice as specified in TS 23.502 [43]. |

|  |
| --- |
| *CarrierInfoNR* field descriptions |
| ***carrierFreq***  Indicates the redirected NR frequency. |
| ***ssbSubcarrierSpacing***  Subcarrier spacing of SSB in the redirected SSB frequency.  Only the following values are applicable depending on the used frequency:  FR1: 15 or 30 kHz  FR2-1: 120 or 240 kHz  FR2-2: 120, 480, or 960 kHz |
| ***smtc***  The SSB periodicity/offset/duration configuration for the redirected SSB frequency. It is based on timing reference of PCell. If the field is absent, the UE uses the SMTC configured in the measObjectNR having the same SSB frequency and subcarrier spacing. |

|  |
| --- |
| *RAN-NotificationAreaInfo* field descriptions |
| ***cellList***  A list of cells configured as RAN area. |
| ***ran-AreaConfigList***  A list of RAN area codes or RA code(s) as RAN area. |

|  |
| --- |
| *PLMN-RAN-AreaConfig* field descriptions |
| ***plmn-Identity***  PLMN Identity to which the cells in *ran-Area* belong. If the field is absent the UE not in SNPN access mode uses the ID of the registered PLMN. This field is not included for UE in SNPN access mode (for UE in SNPN access mode the *ran-Area* always belongs to the registered SNPN). |
| ***ran-AreaCodeList***  The total number of RAN-AreaCodes of all PLMNs does not exceed 32. |
| ***ran-Area***  Indicates whether TA code(s) or RAN area code(s) are used for the RAN notification area. The network uses only TA code(s) or both TA code(s) and RAN area code(s) to configure a UE. The total number of TACs across all PLMNs does not exceed 16. |

|  |
| --- |
| *PLMN-RAN-AreaCell* field descriptions |
| ***plmn-Identity***  PLMN Identity to which the cells in *ran-AreaCells* belong. If the field is absent the UE not in SNPN access mode uses the ID of the registered PLMN. This field is not included for UE in SNPN access mode (for UE in SNPN access mode the *ran-AreaCells* always belongs to the registered SNPN). |
| ***ran-AreaCells***  The total number of cells of all PLMNs does not exceed 32. |

|  |
| --- |
| *SDT-Config* field descriptions |
| ***sdt-DRB-ContinueROHC***  Indicates whether the PDCP entity of the radio bearers configured for SDT continues or resets the ROHC header compression protocol during PDCP re-establishment during SDT procedure, as specified in TS 38.323 [5]. Value *cell* indicates that ROHC header compression continues when the UE resumes for SDT in the same cell as the PCell when the RRCRelease message was received. Value *rna* indicates that ROHC header compression continues when the UE resumes for SDT in a cell belonging to the same RNA as the PCell where the RRCRelease message was received. If the field is absent, the UE releases any stored value for this field and the PDCP entity of the radio bearers configured for SDT always resets the ROHC header compression protocol during PDCP re-establishment when SDT procedure is initiated, as specified in TS 38.323 [5]. |
| ***sdt-DRB-List***  Indicates the ID(s) of the DRB(s) that are configured for SDT. If size of the sequence is zero, then the UE assumes that none of the DRBs are configured for SDT. The network only configures MN terminated MCG bearers for SDT. |
| ***sdt-SRB2-Indication***  Indiates whether SRB2 is configured for SDT or not. |

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| --- |
| *SDT-MAC-PHY-CG-Config* field descriptions |
| ***cg-SDT-CS-RNTI***  The CS-RNTI value for CG-SDT as specified in TS 38.321 [3]. |
| ***cg-SDT-RSRP-ThresholdSSB***  An RSRP threshold configured for SSB selection for CG-SDT as specified in TS 38.321 [3]. |
| ***cg-SDT-TA-ValidationConfig***  Configuration for the RSRP based TA validation. If this field is not configured, then the UE does not perform RSRP based TA validation. |
| ***cg-SDT-timeAlignmentTimer***  TAT value for CG-SDT as specified in TS 38.321 [3]. The network always configures this when *sdt-MAC-PHY-CG-Config* is configured. |

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| --- |
| *CG-SDT-TA-ValidationConfig* field descriptions |
| ***cg-SDT-RSRP-ChangeThreshold***  The RSRP threshold for TA validation for CG-SDT as specified in TS 38.321 [3]. Value *dB2* corresponds to 2 dB, value *dB4* corresponds to 4 dB and so on. |

|  |
| --- |
| *SRS-PosRRC-InactiveConfig* field descriptions |
| ***bwp-NUL***  BWP configuration for SRS for Positioning during the RRC\_INACTIVE state in Normal Uplink Carrier. If the field is absent UE is configured with an SRS for Positioning associated with the initial UL BWP and transmitted, during the RRC\_INACTIVE state, inside the initial UL BWP with the same CP and SCS as configured for initial UL BWP. |
| ***bwp-SUL***  BWP configuration for SRS for Positioning during the RRC\_INACTIVE state in Supplementary Uplink Carrier. If the field is absent UE is configured with an SRS for Positioning associated with the initial UL BWP and transmitted, during the RRC\_INACTIVE state, inside the initial UL BWP with the same CP and SCS as configured for initial UL BWP. |
| ***inactivePosSRS-RSRP-changeThreshold***  RSRP threshold for the increase/decrease of RSRP for time alignment validation as specified in TS 38.321 [3]. |
| ***inactivePosSRS-TimeAlignmentTimer***  TAT value for SRS for positioning transmission during RRC\_INACTIVE State as specified in TS 38.321 [3]. |
| ***srs-PosConfig-NUL***  SRS for Positioning configuration in RRC\_INACTIVE state in Normal Uplink Carrier. |
| ***srs-PosConfig-SUL***  SRS for Positioning configuration in RRC\_INACTIVE state in Supplementary Uplink Carrier. |

|  |  |
| --- | --- |
| *SuspendConfig* field descriptions | |
| ***ran-ExtendedPagingCycle***  The extended DRX (eDRX) cycle for RAN-initiated paging to be applied by the UE. Value *rf256* corresponds to 256 radio frames, value *rf512* corresponds to 512 radio frames and so on. Value of the field indicates an eDRX cycle which is shorter or equal to the IDLE mode eDRX cycle configured for the UE. |
| ***ran-NotificationAreaInfo***  Network ensures that the UE in RRC\_INACTIVE always has a valid *ran-NotificationAreaInfo*. | |
| ***ran-PagingCycle***  Refers to the UE specific cycle for RAN-initiated paging. Value *rf32* corresponds to 32 radio frames, value *rf64* corresponds to 64 radio frames and so on. | |
| ***sl-UEIdentityRemote***  Indicates the C-RNTI to the L2 U2N Remote UE. | |
| ***t380***  Refers to the timer that triggers the periodic RNAU procedure in UE. Value *min5* corresponds to 5 minutes, value *min10* corresponds to 10 minutes and so on. | |

|  |  |
| --- | --- |
| Conditional Presence | Explanation |
| *L2RemoteUE* | The field is mandatory present for L2 U2N Remote UE's RNAU; otherwise it is absent. |
| *RANPaging* | This field is optionally present, Need R, if the UE is configured with eDRX in IDLE mode, see TS 24.401 [23]; otherwise the field is not present. |
| *Redirection2* | The field is optionally present, Need R, if *redirectedCarrierInfo* is included; otherwise the field is not present. |

#### – *RRCResume*

The *RRCResume* message is used to resume the suspended RRC connection.

Signalling radio bearer: SRB1

RLC-SAP: AM

Logical channel: DCCH

Direction: Network to UE

*RRCResume* message

-- ASN1START

-- TAG-RRCRESUME-START

RRCResume ::= SEQUENCE {

rrc-TransactionIdentifier RRC-TransactionIdentifier,

criticalExtensions CHOICE {

rrcResume RRCResume-IEs,

criticalExtensionsFuture SEQUENCE {}

}

}

RRCResume-IEs ::= SEQUENCE {

radioBearerConfig RadioBearerConfig OPTIONAL, -- Need M

masterCellGroup OCTET STRING (CONTAINING CellGroupConfig) OPTIONAL, -- Need M

measConfig MeasConfig OPTIONAL, -- Need M

fullConfig ENUMERATED {true} OPTIONAL, -- Need N

lateNonCriticalExtension OCTET STRING OPTIONAL,

nonCriticalExtension RRCResume-v1560-IEs OPTIONAL

}

RRCResume-v1560-IEs ::= SEQUENCE {

radioBearerConfig2 OCTET STRING (CONTAINING RadioBearerConfig) OPTIONAL, -- Need M

sk-Counter SK-Counter OPTIONAL, -- Need N

nonCriticalExtension RRCResume-v1610-IEs OPTIONAL

}

RRCResume-v1610-IEs ::= SEQUENCE {

idleModeMeasurementReq-r16 ENUMERATED {true} OPTIONAL, -- Need N

restoreMCG-SCells-r16 ENUMERATED {true} OPTIONAL, -- Need N

restoreSCG-r16 ENUMERATED {true} OPTIONAL, -- Need N

mrdc-SecondaryCellGroup-r16 CHOICE {

nr-SCG-r16 OCTET STRING (CONTAINING RRCReconfiguration),

eutra-SCG-r16 OCTET STRING

} OPTIONAL, -- Cond RestoreSCG

needForGapsConfigNR-r16 SetupRelease {NeedForGapsConfigNR-r16} OPTIONAL, -- Need M

nonCriticalExtension RRCResume-v1700-IEs OPTIONAL

}

RRCResume-v1700-IEs ::= SEQUENCE {

sl-ConfigDedicatedNR-r17 SetupRelease {SL-ConfigDedicatedNR-r16} OPTIONAL, -- Cond L2RemoteUE

sl-L2RemoteUE-Config-r17 SetupRelease {SL-L2RemoteUE-Config-r17} OPTIONAL, -- Cond L2RemoteUE

needForGapNCSG-ConfigNR-r17 SetupRelease {NeedForGapNCSG-ConfigNR-r17} OPTIONAL, -- Need M

needForGapNCSG-ConfigEUTRA-r17 SetupRelease {NeedForGapNCSG-ConfigEUTRA-r17} OPTIONAL, -- Need M

scg-State-r17 ENUMERATED {deactivated} OPTIONAL, -- Need S

appLayerMeasConfig-r17 AppLayerMeasConfig-r17 OPTIONAL, -- Need M

nonCriticalExtension SEQUENCE {} OPTIONAL

}

-- TAG-RRCRESUME-STOP

-- ASN1STOP

|  |
| --- |
| *RRCResume-IEs* field descriptions |
| ***idleModeMeasurementReq***  This field indicates that the UE shall report the idle/inactive measurements, if available, to the network in the *RRCResumeComplete* message |
| ***masterCellGroup***  Configuration of the master cell group. |
| ***mrdc-SecondaryCellGroup***  Includes an RRC message for SCG configuration in NR-DC or NE-DC.  For NR-DC (*nr-SCG*), *mrdc-SecondaryCellGroup* contains the *RRCReconfiguration* message as generated (entirely) by SN gNB. In this version of the specification, the RRC message can only include fields *secondaryCellGroup* (with at least *reconfigurationWithSync*)*,* *otherConfig* and *measConfig*.  For NE-DC (*eutra-SCG*), *mrdc-SecondaryCellGroup* includes the E-UTRA *RRCConnectionReconfiguration* message as specified in TS 36.331 [10]. In this version of the specification, the E-UTRA RRC message only include the field *scg-Configuration* with at least *mobilityControlInfoSCG*. |
| ***needForGapsConfigNR***  Configuration for the UE to report measurement gap requirement information of NR target bands in the *RRCReconfigurationComplete* and *RRCResumeComplete* message. |
| ***needForGapNCSG-ConfigEUTRA***  Configuration for the UE to report measurement gap and NCSG requirement information of E‑UTRA target bands in the *RRCReconfigurationComplete* and *RRCResumeComplete* message. |
| ***needForGapNCSG-ConfigNR***  Configuration for the UE to report measurement gap and NCSG requirement information of NR target bands in the *RRCReconfigurationComplete* and *RRCResumeComplete* message. |
| ***radioBearerConfig***  Configuration of Radio Bearers (DRBs, SRBs) including SDAP/PDCP. |
| ***radioBearerConfig2***  Configuration of Radio Bearers (DRBs, SRBs) including SDAP/PDCP. This field can only be used if the UE supports NR-DC or NE-DC. |
| ***restoreMCG-SCells***  Indicates that the UE shall restore the MCG SCells from the UE Inactive AS Context, if stored. |
| ***restoreSCG***  Indicates that the UE shall restore the SCG configurations from the UE Inactive AS Context, if stored. |
| ***scg-State***  Indicates that the SCG is in deactivated state. |
| ***sk-Counter***  A counter used to derive S-KgNB or S-KeNB based on the newly derived KgNB during RRC Resume. The field is only included when there is one or more RB with *keyToUse* set to *secondary* *or mrdc-SecondaryCellGroup* is included. |
| ***sl-ConfigDedicatedNR***  This field is used to provide the dedicated configurations for NR sidelink communication/discovery used by L2 U2N Remote UE. |
| ***sl-L2RemoteUE-Config***  Contains L2 U2N relay operation related configurations used by L2 U2N Remote UE. |

|  |  |
| --- | --- |
| Conditional Presence | Explanation |
| *L2RemoteUE* | The field is mandatory present for L2 U2N Remote UE; otherwise it is absent. |
| *RestoreSCG* | The field is mandatory present if *restoreSCG* is included. It is optionally present, Need M, otherwise. |

#### – *RRCResumeComplete*

The *RRCResumeComplete* message is used to confirm the successful completion of an RRC connection resumption.

Signalling radio bearer: SRB1

RLC-SAP: AM

Logical channel: DCCH

Direction: UE to Network

*RRCResumeComplete* message

-- ASN1START

-- TAG-RRCRESUMECOMPLETE-START

RRCResumeComplete ::= SEQUENCE {

rrc-TransactionIdentifier RRC-TransactionIdentifier,

criticalExtensions CHOICE {

rrcResumeComplete RRCResumeComplete-IEs,

criticalExtensionsFuture SEQUENCE {}

}

}

RRCResumeComplete-IEs ::= SEQUENCE {

dedicatedNAS-Message DedicatedNAS-Message OPTIONAL,

selectedPLMN-Identity INTEGER (1..maxPLMN) OPTIONAL,

uplinkTxDirectCurrentList UplinkTxDirectCurrentList OPTIONAL,

lateNonCriticalExtension OCTET STRING OPTIONAL,

nonCriticalExtension RRCResumeComplete-v1610-IEs OPTIONAL

}

RRCResumeComplete-v1610-IEs ::= SEQUENCE {

idleMeasAvailable-r16 ENUMERATED {true} OPTIONAL,

measResultIdleEUTRA-r16 MeasResultIdleEUTRA-r16 OPTIONAL,

measResultIdleNR-r16 MeasResultIdleNR-r16 OPTIONAL,

scg-Response-r16 CHOICE {

nr-SCG-Response OCTET STRING (CONTAINING RRCReconfigurationComplete),

eutra-SCG-Response OCTET STRING

} OPTIONAL,

ue-MeasurementsAvailable-r16 UE-MeasurementsAvailable-r16 OPTIONAL,

mobilityHistoryAvail-r16 ENUMERATED {true} OPTIONAL,

mobilityState-r16 ENUMERATED {normal, medium, high, spare} OPTIONAL,

needForGapsInfoNR-r16 NeedForGapsInfoNR-r16 OPTIONAL,

nonCriticalExtension RRCResumeComplete-v1640-IEs OPTIONAL

}

RRCResumeComplete-v1640-IEs ::= SEQUENCE {

uplinkTxDirectCurrentTwoCarrierList-r16 UplinkTxDirectCurrentTwoCarrierList-r16 OPTIONAL,

nonCriticalExtension RRCResumeComplete-v1700-IEs OPTIONAL

}

RRCResumeComplete-v1700-IEs ::= SEQUENCE {

needForGapNCSG-InfoNR-r17 NeedForGapNCSG-InfoNR-r17 OPTIONAL,

needForGapNCSG-InfoEUTRA-r17 NeedForGapNCSG-InfoEUTRA-r17 OPTIONAL,

nonCriticalExtension SEQUENCE {} OPTIONAL

}

-- TAG-RRCRESUMECOMPLETE-STOP

-- ASN1STOP

|  |
| --- |
| *RRCResumeComplete-IEs* field descriptions |
| ***idleMeasAvailable***  Indication that the UE has idle/inactive measurement report available. |
| ***measResultIdleEUTRA***  EUTRA measurement results performed during RRC\_INACTIVE. |
| ***measResultIdleNR***  NR measurement results performed during RRC\_INACTIVE. |
| ***needForGapsInfoNR***  This field is used to indicate the measurement gap requirement information of the UE for NR target bands. |
| ***needForGapNCSG-InfoEUTRA***  This field is used to indicate the measurement gap and NCSG requirement information of the UE for E‑UTRA target bands |
| ***needForGapNCSG-InfoNR***  This field is used to indicate the measurement gap and NCSG requirement information of the UE for NR target bands |
| ***selectedPLMN-Identity***  Index of the PLMN selected by the UE from the *plmn-IdentityInfoList* or *npn-IdentityInfoList* fields included in *SIB1*. |
| ***uplinkTxDirectCurrentList***  The Tx Direct Current locations for the configured serving cells and BWPs if requested by the NW (see *reportUplinkTxDirectCurrent* in *CellGroupConfig*). |
| ***uplinkTxDirectCurrentTwoCarrierList***  The Tx Direct Current locations for the configured uplink intra-band CA with two carriers if requested by the NW (see *reportUplinkTxDirectCurrentTwoCarrier-r16* in *CellGroupConfig*). |

#### – *RRCResumeRequest*

The *RRCResumeRequest* message is used to request the resumption of a suspended RRC connection or perform an RNA update.

Signalling radio bearer: SRB0

RLC-SAP: TM

Logical channel: CCCH

Direction: UE to Network

*RRCResumeRequest* message

-- ASN1START

-- TAG-RRCRESUMEREQUEST-START

RRCResumeRequest ::= SEQUENCE {

rrcResumeRequest RRCResumeRequest-IEs

}

RRCResumeRequest-IEs ::= SEQUENCE {

resumeIdentity ShortI-RNTI-Value,

resumeMAC-I BIT STRING (SIZE (16)),

resumeCause ResumeCause,

spare BIT STRING (SIZE (1))

}

-- TAG-RRCRESUMEREQUEST-STOP

-- ASN1STOP

|  |
| --- |
| *RRCResumeRequest-IEs* field descriptions |
| ***resumeCause***  Provides the resume cause for the RRC connection resume request as provided by the upper layers or RRC. The network is not expected to reject an *RRCResumeRequest* due to unknown cause value being used by the UE. |
| ***resumeIdentity***  UE identity to facilitate UE context retrieval at gNB. |
| ***resumeMAC-I***  Authentication token to facilitate UE authentication at gNB. The 16 least significant bits of the MAC-I calculated using the AS security configuration as specified in 5.3.13.3. |

#### – *RRCResumeRequest1*

The *RRCResumeRequest1* message is used to request the resumption of a suspended RRC connection or perform an RNA update.

Signalling radio bearer: SRB0

RLC-SAP: TM

Logical channel: CCCH1

Direction: UE to Network

*RRCResumeRequest1* message

-- ASN1START

-- TAG-RRCRESUMEREQUEST1-START

RRCResumeRequest1 ::= SEQUENCE {

rrcResumeRequest1 RRCResumeRequest1-IEs

}

RRCResumeRequest1-IEs ::= SEQUENCE {

resumeIdentity I-RNTI-Value,

resumeMAC-I BIT STRING (SIZE (16)),

resumeCause ResumeCause,

spare BIT STRING (SIZE (1))

}

-- TAG-RRCRESUMEREQUEST1-STOP

-- ASN1STOP

|  |
| --- |
| *RRCResumeRequest1-IEs* field descriptions |
| ***resumeCause***  Provides the resume cause for the *RRCResumeRequest1* as provided by the upper layers or RRC. A gNB is not expected to reject an *RRCResumeRequest1* due to unknown cause value being used by the UE. |
| ***resumeIdentity***  UE identity to facilitate UE context retrieval at gNB. |
| ***resumeMAC-I***  Authentication token to facilitate UE authentication at gNB. The 16 least significant bits of the MAC-I calculated using the AS security configuration as specified in 5.3.13.3. |

#### – *RRCSetup*

The *RRCSetup* message is used to establish SRB1.

Signalling radio bearer: SRB0

RLC-SAP: TM

Logical channel: CCCH

Direction: Network to UE

*RRCSetup* message

-- ASN1START

-- TAG-RRCSETUP-START

RRCSetup ::= SEQUENCE {

rrc-TransactionIdentifier RRC-TransactionIdentifier,

criticalExtensions CHOICE {

rrcSetup RRCSetup-IEs,

criticalExtensionsFuture SEQUENCE {}

}

}

RRCSetup-IEs ::= SEQUENCE {

radioBearerConfig RadioBearerConfig,

masterCellGroup OCTET STRING (CONTAINING CellGroupConfig),

lateNonCriticalExtension OCTET STRING OPTIONAL,

nonCriticalExtension RRCSetup-v1700-IEs OPTIONAL

}

RRCSetup-v1700-IEs ::= SEQUENCE {

sl-ConfigDedicatedNR-r17 SL-ConfigDedicatedNR-r16 OPTIONAL, -- Cond L2RemoteUE

sl-L2RemoteUE-Config-r17 SL-L2RemoteUE-Config-r17 OPTIONAL, -- Cond L2RemoteUE

nonCriticalExtension SEQUENCE {} OPTIONAL

}

-- TAG-RRCSETUP-STOP

-- ASN1STOP

|  |
| --- |
| *RRCSetup-IEs* field descriptions |
| ***masterCellGroup***  The network configures only the RLC bearer for the SRB1, *mac-CellGroupConfig*, *physicalCellGroupConfig* and *spCellConfig*. |
| ***radioBearerConfig***  Only SRB1 can be configured in RRC setup. |
| ***sl-ConfigDedicatedNR***  Contains dedicated configurations for NR sidelink communication. The network configures only the PC5 Relay RLC channel and *sl-PHY-MAC-RLC-Config* used for the SRB1. |
| ***sl-L2RemoteUE-Config***  Contains dedicated configurations used for L2 U2N relay related operation. The network configures only the SRAP configuration used for the SRB1. |

|  |  |
| --- | --- |
| Conditional Presence | Explanation |
| *L2RemoteUE* | The field is mandatory present for L2 U2N Remote UE; otherwise it is absent. |

#### – *RRCSetupComplete*

The *RRCSetupComplete* message is used to confirm the successful completion of an RRC connection establishment.

Signalling radio bearer: SRB1

RLC-SAP: AM

Logical channel: DCCH

Direction: UE to Network

*RRCSetupComplete* message

-- ASN1START

-- TAG-RRCSETUPCOMPLETE-START

RRCSetupComplete ::= SEQUENCE {

rrc-TransactionIdentifier RRC-TransactionIdentifier,

criticalExtensions CHOICE {

rrcSetupComplete RRCSetupComplete-IEs,

criticalExtensionsFuture SEQUENCE {}

}

}

RRCSetupComplete-IEs ::= SEQUENCE {

selectedPLMN-Identity INTEGER (1..maxPLMN),

registeredAMF RegisteredAMF OPTIONAL,

guami-Type ENUMERATED {native, mapped} OPTIONAL,

s-NSSAI-List SEQUENCE (SIZE (1..maxNrofS-NSSAI)) OF S-NSSAI OPTIONAL,

dedicatedNAS-Message DedicatedNAS-Message,

ng-5G-S-TMSI-Value CHOICE {

ng-5G-S-TMSI NG-5G-S-TMSI,

ng-5G-S-TMSI-Part2 BIT STRING (SIZE (9))

} OPTIONAL,

lateNonCriticalExtension OCTET STRING OPTIONAL,

nonCriticalExtension RRCSetupComplete-v1610-IEs OPTIONAL

}

RRCSetupComplete-v1610-IEs ::= SEQUENCE {

iab-NodeIndication-r16 ENUMERATED {true} OPTIONAL,

idleMeasAvailable-r16 ENUMERATED {true} OPTIONAL,

ue-MeasurementsAvailable-r16 UE-MeasurementsAvailable-r16 OPTIONAL,

mobilityHistoryAvail-r16 ENUMERATED {true} OPTIONAL,

mobilityState-r16 ENUMERATED {normal, medium, high, spare} OPTIONAL,

nonCriticalExtension RRCSetupComplete-v1690-IEs OPTIONAL

}

RRCSetupComplete-v1690-IEs ::= SEQUENCE {

ul-RRC-Segmentation-r16 ENUMERATED {true} OPTIONAL,

nonCriticalExtension RRCSetupComplete-v1700-IEs OPTIONAL

}

RRCSetupComplete-v1700-IEs ::= SEQUENCE {

onboardingRequest-r17 ENUMERATED {true} OPTIONAL,

nonCriticalExtension SEQUENCE{} OPTIONAL

}

RegisteredAMF ::= SEQUENCE {

plmn-Identity PLMN-Identity OPTIONAL,

amf-Identifier AMF-Identifier

}

-- TAG-RRCSETUPCOMPLETE-STOP

-- ASN1STOP

|  |
| --- |
| *RRCSetupComplete-IEs* field descriptions |
| ***guami-Type***  This field is used to indicate whether the GUAMI included is native (derived from native 5G-GUTI) or mapped (from EPS, derived from EPS GUTI) as specified in TS 24.501 [23]. |
| ***iab-NodeIndication***  This field is used to indicate that the connection is being established by an IAB-node as specified in TS 38.300 [2]. |
| ***idleMeasAvailable***  Indication that the UE has idle/inactive measurement report available. |
| ***mobilityState***  This field indicates the UE mobility state (as defined in TS 38.304 [20], clause 5.2.4.3) just prior to UE going into RRC\_CONNECTED state. The UE indicates the value of *medium* and *high* when being in Medium-mobility and High-mobility states respectively. Otherwise the UE indicates the value *normal*. |
| ***ng-5G-S-TMSI-Part2***  The leftmost 9 bits of 5G-S-TMSI. |
| ***onboardingRequest***  This field indicates that the connection is being established for UE onboarding in the selected onboarding SNPN, see TS 23.501 [32]. |
| ***registeredAMF***  This field is used to transfer the GUAMI of the AMF where the UE is registered, as provided by upper layers, see TS 23.003 [21]. |
| ***selectedPLMN-Identity***  Index of the PLMN or SNPN selected by the UE from the *plmn-IdentityInfoList* or *npn-IdentityInfoList* fields included in SIB1. |
| ***ul-RRC-Segmentation***  This field indicates the UE supports uplink RRC segmentation of *UECapabilityInformation.* |

#### *– RRCSetupRequest*

The *RRCSetupRequest* message is used to request the establishment of an RRC connection.

Signalling radio bearer: SRB0

RLC-SAP: TM

Logical channel: CCCH

Direction: UE to Network

*RRCSetupRequest message*

-- ASN1START

-- TAG-RRCSETUPREQUEST-START

RRCSetupRequest ::= SEQUENCE {

rrcSetupRequest RRCSetupRequest-IEs

}

RRCSetupRequest-IEs ::= SEQUENCE {

ue-Identity InitialUE-Identity,

establishmentCause EstablishmentCause,

spare BIT STRING (SIZE (1))

}

InitialUE-Identity ::= CHOICE {

ng-5G-S-TMSI-Part1 BIT STRING (SIZE (39)),

randomValue BIT STRING (SIZE (39))

}

EstablishmentCause ::= ENUMERATED {

emergency, highPriorityAccess, mt-Access, mo-Signalling,

mo-Data, mo-VoiceCall, mo-VideoCall, mo-SMS, mps-PriorityAccess, mcs-PriorityAccess,

spare6, spare5, spare4, spare3, spare2, spare1}

-- TAG-RRCSETUPREQUEST-STOP

-- ASN1STOP

|  |
| --- |
| *RRCSetupRequest-IEs* field descriptions |
| ***establishmentCause***  Provides the establishment cause for the *RRCSetupRequest* in accordance with the information received from upper layers. gNB is not expected to reject an *RRCSetupRequest* due to unknown cause value being used by the UE. |
| ***ue-Identity***  UE identity included to facilitate contention resolution by lower layers. |

|  |
| --- |
| *InitialUE-Identity* field descriptions |
| ***ng-5G-S-TMSI-Part1***  The rightmost 39 bits of 5G-S-TMSI. |
| ***randomValue***  Integer value in the range 0 to 239 – 1. |

#### – *RRCSystemInfoRequest*

The *RRCSystemInfoRequest* message is used to request SI message(s) required by the UE as specified in clause 5.2.2.3.3.

Signalling radio bearer: SRB0

RLC-SAP: TM

Logical channel: CCCH

Direction: UE to Network

*RRCSystemInfoRequest message*

-- ASN1START

-- TAG-RRCSYSTEMINFOREQUEST-START

RRCSystemInfoRequest ::= SEQUENCE {

criticalExtensions CHOICE {

rrcSystemInfoRequest RRCSystemInfoRequest-IEs,

criticalExtensionsFuture-r16 CHOICE {

rrcPosSystemInfoRequest-r16 RRC-PosSystemInfoRequest-r16-IEs,

criticalExtensionsFuture SEQUENCE {}

}

}

}

RRCSystemInfoRequest-IEs ::= SEQUENCE {

requested-SI-List BIT STRING (SIZE (maxSI-Message)), --32bits

spare BIT STRING (SIZE (12))

}

RRC-PosSystemInfoRequest-r16-IEs ::= SEQUENCE {

requestedPosSI-List BIT STRING (SIZE (maxSI-Message)), --32bits

spare BIT STRING (SIZE (11))

}

-- TAG-RRCSYSTEMINFOREQUEST-STOP

-- ASN1STOP

|  |
| --- |
| *RRCSystemInfoRequest-IEs* field descriptions |
| ***requested-SI-List***  Contains a list of requested SI messages. According to the order of entry in the list of SI messages configured by *schedulingInfoList* in si-*SchedulingInfo* in *SIB1*, first bit corresponds to first/leftmost listed SI message, second bit corresponds to second listed SI message, and so on. |
| ***requestedPosSI-List***  Contains a list of requested SI messages. According to the order of entry in the list of SI messages configured by *pos*S*chedulingInfoList* in *posSI*-*SchedulingInfo* in *SIB1*, first bit corresponds to first/leftmost listed SI message, second bit corresponds to second listed SI message, and so on. |

#### *– SCGFailureInformation*

The *SCGFailureInformation* message is used to provide information regarding NR SCG failures detected by the UE.

Signalling radio bearer: SRB1

RLC-SAP: AM

Logical channel: DCCH

Direction: UE to Network

*SCGFailureInformation* message

-- ASN1START

-- TAG-SCGFAILUREINFORMATION-START

SCGFailureInformation ::= SEQUENCE {

criticalExtensions CHOICE {

scgFailureInformation SCGFailureInformation-IEs,

criticalExtensionsFuture SEQUENCE {}

}

}

SCGFailureInformation-IEs ::= SEQUENCE {

failureReportSCG FailureReportSCG OPTIONAL,

nonCriticalExtension SCGFailureInformation-v1590-IEs OPTIONAL

}

SCGFailureInformation-v1590-IEs ::= SEQUENCE {

lateNonCriticalExtension OCTET STRING OPTIONAL,

nonCriticalExtension SEQUENCE {} OPTIONAL

}

FailureReportSCG ::= SEQUENCE {

failureType ENUMERATED {

t310-Expiry, randomAccessProblem,

rlc-MaxNumRetx,

synchReconfigFailureSCG, scg-ReconfigFailure,

srb3-IntegrityFailure, other-r16, spare1},

measResultFreqList MeasResultFreqList OPTIONAL,

measResultSCG-Failure OCTET STRING (CONTAINING MeasResultSCG-Failure) OPTIONAL,

...,

[[

locationInfo-r16 LocationInfo-r16 OPTIONAL,

failureType-v1610 ENUMERATED {scg-lbtFailure-r16, beamFailureRecoveryFailure-r16,

t312-Expiry-r16, bh-RLF-r16, beamFailure-r17, spare3, spare2, spare1} OPTIONAL

]],

[[

previousPSCellId-r17 SEQUENCE {

physCellId-r17 PhysCellId,

carrierFreq-r17 ARFCN-ValueNR

} OPTIONAL,

failedPSCellId-r17 SEQUENCE {

physCellId-r17 PhysCellId,

carrierFreq-r17 ARFCN-ValueNR

} OPTIONAL,

timeSCGFailure-r17 INTEGER (0..1023) OPTIONAL,

perRAInfoList-r17 PerRAInfoList-r16 OPTIONAL

]]

}

MeasResultFreqList ::= SEQUENCE (SIZE (1..maxFreq)) OF MeasResult2NR

-- TAG-SCGFAILUREINFORMATION-STOP

-- ASN1STOP

| *SCGFailureInformation field descriptions* |
| --- |
| ***measResultFreqList***  The field contains available results of measurements on NR frequencies the UE is configured to measure by *measConfig*. |
| ***measResultSCG-Failure***  The field contains the *MeasResultSCG-Failure* IE which includes available results of measurements on NR frequencies the UE is configured to measure by the NR SCG *RRCReconfiguration* message. |
| ***previousPSCellId***  This field indicates the physical cell id and carrier frequency of the cell that is the source PSCell of the last PSCell change. |
| ***failedPSCellId***  This field indicates the physical cell id and carrier frequency of the cell in which SCG failure is detected or the target PSCell of the failed PSCell change or failed PSCell addition. |
| ***timeSCGFailure***  This field is used to indicate the time elapsed since the last execution of *RRCReconfiguration* with *reconfigurationWithSync* for the SCG until the SCG failure. Actual value = field value \* 100ms. The maximum value 1023 means 102.3s or longer. |

#### *– SCGFailureInformationEUTRA*

The *SCGFailureInformationEUTRA* message is used to provide information regarding E-UTRA SCG failures detected by the UE.

Signalling radio bearer: SRB1

RLC-SAP: AM

Logical channel: DCCH

Direction: UE to Network

*SCGFailureInformationEUTRA* message

-- ASN1START

-- TAG-SCGFAILUREINFORMATIONEUTRA-START

SCGFailureInformationEUTRA ::= SEQUENCE {

criticalExtensions CHOICE {

scgFailureInformationEUTRA SCGFailureInformationEUTRA-IEs,

criticalExtensionsFuture SEQUENCE {}

}

}

SCGFailureInformationEUTRA-IEs ::= SEQUENCE {

failureReportSCG-EUTRA FailureReportSCG-EUTRA OPTIONAL,

nonCriticalExtension SCGFailureInformationEUTRA-v1590-IEs OPTIONAL

}

SCGFailureInformationEUTRA-v1590-IEs ::= SEQUENCE {

lateNonCriticalExtension OCTET STRING OPTIONAL,

nonCriticalExtension SEQUENCE {} OPTIONAL

}

FailureReportSCG-EUTRA ::= SEQUENCE {

failureType ENUMERATED {

t313-Expiry, randomAccessProblem,rlc-MaxNumRetx,

scg-ChangeFailure, spare4,

spare3, spare2, spare1},

measResultFreqListMRDC MeasResultFreqListFailMRDC OPTIONAL,

measResultSCG-FailureMRDC OCTET STRING OPTIONAL,

...,

[[

locationInfo-r16 LocationInfo-r16 OPTIONAL

]]

}

MeasResultFreqListFailMRDC ::= SEQUENCE (SIZE (1.. maxFreq)) OF MeasResult2EUTRA

-- TAG-SCGFAILUREINFORMATIONEUTRA-STOP

-- ASN1STOP

| *SCGFailureInformationEUTRA field descriptions* |
| --- |
| ***measResultFreqListMRDC***  The field contains available results of measurements on E-UTRA frequencies the UE is configured to measure by *measConfig*. |
| ***measResultSCG-FailureMRDC***  Includes the E-UTRA *MeasResultSCG-FailureMRDC* IE as specified in TS 36.331 [10]. The field contains available results of measurements on E-UTRA frequencies the UE is configured to measure by the E-UTRA *RRCConnectionReconfiguration* message. |

#### – *SecurityModeCommand*

The *SecurityModeCommand* message is used to command the activation of AS security.

Signalling radio bearer: SRB1

RLC-SAP: AM

Logical channel: DCCH

Direction: Network to UE

*SecurityModeCommand* message

-- ASN1START

-- TAG-SECURITYMODECOMMAND-START

SecurityModeCommand ::= SEQUENCE {

rrc-TransactionIdentifier RRC-TransactionIdentifier,

criticalExtensions CHOICE {

securityModeCommand SecurityModeCommand-IEs,

criticalExtensionsFuture SEQUENCE {}

}

}

SecurityModeCommand-IEs ::= SEQUENCE {

securityConfigSMC SecurityConfigSMC,

lateNonCriticalExtension OCTET STRING OPTIONAL,

nonCriticalExtension SEQUENCE{} OPTIONAL

}

SecurityConfigSMC ::= SEQUENCE {

securityAlgorithmConfig SecurityAlgorithmConfig,

...

}

-- TAG-SECURITYMODECOMMAND-STOP

-- ASN1STOP

#### – *SecurityModeComplete*

The *SecurityModeComplete* message is used to confirm the successful completion of a security mode command.

Signalling radio bearer: SRB1

RLC-SAP: AM

Logical channel: DCCH

Direction: UE to Network

*SecurityModeComplete* message

-- ASN1START

-- TAG-SECURITYMODECOMPLETE-START

SecurityModeComplete ::= SEQUENCE {

rrc-TransactionIdentifier RRC-TransactionIdentifier,

criticalExtensions CHOICE {

securityModeComplete SecurityModeComplete-IEs,

criticalExtensionsFuture SEQUENCE {}

}

}

SecurityModeComplete-IEs ::= SEQUENCE {

lateNonCriticalExtension OCTET STRING OPTIONAL,

nonCriticalExtension SEQUENCE{} OPTIONAL

}

-- TAG-SECURITYMODECOMPLETE-STOP

-- ASN1STOP

#### – *SecurityModeFailure*

The *SecurityModeFailure* message is used to indicate an unsuccessful completion of a security mode command.

Signalling radio bearer: SRB1

RLC-SAP: AM

Logical channel: DCCH

Direction: UE to Network

*SecurityModeFailure* message

-- ASN1START

-- TAG-SECURITYMODEFAILURE-START

SecurityModeFailure ::= SEQUENCE {

rrc-TransactionIdentifier RRC-TransactionIdentifier,

criticalExtensions CHOICE {

securityModeFailure SecurityModeFailure-IEs,

criticalExtensionsFuture SEQUENCE {}

}

}

SecurityModeFailure-IEs ::= SEQUENCE {

lateNonCriticalExtension OCTET STRING OPTIONAL,

nonCriticalExtension SEQUENCE{} OPTIONAL

}

-- TAG-SECURITYMODEFAILURE-STOP

-- ASN1STOP

#### – *SIB1*

*SIB1* contains information relevant when evaluating if a UE is allowed to access a cell and defines the scheduling of other system information.It also contains radio resource configuration information that is common for all UEs and barring information applied to the unified access control.

Signalling radio bearer: N/A

RLC-SAP: TM

Logical channels: BCCH

Direction: Network to UE

*SIB1* message

-- ASN1START

-- TAG-SIB1-START

SIB1 ::= SEQUENCE {

cellSelectionInfo SEQUENCE {

q-RxLevMin Q-RxLevMin,

q-RxLevMinOffset INTEGER (1..8) OPTIONAL, -- Need S

q-RxLevMinSUL Q-RxLevMin OPTIONAL, -- Need R

q-QualMin Q-QualMin OPTIONAL, -- Need S

q-QualMinOffset INTEGER (1..8) OPTIONAL -- Need S

} OPTIONAL, -- Cond Standalone

cellAccessRelatedInfo CellAccessRelatedInfo,

connEstFailureControl ConnEstFailureControl OPTIONAL, -- Need R

si-SchedulingInfo SI-SchedulingInfo OPTIONAL, -- Need R

servingCellConfigCommon ServingCellConfigCommonSIB OPTIONAL, -- Need R

ims-EmergencySupport ENUMERATED {true} OPTIONAL, -- Need R

eCallOverIMS-Support ENUMERATED {true} OPTIONAL, -- Need R

ue-TimersAndConstants UE-TimersAndConstants OPTIONAL, -- Need R

uac-BarringInfo SEQUENCE {

uac-BarringForCommon UAC-BarringPerCatList OPTIONAL, -- Need S

uac-BarringPerPLMN-List UAC-BarringPerPLMN-List OPTIONAL, -- Need S

uac-BarringInfoSetList UAC-BarringInfoSetList,

uac-AccessCategory1-SelectionAssistanceInfo CHOICE {

plmnCommon UAC-AccessCategory1-SelectionAssistanceInfo,

individualPLMNList SEQUENCE (SIZE (2..maxPLMN)) OF UAC-AccessCategory1-SelectionAssistanceInfo

} OPTIONAL -- Need S

} OPTIONAL, -- Need R

useFullResumeID ENUMERATED {true} OPTIONAL, -- Need R

lateNonCriticalExtension OCTET STRING OPTIONAL,

nonCriticalExtension SIB1-v1610-IEs OPTIONAL

}

SIB1-v1610-IEs ::= SEQUENCE {

idleModeMeasurementsEUTRA-r16 ENUMERATED{true} OPTIONAL, -- Need R

idleModeMeasurementsNR-r16 ENUMERATED{true} OPTIONAL, -- Need R

posSI-SchedulingInfo-r16 PosSI-SchedulingInfo-r16 OPTIONAL, -- Need R

nonCriticalExtension SIB1-v1630-IEs OPTIONAL

}

SIB1-v1630-IEs ::= SEQUENCE {

uac-BarringInfo-v1630 SEQUENCE {

uac-AC1-SelectAssistInfo-r16 SEQUENCE (SIZE (2..maxPLMN)) OF UAC-AC1-SelectAssistInfo-r16

} OPTIONAL, -- Need R

nonCriticalExtension SIB1-v1700-IEs OPTIONAL

}

SIB1-v1700-IEs ::= SEQUENCE {

hsdn-Cell-r17 ENUMERATED {true} OPTIONAL, -- Need R

uac-BarringInfo-v1700 SEQUENCE {

uac-BarringInfoSetList-v1700 UAC-BarringInfoSetList-v1700

} OPTIONAL, -- Cond MINT

sdt-ConfigCommon-r17 SDT-ConfigCommonSIB-r17 OPTIONAL, -- Need R

redCap-ConfigCommon-r17 RedCap-ConfigCommonSIB-r17 OPTIONAL, -- Need R

featurePriorities-r17 SEQUENCE {

redCapPriority-r17 FeaturePriority-r17 OPTIONAL, -- Need R

slicingPriority-r17 FeaturePriority-r17 OPTIONAL, -- Need R

msg3-Repetitions-Priority-r17 FeaturePriority-r17 OPTIONAL, -- Need R

sdt-Priority-r17 FeaturePriority-r17 OPTIONAL -- Need R

} OPTIONAL, -- Need R

si-SchedulingInfo-v1700 SI-SchedulingInfo-v1700 OPTIONAL, -- Need R

hyperSFN-r17 BIT STRING (SIZE (10)) OPTIONAL, -- Need R

eDRX-AllowedIdle-r17 ENUMERATED {true} OPTIONAL, -- Need R

eDRX-AllowedInactive-r17 ENUMERATED {true} OPTIONAL, -- Cond EDRX-RC

intraFreqReselectionRedCap-r17 ENUMERATED {allowed, notAllowed} OPTIONAL, -- Need S

cellBarredNTN-r17 ENUMERATED {barred, notBarred} OPTIONAL, -- Need S

nonCriticalExtension SEQUENCE {} OPTIONAL

}

UAC-AccessCategory1-SelectionAssistanceInfo ::= ENUMERATED {a, b, c}

UAC-AC1-SelectAssistInfo-r16 ::= ENUMERATED {a, b, c, notConfigured}

SDT-ConfigCommonSIB-r17 ::= SEQUENCE {

sdt-RSRP-Threshold-r17 RSRP-Range OPTIONAL, -- Need R

sdt-LogicalChannelSR-DelayTimer-r17 ENUMERATED { sf20, sf40, sf64, sf128, sf512, sf1024, sf2560, spare1} OPTIONAL, -- Need R

sdt-DataVolumeThreshold-r17 ENUMERATED {byte32, byte100, byte200, byte400, byte600, byte800, byte1000, byte2000, byte4000,

byte8000, byte9000, byte10000, byte12000, byte24000, byte48000, byte96000},

t319a-r17 ENUMERATED { ms100, ms200, ms300, ms400, ms600, ms1000, ms2000,

ms3000, ms4000, spare7, spare6, spare5, spare4, spare3, spare2, spare1}

}

RedCap-ConfigCommonSIB-r17 ::= SEQUENCE {

halfDuplexRedCapAllowed-r17 ENUMERATED {true} OPTIONAL, -- Need R

cellBarredRedCap-r17 SEQUENCE {

cellBarredRedCap1Rx-r17 ENUMERATED {barred, notBarred},

cellBarredRedCap2Rx-r17 ENUMERATED {barred, notBarred}

} OPTIONAL, -- Need R

...

}

FeaturePriority-r17 ::= INTEGER (0..7)

-- TAG-SIB1-STOP

-- ASN1STOP

|  |
| --- |
| *SIB1* field descriptions |
| ***cellBarredNTN***  Value *barred* means that the cell is barred for connectivity to NTN, as defined in TS 38.304 [20]. Value *notBarred* means that the cell is allowed for connectivity to NTN. If not present, the UE considers the cell is not allowed for connectivity to NTN, as defined in TS 38.304 [20]. This field is only applicable to NTN-capable UEs. |
| ***cellBarredRedCap1Rx***  Value *barred* means that the cell is barred for a RedCap UE with 1 Rx branch, as defined in TS 38.304 [20]. This field is ignored by non-RedCap UEs. |
| ***cellBarredRedCap2Rx***  Value *barred* means that the cell is barred for a RedCap UE with 2 Rx branches, as defined in TS 38.304 [20]. This field is ignored by non-RedCap UEs. |
| ***cellSelectionInfo***  Parameters for cell selection related to the serving cell. |
| ***eCallOverIMS-Support***  Indicates whether the cell supports eCall over IMS services as defined in TS 23.501 [32]. If absent, eCall over IMS is not supported by the network in the cell. |
| ***eDRX-AllowedIdle***  The presence of this field indicates that extended DRX is allowed in the cell for UEs in RRC\_IDLE. The UE shall stop using extended DRX in RRC\_IDLE if *eDRX-AllowedIdle* is not present. |
| ***eDRX-AllowedInactive***  The presence of this field indicates that extended DRX is allowed in the cell for UEs in RRC\_INACTIVE. The UE shall stop using extended DRX in RRC\_INACTIVE if *eDRX-AllowedInactive* is not present. |
| ***featurePriorities***  Indicates priorities for features, such as RedCap, Slicing, SDT and MSG3-Repetitions for Coverage Enhancements. These priorities are used to determine which *FeatureCombinationPreambles* the UE shall use when a feature maps to more than one *FeatureCombinationPreambles*, as specified in TS 38.321 [3]. A lower value means a higher priority. The network does not signal the same priority for more than one feature. The network signals a priority for all feature that map to at least one *FeatureCombinationPreambles*. |
| ***halfDuplexRedCap-Allowed***  The presence of this field indicates whether the cell supports half-duplex FDD RedCap UEs. |
| ***hsdn-Cell***  This field indicates this is a HSDN cell as specified in TS 38.304 [20]. |
| ***hyperSFN***  Indicates hyper SFN which increments by one when the SFN wraps around. |
| ***idleModeMeasurementsEUTRA***  This field indicates that a UE that is configured for EUTRA idle/inactive measurements shall perform the measurements while camping in this cell and report availability of these measurements when establishing or resuming a connection in this cell. If absent, a UE is not required to perform EUTRA idle/inactive measurements. |
| ***idleModeMeasurementsNR***  This field indicates that a UE that is configured for NR idle/inactive measurements shall perform the measurements while camping in this cell and report availability of these measurements when establishing or resuming a connection in this cell. If absent, a UE is not required to perform NR idle/inactive measurements. |
| ***ims-EmergencySupport***  Indicates whether the cell supports IMS emergency bearer services for UEs in limited service mode. If absent, IMS emergency call is not supported by the network in the cell for UEs in limited service mode. |
| ***intraFreqReselectionRedCap***  Controls cell selection/reselection to intra-frequency cells for RedCap UEs when this cell is barred, or treated as barred by the RedCap UE, as specified in TS 38.304 [20]. If not present, a RedCap UE treats the cell as barred, i.e.,the UE considers that the cell does not support RedCap. |
| ***q-QualMin***  Parameter "Qqualmin" in TS 38.304 [20], applicable for serving cell. If the field is absent, the UE applies the (default) value of negative infinity for Qqualmin. |
| ***q-QualMinOffset***  Parameter "Qqualminoffset" in TS 38.304 [20]. Actual value Qqualminoffset = field value [dB]. If the field is absent, the UE applies the (default) value of 0 dB for Qqualminoffset.Affects the minimum required quality level in the cell. |
| ***q-RxLevMin***  Parameter "Qrxlevmin" in TS 38.304 [20], applicable for serving cell. |
| ***q-RxLevMinOffset***  Parameter "Qrxlevminoffset" in TS 38.304 [20]. Actual value Qrxlevminoffset = field value \* 2 [dB]. If absent, the UE applies the (default) value of 0 dB for Qrxlevminoffset*.* Affects the minimum required Rx level in the cell. |
| ***q-RxLevMinSUL***  Parameter "Qrxlevmin" in TS 38.304 [20], applicable for serving cell. |
| ***sdt-RSRP-Threshold***  RSRP threshold used to determine whether SDT procedure can be initiated, as specified in TS 38.321 [3]. |
| ***sdt-DataVolumeThreshold***  Data volume threshold used to determine whether SDT can be initiated, as specified in TS 38.321 [3]. Value *byte32* corresponds to 32 bytes, value *byte100* corresponds to 100 bytes, and so on. |
| ***sdt-LogicalChannelSR-DelayTimer***  The value of *logicalChannelSR-DelayTimer* applied during SDT for logical channels configured with SDT, as specified in TS 38.321 [3]. Value in number of subframes. Value *sf20* corresponds to 20 subframes, *sf40* corresponds to 40 subframes, and so on. If this field is not configured, then logicalChannelSR-DelayTimer is not applied for SDT logical channels. |
| ***servingCellConfigCommon***  Configuration of the serving cell. |
| ***t319a***  Initial value of the timer T319a. Value *ms100* corresponds to 100 milliseconds, value *ms200* corresponds to 200 milliseconds and so on. |
| ***uac-AccessCategory1-SelectionAssistanceInfo***  Information used to determine whether Access Category 1 applies to the UE, as defined in TS 22.261 [25]. If *plmnCommon* is chosen, the *UAC-AccessCategory1-SelectionAssistanceInfo* is applicable to all the PLMNs and SNPNs in *plmn-IdentityInfoList* and *npn-IdentityInfoList*. If *individualPLMNList* is chosen, the 1st entry in the list corresponds to the first network within all of the PLMNs and SNPNs across the *plmn-IdentityList* and the *npn-IdentityInfoList*, the 2nd entry in the list corresponds to the second network within all of the PLMNs and SNPNs across the *plmn-IdentityList* and the *npn-IdentityInfoList* and so on. If *uac-AC1-SelectAssistInfo-r16* is present, the UE shall ignore the *uac-AccessCategory1-SelectionAssistanceInfo*. |
| ***uac-AC1-SelectAssistInfo***  Information used to determine whether Access Category 1 applies to the UE, as defined in TS 22.261 [25]. The 1st entry in the list corresponds to the first network within all of the PLMNs and SNPNs across the *plmn-IdentityList* and *npn-IdentityInfoList*, the 2nd entry in the list corresponds to the second network within all of the PLMNs and SNPNs across the *plmn-IdentityList* and the *npn-IdentityInfoList* and so on. Value *notConfigured* indicates that Access Category1 is not configured for the corresponding PLMN/SNPN. |
| ***uac-BarringForCommon***  Common access control parameters for each access category. Common values are used for all PLMNs/SNPNs, unless overwritten by the PLMN/SNPN specific configuration provided in *uac-BarringPerPLMN-List*. The parameters are specified by providing an index to the set of configurations (*uac-BarringInfoSetList*). UE behaviour upon absence of this field is specified in clause 5.3.14.2. |
| ***ue-TimersAndConstants***  Timer and constant values to be used by the UE. The cell operating as PCell always provides this field. |
| ***useFullResumeID***  Indicates which resume identifier and Resume request message should be used. UE uses *fullI-RNTI* and *RRCResumeRequest1* if the field is present, or *shortI-RNTI* and *RRCResumeRequest* if the field is absent. |

|  |  |
| --- | --- |
| Conditional Presence | Explanation |
| *EDRX-RC* | The field is optionally present, Need R, in a cell that enables *eDRX-AllowedIdle*, otherwise it is absent. |
| *MINT* | The field is optionally present, Need R, in a cell that provides a configuration for disaster roaming, otherwise it is absent, Need R. |
| *Standalone* | The field is mandatory present in a cell that supports standalone operation, otherwise it is absent. |

#### – *SidelinkUEInformationNR*

The *SidelinkUEinformationNR* message is used for the indication of NR sidelink UE information to the network.

Signalling radio bearer: SRB1

RLC-SAP: AM

Logical channel: DCCH

Direction: UE to Network

*SidelinkUEInformationNR* message

-- ASN1START

-- TAG-SIDELINKUEINFORMATIONNR-START

SidelinkUEInformationNR-r16::= SEQUENCE {

criticalExtensions CHOICE {

sidelinkUEInformationNR-r16 SidelinkUEInformationNR-r16-IEs,

criticalExtensionsFuture SEQUENCE {}

}

}

SidelinkUEInformationNR-r16-IEs ::= SEQUENCE {

sl-RxInterestedFreqList-r16 SL-InterestedFreqList-r16 OPTIONAL,

sl-TxResourceReqList-r16 SL-TxResourceReqList-r16 OPTIONAL,

sl-FailureList-r16 SL-FailureList-r16 OPTIONAL,

lateNonCriticalExtension OCTET STRING OPTIONAL,

nonCriticalExtension SidelinkUEInformationNR-v1700-IEs OPTIONAL

}

SidelinkUEInformationNR-v1700-IEs ::= SEQUENCE {

sl-TxResourceReqList-v1700 SL-TxResourceReqList-v1700 OPTIONAL,

sl-RxDRX-ReportList-v1700 SL-RxDRX-ReportList-v1700 OPTIONAL,

sl-RxInterestedGC-BC-DestList-r17 SL-RxInterestedGC-BC-DestList-r17 OPTIONAL,

sl-RxInterestedFreqListDisc-r17 SL-InterestedFreqList-r16 OPTIONAL,

sl-TxResourceReqListDisc-r17 SL-TxResourceReqListDisc-r17 OPTIONAL,

sl-TxResourceReqListCommRelay-r17 SL-TxResourceReqListCommRelay-r17 OPTIONAL,

ue-Type-r17 ENUMERATED {relayUE, remoteUE} OPTIONAL,

sl-SourceIdentityRemoteUE-r17 SL-SourceIdentity-r17 OPTIONAL,

nonCriticalExtension SEQUENCE {} OPTIONAL

}

SL-InterestedFreqList-r16 ::= SEQUENCE (SIZE (1..maxNrofFreqSL-r16)) OF INTEGER (1..maxNrofFreqSL-r16)

SL-TxResourceReqList-r16 ::= SEQUENCE (SIZE (1..maxNrofSL-Dest-r16)) OF SL-TxResourceReq-r16

SL-TxResourceReq-r16 ::= SEQUENCE {

sl-DestinationIdentity-r16 SL-DestinationIdentity-r16,

sl-CastType-r16 ENUMERATED {broadcast, groupcast, unicast, spare1},

sl-RLC-ModeIndicationList-r16 SEQUENCE (SIZE (1.. maxNrofSLRB-r16)) OF SL-RLC-ModeIndication-r16 OPTIONAL,

sl-QoS-InfoList-r16 SEQUENCE (SIZE (1..maxNrofSL-QFIsPerDest-r16)) OF SL-QoS-Info-r16 OPTIONAL,

sl-TypeTxSyncList-r16 SEQUENCE (SIZE (1..maxNrofFreqSL-r16)) OF SL-TypeTxSync-r16 OPTIONAL,

sl-TxInterestedFreqList-r16 SL-TxInterestedFreqList-r16 OPTIONAL,

sl-CapabilityInformationSidelink-r16 OCTET STRING OPTIONAL

}

SL-TxResourceReqList-v1700 ::= SEQUENCE (SIZE (1..maxNrofSL-Dest-r16)) OF SL-TxResourceReq-v1700

SL-RxDRX-ReportList-v1700 ::= SEQUENCE (SIZE (1..maxNrofSL-Dest-r16)) OF SL-RxDRX-Report-v1700

SL-TxResourceReq-v1700 ::= SEQUENCE {

sl-DRX-InfoFromRxList-r17 SEQUENCE (SIZE (1..maxNrofSL-RxInfoSet-r17)) OF SL-DRX-ConfigUC-SemiStatic-r17 OPTIONAL,

sl-DRX-Indication-r17 ENUMERATED {on, off} OPTIONAL,

...

}

SL-RxDRX-Report-v1700 ::= SEQUENCE {

sl-DRX-ConfigFromTx-r17 SL-DRX-ConfigUC-SemiStatic-r17,

...}

SL-RxInterestedGC-BC-DestList-r17 ::= SEQUENCE (SIZE (1..maxNrofSL-Dest-r16)) OF SL-RxInterestedGC-BC-Dest-r17

SL-RxInterestedGC-BC-Dest-r17 ::= SEQUENCE {

sl-RxInterestedQoS-InfoList-r17 SEQUENCE (SIZE (1..maxNrofSL-QFIsPerDest-r16)) OF SL-QoS-Info-r16,

sl-DestinationIdentity-r16 SL-DestinationIdentity-r16

}

SL-TxResourceReqListDisc-r17 ::= SEQUENCE (SIZE (1..maxNrofSL-Dest-r16)) OF SL-TxResourceReqDisc-r17

SL-TxResourceReqDisc-r17 ::= SEQUENCE {

sl-DestinationIdentityDisc-r17 SL-DestinationIdentity-r16,

sl-SourceIdentityRelayUE-r17 SL-SourceIdentity-r17 OPTIONAL,

sl-CastTypeDisc-r17 ENUMERATED {broadcast, groupcast, unicast, spare1},

sl-TxInterestedFreqListDisc-r17 SL-TxInterestedFreqList-r16,

sl-TypeTxSyncListDisc-r17 SEQUENCE (SIZE (1..maxNrofFreqSL-r16)) OF SL-TypeTxSync-r16,

sl-DiscoveryType-r17 ENUMERATED {relay, non-Relay},

...

}

SL-TxResourceReqListCommRelay-r17 ::= SEQUENCE (SIZE (1..maxNrofSL-Dest-r16)) OF SL-TxResourceReqCommRelayInfo-r17

SL-TxResourceReqCommRelayInfo-r17 ::= SEQUENCE {

sl-RelayDRXConfig-r17 SL-TxResourceReq-v1700 OPTIONAL,

sl-TxResourceReqCommRelay-r17 SL-TxResourceReqCommRelay-r17

}

SL-TxResourceReqCommRelay-r17 ::= CHOICE {

sl-TxResourceReqL2U2N-Relay-r17 SL-TxResourceReqL2U2N-Relay-r17,

sl-TxResourceReqL3U2N-Relay-r17 SL-TxResourceReq-r16

}

SL-TxResourceReqL2U2N-Relay-r17 ::= SEQUENCE {

sl-DestinationIdentityL2U2N-r17 SL-DestinationIdentity-r16 OPTIONAL,

sl-TxInterestedFreqListL2U2N-r17 SL-TxInterestedFreqList-r16,

sl-TypeTxSyncListL2U2N-r17 SEQUENCE (SIZE (1..maxNrofFreqSL-r16)) OF SL-TypeTxSync-r16,

sl-LocalID-Request-r17 ENUMERATED {true} OPTIONAL,

sl-PagingIdentityRemoteUE-r17 SL-PagingIdentityRemoteUE-r17 OPTIONAL,

sl-CapabilityInformationSidelink-r17 OCTET STRING OPTIONAL,

...

}

SL-TxInterestedFreqList-r16 ::= SEQUENCE (SIZE (1..maxNrofFreqSL-r16)) OF INTEGER (1..maxNrofFreqSL-r16)

SL-QoS-Info-r16 ::= SEQUENCE {

sl-QoS-FlowIdentity-r16 SL-QoS-FlowIdentity-r16,

sl-QoS-Profile-r16 SL-QoS-Profile-r16 OPTIONAL

}

SL-RLC-ModeIndication-r16 ::= SEQUENCE {

sl-Mode-r16 CHOICE {

sl-AM-Mode-r16 NULL,

sl-UM-Mode-r16 NULL

},

sl-QoS-InfoList-r16 SEQUENCE (SIZE (1..maxNrofSL-QFIsPerDest-r16)) OF SL-QoS-Info-r16

}

SL-FailureList-r16 ::= SEQUENCE (SIZE (1..maxNrofSL-Dest-r16)) OF SL-Failure-r16

SL-Failure-r16 ::= SEQUENCE {

sl-DestinationIdentity-r16 SL-DestinationIdentity-r16,

sl-Failure-r16 ENUMERATED {rlf,configFailure, drxReject-v1710, spare5, spare4, spare3, spare2, spare1}

}

-- TAG-SIDELINKUEINFORMATIONNR-STOP

-- ASN1STOP

| *SidelinkUEinformationNR* field descriptions |
| --- |
| ***sl-RxDRX-ReportList***  Indicates the accepted DRX configuration that is received from the peer UE and reported to the network for NR sidelink unicast communication. |
| ***sl-RxInterestedFreqList***  Indicates the index of frequency on which the UE is interested to receive NR sidelink communication. The value 1 corresponds to the frequency of first entry in *sl-FreqInfoList* broadcast in *SIB12*, the value 2 corresponds to the frequency of second entry in *sl-FreqInfoList* broadcast in *SIB12* and so on. In this release, only value 1 can be included in the interested frequency list. |
| ***sl-RxInterestedGC-BC-DestList***  Indicates the reported QoS profile and associated destination for which UE is interested in reception to the network for NR sidelink groupcast and broadcast communication. |
| ***sl-SourceIdentityRemoteUE***  This field is used to indicate the Source Layer-2 ID to be used to establish PC5 link with the target L2 U2N Relay UE for path switch. |
| ***sl-TxResourceReq***  Parameters to request the transmission resources for NR sidelink communication to the network in the Sidelink UE Information report. |
| ***sl-TxResourceReqList***  List of parameters to request the transmission resources for NR sidelink communication for the associated destination. If *sl-TxResourceReqList-v1700* is present, it shall contain the same number of entries, listed in the same order as in *sl-TxResourceReqList* (without suffix). |
| ***ue-Type***  Indicates the UE is acting as U2N Relay UE or U2N Remote UE. |

| *SL-TxResourceReq* field descriptions |
| --- |
| ***sl-CapabilityInformationSidelink***  Includes the *UECapabilityInformationSidelink* message (which can be also included in *ueCapabilityInformationSidelink-r16* in *UECapabilityEnquirySidelink* from peer UE) received from the peer UE. |
| ***sl-CastType***  Indicates the cast type for the corresponding destination for which to request the resource. |
| ***sl-DestinationIdentity***  Indicates the destination for which the TX resource request and allocation from the network are concerned. |
| ***sl-DRX-Indication***  Indicates the sidelink DRX is applied (value *on*) or not applied (value *off*) for the associated destination. This field is only valid for NR sidelink groupcast communication. |
| ***sl-DRX-InfoFromRxList***  Indicates list of the sidelink DRX configurations as assistance information received from the peer UE for NR sidelink unicast communication. |
| ***sl-QoS-InfoList***  Includes the QoS profile of the sidelink QoS flow as specified in TS 23.287 [55]. |
| ***sl-QoS-FlowIdentity***  This identity uniquely identifies one sidelink QoS flow between the UE and the network in the scope of UE, which is unique for different destination and cast type. |
| ***sl-RLC-ModeIndication***  This field indicates the RLC mode and optionally the related QoS profiles for the sidelink radio bearer, which has not been configured by the network and is initiated by another UE in unicast. The RLC mode for one sidelink radio bearer is aligned between UE and NW by the *sl-QoS-FlowIdentity*. |
| ***sl-TxInterestedFreqList***  Each entry of this field indicates the index of frequency on which the UE is interested to transmit NR sidelink communication. The value 1 corresponds to the frequency of first entry in *sl-FreqInfoList* broadcast in *SIB12*, the value 2 corresponds to the frequency of second entry in *sl-FreqInfoList broadcast* in *SIB12* and so on. In this release, only value 1 can be included in the interested frequency list. In this release, only one entry can be included in the list. |
| ***sl-TypeTxSyncList***  A list of synchronization reference used by the UE. The UE shall include the same number of entries, listed in the same order, as in *sl-TxInterestedFreqList*, i.e. one for each carrier frequency included in *sl-TxInterestedFreqList*. |

| *SL-Failure* field descriptions |
| --- |
| ***sl-DestinationIdentity***  Indicates the destination for which the SL failure is reporting for unicast. |
| ***sl-Failure***  Indicates the sidelink cause for the sidelink RLF (value *rlf*), sidelink AS configuration failure (value *configFailure*) and the rejection of sidelink DRX configuration (value *drxReject-v1710*) for the associated destination for unicast. |

| *SL-RxDRX-Report* field descriptions |
| --- |
| ***sl-DRX-ConfigFromTx***  Indicates the sidelink DRX configuration received from the peer UE for NR sidelink unicast communication. |
|  |

| ***SL-RxInterestedGC-BC-Dest* field descriptions** |
| --- |
| ***sl-RxInterestedQoS-InfoList***  Indicates the QoS profile for which UE reports its interested service to which SL DRX is applied to the network, for NR sidelink groupcast or broadcast reception. |

| *SL-TxResourceReqDisc* field descriptions |
| --- |
| ***sl-DestinationIdentityDisc***  This field is used to indicate the destination L2 ID for which the TX resource request and allocation from the network are concerned for relay discovery and non-relay discovery. |
| ***sl-SourceIdentityRelayUE***  This field is used to indicate the source L2 ID of relay-related discovery transmission by L2 U2N Relay UE. |
| ***sl-TxInterestedFreqListDisc***  Each entry of this field indicates the index of frequency on which the UE is interested to transmit NR sidelink discovery. The value 1 corresponds to the frequency of first entry in *sl-FreqInfoList* broadcast in *SIB12*, the value 2 corresponds to the frequency of second entry in *sl-FreqInfoList broadcast* in *SIB12* and so on. In this release, only value 1 can be included in the interested frequency list. In this release, only one entry can be included in the list. |

| *SL-TxResourceReqCommRelayInfo* field descriptions |
| --- |
| ***sl-RelayDRXConfig***  This field is used to indicate the applied sidelink DRX configuration for the relay related communication. |
| ***sl-DestinationIdentityL2U2N***  This field is used to indicate the destination L2 ID for which the TX resource request and allocation from the network are concerned for the established PC5 link for relay by L2 U2N Relay UE, or L3 U2N Relay UE, or L3 U2N Remote UE. |
| ***sl-LocalID-Request***  This field is used to request local UE ID for the corresponding destination by the L2 U2N Relay UE. |
| ***sl-TxInterestedFreqListL2U2N***  Each entry of this field indicates the index of frequency on which the UE is interested to transmit NR sidelink communication for established PC5 link for relay. The value 1 corresponds to the frequency of first entry in *sl-FreqInfoList* broadcast in SIB12, the value 2 corresponds to the frequency of second entry in *sl-FreqInfoList* broadcast in *SIB12* and so on. In this release, only value 1 can be included in the interested frequency list. In this release, only one entry can be included in the list. |
| ***sl-PagingIdentityRemoteUE***  This field is used to indicate the paging UE ID(s) for the corresponding destination(s) by the L2 U2N Relay UE. |

#### – *SystemInformation*

The *SystemInformation* message is used to convey one or more System Information Blocks or Positioning System Information Blocks. All the SIBs or posSIBs included are transmitted with the same periodicity.

Signalling radio bearer: N/A

RLC-SAP: TM

Logical channels: BCCH

Direction: Network to UE

*SystemInformation message*

-- ASN1START

-- TAG-SYSTEMINFORMATION-START

SystemInformation ::= SEQUENCE {

criticalExtensions CHOICE {

systemInformation SystemInformation-IEs,

criticalExtensionsFuture-r16 CHOICE {

posSystemInformation-r16 PosSystemInformation-r16-IEs,

criticalExtensionsFuture SEQUENCE {}

}

}

}

SystemInformation-IEs ::= SEQUENCE {

sib-TypeAndInfo SEQUENCE (SIZE (1..maxSIB)) OF CHOICE {

sib2 SIB2,

sib3 SIB3,

sib4 SIB4,

sib5 SIB5,

sib6 SIB6,

sib7 SIB7,

sib8 SIB8,

sib9 SIB9,

...,

sib10-v1610 SIB10-r16,

sib11-v1610 SIB11-r16,

sib12-v1610 SIB12-r16,

sib13-v1610 SIB13-r16,

sib14-v1610 SIB14-r16,

sib15-v1700 SIB15-r17,

sib16-v1700 SIB16-r17,

sib17-v1700 SIB17-r17,

sib18-v1700 SIB18-r17,

sib19-v1700 SIB19-r17,

sib20-v1700 SIB20-r17,

sib21-v1700 SIB21-r17

},

lateNonCriticalExtension OCTET STRING OPTIONAL,

nonCriticalExtension SEQUENCE {} OPTIONAL

}

-- TAG-SYSTEMINFORMATION-STOP

-- ASN1STOP

#### – *UEAssistanceInformation*

The *UEAssistanceInformation* message is used for the indication of UE assistance information to the network.

Signalling radio bearer: SRB1, SRB3

RLC-SAP: AM

Logical channel: DCCH

Direction: UE to Network

*UEAssistanceInformation message*

-- ASN1START

-- TAG-UEASSISTANCEINFORMATION-START

UEAssistanceInformation ::= SEQUENCE {

criticalExtensions CHOICE {

ueAssistanceInformation UEAssistanceInformation-IEs,

criticalExtensionsFuture SEQUENCE {}

}

}

UEAssistanceInformation-IEs ::= SEQUENCE {

delayBudgetReport DelayBudgetReport OPTIONAL,

lateNonCriticalExtension OCTET STRING OPTIONAL,

nonCriticalExtension UEAssistanceInformation-v1540-IEs OPTIONAL

}

DelayBudgetReport::= CHOICE {

type1 ENUMERATED {

msMinus1280, msMinus640, msMinus320, msMinus160,msMinus80, msMinus60, msMinus40,

msMinus20, ms0, ms20,ms40, ms60, ms80, ms160, ms320, ms640, ms1280},

...

}

UEAssistanceInformation-v1540-IEs ::= SEQUENCE {

overheatingAssistance OverheatingAssistance OPTIONAL,

nonCriticalExtension UEAssistanceInformation-v1610-IEs OPTIONAL

}

OverheatingAssistance ::= SEQUENCE {

reducedMaxCCs ReducedMaxCCs-r16 OPTIONAL,

reducedMaxBW-FR1 ReducedMaxBW-FRx-r16 OPTIONAL,

reducedMaxBW-FR2 ReducedMaxBW-FRx-r16 OPTIONAL,

reducedMaxMIMO-LayersFR1 SEQUENCE {

reducedMIMO-LayersFR1-DL MIMO-LayersDL,

reducedMIMO-LayersFR1-UL MIMO-LayersUL

} OPTIONAL,

reducedMaxMIMO-LayersFR2 SEQUENCE {

reducedMIMO-LayersFR2-DL MIMO-LayersDL,

reducedMIMO-LayersFR2-UL MIMO-LayersUL

} OPTIONAL

}

OverheatingAssistance-r17 ::= SEQUENCE {

reducedMaxBW-FR2-2-r17 SEQUENCE {

reducedBW-FR2-2-DL-r17 ReducedAggregatedBandwidth-r17,

reducedBW-FR2-2-UL-r17 ReducedAggregatedBandwidth-r17

} OPTIONAL,

reducedMaxMIMO-LayersFR2-2 SEQUENCE {

reducedMIMO-LayersFR2-2-DL MIMO-LayersDL,

reducedMIMO-LayersFR2-2-UL MIMO-LayersUL

} OPTIONAL

}

ReducedAggregatedBandwidth ::= ENUMERATED {mhz0, mhz10, mhz20, mhz30, mhz40, mhz50, mhz60, mhz80, mhz100, mhz200, mhz300, mhz400}

ReducedAggregatedBandwidth-r17 ::= ENUMERATED {mhz0, mhz100, mhz200, mhz400, mhz800, mhz1200, mhz1600, mhz2000}

UEAssistanceInformation-v1610-IEs ::= SEQUENCE {

idc-Assistance-r16 IDC-Assistance-r16 OPTIONAL,

drx-Preference-r16 DRX-Preference-r16 OPTIONAL,

maxBW-Preference-r16 MaxBW-Preference-r16 OPTIONAL,

maxCC-Preference-r16 MaxCC-Preference-r16 OPTIONAL,

maxMIMO-LayerPreference-r16 MaxMIMO-LayerPreference-r16 OPTIONAL,

minSchedulingOffsetPreference-r16 MinSchedulingOffsetPreference-r16 OPTIONAL,

releasePreference-r16 ReleasePreference-r16 OPTIONAL,

sl-UE-AssistanceInformationNR-r16 SL-UE-AssistanceInformationNR-r16 OPTIONAL,

referenceTimeInfoPreference-r16 BOOLEAN OPTIONAL,

nonCriticalExtension UEAssistanceInformation-v1700-IEs OPTIONAL

}

UEAssistanceInformation-v1700-IEs ::= SEQUENCE {

ul-GapFR2-Preference-r17 UL-GapFR2-Preference-r17 OPTIONAL,

musim-Assistance-r17 MUSIM-Assistance-r17 OPTIONAL,

overheatingAssistance-r17 OverheatingAssistance-r17 OPTIONAL,

maxBW-PreferenceFR2-2-r17 MaxBW-PreferenceFR2-2-r17 OPTIONAL,

maxMIMO-LayerPreferenceFR2-2-r17 MaxMIMO-LayerPreferenceFR2-2-r17 OPTIONAL,

minSchedulingOffsetPreferenceExt-r17 MinSchedulingOffsetPreferenceExt-r17 OPTIONAL,

rlm-MeasRelaxationState-r17 BOOLEAN OPTIONAL,

bfd-MeasRelaxationState-r17 BIT STRING (SIZE (1..maxNrofServingCells)) OPTIONAL,

nonSDT-DataIndication-r17 SEQUENCE {

resumeCause-r17 ResumeCause OPTIONAL

} OPTIONAL,

scg-DeactivationPreference ENUMERATED { scgDeactivationPreferred, noPreference } OPTIONAL,

uplinkData-r17 ENUMERATED { true } OPTIONAL,

rrm-MeasRelaxationFulfilment-r17 BOOLEAN OPTIONAL,

propagationDelayDifference-r17 PropagationDelayDifference-r17 OPTIONAL,

nonCriticalExtension SEQUENCE {} OPTIONAL

}

IDC-Assistance-r16 ::= SEQUENCE {

affectedCarrierFreqList-r16 AffectedCarrierFreqList-r16 OPTIONAL,

affectedCarrierFreqCombList-r16 AffectedCarrierFreqCombList-r16 OPTIONAL,

...

}

AffectedCarrierFreqList-r16 ::= SEQUENCE (SIZE (1.. maxFreqIDC-r16)) OF AffectedCarrierFreq-r16

AffectedCarrierFreq-r16 ::= SEQUENCE {

carrierFreq-r16 ARFCN-ValueNR,

interferenceDirection-r16 ENUMERATED {nr, other, both, spare}

}

AffectedCarrierFreqCombList-r16 ::= SEQUENCE (SIZE (1..maxCombIDC-r16)) OF AffectedCarrierFreqComb-r16

AffectedCarrierFreqComb-r16 ::= SEQUENCE {

affectedCarrierFreqComb-r16 SEQUENCE (SIZE (2..maxNrofServingCells)) OF ARFCN-ValueNR OPTIONAL,

victimSystemType-r16 VictimSystemType-r16

}

VictimSystemType-r16 ::= SEQUENCE {

gps-r16 ENUMERATED {true} OPTIONAL,

glonass-r16 ENUMERATED {true} OPTIONAL,

bds-r16 ENUMERATED {true} OPTIONAL,

galileo-r16 ENUMERATED {true} OPTIONAL,

navIC-r16 ENUMERATED {true} OPTIONAL,

wlan-r16 ENUMERATED {true} OPTIONAL,

bluetooth-r16 ENUMERATED {true} OPTIONAL,

...

}

DRX-Preference-r16 ::= SEQUENCE {

preferredDRX-InactivityTimer-r16 ENUMERATED {

ms0, ms1, ms2, ms3, ms4, ms5, ms6, ms8, ms10, ms20, ms30, ms40, ms50, ms60, ms80,

ms100, ms200, ms300, ms500, ms750, ms1280, ms1920, ms2560, spare9, spare8,

spare7, spare6, spare5, spare4, spare3, spare2, spare1} OPTIONAL,

preferredDRX-LongCycle-r16 ENUMERATED {

ms10, ms20, ms32, ms40, ms60, ms64, ms70, ms80, ms128, ms160, ms256, ms320, ms512,

ms640, ms1024, ms1280, ms2048, ms2560, ms5120, ms10240, spare12, spare11, spare10,

spare9, spare8, spare7, spare6, spare5, spare4, spare3, spare2, spare1 } OPTIONAL,

preferredDRX-ShortCycle-r16 ENUMERATED {

ms2, ms3, ms4, ms5, ms6, ms7, ms8, ms10, ms14, ms16, ms20, ms30, ms32,

ms35, ms40, ms64, ms80, ms128, ms160, ms256, ms320, ms512, ms640, spare9,

spare8, spare7, spare6, spare5, spare4, spare3, spare2, spare1 } OPTIONAL,

preferredDRX-ShortCycleTimer-r16 INTEGER (1..16) OPTIONAL

}

MaxBW-Preference-r16 ::= SEQUENCE {

reducedMaxBW-FR1-r16 ReducedMaxBW-FRx-r16 OPTIONAL,

reducedMaxBW-FR2-r16 ReducedMaxBW-FRx-r16 OPTIONAL

}

MaxBW-PreferenceFR2-2-r17 ::= SEQUENCE {

reducedMaxBW-FR2-2-r17 SEQUENCE {

reducedBW-FR2-2-DL-r17 ReducedAggregatedBandwidth-r17 OPTIONAL,

reducedBW-FR2-2-UL-r17 ReducedAggregatedBandwidth-r17 OPTIONAL

} OPTIONAL

}

MaxCC-Preference-r16 ::= SEQUENCE {

reducedMaxCCs-r16 ReducedMaxCCs-r16 OPTIONAL

}

MaxMIMO-LayerPreference-r16 ::= SEQUENCE {

reducedMaxMIMO-LayersFR1-r16 SEQUENCE {

reducedMIMO-LayersFR1-DL-r16 INTEGER (1..8),

reducedMIMO-LayersFR1-UL-r16 INTEGER (1..4)

} OPTIONAL,

reducedMaxMIMO-LayersFR2-r16 SEQUENCE {

reducedMIMO-LayersFR2-DL-r16 INTEGER (1..8),

reducedMIMO-LayersFR2-UL-r16 INTEGER (1..4)

} OPTIONAL

}

MaxMIMO-LayerPreferenceFR2-2-r17 ::= SEQUENCE {

reducedMaxMIMO-LayersFR2-2-r17 SEQUENCE {

reducedMIMO-LayersFR2-2-DL-r17 INTEGER (1..8),

reducedMIMO-LayersFR2-2-UL-r17 INTEGER (1..4)

} OPTIONAL

}

MinSchedulingOffsetPreference-r16 ::= SEQUENCE {

preferredK0-r16 SEQUENCE {

preferredK0-SCS-15kHz-r16 ENUMERATED {sl1, sl2, sl4, sl6} OPTIONAL,

preferredK0-SCS-30kHz-r16 ENUMERATED {sl1, sl2, sl4, sl6} OPTIONAL,

preferredK0-SCS-60kHz-r16 ENUMERATED {sl2, sl4, sl8, sl12} OPTIONAL,

preferredK0-SCS-120kHz-r16 ENUMERATED {sl2, sl4, sl8, sl12} OPTIONAL

} OPTIONAL,

preferredK2-r16 SEQUENCE {

preferredK2-SCS-15kHz-r16 ENUMERATED {sl1, sl2, sl4, sl6} OPTIONAL,

preferredK2-SCS-30kHz-r16 ENUMERATED {sl1, sl2, sl4, sl6} OPTIONAL,

preferredK2-SCS-60kHz-r16 ENUMERATED {sl2, sl4, sl8, sl12} OPTIONAL,

preferredK2-SCS-120kHz-r16 ENUMERATED {sl2, sl4, sl8, sl12} OPTIONAL

} OPTIONAL

}

MinSchedulingOffsetPreferenceExt-r17 ::= SEQUENCE {

preferredK0-r17 SEQUENCE {

preferredK0-SCS-480kHz-r17 ENUMERATED {sl8, sl16, sl32, sl48} OPTIONAL,

preferredK0-SCS-960kHz-r17 ENUMERATED {sl8, sl16, sl32, sl48} OPTIONAL

} OPTIONAL,

preferredK2-r17 SEQUENCE {

preferredK2-SCS-480kHz-r17 ENUMERATED {sl8, sl16, sl32, sl48} OPTIONAL,

preferredK2-SCS-960kHz-r17 ENUMERATED {sl8, sl16, sl32, sl48} OPTIONAL

} OPTIONAL

}

MUSIM-Assistance-r17 ::= SEQUENCE {

musim-PreferredRRC-State-r17 ENUMERATED {idle, inactive, outOfConnected} OPTIONAL,

musim-GapPreferenceList-r17 MUSIM-GapPreferenceList-r17 OPTIONAL

}

MUSIM-GapPreferenceList-r17 ::= SEQUENCE (SIZE (1..4)) OF MUSIM-GapInfo-r17

ReleasePreference-r16 ::= SEQUENCE {

preferredRRC-State-r16 ENUMERATED {idle, inactive, connected, outOfConnected}

}

ReducedMaxBW-FRx-r16 ::= SEQUENCE {

reducedBW-DL-r16 ReducedAggregatedBandwidth,

reducedBW-UL-r16 ReducedAggregatedBandwidth

}

ReducedMaxCCs-r16 ::= SEQUENCE {

reducedCCsDL-r16 INTEGER (0..31),

reducedCCsUL-r16 INTEGER (0..31)

}

SL-UE-AssistanceInformationNR-r16 ::= SEQUENCE (SIZE (1..maxNrofTrafficPattern-r16)) OF SL-TrafficPatternInfo-r16

SL-TrafficPatternInfo-r16::= SEQUENCE {

trafficPeriodicity-r16 ENUMERATED {ms20, ms50, ms100, ms200, ms300, ms400, ms500, ms600, ms700, ms800, ms900, ms1000},

timingOffset-r16 INTEGER (0..10239),

messageSize-r16 BIT STRING (SIZE (8)),

sl-QoS-FlowIdentity-r16 SL-QoS-FlowIdentity-r16

}

UL-GapFR2-Preference-r17::= SEQUENCE {

ul-GapFR2-PatternPreference-r17 INTEGER (0..3) OPTIONAL

}

PropagationDelayDifference-r17 ::= SEQUENCE (SIZE (1..4)) OF INTEGER (-270..270)

-- TAG-UEASSISTANCEINFORMATION-STOP

-- ASN1STOP

Editor's note: The value range for ReducedAggregatedBandwidth-r17 needs RAN4 confirmation

Editor's note: The value range for preferred K0/K2 for SCS 960 kHz needs RAN1 confirmation

| *UEAssistanceInformation* field descriptions |
| --- |
| ***affectedCarrierFreqList***  Indicates a list of NR carrier frequencies that are affected by IDC problem. |
| ***affectedCarrierFreqCombList***  Indicates a list of NR carrier frequencie combinations that are affected by IDC problems due to Inter-Modulation Distortion and harmonics from NR when configured with UL CA. |
| ***bfd-MeasRelaxationState***  Indicates the relaxation state of BFD measurements. Each bit corresponds to a serving cell of the cell group. A serving cell is mapped to the (*servCellIndex*+1)-th bit, starting from MSB. A bit that is set to 1 indicates that the UE is performing BFD measurements relaxation on the serving cell mapped on the bit. A bit that is set to 0 indicates that the UE is not performing BFD measurements relaxation on the serving cell mapped on the bit. If a serving cell is not configured to the UE, the corresponding bit is set to 0. |
| ***delayBudgetReport***  Indicates the UE-preferred adjustment to connected mode DRX. |
| ***interferenceDirection***  Indicates the direction of IDC interference. Value *nr* indicates that only NR is victim of IDC interference, value *other* indicates that only another radio is victim of IDC interference and value *both* indicates that both NR and another radio are victims of IDC interference. The other radio refers to either the ISM radio or GNSS (see TR 36.816 [44]). |
| ***minSchedulingOffsetPreference***  Indicates the UE's preferences on *minimumSchedulingOffset* of cross-slot scheduling for power saving. |
| ***minSchedulingOffsetPreferenceExt***  Indicates the UE's preferences on *minimumSchedulingOffset* of cross-slot scheduling for power saving for SCS 480 kHz and/or 960 kHz. |
| ***musim-GapPreferenceList***  Indicates whether the UE supports providing MUSIM assistance information with MUSIM gap preference and related MUSIM gap configuration, as defined in TS 38.133 [14] clause 9.1.2D. |
| ***musim-PreferredRRC-State***  Indicates the UE's preferred RRC state when leaving RRC\_CONNECTED. |
| ***nonSDT-DataIndication***  Informs the network about the arrival of data and/or signaling mapped to radio bearers not configured for SDT while *T319a* is running. |
| ***preferredDRX-InactivityTimer***  Indicates the UE's preferred DRX inactivity timer length for power saving. Value in ms (milliSecond). *ms0* corresponds to 0, *ms1* corresponds to 1 ms, *ms2* corresponds to 2 ms, and so on. If the field is absent from the *DRX-Preference* IE, it is interpreted as the UE having no preference for the DRX inactivity timer. If secondary DRX group is configured, the *preferredDRX-InactivityTimer* only applies to the default DRX group. |
| ***preferredDRX-LongCycle***  Indicates the UE's preferred long DRX cycle length for power saving. Value in ms. *ms10* corresponds to 10ms, *ms20* corresponds to 20 ms, *ms32* corresponds to 32 ms, and so on. If *preferredDRX-ShortCycle* is provided, the value of *preferredDRX-LongCycle* shall be a multiple of the *preferredDRX-ShortCycle* value. If the field is absent from the *DRX-Preference* IE, it is interpreted as the UE having no preference for the long DRX cycle. |
| ***preferredDRX-ShortCycle***  Indicates the UE's preferred short DRX cycle length for power saving. Value in ms. *ms2* corresponds to 2ms, *ms3* corresponds to 3 ms, *ms4* corresponds to 4 ms, and so on. If the field is absent from the *DRX-Preference* IE, it is interpreted as the UE having no preference for the short DRX cycle. |
| ***preferredDRX-ShortCycleTimer***  Indicates the UE's preferred short DRX cycle timer for power saving. Value in multiples of *preferredDRX-ShortCycle*. A value of 1 corresponds to *preferredDRX-ShortCycle*, a value of 2 corresponds to 2 \* *preferredDRX-ShortCycle* and so on. If the field is absent from the *DRX-Preference* IE, it is interpreted as the UE having no preference for the short DRX cycle timer. A preference for the short DRX cycle is indicated when a preference for the short DRX cycle timer is indicated. |
| ***preferredK0***  Indicates the UE's preferred value of *k0* (slot offset between DCI and its scheduled PDSCH - see TS 38.214 [19], clause 5.1.2.1) for cross-slot scheduling for power saving. Value is defined for each subcarrier spacing (numerology) in units of slots. *sl1* corresponds to 1 slot, *sl2* corresponds to 2 slots, *sl4* corresponds to 4 slots, and so on. If a value for a subcarrier spacing is absent, it is interpreted as the UE having no preference on *k0* for cross-slot scheduling for that subcarrier spacing. If the field is absent from the *MinSchedulingOffsetPreference* IE, it is interpreted as the UE having no preference on *k0* for cross-slot scheduling. |
| ***preferredK2***  Indicates the UE's preferred value of *k2* (slot offset between DCI and its scheduled PUSCH - see TS 38.214 [19], clause 6.1.2.1) for cross-slot scheduling for power saving. Value is defined for each subcarrier spacing (numerology) in units of slots. *sl1* corresponds to 1 slot, *sl2* corresponds to 2 slots, *sl4* corresponds to 4 slots, and so on. If a value for a subcarrier spacing is absent, it is interpreted as the UE having no preference on *k2* for cross-slot scheduling for that subcarrier spacing. If the field is absent from the *MinSchedulingOffsetPreference* IE, it is interpreted as the UE having no preference on *k2* for cross-slot scheduling. |
| ***preferredRRC-State***  Indicates the UE's preferred RRC state. The value *idle* is indicated if the UE prefers to be released from RRC\_CONNECTED and transition to RRC\_IDLE. The value *inactive* is indicated if the UE prefers to be released from RRC\_CONNECTED and transition to RRC\_INACTIVE. The value *connected* is indicated if the UE prefers to revert an earlier indication to leave RRC\_CONNECTED state. The value *outOfConnected* is indicated if the UE prefers to be released from RRC\_CONNECTED and has no preferred RRC state to transition to. The value *connected* can only be indicated if the UE is configured with *connectedReporting*. |
| ***propagationDelayDifference***  Indicates the service link propagation delay difference between serving cell and each neighbour cell included in *neighCellInfoList,* defined as neighbour cell's service link propagation delay minus serving cell's service link propagation delay, in number of ms. First entry in *propagationDelayDifference* corresponds to first entry in *neighCellInfoList*, second entry in *propagationDelayDifference* corresponds to second entry in *neighCellInfoList*, and so on. |
| ***reducedBW-FR1***  Indicates the UE's preference on reduced configuration corresponding to the maximum aggregated bandwidth across all downlink carrier(s) and across all uplink carrier(s) of FR1, to address overheating or power saving. This field is allowed to be reported only when UE is configured with serving cell(s) operating on FR1. The aggregated bandwidth across all downlink carrier(s) of FR1 is the sum of bandwidth of active downlink BWP(s) across all activated downlink carrier(s) of FR1. The aggregated bandwidth across all uplink carrier(s) of FR1 is the sum of bandwidth of active uplink BWP(s) across all activated uplink carrier(s) of FR1. If the field is absent from the *MaxBW-Preference* IE or the *OverheatingAssistance* IE, it is interpreted as the UE having no preference on the maximum aggregated bandwidth of FR1.  When indicated to address overheating, this maximum aggregated bandwidth includes carrier(s) of FR1 of both the NR MCG and the SCG. This maximum aggregated bandwidth only includes carriers of FR1 of the SCG in (NG)EN-DC. Value *mhz0* is not used when indicated to address overheating.  When indicated to address power saving, this maximum aggregated bandwidth includes carrier(s) of FR1 of the cell group that this UE assistance information is associated with. The aggregated bandwidth can only range up to the current active configuration when indicated to address power savings. |
| ***reducedBW-FR2***  Indicates the UE's preference on reduced configuration corresponding to the maximum aggregated bandwidth across all downlink carrier(s) and across all uplink carrier(s) of FR2-1, to address overheating or power saving. This field is allowed to be reported only when UE is configured with serving cell(s) operating on FR2-1. The aggregated bandwidth across all downlink carrier(s) of FR2-1 is the sum of bandwidth of active downlink BWP(s) across all activated downlink carrier(s) of FR2-1. The aggregated bandwidth across all uplink carrier(s) of FR2 is the sum of bandwidth of active uplink BWP(s) across all activated uplink carrier(s) of FR2-1. If the field is absent from the *MaxBW-Preference* IE or the *OverheatingAssistance* IE, it is interpreted as the UE having no preference on the maximum aggregated bandwidth of FR2-1.  When indicated to address overheating, this maximum aggregated bandwidth includes carrier(s) of FR2 of both the NR MCG and the NR SCG. This maximum aggregated bandwidth only includes carriers of FR2-1 of the SCG in (NG)EN-DC.  When indicated to address power saving, this maximum aggregated bandwidth includes carrier(s) of FR2-1 of the cell group that this UE assistance information is associated with. The aggregated bandwidth can only range up to the current active configuration when indicated to address power savings. |
| ***reducedMaxBW-FR2-2***  Indicates the UE's preference on reduced configuration corresponding to the maximum aggregated bandwidth across all downlink carrier(s) and across all uplink carrier(s) of FR2-2, to address overheating or power saving. This field is allowed to be reported only when UE is configured with serving cell(s) operating on FR2-2. The aggregated bandwidth across all downlink carrier(s) of FR2-2 is the sum of bandwidth of active downlink BWP(s) across all activated downlink carrier(s) of FR2-2. The aggregated bandwidth across all uplink carrier(s) of FR2-2 is the sum of bandwidth of active uplink BWP(s) across all activated uplink carrier(s) of FR2-2. If the field is absent from the *MaxBW-PreferenceFR2-2* IE or the *OverheatingAssistance* IE, it is interpreted as the UE having no preference on the maximum aggregated bandwidth of FR2-2.  When indicated to address overheating, this maximum aggregated bandwidth includes carrier(s) of FR2-2 of both the NR MCG and the NR SCG. This maximum aggregated bandwidth only includes carriers of FR2-2 of the SCG in (NG)EN-DC.  When indicated to address power saving, this maximum aggregated bandwidth includes carrier(s) of FR2-2 of the cell group that this UE assistance information is associated with. The aggregated bandwidth can only range up to the current active configuration when indicated to address power savings. |
| ***reducedCCsDL***  Indicates the UE's preference on reduced configuration corresponding to the maximum number of downlink SCells indicated by the field, to address overheating or power saving.  When indicated to address overheating, this maximum number includes both SCells of the NR MCG and PSCell/SCells of the SCG. This maximum number only includes PSCell/SCells of the SCG in (NG)EN-DC.  When indicated to address power saving, this maximum number includes PSCell/SCells of the cell group that this UE assistance information is associated with. The maximum number of downlink SCells can only range up to the current active configuration when indicated to address power savings. |
| ***reducedCCsUL***  Indicates the UE's preference on reduced configuration corresponding to the maximum number of uplink SCells indicated by the field, to address overheating or power saving.  When indicated to address overheating, this maximum number includes both SCells of the NR MCG and PSCell/SCells of the SCG. This maximum number only includes PSCell/SCells of the SCG in (NG)EN-DC.  When indicated to address power saving, this maximum number includes PSCell/SCells of the cell group that this UE assistance information is associated with. The maximum number of uplink SCells can only range up to the current active configuration when indicated to address power savings. |
| ***reducedMIMO-LayersFR1-DL***  Indicates the UE's preference on reduced configuration corresponding to the maximum number of downlink MIMO layers of each serving cell operating on FR1 indicated by the field, to address overheating or power saving. This field is allowed to be reported only when UE is configured with serving cells operating on FR1. The maximum number of downlink MIMO layers can only range up to the maximum number of MIMO layers configured across all activated downlink carrier(s) of FR1 in the cell group when indicated to address power savings. |
| ***reducedMIMO-LayersFR1-UL***  Indicates the UE's preference on reduced configuration corresponding to the maximum number of uplink MIMO layers of each serving cell operating on FR1 indicated by the field, to address overheating or power saving. This field is allowed to be reported only when UE is configured with serving cells operating on FR1. The maximum number of uplink MIMO layers can only range up to the maximum number of MIMO layers configured across all activated uplink carrier(s) of FR1 in the cell group when indicated to address power savings. |
| ***reducedMIMO-LayersFR2-DL***  Indicates the UE's preference on reduced configuration corresponding to the maximum number of downlink MIMO layers of each serving cell operating on FR2-1 indicated by the field, to address overheating or power saving. This field is allowed to be reported only when UE is configured with serving cells operating on FR2-1. The maximum number of downlink MIMO layers can only range up to the maximum number of MIMO layers configured across all activated downlink carrier(s) of FR2-1 in the cell group when indicated to address power savings. |
| ***reducedMIMO-LayersFR2-UL***  Indicates the UE's preference on reduced configuration corresponding to the maximum number of uplink MIMO layers of each serving cell operating on FR2-1 indicated by the field, to address overheating or power saving. This field is allowed to be reported only when UE is configured with serving cells operating on FR2-1. The maximum number of uplink MIMO layers can only range up to the maximum number of MIMO layers configured across all activated uplink carrier(s) of FR2-1 in the cell group when indicated to address power savings. |
| ***reducedMIMO-LayersFR2-2-DL***  Indicates the UE's preference on reduced configuration corresponding to the maximum number of downlink MIMO layers of each serving cell operating on FR2-2 indicated by the field, to address overheating or power saving. This field is allowed to be reported only when UE is configured with serving cells operating on FR2-2. The maximum number of downlink MIMO layers can only range up to the maximum number of MIMO layers configured across all activated downlink carrier(s) of FR2-2 in the cell group when indicated to address power savings. |
| ***reducedMIMO-LayersFR2-2-UL***  Indicates the UE's preference on reduced configuration corresponding to the maximum number of uplink MIMO layers of each serving cell operating on FR2-2 indicated by the field, to address overheating or power saving. This field is allowed to be reported only when UE is configured with serving cells operating on FR2-2. The maximum number of uplink MIMO layers can only range up to the maximum number of MIMO layers configured across all activated uplink carrier(s) of FR2-2 in the cell group when indicated to address power savings. |
| ***referenceTimeInfoPreference***  Indicates whether the UE prefers being provisioned with the timing information specified in the IE *ReferenceTimeInfo*. |
| ***resumeCause***  Provides the resume cause based on the information received from the upper layers. |
| ***rlm-MeasRelaxationState***  Indicates the relaxation state of RLM measurements. Value *true* indicates that the UE is performing relaxation of RLM measurements, and value *false* indicates that the UE is not performing relaxation of RLM measurements. |
| ***rrm-MeasRelaxationFulfilment***  Indicates whether the UE fulfils the relaxed measurement criterion for stationary UE in 5.7.4.4. Value true indicates that the UE fulfils the criterion, and value false indicates that the UE does not fulfil the criterion. |
| ***sl-QoS-FlowIdentity***  This identity uniquely identifies one sidelink QoS flow between the UE and the network in the scope of UE, which is unique for different destination and cast type. |
| ***sl-UE-AssistanceInformationNR***  Indicates the traffic characteristic of sidelink logical channel(s), specified in the IE *SL-TrafficPatternInfo,* that are setup for NR sidelink communication. |
| ***type1***  Indicates the preferred amount of increment/decrement to the long DRX cycle length with respect to the current configuration. Value in number of milliseconds. Value *ms40* corresponds to 40 milliseconds, *msMinus40* corresponds to -40 milliseconds and so on. |
| ***ul-GapFR2-PatternPreference***  Indicates the UE's preference on FR2 UL gap pattern as defined in TS 38.133 [14]. |
| ***victimSystemType***  Indicate the list of victim system types to which IDC interference is caused from NR when configured with UL CA. Value *gps*, *glonass*, *bds*, *galileo* and *navIC* indicates the type of GNSS. Value *wlan* indicates WLAN and value *bluetooth* indicates Bluetooth. |

|  |
| --- |
| *SL-TrafficPatternInfo field descriptions* |
| ***messageSize***  Indicates the maximum TB size based on the observed traffic pattern. The value refers to the index of TS 38.321 [3], table 6.1.3.1-2. |
| ***timingOffset***  This field indicates the estimated timing for a packet arrival in a sidelink logical channel. Specifically, the value indicates the timing offset with respect to subframe#0 of SFN#0 in milliseconds. |
| ***trafficPeriodicity***  This field indicates the estimated data arrival periodicity in a sidelink logical channel. Value ms20 corresponds to 20 ms, ms50 corresponds to 50 ms and so on. |

#### – *UECapabilityEnquiry*

The *UECapabilityEnquiry* message is used to request UE radio access capabilities for NR as well as for other RATs.

Signalling radio bearer: SRB1

RLC-SAP: AM

Logical channel: DCCH

Direction: Network to UE

*UECapabilityEnquiry* message

-- ASN1START

-- TAG-UECAPABILITYENQUIRY-START

UECapabilityEnquiry ::= SEQUENCE {

rrc-TransactionIdentifier RRC-TransactionIdentifier,

criticalExtensions CHOICE {

ueCapabilityEnquiry UECapabilityEnquiry-IEs,

criticalExtensionsFuture SEQUENCE {}

}

}

UECapabilityEnquiry-IEs ::= SEQUENCE {

ue-CapabilityRAT-RequestList UE-CapabilityRAT-RequestList,

lateNonCriticalExtension OCTET STRING OPTIONAL,

ue-CapabilityEnquiryExt OCTET STRING (CONTAINING UECapabilityEnquiry-v1560-IEs) OPTIONAL -- Need N

}

UECapabilityEnquiry-v1560-IEs ::= SEQUENCE {

capabilityRequestFilterCommon UE-CapabilityRequestFilterCommon OPTIONAL, -- Need N

nonCriticalExtension UECapabilityEnquiry-v1610-IEs OPTIONAL

}

UECapabilityEnquiry-v1610-IEs ::= SEQUENCE {

rrc-SegAllowed-r16 ENUMERATED {enabled} OPTIONAL, -- Need N

nonCriticalExtension SEQUENCE {} OPTIONAL

}

-- TAG-UECAPABILITYENQUIRY-STOP

-- ASN1STOP

#### – *UECapabilityInformation*

The IE *UECapabilityInformation* message is used to transfer UE radio access capabilities requested by the network.

Signalling radio bearer: SRB1

RLC-SAP: AM

Logical channel: DCCH

Direction: UE to Network

*UECapabilityInformation* message

-- ASN1START

-- TAG-UECAPABILITYINFORMATION-START

UECapabilityInformation ::= SEQUENCE {

rrc-TransactionIdentifier RRC-TransactionIdentifier,

criticalExtensions CHOICE {

ueCapabilityInformation UECapabilityInformation-IEs,

criticalExtensionsFuture SEQUENCE {}

}

}

UECapabilityInformation-IEs ::= SEQUENCE {

ue-CapabilityRAT-ContainerList UE-CapabilityRAT-ContainerList OPTIONAL,

lateNonCriticalExtension OCTET STRING OPTIONAL,

nonCriticalExtension SEQUENCE{} OPTIONAL

}

-- TAG-UECAPABILITYINFORMATION-STOP

-- ASN1STOP

#### – *UEInformationRequest*

The *UEInformationRequest* message is used by the network to retrieve information from the UE.

Signalling radio bearer: SRB1

RLC-SAP: AM

Logical channel: DCCH

Direction: Network to UE

*UEInformationRequest message*

-- ASN1START

-- TAG-UEINFORMATIONREQUEST-START

UEInformationRequest-r16 ::= SEQUENCE {

rrc-TransactionIdentifier RRC-TransactionIdentifier,

criticalExtensions CHOICE {

ueInformationRequest-r16 UEInformationRequest-r16-IEs,

criticalExtensionsFuture SEQUENCE {}

}

}

UEInformationRequest-r16-IEs ::= SEQUENCE {

idleModeMeasurementReq-r16 ENUMERATED{true} OPTIONAL, -- Need N

logMeasReportReq-r16 ENUMERATED {true} OPTIONAL, -- Need N

connEstFailReportReq-r16 ENUMERATED {true} OPTIONAL, -- Need N

ra-ReportReq-r16 ENUMERATED {true} OPTIONAL, -- Need N

rlf-ReportReq-r16 ENUMERATED {true} OPTIONAL, -- Need N

mobilityHistoryReportReq-r16 ENUMERATED {true} OPTIONAL, -- Need N

lateNonCriticalExtension OCTET STRING OPTIONAL,

nonCriticalExtension UEInformationRequest-v1700-IEs OPTIONAL

}

UEInformationRequest-v1700-IEs ::= SEQUENCE {

successHO-ReportReq-r17 ENUMERATED {true} OPTIONAL, -- Need N

coarseLocationRequest-r17 ENUMERATED {true} OPTIONAL, -- Need N

nonCriticalExtension SEQUENCE {} OPTIONAL

}

-- TAG-UEINFORMATIONREQUEST-STOP

-- ASN1STOP

|  |
| --- |
| *UEInformationRequest-IEs* field descriptions |
| ***coarseLocationRequest***  This field is used to request UE to report coarse location information. |
| ***connEstFailReportReq***  This field is used to indicate whether the UE shall report information about the connection failure. |
| ***idleModeMeasurementReq***  This field indicates that the UE shall report the idle/inactive measurement information, if available, to the network in the *UEInformationResponse* message. |
| ***logMeasReportReq***  This field is used to indicate whether the UE shall report information about logged measurements. |
| ***mobilityHistoryReportReq***  This field is used to indicate whether the UE shall report information about mobility history information. |
| ***ra-ReportReq***  This field is used to indicate whether the UE shall report information about the random access procedure. |
| ***rlf-ReportReq***  This field is used to indicate whether the UE shall report information about the radio link failure. |
| ***successHO-ReportReq***  This field is used to indicate whether the UE shall report information about the successful handover report. |

#### – *UEInformationResponse*

The *UEInformationResponse* message is used by the UE to transfer information requested by the network.

Signalling radio bearer: SRB1 or SRB2 (when logged measurement information is included)

RLC-SAP: AM

Logical channel: DCCH

Direction: UE to network

*UEInformationResponse message*

-- ASN1START

-- TAG-UEINFORMATIONRESPONSE-START

UEInformationResponse-r16 ::= SEQUENCE {

rrc-TransactionIdentifier RRC-TransactionIdentifier,

criticalExtensions CHOICE {

ueInformationResponse-r16 UEInformationResponse-r16-IEs,

criticalExtensionsFuture SEQUENCE {}

}

}

UEInformationResponse-r16-IEs ::= SEQUENCE {

measResultIdleEUTRA-r16 MeasResultIdleEUTRA-r16 OPTIONAL,

measResultIdleNR-r16 MeasResultIdleNR-r16 OPTIONAL,

logMeasReport-r16 LogMeasReport-r16 OPTIONAL,

connEstFailReport-r16 ConnEstFailReport-r16 OPTIONAL,

ra-ReportList-r16 RA-ReportList-r16 OPTIONAL,

rlf-Report-r16 RLF-Report-r16 OPTIONAL,

mobilityHistoryReport-r16 MobilityHistoryReport-r16 OPTIONAL,

lateNonCriticalExtension OCTET STRING OPTIONAL,

nonCriticalExtension UEInformationResponse-v1700-IEs OPTIONAL

}

UEInformationResponse-v1700-IEs ::= SEQUENCE {

successHO-Report-r17 SuccessHO-Report-r17 OPTIONAL,

connEstFailReportList-r17 ConnEstFailReportList-r17 OPTIONAL,

coarseLocationInfo-r17 OCTET STRING OPTIONAL,

nonCriticalExtension SEQUENCE {} OPTIONAL

}

LogMeasReport-r16 ::= SEQUENCE {

absoluteTimeStamp-r16 AbsoluteTimeInfo-r16,

traceReference-r16 TraceReference-r16,

traceRecordingSessionRef-r16 OCTET STRING (SIZE (2)),

tce-Id-r16 OCTET STRING (SIZE (1)),

logMeasInfoList-r16 LogMeasInfoList-r16,

logMeasAvailable-r16 ENUMERATED {true} OPTIONAL,

logMeasAvailableBT-r16 ENUMERATED {true} OPTIONAL,

logMeasAvailableWLAN-r16 ENUMERATED {true} OPTIONAL,

...

}

LogMeasInfoList-r16 ::= SEQUENCE (SIZE (1..maxLogMeasReport-r16)) OF LogMeasInfo-r16

LogMeasInfo-r16 ::= SEQUENCE {

locationInfo-r16 LocationInfo-r16 OPTIONAL,

relativeTimeStamp-r16 INTEGER (0..7200),

servCellIdentity-r16 CGI-Info-Logging-r16 OPTIONAL,

measResultServingCell-r16 MeasResultServingCell-r16 OPTIONAL,

measResultNeighCells-r16 SEQUENCE {

measResultNeighCellListNR MeasResultListLogging2NR-r16 OPTIONAL,

measResultNeighCellListEUTRA MeasResultList2EUTRA-r16 OPTIONAL

},

anyCellSelectionDetected-r16 ENUMERATED {true} OPTIONAL,

...,

[[

inDeviceCoexDetected-r17 ENUMERATED {true} OPTIONAL

]]

}

ConnEstFailReport-r16 ::= SEQUENCE {

measResultFailedCell-r16 MeasResultFailedCell-r16,

locationInfo-r16 LocationInfo-r16 OPTIONAL,

measResultNeighCells-r16 SEQUENCE {

measResultNeighCellListNR MeasResultList2NR-r16 OPTIONAL,

measResultNeighCellListEUTRA MeasResultList2EUTRA-r16 OPTIONAL

},

numberOfConnFail-r16 INTEGER (1..8),

perRAInfoList-r16 PerRAInfoList-r16,

timeSinceFailure-r16 TimeSinceFailure-r16,

...

}

ConnEstFailReportList-r17 ::= SEQUENCE (SIZE (1..maxCEFReport-r17)) OF ConnEstFailReport-r16

MeasResultServingCell-r16 ::= SEQUENCE {

resultsSSB-Cell MeasQuantityResults,

resultsSSB SEQUENCE{

best-ssb-Index SSB-Index,

best-ssb-Results MeasQuantityResults,

numberOfGoodSSB INTEGER (1..maxNrofSSBs-r16)

} OPTIONAL

}

MeasResultFailedCell-r16 ::= SEQUENCE {

cgi-Info CGI-Info-Logging-r16,

measResult-r16 SEQUENCE {

cellResults-r16 SEQUENCE{

resultsSSB-Cell-r16 MeasQuantityResults

},

rsIndexResults-r16 SEQUENCE{

resultsSSB-Indexes-r16 ResultsPerSSB-IndexList

}

}

}

RA-ReportList-r16 ::= SEQUENCE (SIZE (1..maxRAReport-r16)) OF RA-Report-r16

RA-Report-r16 ::= SEQUENCE {

cellId-r16 CHOICE {

cellGlobalId-r16 CGI-Info-Logging-r16,

pci-arfcn-r16 PCI-ARFCN-NR-r16

},

ra-InformationCommon-r16 RA-InformationCommon-r16 OPTIONAL,

raPurpose-r16 ENUMERATED {accessRelated, beamFailureRecovery, reconfigurationWithSync, ulUnSynchronized,

schedulingRequestFailure, noPUCCHResourceAvailable, requestForOtherSI,

msg3RequestForOtherSI-r17, spare8, spare7, spare6, spare5, spare4, spare3,

spare2, spare1},

...,

[[

spCellID-r17 CGI-Info-Logging-r16 OPTIONAL

]]

}

RA-InformationCommon-r16 ::= SEQUENCE {

absoluteFrequencyPointA-r16 ARFCN-ValueNR,

locationAndBandwidth-r16 INTEGER (0..37949),

subcarrierSpacing-r16 SubcarrierSpacing,

msg1-FrequencyStart-r16 INTEGER (0..maxNrofPhysicalResourceBlocks-1) OPTIONAL,

msg1-FrequencyStartCFRA-r16 INTEGER (0..maxNrofPhysicalResourceBlocks-1) OPTIONAL,

msg1-SubcarrierSpacing-r16 SubcarrierSpacing OPTIONAL,

msg1-SubcarrierSpacingCFRA-r16 SubcarrierSpacing OPTIONAL,

msg1-FDM-r16 ENUMERATED {one, two, four, eight} OPTIONAL,

msg1-FDMCFRA-r16 ENUMERATED {one, two, four, eight} OPTIONAL,

perRAInfoList-r16 PerRAInfoList-r16,

...,

[[

perRAInfoList-v1660 PerRAInfoList-v1660 OPTIONAL

]],

[[

msg1-SCS-From-prach-ConfigurationIndex-r16 ENUMERATED {kHz1dot25, kHz5, spare2, spare1} OPTIONAL

]],

[[

msg1-SCS-From-prach-ConfigurationIndexCFRA-r16 ENUMERATED {kHz1dot25, kHz5, spare2, spare1} OPTIONAL

]],

[[

msgA-RO-FrequencyStart-r17 INTEGER (0..maxNrofPhysicalResourceBlocks-1) OPTIONAL,

msgA-RO-FrequencyStartCFRA-r17 INTEGER (0..maxNrofPhysicalResourceBlocks-1) OPTIONAL,

msgA-SubcarrierSpacing-r17 SubcarrierSpacing OPTIONAL,

msgA-RO-FDM-r17 ENUMERATED {one, two, four, eight} OPTIONAL,

msgA-RO-FDMCFRA-r17 ENUMERATED {one, two, four, eight} OPTIONAL,

msgA-SCS-From-prach-ConfigurationIndex-r17 ENUMERATED {kHz1dot25, kHz5, spare2, spare1} OPTIONAL,

msgA-TransMax-r17 ENUMERATED {n1, n2, n4, n6, n8, n10, n20, n50, n100, n200} OPTIONAL,

msgA-MCS-r17 INTEGER (0..15) OPTIONAL,

nrofPRBs-PerMsgA-PO-r17 INTEGER (1..32) OPTIONAL,

msgA-PUSCH-TimeDomainAllocation-r17 INTEGER (1..maxNrofUL-Allocations) OPTIONAL,

frequencyStartMsgA-PUSCH-r17 INTEGER (0..maxNrofPhysicalResourceBlocks-1) OPTIONAL,

nrofMsgA-PO-FDM-r17 ENUMERATED {one, two, four, eight} OPTIONAL,

dlPathlossRSRP-r17 RSRP-Range OPTIONAL,

intendedSIBs-r17 SEQUENCE (SIZE (1..maxSIB)) OF SIB-Type-r17 OPTIONAL,

ssbsForSI-Acquisition-r17 SEQUENCE (SIZE (1..maxNrofSSBs-r16)) OF SSB-Index OPTIONAL,

msgA-PUSCH-PayloadSize-r17 BIT STRING (SIZE (5)) OPTIONAL,

onDemandSISuccess-r17 ENUMERATED {true} OPTIONAL

]]

}

PerRAInfoList-r16 ::= SEQUENCE (SIZE (1..200)) OF PerRAInfo-r16

PerRAInfoList-v1660 ::= SEQUENCE (SIZE (1..200)) OF PerRACSI-RSInfo-v1660

PerRAInfo-r16 ::= CHOICE {

perRASSBInfoList-r16 PerRASSBInfo-r16,

perRACSI-RSInfoList-r16 PerRACSI-RSInfo-r16

}

PerRASSBInfo-r16 ::= SEQUENCE {

ssb-Index-r16 SSB-Index,

numberOfPreamblesSentOnSSB-r16 INTEGER (1..200),

perRAAttemptInfoList-r16 PerRAAttemptInfoList-r16

}

PerRACSI-RSInfo-r16 ::= SEQUENCE {

csi-RS-Index-r16 CSI-RS-Index,

numberOfPreamblesSentOnCSI-RS-r16 INTEGER (1..200)

}

PerRACSI-RSInfo-v1660 ::= SEQUENCE {

csi-RS-Index-v1660 INTEGER (1..96) OPTIONAL

}

PerRAAttemptInfoList-r16 ::= SEQUENCE (SIZE (1..200)) OF PerRAAttemptInfo-r16

PerRAAttemptInfo-r16 ::= SEQUENCE {

contentionDetected-r16 BOOLEAN OPTIONAL,

dlRSRPAboveThreshold-r16 BOOLEAN OPTIONAL,

...,

[[

fallbackToFourStepRA-r17 ENUMERATED {true} OPTIONAL

]]

}

SIB-Type-r17 ::= ENUMERATED {sibType2, sibType3, sibType4, sibType5, sibType9, sibType10-v1610, sibType11-v1610, sibType12-v1610,

sibType13-v1610, sibType14-v1610, spare6, spare5, spare4, spare3, spare2, spare1}

RLF-Report-r16 ::= CHOICE {

nr-RLF-Report-r16 SEQUENCE {

measResultLastServCell-r16 MeasResultRLFNR-r16,

measResultNeighCells-r16 SEQUENCE {

measResultListNR-r16 MeasResultList2NR-r16 OPTIONAL,

measResultListEUTRA-r16 MeasResultList2EUTRA-r16 OPTIONAL

} OPTIONAL,

c-RNTI-r16 RNTI-Value,

previousPCellId-r16 CHOICE {

nrPreviousCell-r16 CGI-Info-Logging-r16,

eutraPreviousCell-r16 CGI-InfoEUTRALogging

} OPTIONAL,

failedPCellId-r16 CHOICE {

nrFailedPCellId-r16 CHOICE {

cellGlobalId-r16 CGI-Info-Logging-r16,

pci-arfcn-r16 PCI-ARFCN-NR-r16

},

eutraFailedPCellId-r16 CHOICE {

cellGlobalId-r16 CGI-InfoEUTRALogging,

pci-arfcn-r16 PCI-ARFCN-EUTRA-r16

}

},

reconnectCellId-r16 CHOICE {

nrReconnectCellId-r16 CGI-Info-Logging-r16,

eutraReconnectCellId-r16 CGI-InfoEUTRALogging

} OPTIONAL,

timeUntilReconnection-r16 TimeUntilReconnection-r16 OPTIONAL,

reestablishmentCellId-r16 CGI-Info-Logging-r16 OPTIONAL,

timeConnFailure-r16 INTEGER (0..1023) OPTIONAL,

timeSinceFailure-r16 TimeSinceFailure-r16,

connectionFailureType-r16 ENUMERATED {rlf, hof},

rlf-Cause-r16 ENUMERATED {t310-Expiry, randomAccessProblem, rlc-MaxNumRetx,

beamFailureRecoveryFailure, lbtFailure-r16,

bh-rlfRecoveryFailure, t312-expiry-r17, spare1},

locationInfo-r16 LocationInfo-r16 OPTIONAL,

noSuitableCellFound-r16 ENUMERATED {true} OPTIONAL,

ra-InformationCommon-r16 RA-InformationCommon-r16 OPTIONAL,

...,

[[

csi-rsRLMConfigBitmap-v1650 BIT STRING (SIZE (96)) OPTIONAL

]],

[[

lastHO-Type-r17 ENUMERATED {cho, daps, spare2, spare1} OPTIONAL,

timeConnSourceDAPS-Failure-r17 TimeConnSourceDAPS-Failure-r17 OPTIONAL,

timeSinceCHO-Reconfig-r17 TimeSinceCHO-Reconfig-r17 OPTIONAL,

choCellId-r17 CHOICE {

cellGlobalId-r17 CGI-Info-Logging-r16,

pci-arfcn-r17 PCI-ARFCN-NR-r16

} OPTIONAL,

choCandidateCellList-r17 ChoCandidateCellList-r17 OPTIONAL

]]

},

eutra-RLF-Report-r16 SEQUENCE {

failedPCellId-EUTRA CGI-InfoEUTRALogging,

measResult-RLF-Report-EUTRA-r16 OCTET STRING,

...,

[[

measResult-RLF-Report-EUTRA-v1690 OCTET STRING OPTIONAL

]]

}

}

SuccessHO-Report-r17 ::= SEQUENCE {

sourceCellInfo-r17 SEQUENCE {

sourcePCellId-r17 CGI-Info-Logging-r16,

sourceCellMeas-r17 MeasResultSuccessHONR-r17 OPTIONAL,

rlf-InSourceDAPS-r17 ENUMERATED {true} OPTIONAL

},

targetCellInfo-r17 SEQUENCE {

targetPCellId-r17 CGI-Info-Logging-r16,

targetCellMeas-r17 MeasResultSuccessHONR-r17 OPTIONAL

},

measResultNeighCells-r17 SEQUENCE {

measResultListNR-r17 MeasResultList2NR-r16 OPTIONAL,

measResultListEUTRA-r17 MeasResultList2EUTRA-r16 OPTIONAL

} OPTIONAL,

locationInfo-r17 LocationInfo-r16 OPTIONAL,

timeSinceCHO-Reconfig-r17 TimeSinceCHO-Reconfig-r17 OPTIONAL,

shr-Cause-r17 SHR-Cause-r17 OPTIONAL,

ra-InformationCommon-r17 RA-InformationCommon-r16 OPTIONAL,

upInterruptionTimeAtHO-r17 UPInterruptionTimeAtHO-r17 OPTIONAL,

c-RNTI-r17 RNTI-Value OPTIONAL,

...

}

MeasResultList2NR-r16 ::= SEQUENCE(SIZE (1..maxFreq)) OF MeasResult2NR-r16

MeasResultList2EUTRA-r16 ::= SEQUENCE(SIZE (1..maxFreq)) OF MeasResult2EUTRA-r16

MeasResult2NR-r16 ::= SEQUENCE {

ssbFrequency-r16 ARFCN-ValueNR OPTIONAL,

refFreqCSI-RS-r16 ARFCN-ValueNR OPTIONAL,

measResultList-r16 MeasResultListNR

}

MeasResultListLogging2NR-r16 ::= SEQUENCE(SIZE (1..maxFreq)) OF MeasResultLogging2NR-r16

MeasResultLogging2NR-r16 ::= SEQUENCE {

carrierFreq-r16 ARFCN-ValueNR,

measResultListLoggingNR-r16 MeasResultListLoggingNR-r16

}

MeasResultListLoggingNR-r16 ::= SEQUENCE (SIZE (1..maxCellReport)) OF MeasResultLoggingNR-r16

MeasResultLoggingNR-r16 ::= SEQUENCE {

physCellId-r16 PhysCellId,

resultsSSB-Cell-r16 MeasQuantityResults,

numberOfGoodSSB-r16 INTEGER (1..maxNrofSSBs-r16) OPTIONAL

}

MeasResult2EUTRA-r16 ::= SEQUENCE {

carrierFreq-r16 ARFCN-ValueEUTRA,

measResultList-r16 MeasResultListEUTRA

}

MeasResultRLFNR-r16 ::= SEQUENCE {

measResult-r16 SEQUENCE {

cellResults-r16 SEQUENCE{

resultsSSB-Cell-r16 MeasQuantityResults OPTIONAL,

resultsCSI-RS-Cell-r16 MeasQuantityResults OPTIONAL

},

rsIndexResults-r16 SEQUENCE{

resultsSSB-Indexes-r16 ResultsPerSSB-IndexList OPTIONAL,

ssbRLMConfigBitmap-r16 BIT STRING (SIZE (64)) OPTIONAL,

resultsCSI-RS-Indexes-r16 ResultsPerCSI-RS-IndexList OPTIONAL,

csi-rsRLMConfigBitmap-r16 BIT STRING (SIZE (96)) OPTIONAL

} OPTIONAL

}

}

MeasResultSuccessHONR-r17::= SEQUENCE {

measResult-r17 SEQUENCE {

cellResults-r17 SEQUENCE{

resultsSSB-Cell-r17 MeasQuantityResults OPTIONAL,

resultsCSI-RS-Cell-r17 MeasQuantityResults OPTIONAL

},

rsIndexResults-r17 SEQUENCE{

resultsSSB-Indexes-r17 ResultsPerSSB-IndexList OPTIONAL,

resultsCSI-RS-Indexes-r17 ResultsPerCSI-RS-IndexList OPTIONAL

}

}

}

ChoCandidateCellList-r17 ::= SEQUENCE(SIZE (1..maxNrofCondCells-r16)) OF ChoCandidateCell-r17

ChoCandidateCell-r17 ::= CHOICE {

cellGlobalId-r17 CGI-Info-Logging-r16,

pci-arfcn-r17 PCI-ARFCN-NR-r16

}

SHR-Cause-r17 ::= SEQUENCE {

t304-cause-r17 ENUMERATED {true} OPTIONAL,

t310-cause-r17 ENUMERATED {true} OPTIONAL,

t312-cause-r17 ENUMERATED {true} OPTIONAL,

sourceDAPS-Failure-r17 ENUMERATED {true} OPTIONAL,

...

}

TimeSinceFailure-r16 ::= INTEGER (0..172800)

MobilityHistoryReport-r16 ::= VisitedCellInfoList-r16

TimeUntilReconnection-r16 ::= INTEGER (0..172800)

TimeSinceCHO-Reconfig-r17 ::= INTEGER (0..1023)

TimeConnSourceDAPS-Failure-r17 ::= INTEGER (0..1023)

UPInterruptionTimeAtHO-r17 ::= INTEGER (0..1023)

-- TAG-UEINFORMATIONRESPONSE-STOP

-- ASN1STOP

|  |
| --- |
| *UEInformationResponse-IEs* field descriptions |
| ***coarseLocationInfo***  Parameter type Ellipsoid-Point defined in TS 37.355 [49]. The first/leftmost bit of the first octet contains the most significant bit. The least significant bits of *degreesLatitude* and *degreesLongitude* are set to 0 to meet the accuracy requirement corresponds to a granularity of approximately 2 km.  It is up to UE implementation how many LSBs are set to 0 to meet the accuracy requirement. |
| ***connEstFailReport***  This field is used to provide connection establishment failure or connection resume failure information*.* |
| ***connEstFailReportList***  This field is used to provide the list of *connEstFailReport* that are stored by the UE for the past up to *maxCEFReport-r17.* |
| ***logMeasReport***  This field is used to provide the measurement results stored by the UE associated to logged MDT. |
| ***measResultIdleEUTRA***  EUTRA measurement results performed during RRC\_INACTIVE or RRC\_IDLE. |
| ***measResultIdleNR***  NR measurement results performed during RRC\_INACTIVE or RRC\_IDLE. |
| ***ra-ReportList***  This field is used to provide the list of RA reports that is stored by the UE for the past upto *maxRAReport-r16* number of successful random access procedures, or failed or successful completion of on-demand system information request procedure. |
| ***rlf-Report***  This field is used to indicate the RLF report related contents. |
| ***successHO-Report***  This field is used to provide the successful handover report if triggered based on the successful handover configuration. |

|  |
| --- |
| *LogMeasReport* field descriptions |
| ***absoluteTimeStamp***  Indicates the absolute time when the logged measurement configuration logging is provided, as indicated by NR within *absoluteTimeInfo*. |
| ***anyCellSelectionDetected***  This field is used to indicate the detection of *any cell selection* state, as defined in TS 38.304 [20]. The UE sets this field when performing the logging of measurement results in RRC\_IDLE or RRC\_INACTIVE and there is no suitable cell or no acceptable cell. |
| ***inDeviceCoexDetected***  Indicates that measurement logging is suspended due to IDC problem detection. |
| ***measResultServingCell***  This field refers to the log measurement results taken in the Serving cell. |
| ***numberOfGoodSSB***  Indicates the number of good beams (beams that are above *absThreshSS-BlocksConsolidation,* if configured by the network) associated to the cells within the R value range (which is configured by network for cell reselection) of the highest ranked cell as part of the beam level measurements. If the UE has no SSB of a neighbour cell whose measurement quantity is above the *absThreshSS-BlocksConsolidation* or if the network has not configured the *absThreshSS-BlocksConsolidation*, then the UE does not include *numberOfGoodSSB* for the corresponding neighbour cell. If the UE has no SSB of the serving cell whose measurement quantity is above the *absThreshSS-BlocksConsolidation* or if the network has not configured the *absThreshSS-BlocksConsolidation*, then the UE shall set the *numberOfGoodSSB* for the serving cell to one. |
| ***relativeTimeStamp***  Indicates the time of logging measurement results, measured relative to the *absoluteTimeStamp*. Value in seconds. |
| ***tce-Id***  Parameter Trace Collection Entity Id: See TS 32.422 [52]. |
| ***traceRecordingSessionRef***  Parameter Trace Recording Session Reference: See TS 32.422 [52]. |

|  |
| --- |
| *ConnEstFailReport* field descriptions |
| ***measResultFailedCell***  This field refers to the last measurement results taken in the cell, where connection establishment failure or connection resume failure happened. |
| ***measResultNeighCells***  This field refers to the neighbour cell measurements when connection establishment failure or connection resume failure happened. |
| ***numberOfConnFail***  This field is used to indicate the latest number of consecutive failed RRCSetup or RRCResume procedures in the same cell independent of RRC state transition. |
| ***timeSinceFailure***  This field is used to indicate the time that elapsed since the connection (establishment or resume) failure. Value in seconds. The maximum value 172800 means 172800s or longer. |

|  |
| --- |
| *RA-InformationCommon* field descriptions |
| ***absoluteFrequencyPointA***  This field indicates the absolute frequency position of the reference resource block (Common RB 0). |
| ***locationAndBandwidth***  Frequency domain location and bandwidth of the bandwidth part associated to the random-access resources used by the UE. |
| ***perRAInfoList, perRAInfoList-v1660***  This field provides detailed information about each of the random access attempts in the chronological order of the random access attempts. If perRAInfoList-v1660 is present, it shall contain the same number of entries, listed in the same order as in perRAInfoList-r16. |
| ***subcarrierSpacing***  Subcarrier spacing used in the BWP associated to the random-access resources used by the UE. |

|  |
| --- |
| *RA-Report* field descriptions |
| ***cellID***  This field indicates the CGI of the cell in which the associated random access procedure was performed. |
| ***contentionDetected***  This field is used to indicate that contention was detected for the transmitted preamble in the given random access attempt or not. This field is not included when the UE performs random access attempt is using contention free random-access resources or when the *raPurpose* is set to *requestForOtherSI* or when the RA attempt is a 2-step RA attempt and fallback to 4-step RA did not occur (i.e. *fallbackToFourStepRA* is not included). |
| ***csi-RS-Index, csi-RS-Index-v1660***  This field is used to indicate the CSI-RS index corresponding to the random access attempt.  If the random access procedure is for beam failure recovery, the field indicates the NZP-CSI-RS-ResourceId. For CSI-RS index larger than maxNrofCSI-RS-ResourcesRRM-1, the index value is the sum of csi-RS-Index (without suffix) and csi-RS-Index-v1660. |
| ***dlPathlossRSRP***  Measeured RSRP of the DL pathloss reference obtained at the time of *RA\_Type* selection stage of the RA procedure as captured in TS 38.321 [3]. |
| ***dlRSRPAboveThreshold***  In 4 step random access procedure, this field is used to indicate whether the DL beam (SSB) quality associated to the random access attempt was above or below the threshold *rsrp-ThresholdSSB* in *beamFailureRecoveryConfig* in UL BWP configuration of UL BWP selected for random access procedure initiated for beam failure recovery; Otherwise, *rsrp-ThresholdSSB* in *rach-ConfigCommon* in UL BWP configuration of UL BWP selected for random access procedure.  In 2 step random access procedure, this field is used to indicate whether the DL beam (SSB) quality associated to the random access attempt was above or below the threshold *msgA-RSRP-ThresholdSSB* in *rach-ConfigCommonTwoStepRA* in UL BWP configuration of UL BWP selected for random access procedure. |
| ***fallbackToFourStepRA***  This field indicates if a fallback indication in MsgB is received (according to TS 38.321 [3]) for the 2-step random access attempt. |
| ***intendedSIBs***  This field indicates the SIB(s) the UE wanted to receive as a result of the on demand SI request (when the RA procedure is a used as a SI request) initiated by the UE. That is, it indicates the one(s) of the SIB(s) in the SI message(s) requested to be broadcast that the UE was interested in. |
| ***msg1-SCS-From-prach-ConfigurationIndex***  This field is set by the UE with the corresponding SCS for CBRA as derived from the *prach-ConfigurationIndex* in *RACH-ConfigGeneric* when the *msg1-SubcarrierSpacing* is absent; otherwise, this field is absent. |
| ***msg1-SCS-From-prach-ConfigurationIndexCFRA***  This field is set by the UE with the corresponding SCS for CFRA as derived from the *prach-ConfigurationIndex* in *RACH-ConfigGeneric* when the *msg1-SubcarrierSpacing* is absent; otherwise, this field is absent. |
| ***msgA-PUSCH-PayloadSize***  This field indicates the size of the overall payload available in the UE buffer at the time of initiating the 2 step RA procedure. The value refers to the index of TS 38.321 [3], table 6.1.3.1-1, corresponding to the UE buffer size. |
| ***msgA-RO-FDM***  This field indicates the number of msgA PRACH transmission occasions Frequency-Division Multiplexed in one time instance for the PRACH resources configured for 2-step CBRA.. |
| ***msgA-RO-FDMCFRA***  This field indicates the number of msgA PRACH transmission occasions Frequency-Division Multiplexed in one time instance for the PRACH resources configured for 2-step CFRA. |
| ***msgA-RO-FrequencyStart***  This field indicates the lowest resource block of the contention based random-access resources for 2-step CBRA in the random-access procedure. The indication has the form of the offset of the lowest PRACH transmissions occasion with respect to PRB 0 in the frequency domain. |
| ***msgA-RO-FrequencyStartCFRA***  This field indicates the lowest resource block of the contention free random-access resources for the 2-step CFRA in the random-access procedure. The indication has the form of the offset of the lowest PRACH transmissions occasion with respect to PRB 0 in the frequency domain. |
| ***msgA-SCS-From-prach-ConfigurationIndex***  This field is set by the UE with the corresponding SCS as derived from the *msgA-PRACH-ConfigurationIndex* in *RACH-ConfigGenericTwoStepRA* (see tables Table 6.3.3.1-1, Table 6.3.3.1-2, Table 6.3.3.2-2 and Table 6.3.3.2-3, TS 38.211 [16]) when the *msgA-SubcarrierSpacing* is absent and when only 2-step random-access resources are available in the UL BWP used in the random-access procedure; otherwise, this field is absent. |
| ***numberOfPreamblesSentOnCSI-RS***  This field is used to indicate the total number of successive RA preambles that were transmitted on the corresponding CSI-RS. |
| ***numberOfPreamblesSentOnSSB***  This field is used to indicate the total number of successive RA preambles that were transmitted on the corresponding SS/PBCH block. |
| ***onDemandSISuccess***  This field is set to *true* when the RA report entry is included because of either msg1 based on demand SI request or msg3 based on demand SI request and if the on-demand SI request is successful. This field is set to *false* when the RA report entry is included because of either msg1 based on demand SI request or msg3 based on demand SI request and if the on-demand SI request is not successful. Otherwise, the field is absent. |
| ***perRAAttemptInfoList***  This field provides detailed information about a random access attempt. |
| ***perRACSI-RSInfoList***  This field provides detailed information about the successive random access attempts associated to the same CSI-RS. |
| ***perRASSBInfoList***  This field provides detailed information about the successive random access attempts associated to the same SS/PBCH block. |
| ***ra-InformationCommon***  This field is used to provide information on random access attempts. This field is mandatory present. |
| ***raPurpose***  This field is used to indicate the RA scenario for which the RA report entry is triggered. The RA accesses associated to Initial access from RRC\_IDLE, RRC re-establishment procedure, transition from RRC-INACTIVE. The indicator *beamFailureRecovery* is used in case of successful beam failure recovery related RA procedure in the SpCell [3]. The indicator *reconfigurationWithSync* is used if the UE executes a reconfiguration with sync. The indicator *ulUnSynchronized* is used if the random access procedure is initiated in a SpCell by DL or UL data arrival during RRC\_CONNECTED when the timeAlignmentTimer is not running in the PTAG or if the RA procedure is initiated in a serving cell by a PDCCH order [3]. The indicator *schedulingRequestFailure* is used in case of SR failures [3]. The indicator *noPUCCHResourceAvailable* is used when the UE has no valid SR PUCCH resources configured [3]. The indicator *requestForOtherSI* is used for MSG1 based on demand SI request. The indicator *msg3RequestForOtherSI* is used in case of MSG3 based SI request. The field can also be used for the SCG-related RA-Report when the *raPurpose* is set to *beamFailureRecovery*, *reconfigurationWithSync*, *ulUnSynchronized*, *schedulingRequestFailure* and *noPUCCHResourceAvailable*. |
| ***spCellID***  This field is used to indicate the CGI of the SpCell of the cell group associated to the SCell in which the associated random access procedure was performed. If the UE performs RA procedure on a SCell associated to the MCG, then this field is set to the CGI of the PCell and if the UE performs RA procedure on a SCell associated to the SCG, then this field is set to the CGI of the PSCell. Otherwise, the field is absent. |
| ***ssb-Index***  This field is used to indicate the SS/PBCH index of the SS/PBCH block corresponding to the random access attempt. |
| ***ssbsForSI-Acquisition***  This field indicates the SSB(s) (in the form of SSB index(es)) that the UE used to receive the requested SI message(s). The field is present if the purpose of the random access procedure was to request on-demand SI (i.e. if the *raPurpose* is set to *requestForOtherSI* or *msg3RequestForOtherSI*). Otherwise, the field is absent. |

|  |
| --- |
| *RLF-Report* field descriptions |
| ***choCandidateCellList***  This field is used to indicate the list of candidate target cells for conditional handover included in *condRRCReconfig* at the time of connection failure. The field does not include the candidate target cells included in *measResulNeighCells*. |
| ***choCellId***  This field is used to indicate the candidate target cell for conditional handover included in *condRRCReconfig* that the UE selected for CHO based recovery while T311 is running. |
| ***connectionFailureType***  This field is used to indicate whether the connection failure is due to radio link failure or handover failure. |
| ***csi-rsRLMConfigBitmap,csi-rsRLMConfigBitmap-v1650***  These fields are used to indicate the CSI-RS indexes configured in the RLM configurations for the active BWP when the UE declares RLF or HOF. The UE first fills in the *csi-rsRLMConfigBitmap-r16* to indicate the first 96 CSI-RS indexes and then *csi-rsRLMConfigBitmap-v1650* to indicate the latter 96 CSI-RS indexes. The first/leftmost bit in *csi-rsRLMConfigBitmap-r16* corresponds to CSI-RS index 0, the second bit corresponds to CSI-RS index 1. The first/leftmost bit in *csi-rsRLMConfigBitmap-v1650* corresponds to CSI-RS index 96, the second bit corresponds to CSI-RS index 97. These fields are included only if the *RadioLinkMonitoringConfig* for the respective BWP is configured. |
| ***c-RNTI***  This field indicates the C-RNTI used in the PCell upon detecting radio link failure or the C-RNTI used in the source PCell upon handover failure. |
| ***failedPCellId***  This field is used to indicate the PCell in which RLF is detected or the target PCell of the failed handover. For intra-NR handover *nrFailedPCellId* is included and for the handover from NR to EUTRA *eutraFailedPCellId* is included. The UE sets the ARFCN according to the frequency band used for transmission/ reception when the failure occurred. |
| ***failedPCellId-EUTRA***  This field is used to indicate the PCell in which RLF is detected or the source PCell of the failed handover in an E-UTRA RLF report. |
| ***lastHO-Type***  This field is used to indicate the type of the last executed handover before the last detected connection failure. The field is set to *cho* if the last executed handover was initiated by a conditional reconfiguration execution. The field is set to *daps* if the last executed handover was a DAPS handover. |
| ***measResultListEUTRA***  This field refers to the last measurement results taken in the neighboring EUTRA Cells, when the radio link failure or handover failure happened. |
| ***measResultListNR***  This field refers to the last measurement results taken in the neighboring NR Cells, when the radio link failure or handover failure happened or successful handover happened. If configuration of the conditional handover is available in *VarConditionalReconfig* when the radio link failure happened, or if the last executed *RRCReconfiguration* message including *reconfigurationWithSync* was concerning a conditional handover when the handover failure or the successful handover happened, the UE uses *measResultListNR-r17*, otherwise it uses *measResultListNR-r16*. |
| ***measResultLastServCell***  This field refers to the log measurement results taken in the PCell upon detecting radio link failure or the source PCell upon handover failure. |
| ***measResult-RLF-Report-EUTRA***  Includes the E-UTRA *RLF-Report-r9* IE as specified in TS 36.331 [10]. |
| ***measResult-RLF-Report-EUTRA-v1690***  Includes the E-UTRA *RLF-Report-v9e0* IE as specified in TS 36.331 [10]. |
| ***noSuitableCellFound***  This field is set by the UE when the T311 expires. |
| ***previousPCellId***  This field is used to indicate the source PCell of the last handover (source PCell when the last executed *RRCReconfiguration* message including *reconfigurationWithSync* was received). For intra-NR handover *nrPreviousCell* is included and for the handover from EUTRA to NR *eutraPreviousCell* is included. |
| ***ra-InformationCommon***  This field is optionally included when c*onnectionFailureType* is set to 'hof' or when *connectionFailureType* is set to 'rlf' and the *rlf-Cause* equals to 'randomAccessProblem' or 'beamRecoveryFailure'; otherwise this field is absent. |
| ***reconnectCellId***  This field is used to indicate the cell in which the UE comes back to connected after connection failure and after failing to perform reestablishment. If the UE comes back to RRC CONNECTED in an NR cell then *nrReconnectCellID* is included and if the UE comes back to RRC CONNECTED in an LTE cell then *eutraReconnectCellID* is included |
| ***reestablishmentCellId***  If the UE was not configured with *conditionalReconfiguration* at the time of re-establishment attempt, or if the cell selected for the re-establishment attempt is not a candidate target cell for conditional reconfiguration, this field is used to indicate the cell in which the re-establishment attempt was made after connection failure. |
| ***rlf-Cause***  This field is used to indicate the cause of the last radio link failure that was detected. In case of handover failure information reporting (i.e., the *connectionFailureType* is set to '*hof*'), the UE is allowed to set this field to any value, except for the case in which a radio link failure was detected in the source PCell while performing a DAPS handover.. |
| ***ssbRLMConfigBitmap***  This field is used to indicate the SS/PBCH block indexes configured in the RLM configurations for the active BWP when the UE declares RLF or HOF.The first/leftmost bit corresponds to SSB index 0, the second bit corresponds to SSB index 1. This field is included only if the *RadioLinkMonitoringConfig* for the respective BWP is configured. |
| ***timeConnFailure***  This field is used to indicate the time elapsed since the last HO execution until connection failure. Actual value = field value \* 100ms. The maximum value 1023 means 102.3s or longer. |
| ***timeConnSourceDAPS-Failure***  This field is used to indicate the time that elapsed between the last DAPS handover execution and the radio link failure detected in the source cell while T304 is running. Value in milliseconds. The maximum value 1023 means 1023ms or longer. |
| ***timeSinceFailure***  This field is used to indicate the time that elapsed since the connection (radio link or handover) failure. Value in seconds. The maximum value 172800 means 172800s or longer. In the case of failure(s) (either at source or at target or at both) associated to DAPS handover, this field indicates the time elapsed since the latest connection (radio link or handover) failure. |
| *timeSinceCHO-Reconfig*  In case of handover failure, this field is used to indicate the time elapsed between the initiation of the last conditional reconfiguration execution towards the target cell and the reception of the latest conditional reconfiguration. In case of radio link failure, this field is used to indicate the time elapsed between the radio link failure and the reception of the latest conditional reconfiguration while connected to the source PCell. Actual value = field value \* 100ms. The maximum value 1023 means 102.3s or longer. |
| ***timeUntilReconnection***  This field is used to indicate the time that elapsed between the connection (radio link or handover) failure and the next time the UE comes to RRC CONNECTED in an NR or EUTRA cell, after failing to perform reestablishment. Value in seconds. The maximum value 172800 means 172800s or longer. |

|  |
| --- |
| *SuccessHO-Report* field descriptions |
| ***c-RNTI***  This field indicates the C-RNTI assigned by the target PCell of the handover for which the successful HO report was generated. |
| *rlf-InSourceDAPS*  This field indicates whether a radio link failure occurred at the source cell while T304 was running. |
| ***shr-Cause***  This field is used to indicate the cause of the successful HO report. |
| ***sourceCellMeas***  This field refers to the last measurement results taken in the source PCell of a handover in which the successful handover triggers the *SuccessHO-Report*. |
| ***sourcePCellId***  This field is used to indicate the source PCell of a handover in which the successful handover triggers the *SuccessHO-Report*. |
| ***targetCellId***  This field is used to indicate the target PCell of a handover in which the successful handover triggers the *SuccessHO-Report*. |
| ***targetCellMeas***  This field refers to the last measurement results taken in the target PCell of a handover in which the successful handover triggers the *SuccessHO-Report*. |
| ***timeSinceCHO-Reconfig***  This field is used to indicate the time elapsed between the initiation of the last conditional reconfiguration execution towards the target cell and the reception of the latest conditional reconfiguration for this target cell. Actual value = field value \* 100ms. The maximum value 1023 means 102.3s or longer. |
| ***upInterruptionTimeAtHO***  This field is used to indicate the time elapsed between the time of arrival of the last PDCP PDU received from the source cell for any data radio bearer and the time of arrival of the first non-duplicate PDCP PDU received from the target cell for any data radio bearer, and it is measured at the time of arrival of the first non-duplicate PDCP PDU received from the target cell for any data radio bearer. The field is set only in case of DAPS handover. Value in milliseconds. The maximum value 1023 means 1023ms or longer. |

#### – *UEPositioningAssistanceInfo*

The *UEPositioningAssistanceInfo* message is used to provide positioning assistance information as requested by the Network.

Signalling radio bearer: SRB1

RLC-SAP: AM

Logical channel: DCCH

Direction: UE to Network

*UEPositioningAssistanceInfo message*

-- ASN1START

-- TAG-UEPOSITIONINGASSISTANCEINFO-START

UEPositioningAssistanceInfo-r17 ::= SEQUENCE {

criticalExtensions CHOICE {

uePositioningAssistanceInfo-r17 UEPositioningAssistanceInfo-r17-IEs,

criticalExtensionsFuture SEQUENCE {}

}

}

UEPositioningAssistanceInfo-r17-IEs ::= SEQUENCE {

ue-TxTEG-AssociationList-r17 UE-TxTEG-AssociationList-r17 OPTIONAL,

lateNonCriticalExtension OCTET STRING OPTIONAL,

nonCriticalExtension SEQUENCE {} OPTIONAL

}

UE-TxTEG-AssociationList-r17 ::= SEQUENCE (SIZE (1..maxNrOfTxTEGReport-r17)) OF UE-TxTEG-Association-r17

UE-TxTEG-Association-r17 ::= SEQUENCE {

ue-TxTEG-ID-r17 INTEGER (0..maxNrOfTxTEG-ID-1-r17),

nr-TimeStamp-r17 NR-TimeStamp-r17,

associatedSRS-PosResourceIdList-r17 SEQUENCE (SIZE(1..maxNrofSRS-PosResources-r16)) OF SRS-PosResourceId-r16,

servCellId-r17 ServCellIndex OPTIONAL

}

NR-TimeStamp-r17 ::= SEQUENCE {

nr-SFN-r17 INTEGER (0..1023),

nr-Slot-r17 CHOICE {

scs15-r17 INTEGER (0..9),

scs30-r17 INTEGER (0..19),

scs60-r17 INTEGER (0..39),

scs120-r17 INTEGER (0..79)

},

...

}

-- TAG-UEPOSITIONINGASSISTANCEINFO-STOP

-- ASN1STOP

|  |
| --- |
| *UEPositioningAssistanceInfo* field descriptions |
| ***nr-TimeStamp***  This field specifies the latest time instance at which the association is valid prior to the reporting. |
| ***servCellID***  This field indicates the serving cell information of SRS for positioning resources associated to the UE Tx TEG report. |
| ***ue-TxTEG-ID***  Identifies the ID of UE Tx TEG. |

#### – *ULDedicatedMessageSegment*

The *ULDedicatedMessageSegment* message is used to transfer segments of the *UECapabilityInformation* or *MeasurementReportAppLayer* message. SRB1 is used at transfer of segments of *UECapabilityInformation* and SRB4 is used at transfer of segments of *MeasurementReportAppLayer*.

Signalling radio bearer: SRB1 or SRB4

RLC-SAP: AM

Logical channel: DCCH

Direction: UE to Network

*ULDedicatedMessageSegment message*

-- ASN1START

-- TAG-ULDEDICATEDMESSAGESEGMENT-START

ULDedicatedMessageSegment-r16 ::= SEQUENCE {

criticalExtensions CHOICE {

ulDedicatedMessageSegment-r16 ULDedicatedMessageSegment-r16-IEs,

criticalExtensionsFuture SEQUENCE {}

}

}

ULDedicatedMessageSegment-r16-IEs ::= SEQUENCE {

segmentNumber-r16 INTEGER (0..15),

rrc-MessageSegmentContainer-r16 OCTET STRING,

rrc-MessageSegmentType-r16 ENUMERATED {notLastSegment, lastSegment},

lateNonCriticalExtension OCTET STRING OPTIONAL,

nonCriticalExtension SEQUENCE {} OPTIONAL

}

-- TAG-ULDEDICATEDMESSAGESEGMENT-STOP

-- ASN1STOP

|  |
| --- |
| *ULDedicatedMessageSegment* field descriptions |
| ***segmentNumber***  Identifies the sequence number of a segment within the encoded UL DCCH message. |
| ***rrc-MessageSegmentContainer***  Includes a segment of the encoded UL DCCH message. The size of the included segment in this container should be small enough that the resulting encoded RRC message PDU is less than or equal to the PDCP SDU size limit. |
| ***rrc-MessageSegmentType***  Indicates whether the included UL DCCH message segment is the last segment or not. |

#### – *ULInformationTransfer*

The *ULInformationTransfer* message is used for the uplink transfer of NAS or non-3GPP dedicated information, or IAB-DU specific F1-C related information.

Signalling radio bearer: SRB2 or SRB1 (only if SRB2 not established yet). If SRB2 is suspended, the UE does not send this message until SRB2 is resumed. If only *dedicatedInfoF1c* is included, SRB2 is used.

RLC-SAP: AM

Logical channel: DCCH

Direction: UE to network

*ULInformationTransfer message*

-- ASN1START

-- TAG-ULINFORMATIONTRANSFER-START

ULInformationTransfer ::= SEQUENCE {

criticalExtensions CHOICE {

ulInformationTransfer ULInformationTransfer-IEs,

criticalExtensionsFuture SEQUENCE {}

}

}

ULInformationTransfer-IEs ::= SEQUENCE {

dedicatedNAS-Message DedicatedNAS-Message OPTIONAL,

lateNonCriticalExtension OCTET STRING OPTIONAL,

nonCriticalExtension ULInformationTransfer-v1700-IEs OPTIONAL

}

ULInformationTransfer-v1700-IEs ::= SEQUENCE {

dedicatedInfoF1c-r17 DedicatedInfoF1c-r17 OPTIONAL,

nonCriticalExtension SEQUENCE {} OPTIONAL

}

-- TAG-ULINFORMATIONTRANSFER-STOP

-- ASN1STOP

#### – *ULInformationTransferIRAT*

The *ULInformationTransferIRAT* message is used for the uplink transfer of information terminated at NR MCG but specified by another RAT. In this version of the specification, the message is used for V2X sidelink communication messages specified in TS 36.331 [10].

Signalling radio bearer: SRB1

RLC-SAP: AM

Logical channel: DCCH

Direction: UE to network

*ULInformationTransferIRAT* message

-- ASN1START

-- TAG-ULINFORMATIONTRANSFERIRAT-START

ULInformationTransferIRAT-r16 ::= SEQUENCE {

criticalExtensions CHOICE {

c1 CHOICE {

ulInformationTransferIRAT-r16 ULInformationTransferIRAT-r16-IEs,

spare3 NULL, spare2 NULL, spare1 NULL

},

criticalExtensionsFuture SEQUENCE {}

}

}

ULInformationTransferIRAT-r16-IEs ::= SEQUENCE {

ul-DCCH-MessageEUTRA-r16 OCTET STRING OPTIONAL,

lateNonCriticalExtension OCTET STRING OPTIONAL,

nonCriticalExtension SEQUENCE {} OPTIONAL

}

-- TAG-ULINFORMATIONTRANSFERIRAT-STOP

-- ASN1STOP

| *ULInformationTransferIRAT* field descriptions |
| --- |
| ***ul-DCCH-MessageEUTRA***  Includes the *UL-DCCH-Message* as defined in TS 36.331 [10]. In this version of the specification, the field is only used to transfer the E-UTRA RRC *MeasurementReport*, E-UTRA RRC *SidelinkUEInformation* and the E-UTRA RRC *UEAssistanceInformation messages*. |

#### *– ULInformationTransferMRDC*

The *ULInformationTransferMRDC* message is used for the uplink transfer of MR-DC dedicated information (e.g. for transferring the NR or E-UTRA RRC *MeasurementReport* message, the *FailureInformation* message, the *UEAssistanceInformation* message, the *RRCReconfigurationComplete* message or the NR or E-UTRA RRC *MCGFailureInformation* message).

Signalling radio bearer: SRB1, SRB3

RLC-SAP: AM

Logical channel: DCCH

Direction: UE to Network

*ULInformationTransferMRDC message*

-- ASN1START

-- TAG-ULINFORMATIONTRANSFERMRDC-START

ULInformationTransferMRDC ::= SEQUENCE {

criticalExtensions CHOICE {

c1 CHOICE {

ulInformationTransferMRDC ULInformationTransferMRDC-IEs,

spare3 NULL, spare2 NULL, spare1 NULL

},

criticalExtensionsFuture SEQUENCE {}

}

}

ULInformationTransferMRDC-IEs::= SEQUENCE {

ul-DCCH-MessageNR OCTET STRING OPTIONAL,

ul-DCCH-MessageEUTRA OCTET STRING OPTIONAL,

lateNonCriticalExtension OCTET STRING OPTIONAL,

nonCriticalExtension SEQUENCE {} OPTIONAL

}

-- TAG-ULINFORMATIONTRANSFERMRDC-STOP

-- ASN1STOP

| *ULInformationTransferMRDC* field descriptions |
| --- |
| ***ul-DCCH-MessageNR***  Includes the *UL-DCCH-Message*. In this version of the specification, the field is only used to transfer the NR RRC *MeasurementReport*, *RRCReconfigurationComplete, UEAssistanceInformation,* *FailureInformation*, and *IABOtherInformation* messages when sent via SRB1 and to transfer the NR *MCGFailureInformation* message when sent via SRB3. |
| ***ul-DCCH-MessageEUTRA***  Includes the *UL-DCCH-Message*. In this version of the specification, the field is only used to transfer the E-UTRA RRC *MeasurementReport* message when sent via SRB1 and to transfer the E-UTRA *MCGFailureInformation* message when sent via SRB3. |

## 6.3 RRC information elements

### 6.3.0 Parameterized types

#### – *SetupRelease*

*SetupRelease* allows the *ElementTypeParam* to be used as the referenced data type for the setup and release entries. See A.3.8 for guidelines.

-- ASN1START

-- TAG-SETUPRELEASE-START

SetupRelease { ElementTypeParam } ::= CHOICE {

release NULL,

setup ElementTypeParam

}

-- TAG-SETUPRELEASE-STOP

-- ASN1STOP

### 6.3.1 System information blocks

#### – *SIB2*

*SIB2* contains cell re-selection information common for intra-frequency, inter-frequency and/or inter-RAT cell re-selection (i.e. applicable for more than one type of cell re-selection but not necessarily all) as well as intra-frequency cell re-selection information other than neighbouring cell related.

*SIB2* information element

-- ASN1START

-- TAG-SIB2-START

SIB2 ::= SEQUENCE {

cellReselectionInfoCommon SEQUENCE {

nrofSS-BlocksToAverage INTEGER (2..maxNrofSS-BlocksToAverage) OPTIONAL, -- Need S

absThreshSS-BlocksConsolidation ThresholdNR OPTIONAL, -- Need S

rangeToBestCell RangeToBestCell OPTIONAL, -- Need R

q-Hyst ENUMERATED {

dB0, dB1, dB2, dB3, dB4, dB5, dB6, dB8, dB10,

dB12, dB14, dB16, dB18, dB20, dB22, dB24},

speedStateReselectionPars SEQUENCE {

mobilityStateParameters MobilityStateParameters,

q-HystSF SEQUENCE {

sf-Medium ENUMERATED {dB-6, dB-4, dB-2, dB0},

sf-High ENUMERATED {dB-6, dB-4, dB-2, dB0}

}

} OPTIONAL, -- Need R

...

},

cellReselectionServingFreqInfo SEQUENCE {

s-NonIntraSearchP ReselectionThreshold OPTIONAL, -- Need S

s-NonIntraSearchQ ReselectionThresholdQ OPTIONAL, -- Need S

threshServingLowP ReselectionThreshold,

threshServingLowQ ReselectionThresholdQ OPTIONAL, -- Need R

cellReselectionPriority CellReselectionPriority,

cellReselectionSubPriority CellReselectionSubPriority OPTIONAL, -- Need R

...

},

intraFreqCellReselectionInfo SEQUENCE {

q-RxLevMin Q-RxLevMin,

q-RxLevMinSUL Q-RxLevMin OPTIONAL, -- Need R

q-QualMin Q-QualMin OPTIONAL, -- Need S

s-IntraSearchP ReselectionThreshold,

s-IntraSearchQ ReselectionThresholdQ OPTIONAL, -- Need S

t-ReselectionNR T-Reselection,

frequencyBandList MultiFrequencyBandListNR-SIB OPTIONAL, -- Need S

frequencyBandListSUL MultiFrequencyBandListNR-SIB OPTIONAL, -- Need R

p-Max P-Max OPTIONAL, -- Need S

smtc SSB-MTC OPTIONAL, -- Need S

ss-RSSI-Measurement SS-RSSI-Measurement OPTIONAL, -- Need R

ssb-ToMeasure SSB-ToMeasure OPTIONAL, -- Need S

deriveSSB-IndexFromCell BOOLEAN,

...,

[[

t-ReselectionNR-SF SpeedStateScaleFactors OPTIONAL -- Need N

]],

[[

smtc2-LP-r16 SSB-MTC2-LP-r16 OPTIONAL, -- Need R

ssb-PositionQCL-Common-r16 SSB-PositionQCL-Relation-r16 OPTIONAL -- Cond SharedSpectrum

]],

[[

ssb-PositionQCL-Common-r17 SSB-PositionQCL-Relation-r17 OPTIONAL -- Cond SharedSpectrum2

]]

},

...,

[[

relaxedMeasurement-r16 SEQUENCE {

lowMobilityEvaluation-r16 SEQUENCE {

s-SearchDeltaP-r16 ENUMERATED {

dB3, dB6, dB9, dB12, dB15,

spare3, spare2, spare1},

t-SearchDeltaP-r16 ENUMERATED {

s5, s10, s20, s30, s60, s120, s180,

s240, s300, spare7, spare6, spare5,

spare4, spare3, spare2, spare1}

} OPTIONAL, -- Need R

cellEdgeEvaluation-r16 SEQUENCE {

s-SearchThresholdP-r16 ReselectionThreshold,

s-SearchThresholdQ-r16 ReselectionThresholdQ OPTIONAL -- Need R

} OPTIONAL, -- Need R

combineRelaxedMeasCondition-r16 ENUMERATED {true} OPTIONAL, -- Need R

highPriorityMeasRelax-r16 ENUMERATED {true} OPTIONAL -- Need R

} OPTIONAL -- Need R

]],

[[

cellEquivalentSize-r17 INTEGER(2..16) OPTIONAL, -- Cond HSDN

relaxedMeasurement-r17 SEQUENCE {

stationaryMobilityEvaluation-r17 SEQUENCE {

s-SearchDeltaP-Stationary-r17 ENUMERATED {dB2, dB3, dB6, dB9, dB12, dB15, spare2, spare1},

t-SearchDeltaP-Stationary-r17 ENUMERATED {s5, s10, s20, s30, s60, s120, s180, s240, s300, spare7, spare6, spare5,

spare4, spare3, spare2, spare1}

},

cellEdgeEvaluationWhileStationary-r17 SEQUENCE {

s-SearchThresholdP2-r17 ReselectionThreshold,

s-SearchThresholdQ2-r17 ReselectionThresholdQ OPTIONAL -- Need R

} OPTIONAL, -- Need R

combineRelaxedMeasCondition2-r17 ENUMERATED {true} OPTIONAL -- Need R

} OPTIONAL -- Need R

]]

}

RangeToBestCell ::= Q-OffsetRange

-- TAG-SIB2-STOP

-- ASN1STOP

| *SIB2* field descriptions |
| --- |
| ***absThreshSS-BlocksConsolidation***  Threshold for consolidation of L1 measurements per RS index. If the field is absent, the UE uses the measurement quantity as specified in TS 38.304 [20]. |
| ***cellEdgeEvaluation***  Indicates the criteria for a UE to detect that it is not at cell edge, in order to relax measurement requirements for cell reselection (see TS 38.304 [20], clause 5.2.4.9.2). |
| ***cellEdgeEvaluationWhileStationary***  Indicates the criteria for a UE to detect that it is not at cell edge while stationary, in order to relax measurement requirements for cell reselection (see TS 38.304 [20], clause 5.2.4.9.4). |
| ***cellEquivalentSize***  The number of cell count used for mobility state estimation for this cell as specified in TS 38.304 [20]. |
| ***cellReselectionInfoCommon***  Cell re-selection information common for intra-frequency, inter-frequency and/ or inter-RAT cell re-selection. |
| ***cellReselectionServingFreqInfo***  Information common for non-intra-frequency cell re-selection i.e. cell re-selection to inter-frequency and inter-RAT cells. |
| ***combineRelaxedMeasCondition***  When both *lowMobilityEvalutation* and *cellEdgeEvalutation* criteria are present in SIB2, this parameter configures the UE to fulfil both criteria in order to relax measurement requirements for cell reselection. If the field is absent, the UE is allowed to relax measurement requirements for cell reselection when either or both of the criteria are met. (See TS 38.304 [20], clause 5.2.4.9.0) |
| ***combineRelaxedMeasCondition2***  When both *stationaryMobilityEvaluation* and *cellEdgeEvaluationWhileStationary* criteria are present in SIB2, this parameter configures the UE to fulfil both criteria in order to relax measurement requirements for cell reselection. If the field is absent, the UE is allowed to relax measurement requirements for cell reselection when only the stationary criteria is met. (See TS 38.304 [20], clause 5.2.4.9.0) |
| ***deriveSSB-IndexFromCell***  This field indicates whether the UE can utilize serving cell timing to derive the index of SS block transmitted by neighbour cell. If this field is set to *true*, the UE assumes SFN and frame boundary alignment across cells on the serving frequency as specified in TS 38.133 [14]. |
| ***frequencyBandList***  Indicates the list of frequency bands for which the NR cell reselection parameters apply. The UE behaviour in case the field is absent is described in clause 5.2.2.4.3. |
| ***highPriorityMeasRelax***  Indicates whether measurements can be relaxed on high priority frequencies. If the field is absent, the UE shall not relax measurements on high priority frequencies beyond "Thigher\_priority\_search" unless both low mobility and not at cell edge criteria are fulfilled (see TS 38.133 [14], clauses 4.2.2.7, 4.2.2.10 and 4.2.2.11). |
| ***intraFreqCellReselectionInfo***  Cell re-selection information common for intra-frequency cells. |
| ***lowMobilityEvaluation***  Indicates the criteria for a UE to detect low mobility, in order to relax measurement requirements for cell reselection (see TS 38.304 [20], clause 5.2.4.9.1). |
| ***nrofSS-BlocksToAverage***  Number of SS blocks to average for cell measurement derivation. If the field is absent the UE uses the measurement quantity as specified in TS 38.304 [20]. |
| ***p-Max***  Value in dBm applicable for the intra-frequency neighbouring NR cells. If absent the UE applies the maximum power according to TS 38.101-1 [15] in case of an FR1 cell or TS 38.101-2 [39] in case of an FR2 cell. In this release of the specification, if *p-Max* is present on a carrier frequency in FR2, the UE shall ignore the field and applies the maximum power according to TS 38.101-2 [39]. This field is ignored by IAB-MT. The IAB-MT applies output power and emissions requirements, as specified in TS 38.174 [63]. |
| ***q-Hyst***  Parameter "*Qhyst*" in TS 38.304 [20], Value in dB. Value *dB1* corresponds to 1 dB, *dB2* corresponds to 2 dB and so on. |
| ***q-HystSF***  Parameter "Speed dependent ScalingFactor for Qhyst" in TS 38.304 [20]. The *sf-Medium* and *sf-High* concern the additional hysteresis to be applied, in Medium and High Mobility state respectively, to Qhyst as defined in TS 38.304 [20]. In dB. Value *dB-6* corresponds to -6dB, *dB-4* corresponds to -4dB and so on. |
| ***q-QualMin***  Parameter "Qqualmin" in TS 38.304 [20], applicable for intra-frequency neighbour cells. If the field is absent, the UE applies the (default) value of negative infinity for Qqualmin. |
| ***q-RxLevMin***  Parameter "Qrxlevmin" in TS 38.304 [20], applicable for intra-frequency neighbour cells. |
| ***q-RxLevMinSUL***  Parameter "Qrxlevmin" in TS 38.304 [20], applicable for intra-frequency neighbour cells. |
| ***rangeToBestCell***  Parameter "rangeToBestCell" in TS 38.304 [20]. The network configures only non-negative (in dB) values. |
| ***relaxedMeasurement***  Configuration to allow relaxation of RRM measurement requirements for cell reselection (see TS 38.304 [20], clause 5.2.4.9). |
| ***s-IntraSearchP***  Parameter "SIntraSearchP" in TS 38.304 [20]. |
| ***s-IntraSearchQ***  Parameter "SIntraSearchQ" in TS 38.304 [20]. If the field is absent, the UE applies the (default) value of 0 dB for SIntraSearchQ. |
| ***s-NonIntraSearchP***  Parameter "SnonIntraSearchP" in TS 38.304 [20]. If this field is absent, the UE applies the (default) value of infinity for SnonIntraSearchP. |
| ***s-NonIntraSearchQ***  Parameter "SnonIntraSearchQ" in TS 38.304 [20]. If the field is absent, the UE applies the (default) value of 0 dB for SnonIntraSearchQ. |
| ***s-SearchDeltaP***  Parameter "SSearchDeltaP" in TS 38.304 [20]. Value dB3 corresponds to 3 dB, dB6 corresponds to 6 dB and so on. |
| ***s-SearchDeltaP-Stationary***  Parameter "SSearchDeltaP-Stationary" in TS 38.304 [20]. Value *dB2* corresponds to 2 dB, *dB3* corresponds to 3 dB and so on. |
| ***s-SearchThresholdP, s-SearchThresholdP2***  Parameters "SSearchThresholdP" and "SSearchThresholdP2" in TS 38.304 [20]. The network configures *s-SearchThresholdP* and *s-SearchThresholdP2* to be less than or equal to *s-IntraSearchP* and *s-NonIntraSearchP*. |
| ***s-SearchThresholdQ, s-SearchThresholdQ2***  Parameters "SSearchThresholdQ" and "SSearchThresholdQ2" in TS 38.304 [20]. The network configures *s-SearchThresholdQ* and *s-SearchThresholdQ2* to be less than or equal to *s-IntraSearchQ* and *s-NonIntraSearchQ*. |
| ***smtc***  Measurement timing configuration for intra-frequency measurement. If this field is absent, the UE assumes that SSB periodicity is 5 ms for the intra-frequnecy cells. |
| ***smtc2-LP***  Measurement timing configuration for intra-frequency neighbour cells with a Long Periodicity (LP) indicated by periodicity in *smtc2-LP*. The timing offset and duration are equal to the offset and duration indicated in *smtc* in *intraFreqCellReselectionInfo*. The periodicity in *smtc2-LP* can only be set to a value strictly larger than the periodicity in *smtc* in *intraFreqCellReselectionInfo* (e.g. if *smtc* indicates sf20 the Long Periodicity can only be set to sf40, sf80 or sf160, if *smtc* indicates sf160, *smtc2-LP* cannot be configured). The *pci-List*, if present, includes the physical cell identities of the intra-frequency neighbour cells with Long Periodicity. If *smtc2-LP* is absent, the UE assumes that there are no intra-frequency neighbour cells with a Long Periodicity. |
| ***ssb-PositionQCL-Common***  Indicates the QCL relation between SS/PBCH blocks for intra-frequency neighbor cells as specified in TS 38.213 [13], clause 4.1. |
| ***ssb-ToMeasure***  The set of SS blocks to be measured within the SMTC measurement duration (see TS 38.215 [9]). When the field is absent the UE measures on all SS-blocks. |
| ***stationaryMobilityEvaluation***  Indicates the criteria for a UE to detect stationary mobility, in order to relax measurement requirements for cell reselection (see TS 38.304 [20], clause 5.2.4.9.0). |
| ***t-ReselectionNR***  Parameter "TreselectionNR" in TS 38.304 [20]. |
| ***t-ReselectionNR-SF***  Parameter "Speed dependent ScalingFactor for TreselectionNR" in TS 38.304 [20]. If the field is absent, the UE behaviour is specified in TS 38.304 [20]. |
| ***threshServingLowP***  Parameter "ThreshServing, LowP" in TS 38.304 [20]. |
| ***threshServingLowQ***  Parameter "ThreshServing, LowQ" in TS 38.304 [20]. |
| ***t-SearchDeltaP***  Parameter "TSearchDeltaP" in TS 38.304 [20]. Value in seconds. Value *s5* means 5 seconds, value *s10* means 10 seconds and so on. |
| ***t-SearchDeltaP-Stationary***  Parameter "TSearchDeltaP-Stationary" in TS 38.304 [20]. Value in seconds. Value *s5* means 5 seconds, value *s10* means 10 seconds and so on. |

|  |  |
| --- | --- |
| Conditional Presence | Explanation |
| *HSDN* | The field is optionally present, Need R, if *speedStateReselectionPars* is present; otherwise the field is not present. |
| *SharedSpectrum* | This field is mandatory present if this intra-frequency operates with shared spectrum channel access in FR1. Otherwise, it is absent, Need R. |
| *SharedSpectrum2* | This field is optionally present if this intra-frequency operates with shared spectrum channel access in FR2-2. Otherwise, it is absent, Need R. |

#### – *SIB3*

*SIB3* contains neighbouring cell related information relevant only for intra-frequency cell re-selection. The IE includes cells with specific re-selection parameters as well as exclude-listed cells.

*SIB3* information element

-- ASN1START

-- TAG-SIB3-START

SIB3 ::= SEQUENCE {

intraFreqNeighCellList IntraFreqNeighCellList OPTIONAL, -- Need R

intraFreqExcludedCellList IntraFreqExcludedCellList OPTIONAL, -- Need R

lateNonCriticalExtension OCTET STRING OPTIONAL,

...,

[[

intraFreqNeighCellList-v1610 IntraFreqNeighCellList-v1610 OPTIONAL, -- Need R

intraFreqAllowedCellList-r16 IntraFreqAllowedCellList-r16 OPTIONAL, -- Cond SharedSpectrum2

intraFreqCAG-CellList-r16 SEQUENCE (SIZE (1..maxPLMN)) OF IntraFreqCAG-CellListPerPLMN-r16 OPTIONAL -- Need R

]],

[[

intraFreqNeighHSDN-CellList-r17 IntraFreqNeighHSDN-CellList-r17 OPTIONAL, -- Need R

intraFreqNeighCellList-v1710 IntraFreqNeighCellList-v1710 OPTIONAL -- Need R

]]

}

IntraFreqNeighCellList ::= SEQUENCE (SIZE (1..maxCellIntra)) OF IntraFreqNeighCellInfo

IntraFreqNeighCellList-v1610::= SEQUENCE (SIZE (1..maxCellIntra)) OF IntraFreqNeighCellInfo-v1610

IntraFreqNeighCellList-v1710 ::= SEQUENCE (SIZE (1..maxCellIntra)) OF IntraFreqNeighCellInfo-v1710

IntraFreqNeighCellInfo ::= SEQUENCE {

physCellId PhysCellId,

q-OffsetCell Q-OffsetRange,

q-RxLevMinOffsetCell INTEGER (1..8) OPTIONAL, -- Need R

q-RxLevMinOffsetCellSUL INTEGER (1..8) OPTIONAL, -- Need R

q-QualMinOffsetCell INTEGER (1..8) OPTIONAL, -- Need R

...

}

IntraFreqNeighCellInfo-v1610 ::= SEQUENCE {

ssb-PositionQCL-r16 SSB-PositionQCL-Relation-r16 OPTIONAL -- Cond SharedSpectrum2

}

IntraFreqNeighCellInfo-v1710 ::= SEQUENCE {

ssb-PositionQCL-r17 SSB-PositionQCL-Relation-r17 OPTIONAL -- Cond SharedSpectrum2

}

IntraFreqExcludedCellList ::= SEQUENCE (SIZE (1..maxCellExcluded)) OF PCI-Range

IntraFreqAllowedCellList-r16 ::= SEQUENCE (SIZE (1..maxCellAllowed)) OF PCI-Range

IntraFreqCAG-CellListPerPLMN-r16 ::= SEQUENCE {

plmn-IdentityIndex-r16 INTEGER (1..maxPLMN),

cag-CellList-r16 SEQUENCE (SIZE (1..maxCAG-Cell-r16)) OF PCI-Range

}

IntraFreqNeighHSDN-CellList-r17 ::= SEQUENCE (SIZE (1..maxCellIntra)) OF PCI-Range

-- TAG-SIB3-STOP

-- ASN1STOP

| *SIB3* field descriptions |
| --- |
| ***intraFreqAllowedCellList***  List of allow-listed intra-frequency neighbouring cells, see TS 38.304 [20], clause 5.2.4. |
| ***intraFreqCAG-CellList***  List of intra-frequency neighbouring CAG cells (as defined in TS 38.304 [20]) per PLMN. |
| ***intraFreqExcludedCellList***  List of exclude-listed intra-frequency neighbouring cells. |
| ***intraFreqNeighCellList***  List of intra-frequency neighbouring cells with specific cell re-selection parameters. If *intraFreqNeighCellList-v1610* is present, it shall contain the same number of entries, listed in the same order as in *intraFreqNeighCellList* (without suffix). |
| ***intraFreqNeighHSDN-CellList***  List of intra-frequency neighbouring HSDN cells as specified in TS 38.304 [20]. |
| ***q-OffsetCell***  Parameter "Qoffsets,n" in TS 38.304 [20]. |
| ***q-QualMinOffsetCell***  Parameter "Qqualminoffsetcell" in TS 38.304 [20]. Actual value Qqualminoffsetcell = field value [dB]. |
| ***q-RxLevMinOffsetCell***  Parameter "Qrxlevminoffsetcell" in TS 38.304 [20]. Actual value Qrxlevminoffsetcell = field value \* 2 [dB]. |
| ***q-RxLevMinOffsetCellSUL***  Parameter "QrxlevminoffsetcellSUL" in TS 38.304 [20]. Actual value QrxlevminoffsetcellSUL = field value \* 2 [dB]. |
| ***ssb-PositionQCL***  Indicates the QCL relation between SS/PBCH blocks for a specific intra-frequency neighbor cell as specified in TS 38.213 [13], clause 4.1. If provided, the cell specific value overwrites the value signalled by *ssb-PositionQCL-Common* in *SIB2* for the indicated cell. |

|  |  |
| --- | --- |
| Conditional Presence | Explanation |
| *SharedSpectrum2* | The field is optional present, Need R, if this intra-frequency or neighbor cell operates with shared spectrum channel access. Otherwise, it is absent, Need R. |

#### – *SIB4*

*SIB4* contains information relevant for inter-frequency cell re-selection (i.e. information about other NR frequencies and inter-frequency neighbouring cells relevant for cell re-selection), which can also be used for NR idle/inactive measurements. The IE includes cell re-selection parameters common for a frequency as well as cell specific re-selection parameters.

*SIB4* information element

-- ASN1START

-- TAG-SIB4-START

SIB4 ::= SEQUENCE {

interFreqCarrierFreqList InterFreqCarrierFreqList,

lateNonCriticalExtension OCTET STRING OPTIONAL,

...,

[[

interFreqCarrierFreqList-v1610 InterFreqCarrierFreqList-v1610 OPTIONAL -- Need R

]],

[[

interFreqCarrierFreqList-v1700 InterFreqCarrierFreqList-v1700 OPTIONAL -- Need R

]]

}

InterFreqCarrierFreqList ::= SEQUENCE (SIZE (1..maxFreq)) OF InterFreqCarrierFreqInfo

InterFreqCarrierFreqList-v1610 ::= SEQUENCE (SIZE (1..maxFreq)) OF InterFreqCarrierFreqInfo-v1610

InterFreqCarrierFreqList-v1700 ::= SEQUENCE (SIZE (1..maxFreq)) OF InterFreqCarrierFreqInfo-v1700

InterFreqCarrierFreqInfo ::= SEQUENCE {

dl-CarrierFreq ARFCN-ValueNR,

frequencyBandList MultiFrequencyBandListNR-SIB OPTIONAL, -- Cond Mandatory

frequencyBandListSUL MultiFrequencyBandListNR-SIB OPTIONAL, -- Need R

nrofSS-BlocksToAverage INTEGER (2..maxNrofSS-BlocksToAverage) OPTIONAL, -- Need S

absThreshSS-BlocksConsolidation ThresholdNR OPTIONAL, -- Need S

smtc SSB-MTC OPTIONAL, -- Need S

ssbSubcarrierSpacing SubcarrierSpacing,

ssb-ToMeasure SSB-ToMeasure OPTIONAL, -- Need S

deriveSSB-IndexFromCell BOOLEAN,

ss-RSSI-Measurement SS-RSSI-Measurement OPTIONAL, -- Need R

q-RxLevMin Q-RxLevMin,

q-RxLevMinSUL Q-RxLevMin OPTIONAL, -- Need R

q-QualMin Q-QualMin OPTIONAL, -- Need S

p-Max P-Max OPTIONAL, -- Need S

t-ReselectionNR T-Reselection,

t-ReselectionNR-SF SpeedStateScaleFactors OPTIONAL, -- Need S

threshX-HighP ReselectionThreshold,

threshX-LowP ReselectionThreshold,

threshX-Q SEQUENCE {

threshX-HighQ ReselectionThresholdQ,

threshX-LowQ ReselectionThresholdQ

} OPTIONAL, -- Cond RSRQ

cellReselectionPriority CellReselectionPriority OPTIONAL, -- Need R

cellReselectionSubPriority CellReselectionSubPriority OPTIONAL, -- Need R

q-OffsetFreq Q-OffsetRange DEFAULT dB0,

interFreqNeighCellList InterFreqNeighCellList OPTIONAL, -- Need R

interFreqExcludedCellList InterFreqExcludedCellList OPTIONAL, -- Need R

...

}

InterFreqCarrierFreqInfo-v1610 ::= SEQUENCE {

interFreqNeighCellList-v1610 InterFreqNeighCellList-v1610 OPTIONAL, -- Need R

smtc2-LP-r16 SSB-MTC2-LP-r16 OPTIONAL, -- Need R

interFreqAllowedCellList-r16 InterFreqAllowedCellList-r16 OPTIONAL, -- Cond SharedSpectrum2

ssb-PositionQCL-Common-r16 SSB-PositionQCL-Relation-r16 OPTIONAL, -- Cond SharedSpectrum

interFreqCAG-CellList-r16 SEQUENCE (SIZE (1..maxPLMN)) OF InterFreqCAG-CellListPerPLMN-r16 OPTIONAL -- Need R

}

InterFreqCarrierFreqInfo-v1700 ::= SEQUENCE {

interFreqNeighHSDN-CellList-r17 InterFreqNeighHSDN-CellList-r17 OPTIONAL, -- Need R

highSpeedMeasInterFreq-r17 ENUMERATED {true} OPTIONAL, -- Need R

redCapAccessAllowed-r17 ENUMERATED {true} OPTIONAL, -- Need R

ssb-PositionQCL-Common-r17 SSB-PositionQCL-Relation-r17 OPTIONAL, -- Cond SharedSpectrum

interFreqNeighCellList-v1710 InterFreqNeighCellList-v1710 OPTIONAL -- Cond SharedSpectrum2

}

InterFreqNeighHSDN-CellList-r17 ::= SEQUENCE (SIZE (1..maxCellInter)) OF PCI-Range

InterFreqNeighCellList ::= SEQUENCE (SIZE (1..maxCellInter)) OF InterFreqNeighCellInfo

InterFreqNeighCellList-v1610 ::= SEQUENCE (SIZE (1..maxCellInter)) OF InterFreqNeighCellInfo-v1610

InterFreqNeighCellList-v1710 ::= SEQUENCE (SIZE (1..maxCellInter)) OF InterFreqNeighCellInfo-v1710

InterFreqNeighCellInfo ::= SEQUENCE {

physCellId PhysCellId,

q-OffsetCell Q-OffsetRange,

q-RxLevMinOffsetCell INTEGER (1..8) OPTIONAL, -- Need R

q-RxLevMinOffsetCellSUL INTEGER (1..8) OPTIONAL, -- Need R

q-QualMinOffsetCell INTEGER (1..8) OPTIONAL, -- Need R

...

}

InterFreqNeighCellInfo-v1610 ::= SEQUENCE {

ssb-PositionQCL-r16 SSB-PositionQCL-Relation-r16 OPTIONAL -- Cond SharedSpectrum2

}

InterFreqNeighCellInfo-v1710 ::= SEQUENCE {

ssb-PositionQCL-r17 SSB-PositionQCL-Relation-r17 OPTIONAL -- Cond SharedSpectrum2

}

InterFreqExcludedCellList ::= SEQUENCE (SIZE (1..maxCellExcluded)) OF PCI-Range

InterFreqAllowedCellList-r16 ::= SEQUENCE (SIZE (1..maxCellAllowed)) OF PCI-Range

InterFreqCAG-CellListPerPLMN-r16 ::= SEQUENCE {

plmn-IdentityIndex-r16 INTEGER (1..maxPLMN),

cag-CellList-r16 SEQUENCE (SIZE (1..maxCAG-Cell-r16)) OF PCI-Range

}

-- TAG-SIB4-STOP

-- ASN1STOP

| *SIB4* field descriptions |
| --- |
| ***absThreshSS-BlocksConsolidation***  Threshold for consolidation of L1 measurements per RS index. If the field is absent, the UE uses the measurement quantity as specified in TS 38.304 [20]. |
| ***deriveSSB-IndexFromCell***  This field indicates whether the UE may use the timing of any detected cell on that frequency to derive the SSB index of all neighbour cells on that frequency. If this field is set to *true*, the UE assumes SFN and frame boundary alignment across cells on the neighbor frequency as specified in TS 38.133 [14]. |
| ***dl-CarrierFreq***  This field indicates center frequency of the SS block of the neighbour cells, where the frequency corresponds to a GSCN value as specified in TS 38.101-1 [15]. |
| ***frequencyBandList***  Indicates the list of frequency bands for which the NR cell reselection parameters apply. |
| ***highSpeedMeasInterFreq***  If the field is set to *true* and UE supports high speed inter-frequency IDLE/INACTIVE measurements, the UE shall apply the enhanced inter-frequency RRM requirements on the inter-frequency carrier to support high speed up to 500 km/h in RRC\_IDLE/RRC\_INACTIVE as specified in TS 38.133 [14]. |
| ***interFreqAllowedCellList***  List of allow-listed inter-frequency neighbouring cells, see TS 38.304 [20], clause 5.2.4. |
| ***interFreqCAG-CellList***  List of inter-frequency neighbouring CAG cells (as defined in TS 38.304 [20] per PLMN. |
| ***interFreqCarrierFreqList***  List of neighbouring carrier frequencies and frequency specific cell re-selection information. If *interFreqCarrierFreqList-v1610* or */interFreqCarrierFreqList-v1700* are present, they shall contain the same number of entries, listed in the same order as in *interFreqCarrierFreqList* (without suffix). |
| ***interFreqExcludedCellList***  List of exclude-listed inter-frequency neighbouring cells. |
| ***interFreqNeighCellList***  List of inter-frequency neighbouring cells with specific cell re-selection parameters. If *interFreqNeighCellList-v1610* is present, it shall contain the same number of entries, listed in the same order as in *interFreqNeighCellList* (without suffix). |
| ***interFreqNeighHSDN-CellList***  List of inter-frequency neighbouring HSDN cells as specified in TS 38.304 [20]. |
| ***nrofSS-BlocksToAverage***  Number of SS blocks to average for cell measurement derivation. If the field is absent, the UE uses the measurement quantity as specified in TS 38.304 [20]. |
| ***p-Max***  Value in dBm applicable for the neighbouring NR cells on this carrier frequency. If absent the UE applies the maximum power according to TS 38.101-1 [15] in case of an FR1 cell or TS 38.101-2 [39] in case of an FR2 cell. In this release of the specification, if *p-Max* is present on a carrier frequency in FR2, the UE shall ignore the field and applies the maximum power according to TS 38.101-2 [39]. This field is ignored by IAB-MT. The IAB-MT applies output power and emissions requirements, as specified in TS 38.174 [63]. |
| ***q-OffsetCell***  Parameter "Qoffsets,n" in TS 38.304 [20]. |
| ***q-OffsetFreq***  Parameter "Qoffsetfrequency" in TS 38.304 [20]. |
| ***q-QualMin***  Parameter "Qqualmin" in TS 38.304 [20]. If the field is absent, the UE applies the (default) value of negative infinity for Qqualmin. |
| ***q-QualMinOffsetCell***  Parameter "Qqualminoffsetcell" in TS 38.304 [20]. Actual value Qqualminoffsetcell = field value [dB]. |
| ***q-RxLevMin***  Parameter "Qrxlevmin" in TS 38.304 [20]. |
| ***q-RxLevMinOffsetCell***  Parameter "Qrxlevminoffsetcell" in TS 38.304 [20]. Actual value Qrxlevminoffsetcell = field value \* 2 [dB]. |
| ***q-RxLevMinOffsetCellSUL***  Parameter "QrxlevminoffsetcellSUL" in TS 38.304 [20]. Actual value QrxlevminoffsetcellSUL = field value \* 2 [dB]. |
| ***q-RxLevMinSUL***  Parameter "Qrxlevmin" in TS 38.304 [20]. |
| ***redCapAccessAllowed***  Indicates whether RedCap UEs are allowed to access the frequency. |
| ***smtc***  Measurement timing configuration for inter-frequency measurement. If this field is absent, the UE assumes that SSB periodicity is 5 ms in this frequency. |
| ***smtc2-LP***  Measurement timing configuration for inter-frequency neighbour cells with a Long Periodicity (LP) indicated by periodicity in *smtc2-LP*. The timing offset and duration are equal to the offset and duration indicated in *smtc* in *InterFreqCarrierFreqInfo*. The periodicity in *smtc2-LP* can only be set to a value strictly larger than the periodicity in *smtc* in *InterFreqCarrierFreqInfo* (e.g. if *smtc* indicates sf20 the Long Periodicity can only be set to sf40, sf80 or sf160, if *smtc* indicates sf160, *smtc2-LP* cannot be configured). The *pci-List*, if present, includes the physical cell identities of the inter-frequency neighbour cells with Long Periodicity. If *smtc2-LP* is absent, the UE assumes that there are no inter-frequency neighbour cells with a Long Periodicity. |
| ***ssb-PositionQCL***  Indicates the QCL relation between SS/PBCH blocks for a specific neighbor cell as specified in TS 38.213 [13], clause 4.1. If provided, the cell specific value overwrites the common value signalled by *ssb-PositionQCL-Common* in *SIB4* for the indicated cell. |
| ***ssb-PositionQCL-Common***  Indicates the QCL relation between SS/PBCH blocks for inter-frequency neighbor cells as specified in TS 38.213 [13], clause 4.1. |
| ***ssb-ToMeasure***  The set of SS blocks to be measured within the SMTC measurement duration (see TS 38.215 [9]). When the field is absent the UE measures on all SS-blocks. |
| ***ssbSubcarrierSpacing***  Subcarrier spacing of SSB.  Only the following values are applicable depending on the used frequency:  FR1: 15 or 30 kHz  FR2-1: 120 or 240 kHz  FR2-2: 120, 480, or 960 kHz |
| ***threshX-HighP***  Parameter "ThreshX, HighP" in TS 38.304 [20]. |
| ***threshX-HighQ***  Parameter "ThreshX, HighQ" in TS 38.304 [20]. |
| ***threshX-LowP***  Parameter "ThreshX, LowP" in TS 38.304 [20]. |
| ***threshX-LowQ***  Parameter "ThreshX, LowQ" in TS 38.304 [20]. |
| ***t-ReselectionNR***  Parameter "TreselectionNR" in TS 38.304 [20]. |
| ***t-ReselectionNR-SF***  Parameter "Speed dependent ScalingFactor for TreselectionNR" in TS 38.304 [20]. If the field is absent, the UE behaviour is specified in TS 38.304 [20]. |

|  |  |
| --- | --- |
| Conditional Presence | Explanation |
| *Mandatory* | The field is mandatory present in SIB4. |
| *RSRQ* | The field is mandatory present if *threshServingLowQ* is present in *SIB2*; otherwise it is absent. |
| *SharedSpectrum* | This field is mandatory present if this inter-frequency operates with shared spectrum channel access. Otherwise, it is absent, Need R. |
| *SharedSpectrum2* | The field is optional present, Need R, if this inter-frequency or neighbor cell operates with shared spectrum channel access. Otherwise, it is absent, Need R. |

#### – *SIB5*

*SIB5* contains information relevant only for inter-RAT cell re-selection i.e. information about E-UTRA frequencies and E-UTRAs neighbouring cells relevant for cell re-selection. The IE includes cell re-selection parameters common for a frequency.

*SIB5* information element

-- ASN1START

-- TAG-SIB5-START

SIB5 ::= SEQUENCE {

carrierFreqListEUTRA CarrierFreqListEUTRA OPTIONAL, -- Need R

t-ReselectionEUTRA T-Reselection,

t-ReselectionEUTRA-SF SpeedStateScaleFactors OPTIONAL, -- Need S

lateNonCriticalExtension OCTET STRING OPTIONAL,

...,

[[

carrierFreqListEUTRA-v1610 CarrierFreqListEUTRA-v1610 OPTIONAL -- Need R

]],

[[

carrierFreqListEUTRA-v1700 CarrierFreqListEUTRA-v1700 OPTIONAL, -- Need R

idleModeMeasVoiceFallback-r17 ENUMERATED{true} OPTIONAL -- Need R

]]

}

CarrierFreqListEUTRA ::= SEQUENCE (SIZE (1..maxEUTRA-Carrier)) OF CarrierFreqEUTRA

CarrierFreqListEUTRA-v1610 ::= SEQUENCE (SIZE (1..maxEUTRA-Carrier)) OF CarrierFreqEUTRA-v1610

CarrierFreqListEUTRA-v1700 ::= SEQUENCE (SIZE (1..maxEUTRA-Carrier)) OF CarrierFreqEUTRA-v1700

CarrierFreqEUTRA ::= SEQUENCE {

carrierFreq ARFCN-ValueEUTRA,

eutra-multiBandInfoList EUTRA-MultiBandInfoList OPTIONAL, -- Need R

eutra-FreqNeighCellList EUTRA-FreqNeighCellList OPTIONAL, -- Need R

eutra-ExcludedCellList EUTRA-FreqExcludedCellList OPTIONAL, -- Need R

allowedMeasBandwidth EUTRA-AllowedMeasBandwidth,

presenceAntennaPort1 EUTRA-PresenceAntennaPort1,

cellReselectionPriority CellReselectionPriority OPTIONAL, -- Need R

cellReselectionSubPriority CellReselectionSubPriority OPTIONAL, -- Need R

threshX-High ReselectionThreshold,

threshX-Low ReselectionThreshold,

q-RxLevMin INTEGER (-70..-22),

q-QualMin INTEGER (-34..-3),

p-MaxEUTRA INTEGER (-30..33),

threshX-Q SEQUENCE {

threshX-HighQ ReselectionThresholdQ,

threshX-LowQ ReselectionThresholdQ

} OPTIONAL -- Cond RSRQ

}

CarrierFreqEUTRA-v1610 ::= SEQUENCE {

highSpeedEUTRACarrier-r16 ENUMERATED {true} OPTIONAL -- Need R

}

CarrierFreqEUTRA-v1700 ::= SEQUENCE {

eutra-FreqNeighHSDN-CellList-r17 EUTRA-FreqNeighHSDN-CellList-r17 OPTIONAL -- Need R

}

EUTRA-FreqNeighHSDN-CellList-r17 ::= SEQUENCE (SIZE (1..maxCellEUTRA)) OF EUTRA-PhysCellIdRange

EUTRA-FreqExcludedCellList ::= SEQUENCE (SIZE (1..maxEUTRA-CellExcluded)) OF EUTRA-PhysCellIdRange

EUTRA-FreqNeighCellList ::= SEQUENCE (SIZE (1..maxCellEUTRA)) OF EUTRA-FreqNeighCellInfo

EUTRA-FreqNeighCellInfo ::= SEQUENCE {

physCellId EUTRA-PhysCellId,

dummy EUTRA-Q-OffsetRange,

q-RxLevMinOffsetCell INTEGER (1..8) OPTIONAL, -- Need R

q-QualMinOffsetCell INTEGER (1..8) OPTIONAL -- Need R

}

-- TAG-SIB5-STOP

-- ASN1STOP

| *SIB5* field descriptions |
| --- |
| ***carrierFreqListEUTRA***  List of carrier frequencies of E-UTRA. If the *carrierFreqListEUTRA-v1610/ carrierFreqListEUTRA-v1700* is present, it shall contain the same number of entries, listed in the same order as in the *carrierFreqListEUTRA* (without suffix). |
| ***dummy***  This field is not used in the specification. If received it shall be ignored by the UE. |
| ***eutra-ExcludedCellList***  List of exclude-listed E-UTRA neighbouring cells. |
| ***eutra-FreqNeighHSDN-CellList***  List of neighbouring EUTRA HSDN cells as specified in TS 36.304 [27]. |
| ***eutra-multiBandInfoList***  Indicates the list of frequency bands in addition to the band represented by *carrierFreq* for which cell reselection parameters are common, and a list of *additionalPmax* and *additionalSpectrumEmission* values, as defined in TS 36.101 [22], table 6.2.4-1, for the frequency bands in *eutra-multiBandInfoList* |
| ***highSpeedEUTRACarrier***  If the field is present, the UE shall apply the enhanced NR-EUTRA inter-RAT measurement requirements to support high speed up to 500 km/h as specified in TS 38.133 [14] to the E-UTRA carrier. |
| ***idleModeMeasVoiceFallback***  Indicates whether E-UTRA idle/inactive measurements and reporting for EPS fallback can be used. |
| ***p-MaxEUTRA***  The maximum allowed transmission power in dBm on the (uplink) carrier frequency, see TS 36.304 [27]. |
| ***q-QualMin***  Parameter "Q*qualmin*" in TS 36.304 [27]. Actual value Qqualmin = field value [dB]. |
| ***q-QualMinOffsetCell***  Parameter "*Qqualminoffsetcell*" in TS 36.304 [27]. Actual value Qqualminoffsetcell = field value [dB]. |
| ***q-RxLevMin***  Parameter "Q*rxlevmin*" in TS 36.304 [27]. Actual value Qrxlevmin = field value \* 2 [dBm]. |
| ***q-RxLevMinOffsetCell***  Parameter "*Qrxlevminoffsetcell*" in TS 36.304 [27]. Actual value Qrxlevminoffsetcell = field value \* 2 [dB]. |
| ***t-ReselectionEUTRA***  Parameter "TreselectionEUTRA" in TS 38.304 [20]. |
| ***threshX-High***  Parameter "ThreshX, HighP" in TS 38.304 [20]. |
| ***threshX-HighQ***  Parameter "ThreshX, HighQ" in TS 38.304 [20]. |
| ***threshX-Low***  Parameter "ThreshX, LowP" in TS 38.304 [20]. |
| ***threshX-LowQ***  Parameter "ThreshX, LowQ" in TS 38.304 [20]. |
| ***t-ReselectionEUTRA-SF***  Parameter "Speed dependent ScalingFactor for TreselectionEUTRA" in TS 38.304 [20]. If the field is absent, the UE behaviour is specified in TS 38.304 [20]. |

|  |  |
| --- | --- |
| Conditional Presence | Explanation |
| *RSRQ* | The field is mandatory present if the *threshServingLowQ* is present in *SIB2*; otherwise it is absent. |

#### *– SIB6*

*SIB6* contains an ETWS primary notification.

*SIB6* information element

-- ASN1START

-- TAG-SIB6-START

SIB6 ::= SEQUENCE {

messageIdentifier BIT STRING (SIZE (16)),

serialNumber BIT STRING (SIZE (16)),

warningType OCTET STRING (SIZE (2)),

lateNonCriticalExtension OCTET STRING OPTIONAL,

...

}

-- TAG-SIB6-STOP

-- ASN1STOP

|  |
| --- |
| *SIB6* field descriptions |
| ***messageIdentifier***  Identifies the source and type of ETWS notification. |
| ***serialNumber***  Identifies variations of an ETWS notification. |
| ***warningType***  Identifies the warning type of the ETWS primary notification and provides information on emergency user alert and UE popup. |

#### *– SIB7*

*SIB7* contains an ETWS secondary notification.

*SIB7* information element

-- ASN1START

-- TAG-SIB7-START

SIB7 ::= SEQUENCE {

messageIdentifier BIT STRING (SIZE (16)),

serialNumber BIT STRING (SIZE (16)),

warningMessageSegmentType ENUMERATED {notLastSegment, lastSegment},

warningMessageSegmentNumber INTEGER (0..63),

warningMessageSegment OCTET STRING,

dataCodingScheme OCTET STRING (SIZE (1)) OPTIONAL, -- Cond Segment1

lateNonCriticalExtension OCTET STRING OPTIONAL,

...

}

-- TAG-SIB7-STOP

-- ASN1STOP

|  |
| --- |
| *SIB7* field descriptions |
| ***dataCodingScheme***  Identifies the alphabet/coding and the language applied variations of an ETWS notification. |
| ***messageIdentifier***  Identifies the source and type of ETWS notification. |
| ***serialNumber***  Identifies variations of an ETWS notification. |
| ***warningMessageSegment***  Carries a segment of the Warning Message Contents IE. |
| ***warningMessageSegmentNumber***  Segment number of the ETWS warning message segment contained in the SIB. A segment number of zero corresponds to the first segment, A segment number of one corresponds to the second segment, and so on. |
| ***warningMessageSegmentType***  Indicates whether the included ETWS warning message segment is the last segment or not. |

|  |  |
| --- | --- |
| Conditional Presence | Explanation |
| *Segment1* | The field is mandatory present in the first segment of *SIB7*, otherwise it is absent. |

#### *– SIB8*

*SIB8* contains a CMAS notification.

*SIB8* information element

-- ASN1START

-- TAG-SIB8-START

SIB8 ::= SEQUENCE {

messageIdentifier BIT STRING (SIZE (16)),

serialNumber BIT STRING (SIZE (16)),

warningMessageSegmentType ENUMERATED {notLastSegment, lastSegment},

warningMessageSegmentNumber INTEGER (0..63),

warningMessageSegment OCTET STRING,

dataCodingScheme OCTET STRING (SIZE (1)) OPTIONAL, -- Cond Segment1

warningAreaCoordinatesSegment OCTET STRING OPTIONAL, -- Need R

lateNonCriticalExtension OCTET STRING OPTIONAL,

...

}

-- TAG-SIB8-STOP

-- ASN1STOP

|  |
| --- |
| *SIB8* field descriptions |
| ***dataCodingScheme***  Identifies the alphabet/coding and the language applied variations of a CMAS notification. |
| ***messageIdentifier***  Identifies the source and type of CMAS notification. |
| ***serialNumber***  Identifies variations of a CMAS notification. |
| ***warningAreaCoordinatesSegment***  If present, carries a segment, with one or more octets, of the geographical area where the CMAS warning message is valid as defined in [28]. The first octet of the first *warningAreaCoordinatesSegment* is equivalent to the first octet of Warning Area Coordinates IE defined in and encoded according to TS 23.041 [29] and so on. |
| ***warningMessageSegment***  Carries a segment, with one or more octets, of the *Warning Message Contents* IE defined in TS 38.413 [42]. The first octet of the *Warning Message Contents* IE is equivalent to the first octet of the *CB data* IE defined in and encoded according to TS 23.041 [29], clause 9.4.2.2.5, and so on. |
| ***warningMessageSegmentNumber***  Segment number of the CMAS warning message segment contained in the SIB. A segment number of zero corresponds to the first segment, one corresponds to the second segment, and so on. If warning area coordinates are provided for the warning message, then this field applies to both warning message segment and warning area coordinates segment. |
| ***warningMessageSegmentType***  Indicates whether the included CMAS warning message segment is the last segment or not. If warning area coordinates are provided for the warning message, then this field applies to both warning message segment and warning area coordinates segment. |

|  |  |
| --- | --- |
| Conditional Presence | Explanation |
| *Segment1* | The field is mandatory present in the first segment of *SIB8*, otherwise it is absent. |

#### – *SIB9*

*SIB9* contains information related to GPS time and Coordinated Universal Time (UTC). The UE may use the parameters provided in this system information block to obtain the UTC, the GPS and the local time.

NOTE: The UE may use the time information for numerous purposes, possibly involving upper layers e.g. to assist GPS initialisation, to synchronise the UE clock.

*SIB9* information element

-- ASN1START

-- TAG-SIB9-START

SIB9 ::= SEQUENCE {

timeInfo SEQUENCE {

timeInfoUTC INTEGER (0..549755813887),

dayLightSavingTime BIT STRING (SIZE (2)) OPTIONAL, -- Need R

leapSeconds INTEGER (-127..128) OPTIONAL, -- Need R

localTimeOffset INTEGER (-63..64) OPTIONAL -- Need R

} OPTIONAL, -- Need R

lateNonCriticalExtension OCTET STRING OPTIONAL,

...,

[[

referenceTimeInfo-r16 ReferenceTimeInfo-r16 OPTIONAL -- Need R

]]

}

-- TAG-SIB9-STOP

-- ASN1STOP

|  |
| --- |
| *SIB9* field descriptions |
| ***dayLightSavingTime***  Indicates if and how daylight-saving time (DST) is applied to obtain the local time. The semantics are the same as the semantics of the *Daylight Saving Time* IE in TS 24.501 [23] and TS 24.008 [38]. The first/leftmost bit of the bit string contains the b2 of octet 3 and the second bit of the bit string contains b1 of octet 3 in the value part of the *Daylight Saving Time* IE in TS 24.008 [38]. |
| ***leapSeconds***  Number of leap seconds offset between GPS Time and UTC. UTC and GPS time are related i.e. GPS time -leapSeconds = UTC time. |
| ***localTimeOffset***  Offset between UTC and local time in units of 15 minutes. Actual value = field value \* 15 minutes. Local time of the day is calculated as UTC time + localTimeOffset. |
| ***timeInfoUTC***  Coordinated Universal Time corresponding to the SFN boundary at or immediately after the ending boundary of the SI-window in which SIB9 is transmitted. The field counts the number of UTC seconds in 10 ms units since 00:00:00 on Gregorian calendar date 1 January, 1900 (midnight between Sunday, December 31, 1899 and Monday, January 1, 1900). See NOTE 1. This field is excluded when determining changes in system information, i.e. changes of *timeInfoUTC* should neither result in system information change notifications nor in a modification of *valueTag* in *SIB1*. |

NOTE 1: The UE may use this field together with the *leapSeconds* field to obtain GPS time as follows: GPS Time (in seconds) = timeInfoUTC (in seconds) - 2,524,953,600 (seconds) + leapSeconds, where 2,524,953,600 is the number of seconds between 00:00:00 on Gregorian calendar date 1 January, 1900 and 00:00:00 on Gregorian calendar date 6 January, 1980 (start of GPS time).

#### – *SIB10*

*SIB10* contains the HRNNs of the NPNs listed in SIB1.

***SIB10* information element**

-- ASN1START

-- TAG-SIB10-START

SIB10-r16 ::= SEQUENCE {

hrnn-List-r16 HRNN-List-r16 OPTIONAL, -- Need R

lateNonCriticalExtension OCTET STRING OPTIONAL,

...

}

HRNN-List-r16 ::= SEQUENCE (SIZE (1..maxNPN-r16)) OF HRNN-r16

HRNN-r16 ::= SEQUENCE {

hrnn-r16 OCTET STRING (SIZE(1.. maxHRNN-Len-r16)) OPTIONAL -- Need R

}

-- TAG-SIB10-STOP

-- ASN1STOP

|  |
| --- |
| *SIB10* field descriptions |
| ***HRNN-List***  The same amount of HRNN (see TS 23.003 [21]) elements as the number of NPNs in SIB 1 are included. The n-th entry of *HRNN-List* contains the human readable network name of the n-th NPN of SIB1. The *hrnn* in the corresponding entry in *HRNN-List* is absent if there is no HRNN associated with the given NPN. |

#### – *SIB11*

*SIB11* contains information related to idle/inactive measurements.

*SIB11* information element

-- ASN1START

-- TAG-SIB11-START

SIB11-r16 ::= SEQUENCE {

measIdleConfigSIB-r16 MeasIdleConfigSIB-r16 OPTIONAL, -- Need S

lateNonCriticalExtension OCTET STRING OPTIONAL,

...

}

-- TAG-SIB11-STOP

-- ASN1STOP

| *SIB11* field descriptions |
| --- |
| ***measIdleConfigSIB***  Indicates measurement configuration to be stored and used by the UE while in RRC\_IDLE or RRC\_INACTIVE. |

#### – *SIB12*

SIB12 contains NR sidelink communication/discovery configuration.

*SIB12* information element

-- ASN1START

-- TAG-SIB12-START

SIB12-r16 ::= SEQUENCE {

segmentNumber-r16 INTEGER (0..63),

segmentType-r16 ENUMERATED {notLastSegment, lastSegment},

segmentContainer-r16 OCTET STRING

}

SIB12-IEs-r16 ::= SEQUENCE {

sl-ConfigCommonNR-r16 SL-ConfigCommonNR-r16,

lateNonCriticalExtension OCTET STRING OPTIONAL,

...,

[[

sl-DRX-ConfigCommonGC-BC-r17 SL-DRX-ConfigGC-BC-r17 OPTIONAL, -- Need R

sl-DiscConfigCommon-r17 SL-DiscConfigCommon-r17 OPTIONAL, -- Need R

sl-L2U2N-Relay-r17 ENUMERATED {enabled} OPTIONAL, -- Need R

sl-NonRelayDiscovery-r17 ENUMERATED {enabled} OPTIONAL, -- Need R

sl-L3U2N-RelayDiscovery-r17 ENUMERATED {enabled} OPTIONAL, -- Need R

sl-TimersAndConstantsRemoteUE-r17 UE-TimersAndConstantsRemoteUE-r17 OPTIONAL -- Need R

]]

}

SL-ConfigCommonNR-r16 ::= SEQUENCE {

sl-FreqInfoList-r16 SEQUENCE (SIZE (1..maxNrofFreqSL-r16)) OF SL-FreqConfigCommon-r16 OPTIONAL, -- Need R

sl-UE-SelectedConfig-r16 SL-UE-SelectedConfig-r16 OPTIONAL, -- Need R

sl-NR-AnchorCarrierFreqList-r16 SL-NR-AnchorCarrierFreqList-r16 OPTIONAL, -- Need R

sl-EUTRA-AnchorCarrierFreqList-r16 SL-EUTRA-AnchorCarrierFreqList-r16 OPTIONAL, -- Need R

sl-RadioBearerConfigList-r16 SEQUENCE (SIZE (1..maxNrofSLRB-r16)) OF SL-RadioBearerConfig-r16 OPTIONAL, -- Need R

sl-RLC-BearerConfigList-r16 SEQUENCE (SIZE (1..maxSL-LCID-r16)) OF SL-RLC-BearerConfig-r16 OPTIONAL, -- Need R

sl-MeasConfigCommon-r16 SL-MeasConfigCommon-r16 OPTIONAL, -- Need R

sl-CSI-Acquisition-r16 ENUMERATED {enabled} OPTIONAL, -- Need R

sl-OffsetDFN-r16 INTEGER (1..1000) OPTIONAL, -- Need R

t400-r16 ENUMERATED {ms100, ms200, ms300, ms400, ms600, ms1000, ms1500, ms2000} OPTIONAL, -- Need R

sl-MaxNumConsecutiveDTX-r16 ENUMERATED {n1, n2, n3, n4, n6, n8, n16, n32} OPTIONAL, -- Need R

sl-SSB-PriorityNR-r16 INTEGER (1..8) OPTIONAL -- Need R

}

SL-NR-AnchorCarrierFreqList-r16 ::= SEQUENCE (SIZE (1..maxFreqSL-NR-r16)) OF ARFCN-ValueNR

SL-EUTRA-AnchorCarrierFreqList-r16 ::= SEQUENCE (SIZE (1..maxFreqSL-EUTRA-r16)) OF ARFCN-ValueEUTRA

SL-DiscConfigCommon-r17 ::= SEQUENCE {

sl-RelayUE-ConfigCommon-r17 SL-RelayUE-Config-r17,

sl-RemoteUE-ConfigCommon-r17 SL-RemoteUE-Config-r17

}

-- TAG-SIB12-STOP

-- ASN1STOP

| *SIB12* field descriptions |
| --- |
| ***segmentContainer***  This field includes a segment of the encoded *SIB12-IEs*. The size of the included segment in this container should be small enough that the SIB message size is less than or equal to the maximum size of a NR SI, i.e. 2976 bits when SIB12 is broadcast. |
| ***segmentNumber***  This field identifies the sequence number of a segment of *SIB12-IEs*. A segment number of zero corresponds to the first segment, A segment number of one corresponds to the second segment, and so on. |
| ***segmentType***  This field indicates whether the included segment is the last segment or not. |
| ***sl-CSI-Acquisition***  This field indicates whether CSI reporting is enabled in sidelink unicast. If not set, SL CSI reporting is disabled. |
| ***sl-DRX-ConfigCommonGC-BC***  This field indicates the sidelink DRX configuration for groupcast and broadcast communication, as specified in TS 38.321 [3]. This field, if present, also indicates the gNB is capable of sidelink DRX. |
| ***sl-EUTRA-AnchorCarrierFreqList***  This field indicates the EUTRA anchor carrier frequency list, which can provide the NR sidelink communication configurations. |
| ***sl-FreqInfoList***  This field indicates the NR sidelink communication configuration on some carrier frequency (ies). In this release, only one entry can be configured in the list. |
| ***sl-L2U2N-Relay***  This field indicates the support of NR sidelink Layer-2 relay. |
| ***sl-L3U2N-RelayDiscovery***  This field indicates the support of L3 U2N relay AS-layer capability, i.e. NR sidelink relay discovery. |
| ***sl-MaxNumConsecutiveDTX***  This field indicates the maximum number of consecutive HARQ DTX before triggering sidelink RLF. Value n1 corresponds to 1, value n2 corresponds to 2, and so on. |
| ***sl-MeasConfigCommon***  This field indicates the measurement configurations (e.g. RSRP) for NR sidelink communication. |
| ***sl-NonRelayDiscovery***  This field indicates the support of NR sidelink non-relay discovery. |
| ***sl-NR-AnchorCarrierFreqList***  This field indicates the NR anchor carrier frequency list, which can provide the NR sidelink communication configurations. |
| ***sl-OffsetDFN***  Indicates the timing offset for the UE to determine DFN timing when GNSS is used for timing reference. Value 1 corresponds to 0.001 milliseconds, value 2 corresponds to 0.002 milliseconds, and so on. |
| ***sl-RadioBearerConfigList***  This field indicates one or multiple sidelink radio bearer configurations. |
| ***sl-RLC-BearerConfigList***  This field indicates one or multiple sidelink RLC bearer configurations. |
| ***sl-SSB-PriorityNR***  This field indicates the priority of NR sidelink SSB transmission and reception. |
| ***t400***  Indicates the value for timer T400 as described in clause 7.1. Value ms100 corresponds to 100 ms, value ms200 corresponds to 200 ms and so on. |

#### – *SIB13*

SIB13 contains configurations of V2X sidelink communication defined in TS 36.331 [10].

*SIB13* information element

-- ASN1START

-- TAG-SIB13-START

SIB13-r16 ::= SEQUENCE {

sl-V2X-ConfigCommon-r16 OCTET STRING,

dummy OCTET STRING,

tdd-Config-r16 OCTET STRING,

lateNonCriticalExtension OCTET STRING OPTIONAL,

...

}

-- TAG-SIB13-STOP

-- ASN1STOP

| *SIB13* field descriptions |
| --- |
| ***dummy***  This field is not used in the specification and the UE ignores the received value. |
| ***sl-V2X-ConfigCommon***  This field includes the E-UTRA *SystemInformationBlockType21* message as specified in TS 36.331 [10]. |
| ***tdd-Config***  This field includes the *tdd-Config* in E-UTRA *SystemInformationBlockType1* message as specified in TS 36.331 [10]. |

#### – *SIB14*

SIB14 contains configurations of V2X sidelink communication defined in TS 36.331 [10], which can be used jointly with that included in *SIB13*.

*SIB14* information element

-- ASN1START

-- TAG-SIB14-START

SIB14-r16 ::= SEQUENCE {

sl-V2X-ConfigCommonExt-r16 OCTET STRING,

lateNonCriticalExtension OCTET STRING OPTIONAL,

...

}

-- TAG-SIB14-STOP

-- ASN1STOP

| *SIB14* field descriptions |
| --- |
| ***sl-V2X-ConfigCommonExt***  This field includes the E-UTRA *SystemInformationBlockType26* message as specified in TS 36.331 [10]. |

#### – *SIB15*

*SIB15* contains configurations of disaster roaming information.

*SIB15* information element

-- ASN1START

-- TAG-SIB15-START

SIB15-r17 ::= SEQUENCE {

commonPLMNsWithDisasterCondition-r17 SEQUENCE (SIZE (1..maxPLMN)) OF PLMN-Identity OPTIONAL, -- Need R

applicableDisasterInfoList-r17 SEQUENCE (SIZE (1..maxPLMN)) OF ApplicableDisasterInfo-r17 OPTIONAL, -- Need R

lateNonCriticalExtension OCTET STRING OPTIONAL,

...

}

ApplicableDisasterInfo-r17 ::= CHOICE {

noDisasterRoaming-r17 NULL,

disasterRoamingFromAnyPLMN-r17 NULL,

commonPLMNs-r17 NULL,

dedicatedPLMNs-r17 SEQUENCE (SIZE (1..maxPLMN)) OF PLMN-Identity

}

-- TAG-SIB15-STOP

-- ASN1STOP

| *SIB15* field descriptions |
| --- |
| ***commonPLMNsWithDisasterCondition***  A list of PLMN(s) for which disaster condition applies and that disaster inbound roaming is accepted, which can be commonly applicable to the PLMNs sharing the cell. |
| ***applicableDisasterInfoList***  A list indicating the applicable disaster roaming information for the networks indicated in *plmn-IdentityList* and *npn-IdentityList-r16*. The network indicates in this list one entry for each entry of *plmn-IdentityList*, followed by one entry for each entry of *npn-IdentifyList-r16*, meaning that this list will have as many entries as the number of entries of the combination of *plmn-IdentityList* and *npn-IdentifyList-r16*. The first entry in this list indicates the disaster roaming information applicable for the network(s) in the first entry of *plmn-IdentityList*/*npn-IdentityList-r16*, the second entry in this list indicates the disaster roaming information applicable for the network(s) in the second entry of *plmn-IdentityList*/*npn-IdentityList-r16*, and so on. Each entry in this list can either be having the value *noDisasterRoaming*, *disasterRoamingFromAnyPLMN*, *commonPLMNs*, or *dedicatedPLMNs*. If an entry in this list takes the value *noDisasterRoaming*, disaster inbound roaming is not allowed in this network(s). If an entry in this list takes the value *disasterRoamingFromAnyPLMN*, this network(s) accepts disaster inbound roamers from any other PLMN (except those indicated in SIB1). If an entry in this list takes the value *commonPLMNs*, the PLMN(s) with disaster conditions indicated in the field *commonPLMNsWithDisasterCondition* apply for this network(s). If an entry in this list contains the value *dedicatedPLMNs*, the listed PLMN(s) are the PLMN(s) with disaster conditions that the network(s) corresponding to this entry accepts disaster inbound roamers from. For SNPNs, the network indicates the value *noDisasterRoaming*. |

#### – *SIB16*

SIB16 contains configurations of slice specific cell reselection information.

*SIB16* information element

-- ASN1START

-- TAG-SIB16-START

SIB16-r17 ::= SEQUENCE {

freqPriorityListSlicing-r17 FreqPriorityListSlicing-r17 OPTIONAL, -- Need R

lateNonCriticalExtension OCTET STRING OPTIONAL,

...

}

-- TAG-SIB16-STOP

-- ASN1STOP

| *SIB16* field descriptions |
| --- |
| ***freqPriorityListSlicing***  This field indicates cell reselection priorities for slicing. |

#### – *SIB17*

SIB17 contains configurations of TRS resources for idle/inactive UEs.

*SIB17* information element

-- ASN1START

-- TAG-SIB17-START

SIB17-r17 ::= SEQUENCE {

segmentNumber-r17 INTEGER (0..63),

segmentType-r17 ENUMERATED {notLastSegment, lastSegment},

segmentContainer-r17 OCTET STRING

}

SIB17-IEs-r17 ::= SEQUENCE {

trs-ResourceSetConfig-r17 SEQUENCE (SIZE (1..maxNrofTRS-ResourceSets-r17)) OF TRS-ResourceSet-r17,

validityDuration-r17 ENUMERATED {t1, t2, t4, t8, t16, t32, t64, t128, t256, t512, infinity, spare5, spare4, spare3, spare2,

spare1} OPTIONAL, -- Need S

lateNonCriticalExtension OCTET STRING OPTIONAL,

...

}

TRS-ResourceSet-r17 ::= SEQUENCE {

powerControlOffsetSS-r17 ENUMERATED {db-3, db0, db3, db6},

scramblingID-Info-r17 CHOICE {

scramblingIDforCommon-r17 ScramblingId,

scramblingIDperResourceListWith2-r17 SEQUENCE (SIZE (2)) OF ScramblingId,

scramblingIDperResourceListWith4-r17 SEQUENCE (SIZE (4)) OF ScramblingId,

...

},

firstOFDMSymbolInTimeDomain-r17 INTEGER (0..9),

startingRB-r17 INTEGER (0..maxNrofPhysicalResourceBlocks-1),

nrofRBs-r17 INTEGER (24..maxNrofPhysicalResourceBlocksPlus1),

ssb-Index-r17 SSB-Index,

periodicityAndOffset-r17 CHOICE {

slots10 INTEGER (0..9),

slots20 INTEGER (0..19),

slots40 INTEGER (0..39),

slots80 INTEGER (0..79)

},

frequencyDomainAllocation-r17 BIT STRING (SIZE (4)),

indBitID-r17 INTEGER (0..5),

nrofResources-r17 ENUMERATED {n2, n4}

}

-- TAG-SIB17-STOP

-- ASN1STOP

| *SIB17* field descriptions |
| --- |
| ***segmentContainer***  This field includes a segment of the encoded *SIB17-IEs*. The size of the included segment in this container should be small enough that the SIB message size is less than or equal to the maximum size of a NR SI, i.e. 2976 bits when *SIB17* is broadcast. |
| ***segmentNumber***  This field identifies the sequence number of a segment of *SIB17-IEs*. A segment number of zero corresponds to the first segment, a segment number of one corresponds to the second segment, and so on. |
| ***segmentType***  This field indicates whether the included segment is the last segment or not. |
| ***trs-ResourceSetConfig***  RS configuration of TRS occasion(s) for idle/inactive UE(s), in terms of a list of N>=1 NZP TRS resource set(s). The maximum number of TRS resource sets configured by higher layer is 64. If a TRS resource is configured, the L1 based availability indication is always enabled based on that configuration. A UE which acquired *SIB17* with a TRS configuration but did not yet receive an associated L1-based availability indication considers the configured TRS as unavailable. If SIB scheduling indicates that *SIB17* has changed, the UE considers its configured TRS(s) as unavailable until it receives the associated L1-based availability indication(s). |
| ***validityDuration***  The valid time duration for L1 availability indication, time unit is one default paging cycle. When the field is absent, UE assumes a default time duration to be 2 default paging cycles. The field is only valid while the UE has a valid *SIB17*. |

| *TRS-ResourceSet* field descriptions |
| --- |
| ***firstOFDMSymbolInTimeDomain***  The index of the first OFDM symbol in the PRB used for TRS in a slot. The field indicates the first symbol in a slot for the first TRS resource within the slot, and the symbol for the second TRS resource in the same slot can be derived implicitly with symbol index as *firstOFDMSymbolInTimeDomain*+4. |
| ***frequencyDomainAllocation***  Indicates the offset of the first RE to RE#0 in a RB in row1. |
| ***indBitID***  The index of the associated bit in TRS availability indication field in DCI. Each TRS resource set is configured with an ID i for the association with (i+1)-th indication bit in TRS availability indication field in DCI. |
| ***nrofRBs***  Number of PRBs across which corresponding TRS resource spans. |
| ***nrofResources***  The number of TRS resources for a TRS resource set. |
| ***periodicityAndOffset***  The periodicity and slot offset (slot) for periodic TRS. It is used to determine the location of the first slot of TRS resource set. The periodicity value *slots10* corresponds to 10 slots, value *slots20* corresponds to 20 slots, and so on. |
| ***powerControlOffsetSS***  Power offset (dB) of NZP CSI-RS RE to SSS RE. |
| ***scramblingID-Info***  One or more scrambling IDs are configured for a TRS resource set. If a common scrambling ID is configured, it applies to all the TRS resources within the TRS resource set. Otherwise, each TRS resource within the TRS resource set is provided with a scrambling ID. If the number of TRS resources for the TRS resource set is 2, *scramblingIDperResourceListWith2-r17* is configured, while *scramblingIDperResourceListWith4-r17* is configured for the case that the number of TRS resources for the TRS resource set is 4. |
| ***ssb-Index***  The index of reference SSB with which quasi-collocation information is provided as specified in TS 38.214 [19] clause 5.1.5. |
| ***startingRB***  The PRB index where corresponding TRS resource starts in relation to common resource block #0 (CRB#0) on the common resource block grid. |

#### – *SIB18*

*SIB18* contains Group IDs for Network selection (GINs) to support access using credentials from a Credentials Holder or to support UE onboarding.

***SIB18* information element**

-- ASN1START

-- TAG-SIB18-START

SIB18-r17 ::= SEQUENCE {

gin-ElementList-r17 SEQUENCE (SIZE (1..maxGIN-r17)) OF GIN-Element-r17 OPTIONAL, -- Need R

gins-PerSNPN-List-r17 SEQUENCE (SIZE (1..maxNPN-r16)) OF GINs-PerSNPN-r17 OPTIONAL, -- Need R

lateNonCriticalExtension OCTET STRING OPTIONAL,

...

}

GIN-Element-r17 ::= SEQUENCE {

plmn-Identity-r17 PLMN-Identity,

nid-List-r17 SEQUENCE (SIZE (1..maxGIN-r17)) OF NID-r16

}

GINs-PerSNPN-r17 ::= SEQUENCE {

supportedGINs-r17 BIT STRING (SIZE (1..maxGIN-r17)) OPTIONAL -- Need R

}

-- TAG-SIB18-STOP

-- ASN1STOP

|  |
| --- |
| *SIB18* field descriptions |
| ***gin-ElementList***  The *gin-ElementList* contains one or more GIN elements. Each GIN element contains either one GIN, which is identified by a PLMN ID and a NID, or multiple GINs that share the same PLMN ID. The total number of GINs indicated does not exceed maxGIN-r17. The GIN index *m* is defined as d1+d2+…+d(n-1)+i for the GIN included in the *n*-th entry of the *gin-ElementList* and the *i*-th entry of its corresponding *GIN-Element*, where *d(k)* is the number of GIN index values used in the *k*-th *gin-ElementList* entry. |
| ***gins-PerSNPN-List***  Indicates the supported GINs for each SNPN. The network includes the same number of entries as the number of SNPNs in *snpn-AccessInfoList* in provided in SIB1, and the n-th entry in this list corresponds to the n-th SNPN listed in *snpn-AccessInfoList* provided in SIB1. This field is not present if there is only a single SNPN in *snpn-AccessInfoList* in SIB1, as in that case all GINs in this SIB is associated with that SNPN. |

|  |
| --- |
| *GINs-PerSNPN* field descriptions |
| ***supportedGINs***  Indicates the GINs which are supported by the given SNPN. The first/leftmost bit corresponds to the GIN with GIN index 1, the second bit corresponds to the GIN with GIN index 2 and so on. A bit set to 1 indicates that the GIN is supported by the SNPN. If the field is not present, then the corresponding SNPN does not support any GINs. |

– *SIB19*

*SIB19* contains satellite assistance information.

***SIB19* information element**

-- ASN1START

-- TAG-SIB19-START

SIB19-r17 ::= SEQUENCE {

ntn-Config-r17 NTN-Config-r17 OPTIONAL, -- Need R

t-Service-r17 INTEGER (0..549755813887) OPTIONAL, -- Need R

referenceLocation-r17 ReferenceLocation-r17 OPTIONAL, -- Need R

distanceThresh-r17 INTEGER(0..65525) OPTIONAL, -- Need R

ntn-NeighCellConfigList-r17 NTN-NeighCellConfigList-r17 OPTIONAL, -- Need R

lateNonCriticalExtension OCTET STRING OPTIONAL,

...

}

NTN-NeighCellConfigList-r17 ::= SEQUENCE (SIZE(1..maxCellNTN-r17)) OF NTN-NeighCellConfig-r17

NTN-NeighCellConfig-r17 ::= SEQUENCE {

ntn-Config-r17 NTN-Config-r17 OPTIONAL, -- Need R

carrierFreq-r17 ARFCN-ValueNR OPTIONAL, -- Need R

physCellId-r17 PhysCellId OPTIONAL -- Need R

}

-- TAG-SIB19-STOP

-- ASN1STOP

| ***SIB19* field descriptions** |
| --- |
| ***distanceThresh***  Distance from the serving cell reference location and is used in location-based measurement initiation in RRC\_IDLE and RRC\_INACTIVE, as defined in TS 38.304 [20]. Each step represents 50m. |
| ***ntn-Config***  Provides parameters needed for the UE to access NR via NTN access such as Ephemeris data, common TA parameters, k\_offset, validity duration for UL sync information and epoch. The validity duration, *ntn-UlSyncValidityDuration*, is mandatory present. |
| ***ntn-NeighCellConfigList***  Provides a list of NTN neighbour cells including their *ntn-Config*, carrier frequency and *PhysCellId*. |
| ***referenceLocation***  Reference location of the serving cell provided via NTN quasi-Earth fixed system and is used in location-based measurement initiation in RRC\_IDLE and RRC\_INACTIVE, as defined in TS 38.304 [20].. |
| ***t-Service***  Indicates the time information on when a cell provided via NTN quasi-Earth fixed system is going to stop serving the area it is currently covering. The field indicates a time in multiples of 10 ms after 00:00:00 on Gregorian calendar date 1 January, 1900 (midnight between Sunday, December 31, 1899 and Monday, January 1, 1900). This field is excluded when determining changes in system information, i.e. changes of *t-Service* should neither result in system information change notifications nor in a modification of *valueTag* in *SIB1*. The exact stop time is between the time indicated by the value of this field minus 1 and the time indicated by the value of this field. |

#### – *SIB20*

*SIB20* contains the information required to acquire the MCCH configuration for MBS broadcast.

*SIB20* information element

-- ASN1START

-- TAG-SIB20-START

SIB20-r17 ::= SEQUENCE {

mcch-Config-r17 MCCH-Config-r17,

cfr-ConfigMCCH-MTCH-r17 CFR-ConfigMCCH-MTCH-r17 OPTIONAL, -- Need S

lateNonCriticalExtension OCTET STRING OPTIONAL,

...

}

MCCH-Config-r17 ::= SEQUENCE {

mcch-RepetitionPeriodAndOffset-r17 MCCH-RepetitionPeriodAndOffset-r17,

mcch-WindowStartSlot-r17 INTEGER (0..79),

mcch-WindowDuration-r17 ENUMERATED {sl2, sl4, sl8, sl10, sl20, sl40,sl80, sl160} OPTIONAL, -- Need S

mcch-ModificationPeriod-r17 ENUMERATED {rf2, rf4, rf8, rf16, rf32, rf64, rf128, rf256,

rf512, rf1024, r2048, rf4096, rf8192, rf16384, rf32768, rf65536}

}

MCCH-RepetitionPeriodAndOffset-r17 ::= CHOICE {

rf1-r17 INTEGER(0),

rf2-r17 INTEGER(0..1),

rf4-r17 INTEGER(0..3),

rf8-r17 INTEGER(0..7),

rf16-r17 INTEGER(0..15),

rf32-r17 INTEGER(0..31),

rf64-r17 INTEGER(0..63),

rf128-r17 INTEGER(0..127),

rf256-r17 INTEGER(0..255)

}

-- TAG-SIB20-STOP

-- ASN1STOP

| *SIB20* field descriptions |
| --- |
| ***cfr-ConfigMCCH-MTCH***  Common frequency resource used for MCCH and MTCH reception. If the field is absent, the CFR for broadcast has the same location and size as CORESET0 and PDSCH configuration of MCCH is the same as PDSCH configuration provided in *initialDownlinkBWP* in *SIB1*. |
| ***mcch-WindowDuration***  Indicates, starting from the slot indicated by *mcch-WindowStartSlot*, the duration in slot during which MCCH may be scheduled. Absence of this field means that MCCH is only scheduled in the slot indicated by *mcch-WindowStartSlot*. |
| ***mcch-ModificationPeriod***  Defines periodically appearing boundaries, i.e. radio frames for which SFN mod *mcch-ModificationPeriod* = 0. The contents of different transmissions of MCCH information can only be different if there is at least one such boundary in-between them. Value rf2 corresponds to two radio frames, value rf4 corresponds to four radio frames and so on. |
| ***mcch-RepetitionPeriodAndOffset***  Defines the length and the offset of the MCCH repetition period. rf1 corresponds to a repetition period length of one radio frame, rf2 corresponds to a repetition period length of two radio frames and so on. The corresponding integer value indicates the offset of the repetition period in the number of radio frames. MCCH is scheduled in radio frames for which: SFN mod repetition period length = offset of the repetition period. |
| ***mcch-WindowStartSlot***  Indicates the slot in which MCCH transmission window starts. |

#### – *SIB21*

*SIB21* contains the mapping between frequency and MBS services.

*SIB21* information element

-- ASN1START

-- TAG-SIB21-START

SIB21-r17 ::= SEQUENCE {

mbs-FSAI-IntraFreq-r17 MBS-FSAI-List-r17 OPTIONAL, -- Need R

mbs-FSAI-InterFreqList-r17 MBS-FSAI-InterFreqList-r17 OPTIONAL, -- Need R

lateNonCriticalExtension OCTET STRING OPTIONAL,

...

}

MBS-FSAI-List-r17 ::= SEQUENCE (SIZE (1..maxFSAI-MBS-r17)) OF MBS-FSAI-r17

MBS-FSAI-InterFreqList-r17 ::= SEQUENCE (SIZE (1..maxFreq)) OF MBS-FSAI-InterFreq-r17

MBS-FSAI-InterFreq-r17 ::= SEQUENCE {

dl-CarrierFreq-r17 ARFCN-ValueNR,

mbs-FSAI-List-r17 MBS-FSAI-List-r17

}

MBS-FSAI-r17 ::= OCTET STRING (SIZE (3))

-- TAG-SIB21-STOP

-- ASN1STOP

| *SIB21* field descriptions |
| --- |
| ***mbs-FSAI-InterFreqList***  Contains a list of neighboring frequencies including additional bands, if any, that provide MBS services and the corresponding MBS FSAIs. |
| ***mbs-FSAI-IntraFreq***  Contains the list of MBS FSAIs for the current frequency. For MBS service continuity, the UE shall use all MBS FSAIs listed in *mbs-FSAI-IntraFreq* to derive the MBS frequencies of interest. |

### 6.3.1a Positioning System information blocks

#### – *PosSystemInformation-r16-IEs*

-- ASN1START

-- TAG-POSSYSTEMINFORMATION-R16-IES-START

PosSystemInformation-r16-IEs ::= SEQUENCE {

posSIB-TypeAndInfo-r16 SEQUENCE (SIZE (1..maxSIB)) OF CHOICE {

posSib1-1-r16 SIBpos-r16,

posSib1-2-r16 SIBpos-r16,

posSib1-3-r16 SIBpos-r16,

posSib1-4-r16 SIBpos-r16,

posSib1-5-r16 SIBpos-r16,

posSib1-6-r16 SIBpos-r16,

posSib1-7-r16 SIBpos-r16,

posSib1-8-r16 SIBpos-r16,

posSib2-1-r16 SIBpos-r16,

posSib2-2-r16 SIBpos-r16,

posSib2-3-r16 SIBpos-r16,

posSib2-4-r16 SIBpos-r16,

posSib2-5-r16 SIBpos-r16,

posSib2-6-r16 SIBpos-r16,

posSib2-7-r16 SIBpos-r16,

posSib2-8-r16 SIBpos-r16,

posSib2-9-r16 SIBpos-r16,

posSib2-10-r16 SIBpos-r16,

posSib2-11-r16 SIBpos-r16,

posSib2-12-r16 SIBpos-r16,

posSib2-13-r16 SIBpos-r16,

posSib2-14-r16 SIBpos-r16,

posSib2-15-r16 SIBpos-r16,

posSib2-16-r16 SIBpos-r16,

posSib2-17-r16 SIBpos-r16,

posSib2-18-r16 SIBpos-r16,

posSib2-19-r16 SIBpos-r16,

posSib2-20-r16 SIBpos-r16,

posSib2-21-r16 SIBpos-r16,

posSib2-22-r16 SIBpos-r16,

posSib2-23-r16 SIBpos-r16,

posSib3-1-r16 SIBpos-r16,

posSib4-1-r16 SIBpos-r16,

posSib5-1-r16 SIBpos-r16,

posSib6-1-r16 SIBpos-r16,

posSib6-2-r16 SIBpos-r16,

posSib6-3-r16 SIBpos-r16,

... ,

posSib1-9-v1700 SIBpos-r16,

posSib1-10-v1700 SIBpos-r16,

posSib2-24-v1700 SIBpos-r16,

posSib2-25-v1700 SIBpos-r16,

posSib6-4-v1700 SIBpos-r16,

posSib6-5-v1700 SIBpos-r16,

posSib6-6-v1700 SIBpos-r16

},

lateNonCriticalExtension OCTET STRING OPTIONAL,

nonCriticalExtension SEQUENCE {} OPTIONAL

}

-- TAG-POSSYSTEMINFORMATION-R16-IES-STOP

-- ASN1STOP

#### – *PosSI-SchedulingInfo*

-- ASN1START

-- TAG-POSSI-SCHEDULINGINFO-START

PosSI-SchedulingInfo-r16 ::= SEQUENCE {

posSchedulingInfoList-r16 SEQUENCE (SIZE (1..maxSI-Message)) OF PosSchedulingInfo-r16,

posSI-RequestConfig-r16 SI-RequestConfig OPTIONAL, -- Cond MSG-1

posSI-RequestConfigSUL-r16 SI-RequestConfig OPTIONAL, -- Cond SUL-MSG-1

...,

[[

posSI-RequestConfig-RedCap-r17 SI-RequestConfig OPTIONAL -- Cond REDCAP-MSG-1

]]

}

PosSchedulingInfo-r16 ::= SEQUENCE {

offsetToSI-Used-r16 ENUMERATED {true} OPTIONAL, -- Need R

posSI-Periodicity-r16 ENUMERATED {rf8, rf16, rf32, rf64, rf128, rf256, rf512},

posSI-BroadcastStatus-r16 ENUMERATED {broadcasting, notBroadcasting},

posSIB-MappingInfo-r16 PosSIB-MappingInfo-r16,

...

}

PosSIB-MappingInfo-r16 ::= SEQUENCE (SIZE (1..maxSIB)) OF PosSIB-Type-r16

PosSIB-Type-r16 ::= SEQUENCE {

encrypted-r16 ENUMERATED { true } OPTIONAL, -- Need R

gnss-id-r16 GNSS-ID-r16 OPTIONAL, -- Need R

sbas-id-r16 SBAS-ID-r16 OPTIONAL, -- Need R

posSibType-r16 ENUMERATED { posSibType1-1, posSibType1-2, posSibType1-3, posSibType1-4, posSibType1-5, posSibType1-6,

posSibType1-7, posSibType1-8, posSibType2-1, posSibType2-2, posSibType2-3, posSibType2-4,

posSibType2-5, posSibType2-6, posSibType2-7, posSibType2-8, posSibType2-9, posSibType2-10,

posSibType2-11, posSibType2-12, posSibType2-13, posSibType2-14, posSibType2-15,

posSibType2-16, posSibType2-17, posSibType2-18, posSibType2-19, posSibType2-20,

posSibType2-21, posSibType2-22, posSibType2-23, posSibType3-1, posSibType4-1,

posSibType5-1,posSibType6-1, posSibType6-2, posSibType6-3,... },

areaScope-r16 ENUMERATED {true} OPTIONAL -- Need S

}

GNSS-ID-r16 ::= SEQUENCE {

gnss-id-r16 ENUMERATED{gps, sbas, qzss, galileo, glonass, bds, ...},

...

}

SBAS-ID-r16 ::= SEQUENCE {

sbas-id-r16 ENUMERATED { waas, egnos, msas, gagan, ...},

...

}

-- TAG-POSSI-SCHEDULINGINFO-STOP

-- ASN1STOP

|  |
| --- |
| *PosSI-SchedulingInfo* field descriptions |
| ***areaScope***  Indicates that a posSIB is area specific. If the field is absent, the posSIB is cell specific. |
| ***encrypted***  The presence of this field indicates that the *pos-sib-type* is encrypted as specified in TS 37.355 [49]. |
| ***gnss-id***  The presence of this field indicates that the positioning SIB type is for a specific GNSS. Indicates a specific GNSS (see also TS 37.355 [49]) |
| ***posSI-BroadcastStatus***  Indicates if the SI message is being broadcasted or not. Change of *posSI-BroadcastStat*us should not result in system information change notifications in Short Message transmitted with P-RNTI over DCI (see clause 6.5). The value of the indication is valid until the end of the BCCH modification period when set to *broadcasting*. |
| ***posSI-RequestConfig***  Configuration of Msg1 resources that the UE uses for requesting SI-messages for which *posSI-BroadcastStatus* is set to notBroadcasting. |
| ***posSI-RequestConfig-RedCap***  Configuration of Msg1 resources for *initialUplinkBWP-RedCap*that the RedCap UE uses for requesting SI-messages for which *posSI-BroadcastStatus* is set to *notBroadcasting*. |
| ***posSI-RequestConfigSUL***  Configuration of Msg1 resources that the UE uses for requesting SI-messages for which *posSI-BroadcastStatus* is set to notBroadcasting. |
| ***posSIB-MappingInfo***  List of the posSIBs mapped to this *SystemInformation* message. |
| ***posSibType***  The positioning SIB type is defined in TS 37.355 [49]. |
| ***posSI-Periodicity***  Periodicity of the SI-message in radio frames, such that rf8 denotes 8 radio frames, rf16 denotes 16 radio frames, and so on. If the *offsetToSI-Used* is configured, the *posSI-Periodicity* of rf8 cannot be used. |
| ***offsetToSI-Used***  This field, if present indicates that all the SI messages in *posSchedulingInfoList* are scheduled with an offset of 8 radio frames compared to SI messages in *schedulingInfoList*. *offsetToSI-Used* may be present only if the shortest configured SI message periodicity for SI messages in *schedulingInfoList* is 80ms. If SI offset is used, this field is present in each of the SI messages in the *posSchedulingInfoList*. |
| ***sbas-id***  The presence of this field indicates that the positioning SIB type is for a specific SBAS. Indicates a specific SBAS (see also TS 37.355 [49]). |

| Conditional presence | Explanation |
| --- | --- |
| *MSG-1* | The field is optionally present, Need R, if *posSI-BroadcastStatus* is set to *notBroadcasting* for any SI-message included in *PosSchedulingInfo*. It is absent otherwise. |
| *SUL-MSG-1* | The field is optionally present, Need R, if *supplementaryUplink* is configured in *ServingCellConfigCommonSIB* and if *posSI-BroadcastStatus* is set to *notBroadcasting* for any SI-message included in *PosSchedulingInfo*. It is absent otherwise. |
| *REDCAP-MSG-1* | The field is optionally present, Need R, if *initialUplinkBWP-RedCap* is configured in *UplinkConfigCommonSIB* and if *posSI-BroadcastStatus* is set to *notBroadcasting* for any SI-message included in *PosSchedulingInfo*. It is absent otherwise. |

#### – *SIBpos*

The IE *SIBpos* contains positioning assistance data as defined in TS 37.355 [49].

*SIBpos* information element

-- ASN1START

-- TAG-SIPOS-START

SIBpos-r16 ::= SEQUENCE {

assistanceDataSIB-Element-r16 OCTET STRING,

lateNonCriticalExtension OCTET STRING OPTIONAL,

...

}

-- TAG-SIPOS-STOP

-- ASN1STOP

| *SIBpos* field descriptions |
| --- |
| ***assistanceDataSIB-Element***  Parameter *AssistanceDataSIBelement* defined in TS 37.355 [49]. The first/leftmost bit of the first octet contains the most significant bit. |

### 6.3.2 Radio resource control information elements

#### – *AdditionalSpectrumEmission*

The IE *AdditionalSpectrumEmission* is used to indicate emission requirements to be fulfilled by the UE (see TS 38.101-1 [15], clause 6.2.3, and TS 38.101-2 [39], clause 6.2.3).

*AdditionalSpectrumEmission* information element

-- ASN1START

-- TAG-ADDITIONALSPECTRUMEMISSION-START

AdditionalSpectrumEmission ::= INTEGER (0..7)

-- TAG-ADDITIONALSPECTRUMEMISSION-STOP

-- ASN1STOP

#### – *Alpha*

The IE *Alpha* defines possible values of a the pathloss compensation coefficient for uplink power control. Value *alpha0* corresponds to the value 0, Value *alpha04* corresponds to the value 0.4, Value *alpha05* corresponds to the value 0.5 and so on. Value *alpha1* corresponds to value 1. See also clause 7.1 of TS 38.213 [13].

-- ASN1START

-- TAG-ALPHA-START

Alpha ::= ENUMERATED {alpha0, alpha04, alpha05, alpha06, alpha07, alpha08, alpha09, alpha1}

-- TAG-ALPHA-STOP

-- ASN1STOP

#### – *AMF-Identifier*

The IE *AMF-Identifier* (AMFI) comprises of an AMF Region ID, an AMF Set ID and an AMF Pointer as specified in TS 23.003 [21], clause 2.10.1.

*AMF-Identifier* information element

-- ASN1START

-- TAG-AMF-IDENTIFIER-START

AMF-Identifier ::= BIT STRING (SIZE (24))

-- TAG-AMF-IDENTIFIER-STOP

-- ASN1STOP

#### – *ARFCN-ValueEUTRA*

The IE *ARFCN-ValueEUTRA* is used to indicate the ARFCN applicable for a downlink, uplink or bi-directional (TDD) E-UTRA carrier frequency, as defined in TS 36.101 [22].

*ARFCN-ValueEUTRA* information element

-- ASN1START

-- TAG-ARFCN-VALUEEUTRA-START

ARFCN-ValueEUTRA ::= INTEGER (0..maxEARFCN)

-- TAG-ARFCN-VALUEEUTRA-STOP

-- ASN1STOP

#### – *ARFCN-ValueNR*

The IE *ARFCN-ValueNR* is used to indicate the ARFCN applicable for a downlink, uplink or bi-directional (TDD) NR global frequency raster, as defined in TS 38.101-1 [15] and TS 38.101-2 [39], clause 5.4.2.

-- ASN1START

-- TAG-ARFCN-VALUENR-START

ARFCN-ValueNR ::= INTEGER (0..maxNARFCN)

-- TAG-ARFCN-VALUENR-STOP

-- ASN1STOP

#### – *ARFCN-ValueUTRA-FDD*

The IE *ARFCN-ValueUTRA-FDD* is used to indicate the ARFCN applicable for a downlink (Nd, FDD) UTRA-FDD carrier frequency, as defined in TS 25.331 [45].

*ARFCN-ValueUTRA-FDD* information element

-- ASN1START

-- TAG-ARFCN-ValueUTRA-FDD-START

ARFCN-ValueUTRA-FDD-r16 ::= INTEGER (0..16383)

-- TAG-ARFCN-ValueUTRA-FDD-STOP

-- ASN1STOP

#### – *AvailabilityCombinationsPerCell*

The IE *AvailabilityCombinationsPerCell* is used to configure the *AvailabilityCombinations* applicable for a cell of the IAB DU (see TS 38.213 [13], clause 14). Note that the IE *AvailabilityCombinationsPerCellIndex* can only be configured up to 511.

*AvailabilityCombinationsPerCell* information element

-- ASN1START

-- TAG-AVAILABILITYCOMBINATIONSPERCELL-START

AvailabilityCombinationsPerCell-r16 ::= SEQUENCE {

availabilityCombinationsPerCellIndex-r16 AvailabilityCombinationsPerCellIndex-r16,

iab-DU-CellIdentity-r16 CellIdentity,

positionInDCI-AI-r16 INTEGER(0..maxAI-DCI-PayloadSize-1-r16) OPTIONAL, -- Need M

availabilityCombinations-r16 SEQUENCE (SIZE (1..maxNrofAvailabilityCombinationsPerSet-r16)) OF AvailabilityCombination-r16,

...,

[[

availabilityCombinationsRBGroups-r17 SEQUENCE (SIZE (1..maxNrofAvailabilityCombinationsPerSet-r16)) OF AvailabilityCombinationRB-Groups-r17 OPTIONAL -- Need M

]]

}

AvailabilityCombinationsPerCellIndex-r16 ::= INTEGER(0..maxNrofDUCells-r16)

AvailabilityCombination-r16 ::= SEQUENCE {

availabilityCombinationId-r16 AvailabilityCombinationId-r16,

resourceAvailability-r16 SEQUENCE (SIZE (1..maxNrofResourceAvailabilityPerCombination-r16)) OF INTEGER (0..7)

}

AvailabilityCombinationId-r16 ::= INTEGER (0..maxNrofAvailabilityCombinationsPerSet-1-r16)

AvailabilityCombinationRB-Groups-r17 ::= SEQUENCE {

availabilityCombinationId-r17 AvailabilityCombinationId-r16,

rb-SetGroups-r17 SEQUENCE (SIZE (1..maxNrofRB-SetGroups-r17)) OF RB-SetGroup-r17 OPTIONAL, -- Need R

resourceAvailability-r17 SEQUENCE (SIZE (1..maxNrofResourceAvailabilityPerCombination-r16)) OF INTEGER (0..7) OPTIONAL -- Need R

}

RB-SetGroup-r17 ::= SEQUENCE {

resourceAvailability-r17 SEQUENCE (SIZE (1..maxNrofResourceAvailabilityPerCombination-r16)) OF INTEGER (0..7) OPTIONAL, -- Need R

rb-Sets-r17 SEQUENCE (SIZE (1..maxNrofRB-Sets-r17)) OF INTEGER (0..7) OPTIONAL -- Need R

}

-- TAG-AVAILABILITYCOMBINATIONSPERCELL-STOP

-- ASN1STOP

|  |
| --- |
| *AvailabilityCombination field descriptions* |
| ***availabilityCombinationId***  This ID is used in the DCI Format 2\_5 payload to dynamically select this *AvailabilityCombination*, see TS 38.213 [13], clause 14. |
| ***resourceAvailability***  Indicates the resource availability of soft symbols for a set of consecutive slots in the time domain. The meaning of this field is described in TS 38.213 [13], Table 14.3. If included in *RB-SetGroup* within *AvailabilityCombinationRB-Groups-r17*, it indicates the availability of soft resources for an RB set group. If included in *AvailabilityCombinationRB-Groups-r17* when the *rb-SetGroups* is not configured, it indicates the availability of soft resources in one or multiple slots for all RB sets of a DU cell. |

|  |
| --- |
| *AvailabilityCombinationsPerCell* field descriptions |
| ***iab-DU-CellIdentity***  The ID of the IAB-DU cell for which the *availabilityCombinations* are applicable. |
| ***positionInDCI-AI***  The (starting) position (bit) of the *AvailabilityCombinationId* for the indicated IAB-DU cell (*iab-DU-CellIdentity*) within the DCI payload. |

|  |
| --- |
| *AvailabilityCombinationRBGroups* field descriptions |
| ***rb-SetGroups***  Indicates the RB set groups configured for the availability combination. Each group includes consecutive RB sets. |
| ***rb-Sets***  Indicates the one or more RB set indexes associated to one or more RB sets configured for one RB set group. |

#### – *AvailabilityIndicator*

The IE *AvailabilityIndicator* is used to configure monitoring a PDCCH for Availability Indicators (AI).

*AvailabilityIndicator* information element

-- ASN1START

-- TAG-AVAILABILITYINDICATOR-START

AvailabilityIndicator-r16 ::= SEQUENCE {

ai-RNTI-r16 AI-RNTI-r16,

dci-PayloadSizeAI-r16 INTEGER (1..maxAI-DCI-PayloadSize-r16),

availableCombToAddModList-r16 SEQUENCE (SIZE(1..maxNrofDUCells-r16)) OF AvailabilityCombinationsPerCell-r16 OPTIONAL, -- Need N

availableCombToReleaseList-r16 SEQUENCE (SIZE(1..maxNrofDUCells-r16)) OF AvailabilityCombinationsPerCellIndex-r16 OPTIONAL, -- Need N

...

}

AI-RNTI-r16 ::= RNTI-Value

-- TAG-AVAILABILITYINDICATOR-STOP

-- ASN1STOP

|  |
| --- |
| *AvailabilityIndicator* field descriptions |
| ***ai-RNTI***  Used by an IAB-MT for detection of DCI format 2\_5 indicating *AvailabilityCombinationId* for an IAB-DU's cells. |
| ***availableCombToAddModList***  A list of *availabilityCombinations* to add for the IAB-DU's cells. (see TS 38.213 [13], clause 14). |
| ***availableCombToReleaseList***  A list of *availabilityCombinations* to release for the IAB-DU's cells. (see TS 38.213 [13], clause 14). |
| ***dci-PayloadSizeAI***  Total length of the DCI payload scrambled with ai-RNTI (see TS 38.213 [13]). |

#### – *BAP-RoutingID*

The IE *BAP-RoutingID* is used for IAB-node to configure the BAP Routing ID.

*BAP-RoutingID* information element

-- ASN1START

-- TAG-BAPROUTINGID-START

BAP-RoutingID-r16::= SEQUENCE{

bap-Address-r16 BIT STRING (SIZE (10)),

bap-PathId-r16 BIT STRING (SIZE (10))

}

-- TAG-BAPROUTINGID-STOP

-- ASN1STOP

|  |
| --- |
| *BAP-RoutingID* field descriptions |
| ***bap-Address***  The ID of a destination IAB-node or IAB-donor-DU used in the BAP header. |
| ***bap-PathId***  The ID of a path used in the BAP header. |

#### *– BeamFailureRecoveryConfig*

The IE *BeamFailureRecoveryConfig* is used to configure the UE with RACH resources and candidate beams for beam failure recovery in case of beam failure detection. See also TS 38.321 [3], clause 5.1.1.

*BeamFailureRecoveryConfig* information element

-- ASN1START

-- TAG-BEAMFAILURERECOVERYCONFIG-START

BeamFailureRecoveryConfig ::= SEQUENCE {

rootSequenceIndex-BFR INTEGER (0..137) OPTIONAL, -- Need M

rach-ConfigBFR RACH-ConfigGeneric OPTIONAL, -- Need M

rsrp-ThresholdSSB RSRP-Range OPTIONAL, -- Need M

candidateBeamRSList SEQUENCE (SIZE(1..maxNrofCandidateBeams)) OF PRACH-ResourceDedicatedBFR OPTIONAL, -- Need M

ssb-perRACH-Occasion ENUMERATED {oneEighth, oneFourth, oneHalf, one, two,

four, eight, sixteen} OPTIONAL, -- Need M

ra-ssb-OccasionMaskIndex INTEGER (0..15) OPTIONAL, -- Need M

recoverySearchSpaceId SearchSpaceId OPTIONAL, -- Need R

ra-Prioritization RA-Prioritization OPTIONAL, -- Need R

beamFailureRecoveryTimer ENUMERATED {ms10, ms20, ms40, ms60, ms80, ms100, ms150, ms200} OPTIONAL, -- Need M

...,

[[

msg1-SubcarrierSpacing SubcarrierSpacing OPTIONAL -- Need M

]],

[[

ra-PrioritizationTwoStep-r16 RA-Prioritization OPTIONAL, -- Need R

candidateBeamRSListExt-v1610 SetupRelease{ CandidateBeamRSListExt-r16 } OPTIONAL -- Need M

]],

[[

spCell-BFR-CBRA-r16 ENUMERATED {true} OPTIONAL -- Need R

]]

}

PRACH-ResourceDedicatedBFR ::= CHOICE {

ssb BFR-SSB-Resource,

csi-RS BFR-CSIRS-Resource

}

BFR-SSB-Resource ::= SEQUENCE {

ssb SSB-Index,

ra-PreambleIndex INTEGER (0..63),

...

}

BFR-CSIRS-Resource ::= SEQUENCE {

csi-RS NZP-CSI-RS-ResourceId,

ra-OccasionList SEQUENCE (SIZE(1..maxRA-OccasionsPerCSIRS)) OF INTEGER (0..maxRA-Occasions-1) OPTIONAL, -- Need R

ra-PreambleIndex INTEGER (0..63) OPTIONAL, -- Need R

...

}

CandidateBeamRSListExt-r16::= SEQUENCE (SIZE(1.. maxNrofCandidateBeamsExt-r16)) OF PRACH-ResourceDedicatedBFR

-- TAG-BEAMFAILURERECOVERYCONFIG-STOP

-- ASN1STOP

|  |
| --- |
| *BeamFailureRecoveryConfig* field descriptions |
| ***beamFailureRecoveryTimer***  Timer for beam failure recovery timer. Upon expiration of the timer the UE does not use CFRA for BFR. Value in ms. Value *ms10* corresponds to 10 ms, value *ms20* corresponds to 20 ms, and so on. |
| ***candidateBeamRSList, candidateBeamRSListExt-v1610***  Set of reference signals (CSI-RS and/or SSB) identifying the candidate beams for recovery and the associated RA parameters. This set includes all elements of *candidateBeamRSList* (without suffix) and all elements of *candidateBeamRSListExt-v1610*. The UE maintains *candidateBeamRSList* and *candidateBeamRSListExt-v1610* separately: Receiving *candidateBeamRSListExt-v1610* set to *release* releases only the entries that were configured by *candidateBeamRSListExt-v1610*, and receiving *candidateBeamRSListExt-v1610* set to *setup* replaces only the entries that were configured by *candidateBeamRSListExt-v1610* with the newly signalled entries. The network configures these reference signals to be within the linked DL BWP (i.e., within the DL BWP with the same *bwp-Id*) of the UL BWP in which the *BeamFailureRecoveryConfig* is provided. |
| ***msg1-SubcarrierSpacing***  Subcarrier spacing for contention free beam failure recovery (see TS 38.211 [16], clause 5.3.2).  Only the following values are applicable depending on the used frequency:  FR1: 15 or 30 kHz  FR2-1: 60 or 120 kHz  FR2-2: 120, 480, or 960 kHz |
| ***rsrp-ThresholdSSB***  L1-RSRP threshold used for determining whether a candidate beam may be used by the UE to attempt contention free random access to recover from beam failure (see TS 38.213 [13], clause 6). |
| ***ra-prioritization***  Parameters which apply for prioritized random access procedure for BFR (see TS 38.321 [3], clause 5.1.1). |
| ***ra-PrioritizationTwoStep***  Parameters which apply for prioritized 2-step random access procedure for BFR (see TS 38.321 [3], clause 5.1.1). |
| ***ra-ssb-OccasionMaskIndex***  Explicitly signalled PRACH Mask Index for RA Resource selection in TS 38.321 [3]. The mask is valid for all SSB resources. |
| ***rach-ConfigBFR***  Configuration of random access parameters for BFR. |
| ***recoverySearchSpaceId***  Search space to use for BFR RAR. The network configures this search space to be within the linked DL BWP (i.e., within the DL BWP with the same *bwp-Id*) of the UL BWP in which the *BeamFailureRecoveryConfig* is provided. The CORESET associated with the recovery search space cannot be associated with another search space. Network always configures the UE with a value for this field when contention free random access resources for BFR are configured. |
| ***rootSequenceIndex-BFR***  PRACH root sequence index (see TS 38.211 [16], clause 6.3.3.1) for beam failure recovery. |
| ***spCell-BFR-CBRA***  Indicates that UE is configured to send BFR MAC CE for SpCell BFR as specified in TS38.321 [3]. |
| ***ssb-perRACH-Occasion***  Number of SSBs per RACH occasion for CF-BFR, see TS 38.213 [13], clause 8.1. |

|  |
| --- |
| *BFR-CSIRS-Resource* field descriptions |
| ***csi-RS***  The ID of a *NZP-CSI-RS-Resource* configured in the *CSI-MeasConfig* of this serving cell. This reference signal determines a candidate beam for beam failure recovery (BFR). |
| ***ra-OccasionList***  RA occasions that the UE shall use when performing BFR upon selecting the candidate beam identified by this CSI-RS. The network ensures that the RA occasion indexes provided herein are also configured by *prach-ConfigurationIndex* and *msg1-FDM*. Each RACH occasion is sequentially numbered, first, in increasing order of frequency resource indexes for frequency multiplexed PRACH occasions; second, in increasing order of time resource indexes for time multiplexed PRACH occasions within a PRACH slot and Third, in increasing order of indexes for PRACH slots.  If the field is absent the UE uses the RA occasion associated with the SSB that is QCLed with this CSI-RS. |
| ***ra-PreambleIndex***  The RA preamble index to use in the RA occasions associated with this CSI-RS. If the field is absent, the UE uses the preamble index associated with the SSB that is QCLed with this CSI-RS. |

|  |
| --- |
| *BFR-SSB-Resource* field descriptions |
| ***ra-PreambleIndex***  The preamble index that the UE shall use when performing BFR upon selecting the candidate beams identified by this SSB. |
| ***ssb***  The ID of an SSB transmitted by this serving cell. It determines a candidate beam for beam failure recovery (BFR). |

#### *– BeamFailureRecoveryRSConfig*

The IE *BeamFailureRecoveryRSConfig* is used to configure the UE with candidate beams for beam failure recovery in case of beam failure detection. See also TS 38.321 [3], clause 5.17.

*BeamFailureRecoveryRSConfig* information element

-- ASN1START

-- TAG-BEAMFAILURERECOVERYRSCONFIG-START

BeamFailureRecoveryRSConfig-r16 ::= SEQUENCE {

rsrp-ThresholdBFR-r16 RSRP-Range OPTIONAL, -- Need M

candidateBeamRS-List-r16 SEQUENCE (SIZE(1..maxNrofCandidateBeams-r16)) OF CandidateBeamRS-r16 OPTIONAL, -- Need M

...,

[[

candidateBeamRS-List2-r17 SEQUENCE (SIZE(1..maxNrofCandidateBeams-r16)) OF CandidateBeamRS-r16 OPTIONAL -- Need R

]]

}

-- TAG-BEAMFAILURERECOVERYRSCONFIG-STOP

-- ASN1STOP

|  |
| --- |
| *BeamFailureRecoveryRSConfig* field descriptions |
| ***candidateBeamRS-List***  A list of reference signals (CSI-RS and/or SSB) identifying the candidate beams for recovery. The network always configures this parameter in every instance of this IE. |
| ***candidateBeamRS-List2***  A list of reference signals (CSI-RS and/or SSB) identifying the candidate beams for recovery. |
| ***rsrp-ThresholdBFR***  L1-RSRP threshold used for determining whether a candidate beam may be included by the UE in BFR MAC CE (see TS 38.213 [13], clause 6). The network always configures this parameter in every instance of this IE. |

#### – *BetaOffsets*

The IE *BetaOffsets* is used to configure beta-offset values, see TS 38.213 [13], clause 9.3.

*BetaOffsets* information element

-- ASN1START

-- TAG-BETAOFFSETS-START

BetaOffsets ::= SEQUENCE {

betaOffsetACK-Index1 INTEGER(0..31) OPTIONAL, -- Need S

betaOffsetACK-Index2 INTEGER(0..31) OPTIONAL, -- Need S

betaOffsetACK-Index3 INTEGER(0..31) OPTIONAL, -- Need S

betaOffsetCSI-Part1-Index1 INTEGER(0..31) OPTIONAL, -- Need S

betaOffsetCSI-Part1-Index2 INTEGER(0..31) OPTIONAL, -- Need S

betaOffsetCSI-Part2-Index1 INTEGER(0..31) OPTIONAL, -- Need S

betaOffsetCSI-Part2-Index2 INTEGER(0..31) OPTIONAL -- Need S

}

-- TAG-BETAOFFSETS-STOP

-- ASN1STOP

|  |
| --- |
| *BetaOffsets* field descriptions |
| ***betaOffsetACK-Index1***  Up to 2 bits HARQ-ACK (see TS 38.213 [13], clause 9.3). When the field is absent the UE applies the value 11. |
| ***betaOffsetACK-Index2***  Up to 11 bits HARQ-ACK (see TS 38.213 [13], clause 9.3). When the field is absent the UE applies the value 11. |
| ***betaOffsetACK-Index3***  Above 11 bits HARQ-ACK (see TS 38.213 [13], clause 9.3). When the field is absent the UE applies the value 11. |
| ***betaOffsetCSI-Part1-Index1***  Up to 11 bits of CSI part 1 bits (see TS 38.213 [13], clause 9.3). When the field is absent the UE applies the value 13. |
| ***betaOffsetCSI-Part1-Index2***  Above 11 bits of CSI part 1 bits (see TS 38.213 [13], clause 9.3). When the field is absent the UE applies the value 13. |
| ***betaOffsetCSI-Part2-Index1***  Up to 11 bits of CSI part 2 bits (see TS 38.213 [13], clause 9.3). When the field is absent the UE applies the value 13. |
| ***betaOffsetCSI-Part2-Index2***  Above 11 bits of CSI part 2 bits (see TS 38.213 [13], clause 9.3). When the field is absent the UE applies the value 13. |

#### – *BetaOffsetsCrossPri*

The IE *BetaOffsetsCrossPri* is used to configure beta-offset values for cross-priority HARQ-ACK multiplexing on PUSCH.

*BetaOffsetsCrossPri* information element

-- ASN1START

-- TAG-BETAOFFSETSCROSSPRI-START

BetaOffsetsCrossPri-r17 ::= SEQUENCE (SIZE(3)) OF INTEGER(0..31)

-- TAG-BETAOFFSETSCROSSPRI-STOP

-- ASN1STOP

#### – *BH-LogicalChannelIdentity*

The IE *BH-LogicalChannelIdentity* is used to identify a logical channel between an IAB-node and its parent IAB-node or IAB-donor-DU.

*BH-LogicalChannelIdentity* information element

-- ASN1START

-- TAG-BHLOGICALCHANNELIDENTITY-START

BH-LogicalChannelIdentity-r16 ::= CHOICE {

bh-LogicalChannelIdentity-r16 LogicalChannelIdentity,

bh-LogicalChannelIdentityExt-r16 BH-LogicalChannelIdentity-Ext-r16

}

-- TAG-BHLOGICALCHANNELIDENTITY-STOP

-- ASN1STOP

|  |
| --- |
| *BH-LogicalChannelIdentity* field descriptions |
| ***bh-LogicalChannelIdentity***  ID used for the MAC logical channel. |
| ***bh-LogicalChannelIdentityExt***  ID used for the MAC logical channel. |

#### – *BH-LogicalChannelIdentity-Ext*

The IE *BH-LogicalChannelIdentity-Ext* is used to identify a logical channel between an IAB-node and its parent node.

*BH-LogicalChannelIdentity-Ext* information element

-- ASN1START

-- TAG-BHLOGICALCHANNELIDENTITYEXT-START

BH-LogicalChannelIdentity-Ext-r16 ::= INTEGER (320.. maxLC-ID-Iab-r16)

-- TAG-BHLOGICALCHANNELIDENTITYEXT-STOP

-- ASN1STOP

#### – *BH-RLC-ChannelConfig*

The IE *BH-RLC-ChannelConfig* is used to configure an RLC entity, a corresponding logical channel in MAC for BH RLC channel between IAB-node and its parent node.

*BH-RLC-ChannelConfig* information element

-- ASN1START

-- TAG-BHRLCCHANNELCONFIG-START

BH-RLC-ChannelConfig-r16::= SEQUENCE {

bh-LogicalChannelIdentity-r16 BH-LogicalChannelIdentity-r16 OPTIONAL, -- Cond LCH-SetupOnly

bh-RLC-ChannelID-r16 BH-RLC-ChannelID-r16,

reestablishRLC-r16 ENUMERATED {true} OPTIONAL, -- Need N

rlc-Config-r16 RLC-Config OPTIONAL, -- Cond LCH-Setup

mac-LogicalChannelConfig-r16 LogicalChannelConfig OPTIONAL, -- Cond LCH-Setup

...

}

-- TAG-BHRLCCHANNELCONFIG-STOP

-- ASN1STOP

|  |
| --- |
| *BH-RLC-ChannelConfig* field descriptions |
| ***bh-LogicalChannelIdentity***  Indicates the logical channel id for BH RLC channel of the IAB-node. |
| ***bh-RLC-ChannelID***  Indicates the BH RLC channel in the link between IAB-MT of the IAB-node and IAB-DU of the parent IAB-node or IAB-donor-DU. |
| ***reestablishRLC***  Indicates that RLC should be re-established. |
| ***rlc-Config***  Determines the RLC mode (UM, AM) and provides corresponding parameters. |

|  |  |
| --- | --- |
| Conditional Presence | Explanation |
| *LCH-Setup* | This field is mandatory present upon creation of a new logical channel for a BH RLC channel. It is optionally present, Need M, otherwise. |
| *LCH-SetupOnly* | This field is mandatory present upon creation of a new logical channel for a BH RLC channel. It is absent, Need M otherwise. |

#### – *BH-RLC-ChannelID*

The IE *BH-RLC-ChannelID* is used to identify a BH RLC channel in the link between IAB-MT of the IAB-node and IAB-DU of the parent IAB-node or IAB-donor-DU.

*BH-RLC-ChannelID* information element

-- ASN1START

-- TAG-BHRLCCHANNELID-START

BH-RLC-ChannelID-r16 ::= BIT STRING (SIZE (16))

-- TAG-BHRLCCHANNELID-STOP

-- ASN1STOP

#### – *BSR-Config*

The IE *BSR-Config* is used to configure buffer status reporting.

*BSR-Config* information element

-- ASN1START

-- TAG-BSR-CONFIG-START

BSR-Config ::= SEQUENCE {

periodicBSR-Timer ENUMERATED { sf1, sf5, sf10, sf16, sf20, sf32, sf40, sf64,

sf80, sf128, sf160, sf320, sf640, sf1280, sf2560, infinity },

retxBSR-Timer ENUMERATED { sf10, sf20, sf40, sf80, sf160, sf320, sf640, sf1280, sf2560,

sf5120, sf10240, spare5, spare4, spare3, spare2, spare1},

logicalChannelSR-DelayTimer ENUMERATED { sf20, sf40, sf64, sf128, sf512, sf1024, sf2560, spare1} OPTIONAL, -- Need R

...

}

-- TAG-BSR-CONFIG-STOP

-- ASN1STOP

|  |
| --- |
| *BSR-Config* field descriptions |
| ***logicalChannelSR-DelayTimer***  Value in number of subframes. Value *sf20* corresponds to 20 subframes, *sf40* corresponds to 40 subframes, and so on. |
| ***periodicBSR-Timer***  Value in number of subframes. Value *sf1* corresponds to 1 subframe, value *sf5* corresponds to 5 subframes and so on. |
| ***retxBSR-Timer***  Value in number of subframes. Value *sf10* corresponds to 10 subframes, value *sf20* corresponds to 20 subframes and so on. |

#### – *BWP*

The IE *BWP* is used to configure generic parameters of a bandwidth part as defined in TS 38.211 [16], clause 4.5, and TS 38.213 [13], clause 12.

For each serving cell the network configures at least an initial downlink bandwidth part and one (if the serving cell is configured with an uplink) or two (if using supplementary uplink (SUL)) initial uplink bandwidth parts. Furthermore, the network may configure additional uplink and downlink bandwidth parts for a serving cell.

The uplink and downlink bandwidth part configurations are divided into common and dedicated parameters.

*BWP* information element

-- ASN1START

-- TAG-BWP-START

BWP ::= SEQUENCE {

locationAndBandwidth INTEGER (0..37949),

subcarrierSpacing SubcarrierSpacing,

cyclicPrefix ENUMERATED { extended } OPTIONAL -- Need R

}

-- TAG-BWP-STOP

-- ASN1STOP

|  |
| --- |
| *BWP* field descriptions |
| ***cyclicPrefix***  Indicates whether to use the extended cyclic prefix for this bandwidth part. If not set, the UE uses the normal cyclic prefix. Normal CP is supported for all subcarrier spacings and slot formats. Extended CP is supported only for 60 kHz subcarrier spacing. (see TS 38.211 [16], clause 4.2). Except for SUL, the network ensures the same cyclic prefix length is used in active DL BWP and active UL BWP within a serving cell. |
| ***locationAndBandwidth***  Frequency domain location and bandwidth of this bandwidth part. The value of the field shall be interpreted as resource indicator value (RIV) as defined TS 38.214 [19] with assumptions as described in TS 38.213 [13], clause 12, i.e. setting =275. The first PRB is a PRB determined by *subcarrierSpacing* of this BWP and *offsetToCarrier* (configured in *SCS-SpecificCarrier* contained within *FrequencyInfoDL* / *FrequencyInfoUL* / *FrequencyInfoUL-SIB* / *FrequencyInfoDL-SIB* within *ServingCellConfigCommon* / *ServingCellConfigCommonSIB*) corresponding to this subcarrier spacing. In case of TDD, a BWP-pair (UL BWP and DL BWP with the same *bwp-Id*) must have the same center frequency (see TS 38.213 [13], clause 12) |
| ***subcarrierSpacing***  Subcarrier spacing to be used in this BWP for all channels and reference signals unless explicitly configured elsewhere. Corresponds to subcarrier spacing according to TS 38.211 [16], table 4.2-1. The value *kHz15* corresponds to µ=0, value *kHz30* corresponds to µ=1, and so on.  Only the following values are applicable depending on the used frequency:  FR1: 15, 30, or 60 kHz  FR2-1: 60 or 120 kHz  FR2-2: 120, 480, or 960 kHz  For the initial DL BWP and operation in licensed spectrum this field has the same value as the field *subCarrierSpacingCommon* in *MIB* of the same serving cell. Except for SUL, the network ensures the same subcarrier spacing is used in active DL BWP and active UL BWP within a serving cell. For the initial DL BWP and operation with shared spectrum channel access, the value of this field corresponds to the subcarrier spacing of the SSB associated to the initial DL BWP. |

#### – *BWP-Downlink*

The IE *BWP-Downlink* is used to configure an additional downlink bandwidth part (not for the initial BWP).

*BWP-Downlink* information element

-- ASN1START

-- TAG-BWP-DOWNLINK-START

BWP-Downlink ::= SEQUENCE {

bwp-Id BWP-Id,

bwp-Common BWP-DownlinkCommon OPTIONAL, -- Cond SetupOtherBWP

bwp-Dedicated BWP-DownlinkDedicated OPTIONAL, -- Cond SetupOtherBWP

...

}

-- TAG-BWP-DOWNLINK-STOP

-- ASN1STOP

|  |
| --- |
| *BWP-Downlink* field descriptions |
| ***bwp-Id***  An identifier for this bandwidth part. Other parts of the RRC configuration use the *BWP-Id* to associate themselves with a particular bandwidth part.  The network configures the BWPs with consecutive IDs from 1. The Network does not include the value 0, since value 0 is reserved for the initial BWP. |

|  |  |
| --- | --- |
| Conditional Presence | Explanation |
| *SetupOtherBWP* | The field is mandatory present upon configuration of a new DL BWP. The field is optionally present, Need M, otherwise. |

#### – *BWP-DownlinkCommon*

The IE *BWP-DownlinkCommon* is used to configure the common parameters of a downlink BWP. They are "cell specific" and the network ensures the necessary alignment with corresponding parameters of other UEs. The common parameters of the initial bandwidth part of the PCell are also provided via system information. For all other serving cells, the network provides the common parameters via dedicated signalling.

*BWP-DownlinkCommon* information element

-- ASN1START

-- TAG-BWP-DOWNLINKCOMMON-START

BWP-DownlinkCommon ::= SEQUENCE {

genericParameters BWP,

pdcch-ConfigCommon SetupRelease { PDCCH-ConfigCommon } OPTIONAL, -- Need M

pdsch-ConfigCommon SetupRelease { PDSCH-ConfigCommon } OPTIONAL, -- Need M

...

}

-- TAG-BWP-DOWNLINKCOMMON-STOP

-- ASN1STOP

|  |
| --- |
| *BWP-DownlinkCommon* field descriptions |
| ***pdcch-ConfigCommon***  Cell specific parameters for the PDCCH of this BWP. This field is absent for a dormant BWP. |
| ***pdsch-ConfigCommon***  Cell specific parameters for the PDSCH of this BWP. |

#### – *BWP-DownlinkDedicated*

The IE *BWP-DownlinkDedicated* is used to configure the dedicated (UE specific) parameters of a downlink BWP.

*BWP-DownlinkDedicated* information element

-- ASN1START

-- TAG-BWP-DOWNLINKDEDICATED-START

BWP-DownlinkDedicated ::= SEQUENCE {

pdcch-Config SetupRelease { PDCCH-Config } OPTIONAL, -- Need M

pdsch-Config SetupRelease { PDSCH-Config } OPTIONAL, -- Need M

sps-Config SetupRelease { SPS-Config } OPTIONAL, -- Need M

radioLinkMonitoringConfig SetupRelease { RadioLinkMonitoringConfig } OPTIONAL, -- Need M

...,

[[

sps-ConfigToAddModList-r16 SPS-ConfigToAddModList-r16 OPTIONAL, -- Need N

sps-ConfigToReleaseList-r16 SPS-ConfigToReleaseList-r16 OPTIONAL, -- Need N

sps-ConfigDeactivationStateList-r16 SPS-ConfigDeactivationStateList-r16 OPTIONAL, -- Need R

beamFailureRecoverySCellConfig-r16 SetupRelease {BeamFailureRecoveryRSConfig-r16} OPTIONAL, -- Cond SCellOnly

sl-PDCCH-Config-r16 SetupRelease { PDCCH-Config } OPTIONAL, -- Need M

sl-V2X-PDCCH-Config-r16 SetupRelease { PDCCH-Config } OPTIONAL -- Need M

]],

[[

preConfGapStatus-r17 BIT STRING (SIZE (maxNrofGapId-r17)) OPTIONAL, -- Cond PreConfigMG

beamFailureRecoverySpCellConfig-r17 SetupRelease { BeamFailureRecoveryRSConfig-r16} OPTIONAL, -- Cond SpCellOnly

harq-FeedbackEnablingforSPSactive-r17 BOOLEAN OPTIONAL, -- Need R

cfr-ConfigMulticast-r17 SetupRelease { CFR-ConfigMulticast-r17 } OPTIONAL, -- Need M

dl-PPW-PreConfigToAddModList-r17 DL-PPW-PreConfigToAddModList-r17 OPTIONAL, -- Need N

dl-PPW-PreConfigToReleaseList-r17 DL-PPW-PreConfigToReleaseList-r17 OPTIONAL, -- Need N

nonCellDefiningSSB-r17 NonCellDefiningSSB-r17 OPTIONAL, -- Need R

servingCellMO-r17 MeasObjectId OPTIONAL -- Cond MeasObject-NCDSSB

]]

}

SPS-ConfigToAddModList-r16 ::= SEQUENCE (SIZE (1..maxNrofSPS-Config-r16)) OF SPS-Config

SPS-ConfigToReleaseList-r16 ::= SEQUENCE (SIZE (1..maxNrofSPS-Config-r16)) OF SPS-ConfigIndex-r16

SPS-ConfigDeactivationState-r16 ::= SEQUENCE (SIZE (1..maxNrofSPS-Config-r16)) OF SPS-ConfigIndex-r16

SPS-ConfigDeactivationStateList-r16 ::= SEQUENCE (SIZE (1..maxNrofSPS-DeactivationState)) OF SPS-ConfigDeactivationState-r16

DL-PPW-PreConfigToAddModList-r17 ::= SEQUENCE (SIZE (1..maxNrofPPW-Config-r17)) OF DL-PPW-PreConfig-r17

DL-PPW-PreConfigToReleaseList-r17 ::= SEQUENCE (SIZE (1..maxNrofPPW-Config-r17)) OF DL-PPW-ID-r17

-- TAG-BWP-DOWNLINKDEDICATED-STOP

-- ASN1STOP

|  |
| --- |
| *BWP-DownlinkDedicated* field descriptions |
| ***beamFailureRecoverySCellConfig***  Configuration of candidate RS for beam failure recovery in SCells. |
| ***beamFailureRecoverySpCellConfig***  Configuration of candidate RS for beam failure recovery in SpCells. |
| ***cfr-ConfigMulticast***  UE specific common frequency resource configuration for MBS multicast for one dedicated BWP. This field can be configured within at most one serving cell. |
| ***dl-PPW-PreConfigToAddModList***  Indicates a list of DL-PRS processing window configurations to be added or modified for the dedicated DL BWP. |
| ***dl-PPW-PreConfigToReleaseList***  Indicates a list of DL-PRS processing window configurations to be released for the dedicated DL BWP. |
| ***harq-FeedbackEnablingforSPSactive***  If enabled, UE reports ACK/NACK for the first SPS PDSCH after activation, regardless of if HARQ feedback is enabled or disabled corresponding to the first SPS PDSCH after activation. Otherwise, UE follows configuration of HARQ feedback enabled/disabled corresponding to the first SPS PDSCH after activation. |
| ***nonCellDefiningSSB-r17***  If configured, the RedCap UE operating in this BWP uses this SSB for the purposes for which it would otherwise have used the cell-defining SSB of the serving cell (e.g. obtaining sync, measurements, RLM). Furthermore, other parts of the BWP configuration that refer to an SSB (e.g. the "SSB" configured in the *QCL-Info* IE; the "ssb-Index" configured in the *RadioLinkMonitoringRS*; *CFRA-SSB-Resource*; *PRACH-ResourceDedicatedBFR*) refer implicitily to this NCD-SSB.  The NCD-SSB has the same values for the properties (e.g., *ssb-PositionsInBurst*, *PCI*, *ssb-periodicity*, *ssb-PBCH-BlockPower*) of the corresponding CD-SSB apart from the values of the properties configured in the *NonCellDefiningSSB-r17* IE. |
| ***pdcch-Config***  UE specific PDCCH configuration for one BWP. |
| ***pdsch-Config***  UE specific PDSCH configuration for one BWP. |
| ***preConfGapStatus***  Indicates whether the pre-configured measurement gaps (i.e. the gaps configured with *preConfigInd*) are activated or deactivated upon the switch to this BWP. If this field is configured, the UE shall apply network-controlled mechanism for activation and deactivation of the pre-configured measurement gaps, otherwise the UE shall apply the autonomous activation/deactivation mechanism, as specified in TS 38.133 [14]. The first/leftmost bit corresponds to the measurement gap with gap ID 1, the second bit corresponds to measurement gap with gap ID 2, and so on. Value 0 indicates that the corresponding pre-configured measurement gap is deactivated while value 1 indicates that the corresponding pre-configured measurement gap is activated. The UE shall ignore the bit if the corresponding measurement gap is not a pre-configured measurement gap. |
| ***servingCellMO***  *measObjectId* of the *MeasObjectNR* in *MeasConfig* which is associated to the serving cell. For this *MeasObjectNR*, the following relationship applies between this *MeasObjectNR* and *nonCellDefiningSSB* in *BWP-DownlinkDedicated* of the associated downlink BWP: if *ssbFrequency* is configured, its value is the same as the *absoluteFrequencySSB* in the *nonCellDefiningSSB*. If the field is present in a downlink BWP and the BWP is activated, the RedCap UE uses this measurement object for serving cell measurements, otherwise, the RedCap UE uses the *servingCellMO* in *ServingCellConfig* IE. |
| ***sps-Config***  UE specific SPS (Semi-Persistent Scheduling) configuration for one BWP. Except for reconfiguration with sync, the NW does not reconfigure *sps-Config* when there is an active configured downlink assignment (see TS 38.321 [3]). However, the NW may release the *sps-Config* at any time. Network can only configure SPS in one BWP using either this field or *sps-ConfigToAddModList.* |
| ***sps-ConfigDeactivationStateList***  Indicates a list of the deactivation states in which each state can be mapped to a single or multiple SPS configurations to be deactivated, see clause 10.2 in TS 38.213 [13]. If a state is mapped to multiple SPS configurations, each of these SPS configurations is configured with the same *harq-CodebookID*. |
| ***sps-ConfigToAddModList***  Indicates a list of one or more DL SPS configurations to be added or modified in one BWP. Except for reconfiguration with sync, the NW does not reconfigure a SPS configuration when it is active (see TS 38.321 [3]). |
| ***sps-ConfigToReleaseList***  Indicates a list of one or more DL SPS configurations to be released. The NW may release a SPS configuration at any time. |
| ***radioLinkMonitoringConfig***  UE specific configuration of radio link monitoring for detecting cell- and beam radio link failure occasions. The maximum number of failure detection resources should be limited up to 8 for both cell and beam radio link failure detection. For SCells, only periodic 1-port CSI-RS can be configured in IE *RadioLinkMonitoringConfig*. |
| ***sl-PDCCH-Config***  Indicates the UE specific PDCCH configurations for receiving the SL grants (via SL-RNTI or SL-CS-RNTI) for NR sidelink communication***.*** |
| ***sl-V2X-PDCCH-Config***  Indicates the UE specific PDCCH configurations for receiving SL grants (i.e. sidelink SPS) for V2X sidelink communication***.*** |

|  |  |
| --- | --- |
| Conditional Presence | Explanation |
| *MeasObject-NCD-SSB* | This field is optionally present Need S if the UE is a RedCap UE and *nonCellDefiningSSB* is configured in this DL BWP. It is absent otherwise. |
| *PreConfigMG* | The field is optionally present, Need R, if there is at least one per UE gap configured with *preConfigInd* or there is at least one per FR gap of the same FR which the BWP belongs to and configured with *preConfigInd*. It is absent, Need R, otherwise. |
| *ScellOnly* | The field is optionally present, Need M, in the *BWP-DownlinkDedicated* of an Scell. It is absent otherwise. |
| *SpCellOnly* | The field is optionally present, Need M, in the *BWP-DownlinkDedicated* of an Spcell. It is absent otherwise. |

#### – *BWP-Id*

The IE *BWP-Id* is used to refer to Bandwidth Parts (BWP). The initial BWP is referred to by *BWP-Id* 0. The other BWPs are referred to by *BWP-Id* 1 to *maxNrofBWPs*.

*BWP-Id* information element

-- ASN1START

-- TAG-BWP-ID-START

BWP-Id ::= INTEGER (0..maxNrofBWPs)

-- TAG-BWP-ID-STOP

-- ASN1STOP

#### – *BWP-Uplink*

The IE *BWP-Uplink* is used to configure an additional uplink bandwidth part (not for the initial BWP).

*BWP-Uplink* information element

-- ASN1START

-- TAG-BWP-UPLINK-START

BWP-Uplink ::= SEQUENCE {

bwp-Id BWP-Id,

bwp-Common BWP-UplinkCommon OPTIONAL, -- Cond SetupOtherBWP

bwp-Dedicated BWP-UplinkDedicated OPTIONAL, -- Cond SetupOtherBWP

...

}

-- TAG-BWP-UPLINK-STOP

-- ASN1STOP

|  |
| --- |
| *BWP-Uplink* field descriptions |
| ***bwp-Id***  An identifier for this bandwidth part. Other parts of the RRC configuration use the *BWP-Id* to associate themselves with a particular bandwidth part.  The network configures the BWPs with consecutive IDs from 1. The Network does not include the value 0, since value 0 is reserved for the initial BWP. |

|  |  |
| --- | --- |
| Conditional Presence | Explanation |
| *SetupOtherBWP* | The field is mandatory present upon configuration of a new UL BWP. The field is optionally present, Need M, otherwise. |

#### – *BWP-UplinkCommon*

The IE *BWP-UplinkCommon* is used to configure the common parameters of an uplink BWP. They are "cell specific" and the network ensures the necessary alignment with corresponding parameters of other UEs. The common parameters of the initial bandwidth part of the PCell are also provided via system information. For all other serving cells, the network provides the common parameters via dedicated signalling.

*BWP-UplinkCommon* information element

-- ASN1START

-- TAG-BWP-UPLINKCOMMON-START

BWP-UplinkCommon ::= SEQUENCE {

genericParameters BWP,

rach-ConfigCommon SetupRelease { RACH-ConfigCommon } OPTIONAL, -- Need M

pusch-ConfigCommon SetupRelease { PUSCH-ConfigCommon } OPTIONAL, -- Need M

pucch-ConfigCommon SetupRelease { PUCCH-ConfigCommon } OPTIONAL, -- Need M

...,

[[

rach-ConfigCommonIAB-r16 SetupRelease { RACH-ConfigCommon } OPTIONAL, -- Need M

useInterlacePUCCH-PUSCH-r16 ENUMERATED {enabled} OPTIONAL, -- Need R

msgA-ConfigCommon-r16 SetupRelease { MsgA-ConfigCommon-r16 } OPTIONAL -- Cond SpCellOnly2

]],

[[

enableRA-PrioritizationForSlicing-r17 BOOLEAN OPTIONAL, -- Cond RAPrioSliceAI

additionalRACH-ConfigList-r17 SetupRelease { AdditionalRACH-ConfigList-r17 } OPTIONAL, -- Cond SpCellOnly2

rsrp-ThresholdMsg3-r17 RSRP-Range OPTIONAL, -- Need R

numberOfMsg3-RepetitionsList-r17 SEQUENCE (SIZE (4)) OF NumberOfMsg3-Repetitions-r17 OPTIONAL, -- Cond Msg3Rep

mcs-Msg3-Repetitions-r17 SEQUENCE (SIZE (8)) OF INTEGER (0..31) OPTIONAL -- Cond Msg3Rep

]]

}

AdditionalRACH-ConfigList-r17 ::= SEQUENCE (SIZE(1..maxAdditionalRACH-r17)) OF AdditionalRACH-Config-r17

AdditionalRACH-Config-r17 ::= SEQUENCE {

rach-ConfigCommon-r17 RACH-ConfigCommon OPTIONAL, -- Need R

msgA-ConfigCommon-r17 MsgA-ConfigCommon-r16 OPTIONAL, -- Need R

...

}

NumberOfMsg3-Repetitions-r17::= ENUMERATED {n1, n2, n3, n4, n7, n8, n12, n16}

-- TAG-BWP-UPLINKCOMMON-STOP

-- ASN1STOP

|  |
| --- |
| *BWP-UplinkCommon* field descriptions |
| ***additionalRACH-ConfigList***  List of feature or feature combination-specific RACH configurations, i.e. the RACH configurations configured in addition to the one configured by *rach-ConfigCommon* and by *msgA-ConfigCommon*. The network associates all possible preambles of an additional RACH configuration to a feature or feature combination. |
| ***enableRA-PrioritizationForSlicing***  Indicates whether or not the *ra-PrioritizationForSlicing/ra-PrioritizationForSlicingTwoStep* should override the *ra-PrioritizationForAccessIdentity*. The field is applicable only when the UE is configured by upper layers with both NSAG and Access Identiy 1 or 2. If value *TRUE* is configured, the UE should only apply the *ra-PrioritizationForSlicing/ra-PrioritizationForSlicingTwoStep*. If value *FALSE* is configured, the UE should only apply ra-PrioritizationForAccessIdentity. If the field is absent, the set of applied parameters is up to UE implementation. |
| ***mcs-Msg3-Repetitions***  Configuration of eight candidate MCS indexes for PUSCH transmission scheduled by RAR UL grant and DCI format 0\_0 with CRC scrambled by TC-RNTI. Only the first 4 configured or default MCS indexes are used for PUSCH transmission scheduled by RAR UL grant. If this field is absent when the set(s) of Random Access resources with MSG3 repetition indication are configured in the *BWP-UplinkCommon*, the UE shall apply the values {0, 1, 2, 3, 4, 5, 6, 7} (see see TS 38.214 [19], clause 6.1.4). |
| ***msgA-ConfigCommon***  Configuration of the cell specific PRACH and PUSCH resource parameters for transmission of MsgA in 2-step random access type procedure. The NW can configure *msgA-ConfigCommon* only for UL BWPs if the linked DL BWPs (same bwp-Id as UL-BWP) are the initial DL BWPs or DL BWPs containing the SSB associated to the initial BL BWP |
| ***numberOfMsg3-RepetitionsList***  The number of repetitions for PUSCH transmission scheduled by RAR UL grant and DCI format 0\_0 with CRC scrambled by TC-RNTI. If this field is absent when the set(s) of Random Access resources with MSG3 repetition indication are configured in the *BWP-UplinkCommon*, the UE shall apply the values {n1, n2, n3, n4} (see see TS 38.214 [19], clause 6.1.2.1). |
| ***pucch-ConfigCommon***  Cell specific parameters for the PUCCH of this BWP. |
| ***pusch-ConfigCommon***  Cell specific parameters for the PUSCH of this BWP. |
| ***rach-ConfigCommon***  Configuration of cell specific random access parameters which the UE uses for contention based and contention free random access as well as for contention based beam failure recovery in this BWP. The NW configures SSB-based RA (and hence *RACH-ConfigCommon*) only for UL BWPs if the linked DL BWPs (same *bwp-Id* as UL-BWP) are the initial DL BWPs or DL BWPs containing the SSB associated to the initial DL BWP or for RedCap UEs DL BWPs associated with *nonCellDefiningSSB*. The network configures *rach-ConfigCommon*, whenever it configures contention free random access (for reconfiguration with sync or for beam failure recovery). |
| ***rach-ConfigCommonIAB***  Configuration of cell specific random access parameters for the IAB-MT. The IAB specific IAB RACH configuration is used by IAB-MT, if configured. |
| ***rsrp-ThresholdMsg3***  Threshold used by the UE for determining whether to select resources indicating Msg3 repetition in this BWP, as specified in TS 38.321 [3]. The field is mandatory if both set(s) of Random Access resources with MSG3 repetition indication and set(s) of Random Access resources without MSG3 repetition indication are configured in the BWP. It is absent otherwise. |
| ***useInterlacePUCCH-PUSCH***  If the field is present, the UE uses uplink frequency domain resource allocation Type 2 for cell-specific PUSCH, e.g., PUSCH scheduled by RAR UL grant (see 38.213 clause 8.3 and 38.214 clause 6.1.2.2) and uses interlaced PUCCH Format 0 and 1 for cell-specific PUCCH (see TS 38.213 [13], clause 9.2.1). |

|  |  |
| --- | --- |
| Conditional Presence | Explanation |
| *Msg3Rep* | This field is optional present, Need S, if the set(s) of Random Access resources with MSG3 repetition indication are configured in the *BWP-UplinkCommon*. It is absent otherwise. |
| *RAPrioSliceAI* | The field is optionally present, Need R, if both parameters *ra-PrioritizationForAccessIdentity* and the *ra-PrioritizationForSlicing/ra-PrioritizationForSlicingTwoStep* are included, and the field is sent in system information. It is absent otherwise. |
| *SpCellOnly2* | The field is optionally present, Need M, in the *BWP-UplinkCommon* of an SpCell. It is absent otherwise. |

#### – *BWP-UplinkDedicated*

The IE *BWP-UplinkDedicated* is used to configure the dedicated (UE specific) parameters of an uplink BWP.

*BWP-UplinkDedicated* information element

-- ASN1START

-- TAG-BWP-UPLINKDEDICATED-START

BWP-UplinkDedicated ::= SEQUENCE {

pucch-Config SetupRelease { PUCCH-Config } OPTIONAL, -- Need M

pusch-Config SetupRelease { PUSCH-Config } OPTIONAL, -- Need M

configuredGrantConfig SetupRelease { ConfiguredGrantConfig } OPTIONAL, -- Need M

srs-Config SetupRelease { SRS-Config } OPTIONAL, -- Need M

beamFailureRecoveryConfig SetupRelease { BeamFailureRecoveryConfig } OPTIONAL, -- Cond SpCellOnly

...,

[[

sl-PUCCH-Config-r16 SetupRelease { PUCCH-Config } OPTIONAL, -- Need M

cp-ExtensionC2-r16 INTEGER (1..28) OPTIONAL, -- Need R

cp-ExtensionC3-r16 INTEGER (1..28) OPTIONAL, -- Need R

useInterlacePUCCH-PUSCH-r16 ENUMERATED {enabled} OPTIONAL, -- Need R

pucch-ConfigurationList-r16 SetupRelease { PUCCH-ConfigurationList-r16 } OPTIONAL, -- Need M

lbt-FailureRecoveryConfig-r16 SetupRelease { LBT-FailureRecoveryConfig-r16 } OPTIONAL, -- Need M

configuredGrantConfigToAddModList-r16 ConfiguredGrantConfigToAddModList-r16 OPTIONAL, -- Need N

configuredGrantConfigToReleaseList-r16 ConfiguredGrantConfigToReleaseList-r16 OPTIONAL, -- Need N

configuredGrantConfigType2DeactivationStateList-r16 ConfiguredGrantConfigType2DeactivationStateList-r16 OPTIONAL -- Need R

]],

[[

ul-TCI-StateList-r17 CHOICE {

explicitlist SEQUENCE {

ul-TCI-ToAddModList-r17 SEQUENCE (SIZE (1..maxUL-TCI-r17)) OF TCI-UL-State-r17 OPTIONAL, -- Need N

ul-TCI-ToReleaseList-r17 SEQUENCE (SIZE (1..maxUL-TCI-r17)) OF TCI-UL-State-Id-r17 OPTIONAL -- Need N

},

unifiedTCI-StateRef-r17 ServingCellAndBWP-Id-r17

} OPTIONAL, -- Need R

ul-powerControl-r17 Uplink-powerControlId-r17 OPTIONAL, -- Cond NoTCI-PC

pucch-ConfigurationListMulticast1-r17 SetupRelease { PUCCH-ConfigurationList-r16 } OPTIONAL, -- Need M

pucch-ConfigurationListMulticast2-r17 SetupRelease { PUCCH-ConfigurationList-r16 } OPTIONAL -- Need M

]]

}

ConfiguredGrantConfigToAddModList-r16 ::= SEQUENCE (SIZE (1..maxNrofConfiguredGrantConfig-r16)) OF ConfiguredGrantConfig

ConfiguredGrantConfigToReleaseList-r16 ::= SEQUENCE (SIZE (1..maxNrofConfiguredGrantConfig-r16)) OF ConfiguredGrantConfigIndex-r16

ConfiguredGrantConfigType2DeactivationState-r16 ::= SEQUENCE (SIZE (1..maxNrofConfiguredGrantConfig-r16)) OF ConfiguredGrantConfigIndex-r16

ConfiguredGrantConfigType2DeactivationStateList-r16 ::=

SEQUENCE (SIZE (1..maxNrofCG-Type2DeactivationState)) OF ConfiguredGrantConfigType2DeactivationState-r16

-- TAG-BWP-UPLINKDEDICATED-STOP

-- ASN1STOP

|  |
| --- |
| *BWP-UplinkDedicated* field descriptions |
| ***beamFailureRecoveryConfig***  Configuration of beam failure recovery. If *supplementaryUplink* is present, the field is present only in one of the uplink carriers, either UL or SUL. |
| ***configuredGrantConfig***  A *Configured-Grant* of *type1* or *type2*. It may be configured for UL or SUL but in case of *type1* not for both at a time. Except for reconfiguration with sync, the NW does not reconfigure *configuredGrantConfig* when there is an active configured uplink grant Type 2 (see TS 38.321 [3]). However, the NW may release the *configuredGrantConfig* at any time. Network can only configure configured grant in one BWP using either this field or *configuredGrantConfigToAddModList.* |
| ***configuredGrantConfigToAddModList***  Indicates a list of one or more configured grant configurations to be added or modified for one BWP. Except for reconfiguration with sync, the NW does not reconfigure a Type 2 configured grant configuration when it is active (see TS 38.321 [3]). The network configures multiple CG configurations for one BWP with either all configurations or no configuration configured with *cg-RetransmissionTimer-r16*. |
| ***configuredGrantConfigToReleaseList***  Indicates a list of one or more UL Configured Grant configurations to be released. The NW may release a configured grant configuration at any time. |
| ***configuredGrantConfigType2DeactivationStateList***  Indicates a list of the deactivation states in which each state can be mapped to a single or multiple Configured Grant type 2 configurations to be deactivated when the corresponding deactivation DCI is received, see clause 7.3.1 in TS 38.212 [17] and clause 10.2 in TS 38.213 [13]. |
| ***cp-ExtensionC2, cp-ExtensionC3***  Configures the cyclic prefix (CP) extension (see TS 38.211 [16], clause 5.3.1). For 15 kHz SCS, {1..28} are valid for both *cp-ExtensionC2* and *cp-ExtensionC3*. For 30 kHz SCS, {1..28} are valid for *cp-ExtensionC2* and {2..28} are valid for *cp-ExtensionC3.* For 60 kHz SCS, {2..28} are valid for *cp-ExtensionC2* and {3..28} are valid for *cp-ExtensionC3*. |
| ***lbt-FailureRecoveryConfig***  Configures parameters used for detection of consistent uplink LBT failures for operationwith shared spectrum channel access, as specified in TS 38.321 [3]. |
| ***pucch-Config***  PUCCH configuration for one BWP of the normal UL or SUL of a serving cell. If the UE is configured with SUL, the network configures PUCCH only on the BWPs of one of the uplinks (normal UL or SUL). The network configures *PUCCH-Config* at least on non-initial BWP(s) for SpCell and PUCCH SCell. If supported by the UE, the network may configure at most one additional SCell of a cell group with *PUCCH-Config* (i.e. PUCCH SCell) ; if PUCCH cell switching is supported by the UE, the network may configure at most one additional SCell with *PUCCH-Config* within each PUCCH group.  In (NG)EN-DC and NE-DC, the NW configures at most one serving cell per frequency range with PUCCH. In (NG)EN-DC and NE-DC, if two PUCCH groups are configured, the serving cells of the NR PUCCH group in FR2 use the same numerology. For NR-DC, the maximum number of PUCCH groups in each cell group is one, and only the same numerology is supported for the cell group with carriers only in FR2.  The NW may configure PUCCH for a BWP when setting up the BWP. The network may also add/remove the *pucch-Config* in an *RRCReconfiguration* with *reconfigurationWithSync* (for SpCell or PUCCH SCell) or with SCell release and add (for PUCCH SCell) to move the PUCCH between the UL and SUL carrier of one serving cell. In other cases, only modifications of a previously configured *pucch-Config* are allowed.  If one (S)UL BWP of a serving cell is configured with PUCCH, all other (S)UL BWPs must be configured with PUCCH, too. |
| ***pucch-ConfigurationList***  PUCCH configurations for two simultaneously constructed HARQ-ACK codebooks (see TS 38.213 [13], clause 9.1). Different PUCCH Resource IDs are configured in different *PUCCH-Config* within the *pucch-ConfigurationList* if configured. |
| ***pucch-ConfigurationListMulticast1***  PUCCH configurations for two simultaneously constructed HARQ-ACK codebooks for MBS multicast (see TS 38.213, clause 9). |
| ***pucch-ConfigurationListMulticast2***  PUCCH configurations for two simultaneously constructed NACK-only feedback for MBS multicast (see TS 38.213, clause 9). |
| ***pusch-Config***  PUSCH configuration for one BWP of the normal UL or SUL of a serving cell. If the UE is configured with SUL and if it has a *PUSCH-Config* for both UL and SUL, an UL/SUL indicator field in DCI indicates which of the two to use. See TS 38.212 [17], clause 7.3.1. |
| ***sl-PUCCH-Config***  Indicates the UE specific PUCCH configurations used for the HARQ-ACK feedback reporting for NR sidelink communication. |
| ***srs-Config***  Uplink sounding reference signal configuration. |
| ***ul-powerControl***  Configures power control parameters for PUCCH, PUSCH and SRS when UE is configured with *unifiedTCI-StateType* for this serving cell. |
| ***ul-TCI-StateList***  Indicate the applicable UL TCI states for PUCCH, PUSCH and SRS. |
| ***ul-TCI-ToAddModList***  Indicates a list of UL TCI states. |
| ***unifiedTCI-StateRef***  Provides the serving cell and UL BWP where applicable UL TCI states applicable to this UL BWP are defined. |
| ***useInterlacePUCCH-PUSCH***  If the field is present, the UE uses uplink frequency domain resource allocation Type 2 for PUSCH (see 38.213 clause 8.3 and 38.214 clause 6.1.2.2) and uses interlaced PUCCH Format 0, 1, 2, and 3 for PUCCH (see TS 38.213 [13], clause 9.2.1). |

|  |  |
| --- | --- |
| Conditional Presence | Explanation |
| *NoTCI-PC* | The field is optionally present, Need R, if *unifiedTCI-StateType* is configured for this serving cell and *ul-powerControl* is not configured for any UL TCI state or joint TCI state of this serving cell. Otherwise it is absent, Need R |
| *SpCellOnly* | The field is optionally present, Need M, in the *BWP-UplinkDedicated* of an SpCell. It is absent otherwise. |

NOTE 1: In case of *RRCReconfiguration* with *reconfigurationWithSync*, the UE performs a MAC reset, which involves releasing the PUCCH-CSI/SRS/SR configuration in accordance with clause 5.3.12 and TS 38.321 [6], clauses 5.12 and 5.2. Hence, for these parts of the dedicated radio resource configuration, delta signalling is not supported in the message when *reconfigurationWithSync* is included.

#### *– CandidateBeamRS*

The IE *CandidateBeamRS* inlcudes candidate beams for beam failure recovery in case of beam failure detection. See also TS 38.321 [3], clause 5.17.

*CandidateBeamRS* information element

-- ASN1START

-- TAG-CANDIDATEBEAMRS-START

CandidateBeamRS-r16 ::= SEQUENCE {

candidateBeamConfig-r16 CHOICE {

ssb-r16 SSB-Index,

csi-RS-r16 NZP-CSI-RS-ResourceId

},

servingCellId ServCellIndex OPTIONAL -- Need R

}

-- TAG-CANDIDATEBEAMRS-STOP

-- ASN1STOP

|  |
| --- |
| *CandidateBeamRS* field descriptions |
| ***candidateBeamConfig***  Indicates the resource (i.e. SSB or CSI-RS) defining this beam resource. |
| ***servingCellId***  If the field is absent, the RS belongs to the serving cell in which *BeamFailureRSRecoveryConfig* is configured. |

#### – *CellAccessRelatedInfo*

The IE *CellAccessRelatedInfo* indicates cell access related information for this cell.

*CellAccessRelatedInfo* information element

-- ASN1START

-- TAG-CELLACCESSRELATEDINFO-START

CellAccessRelatedInfo ::= SEQUENCE {

plmn-IdentityInfoList PLMN-IdentityInfoList,

cellReservedForOtherUse ENUMERATED {true} OPTIONAL, -- Need R

...,

[[

cellReservedForFutureUse-r16 ENUMERATED {true} OPTIONAL, -- Need R

npn-IdentityInfoList-r16 NPN-IdentityInfoList-r16 OPTIONAL -- Need R

]],

[[

snpn-AccessInfoList-r17 SEQUENCE (SIZE (1..maxNPN-r16)) OF SNPN-AccessInfo-r17 OPTIONAL -- Need R

]]

}

SNPN-AccessInfo-r17 ::= SEQUENCE {

extCH-Supported-r17 ENUMERATED {true} OPTIONAL, -- Need R

extCH-WithoutConfigAllowed-r17 ENUMERATED {true} OPTIONAL, -- Need R

onboardingEnabled-r17 ENUMERATED {true} OPTIONAL, -- Need R

imsEmergencySupportForSNPN-r17 ENUMERATED {true} OPTIONAL -- Need R

}

-- TAG-CELLACCESSRELATEDINFO-STOP

-- ASN1STOP

|  |
| --- |
| *CellAccessRelatedInfo* field descriptions |
| ***cellReservedForFutureUse***  Indicates whether the cell is reserved, as defined in 38.304 [20] for future use. The field is applicable to all PLMNs and NPNs. This field is ignored by IAB-MT. |
| ***cellReservedForOtherUse***  Indicates whether the cell is reserved, as defined in 38.304 [20]. The field is applicable to all PLMNs. This field is ignored by IAB-MT for cell barring determination, but still considered by NPN capable IAB-MT for determination of an NPN-only cell. |
| ***npn-IdentityInfoList***  The *npn-IdentityInfoList* is used to configure a set of *NPN-IdentityInfo* elements. Each of those elements contains a list of one or more NPN Identities and additional information associated with those NPNs. The total number of PLMNs (identified by a PLMN identity in *plmn -IdentityList*), PNI-NPNs (identified by a PLMN identity and a CAG-ID), and SNPNs (identified by a PLMN identity and a NID) together in the *PLMN-IdentityInfoList* and *NPN-IdentityInfoList* does not exceed 12, except for the NPN-only cells. A PNI-NPN and SNPN can be included only once, and in only one entry of the *NPN-IdentityInfoList*. In case of NPN-only cells the *PLMN-IdentityList* contains a single element that does not count to the limit of 12. The NPN index is defined as *B+c1+c2+…+c(n-1)+d1+d2+…+d(m-1)+e(i)* for the NPN identity included in the *n*-th entry of *NPN-IdentityInfoList* and in the *m*-th entry of *npn-Identitylist* within that *NPN-IdentityInfoList* entry, and the *i*-th entry of its corresponding *NPN-Identity*, where  - *B* is the index used for the last PLMN in the *PLMN-IdentittyInfoList*; in NPN-only cells *B* is considered 0;  - *c(j)* is the number of NPN index values used in the *j*-th *NPN-IdentityInfoList* entry;  - *d(k)* is the number of NPN index values used in the *k*-th *npn-IdentityList* entry within the *n*-th *NPN-IdentityInfoList* entry;  - e(i) is  - *i* if the *n*-th entry of *NPN-IdentityInfoList* entry is for SNPN(s);  - 1 if the *n*-th entry of *NPN-IdentityInfoList* entry is for PNI-NPN(s). |
| ***plmn-IdentityInfoList***  The *plmn-IdentityInfoList* is used to configure a set of *PLMN-IdentityInfo* elements. Each of those elements contains a list of one or more PLMN Identities and additional information associated with those PLMNs. A PLMN-identity can be included only once, and in only one entry of the *PLMN-IdentityInfoList*. The PLMN index is defined as *b1+b2+…+b(n-1)+i* for the PLMN included at the *n*-th entry of *PLMN-IdentityInfoList* and the *i*-th entry of its corresponding *PLMN-IdentityInfo*, where *b(j)* is the number of *PLMN-Identity* entries in each *PLMN-IdentityInfo*, respectively. |
| ***snpn-AccessInfoList***  This list provides access related information for each SNPN in *npn-IdentityInfoList*, see TS 23.501 [32]. The n-th entry of the list contains the access related information of the n-th SNPN in *npn-IdentityInfoList*. |

|  |
| --- |
| *SNPN-AccessInfo* field descriptions |
| ***extCH-Supported***  Indicates whether the SNPN supports access using credentials from a Credentials Holder as specified in TS 23.501 [32]. |
| ***extCH-WithoutConfigAllowed***  Indicates whether the SNPN allows registration attempts with credentials from a Credentials Holder from UEs that are not explicitly configured to select the SNPN as specified in TS 23.501 [32]. |
| ***imsEmergencySupportForSNPN***  Indicates whether the SNPN supports IMS emergency bearer services for UEs in limited service mode in the cell. If absent, IMS emergency call is not supported by the SNPN in the cell for UEs in limited service mode. |
| ***onboardingEnabled***  Indicates whether the onboarding SNPN allows registration for onboarding in the cell as specified in TS 23.501 [32]. |

#### *– CellAccessRelatedInfo-EUTRA-5GC*

The IE *CellAccessRelatedInfo-EUTRA-5GC* indicates cell access related information for an LTE cell connected to 5GC.

*CellAccessRelatedInfo-EUTRA-5GC* information element

-- ASN1START

-- TAG-CELLACCESSRELATEDINFOEUTRA-5GC-START

CellAccessRelatedInfo-EUTRA-5GC ::= SEQUENCE {

plmn-IdentityList-eutra-5gc PLMN-IdentityList-EUTRA-5GC,

trackingAreaCode-eutra-5gc TrackingAreaCode,

ranac-5gc RAN-AreaCode OPTIONAL,

cellIdentity-eutra-5gc CellIdentity-EUTRA-5GC

}

PLMN-IdentityList-EUTRA-5GC::= SEQUENCE (SIZE (1..maxPLMN)) OF PLMN-Identity-EUTRA-5GC

PLMN-Identity-EUTRA-5GC ::= CHOICE {

plmn-Identity-EUTRA-5GC PLMN-Identity,

plmn-index INTEGER (1..maxPLMN)

}

CellIdentity-EUTRA-5GC ::= CHOICE {

cellIdentity-EUTRA BIT STRING (SIZE (28)),

cellId-index INTEGER (1..maxPLMN)

}

-- TAG-CELLACCESSRELATEDINFOEUTRA-5GC-STOP

-- ASN1STOP

#### *– CellAccessRelatedInfo-EUTRA-EPC*

The IE *CellAccessRelatedInfo-EUTRA-EPC* indicates cell access related information for an LTE cell connected to EPC.

*CellAccessRelatedInfo-EUTRA-EPC* information element

-- ASN1START

-- TAG-CELLACCESSRELATEDINFOEUTRA-EPC-START

CellAccessRelatedInfo-EUTRA-EPC ::= SEQUENCE {

plmn-IdentityList-eutra-epc PLMN-IdentityList-EUTRA-EPC,

trackingAreaCode-eutra-epc BIT STRING (SIZE (16)),

cellIdentity-eutra-epc BIT STRING (SIZE (28))

}

PLMN-IdentityList-EUTRA-EPC::= SEQUENCE (SIZE (1..maxPLMN)) OF PLMN-Identity

-- TAG-CELLACCESSRELATEDINFOEUTRA-EPC-STOP

-- ASN1STOP

#### – *CellGroupConfig*

The *CellGroupConfig* IE is used to configure a master cell group (MCG) or secondary cell group (SCG). A cell group comprises of one MAC entity, a set of logical channels with associated RLC entities and of a primary cell (SpCell) and one or more secondary cells (SCells).

*CellGroupConfig* information element

-- ASN1START

-- TAG-CELLGROUPCONFIG-START

-- Configuration of one Cell-Group:

CellGroupConfig ::= SEQUENCE {

cellGroupId CellGroupId,

rlc-BearerToAddModList SEQUENCE (SIZE(1..maxLC-ID)) OF RLC-BearerConfig OPTIONAL, -- Need N

rlc-BearerToReleaseList SEQUENCE (SIZE(1..maxLC-ID)) OF LogicalChannelIdentity OPTIONAL, -- Need N

mac-CellGroupConfig MAC-CellGroupConfig OPTIONAL, -- Need M

physicalCellGroupConfig PhysicalCellGroupConfig OPTIONAL, -- Need M

spCellConfig SpCellConfig OPTIONAL, -- Need M

sCellToAddModList SEQUENCE (SIZE (1..maxNrofSCells)) OF SCellConfig OPTIONAL, -- Need N

sCellToReleaseList SEQUENCE (SIZE (1..maxNrofSCells)) OF SCellIndex OPTIONAL, -- Need N

...,

[[

reportUplinkTxDirectCurrent ENUMERATED {true} OPTIONAL -- Cond BWP-Reconfig

]],

[[

bap-Address-r16 BIT STRING (SIZE (10)) OPTIONAL, -- Need M

bh-RLC-ChannelToAddModList-r16 SEQUENCE (SIZE(1..maxBH-RLC-ChannelID-r16)) OF BH-RLC-ChannelConfig-r16 OPTIONAL, -- Need N

bh-RLC-ChannelToReleaseList-r16 SEQUENCE (SIZE(1..maxBH-RLC-ChannelID-r16)) OF BH-RLC-ChannelID-r16 OPTIONAL, -- Need N

f1c-TransferPath-r16 ENUMERATED {lte, nr, both} OPTIONAL, -- Need M

simultaneousTCI-UpdateList1-r16 SEQUENCE (SIZE (1..maxNrofServingCellsTCI-r16)) OF ServCellIndex OPTIONAL, -- Need R

simultaneousTCI-UpdateList2-r16 SEQUENCE (SIZE (1..maxNrofServingCellsTCI-r16)) OF ServCellIndex OPTIONAL, -- Need R

simultaneousSpatial-UpdatedList1-r16 SEQUENCE (SIZE (1..maxNrofServingCellsTCI-r16)) OF ServCellIndex OPTIONAL, -- Need R

simultaneousSpatial-UpdatedList2-r16 SEQUENCE (SIZE (1..maxNrofServingCellsTCI-r16)) OF ServCellIndex OPTIONAL, -- Need R

uplinkTxSwitchingOption-r16 ENUMERATED {switchedUL, dualUL} OPTIONAL, -- Need R

uplinkTxSwitchingPowerBoosting-r16 ENUMERATED {enabled} OPTIONAL -- Need R

]],

[[

reportUplinkTxDirectCurrentTwoCarrier-r16 ENUMERATED {true} OPTIONAL -- Need N

]],

[[

f1c-TransferPathNRDC-r17 ENUMERATED {mcg, scg, both} OPTIONAL, -- Need M

uplinkTxSwitching-2T-Mode-r17 ENUMERATED {enabled} OPTIONAL, -- Cond 2Tx

uplinkTxSwitching-DualUL-TxState-r17 ENUMERATED {oneT, twoT} OPTIONAL, -- Cond 2Tx

uu-RelayRLC-ChannelToAddModList-r17 SEQUENCE (SIZE(1..maxUu-RelayRLC-ChannelID-r17)) OF Uu-RelayRLC-ChannelConfig-r17

OPTIONAL, -- Need N

uu-RelayRLC-ChannelToReleaseList-r17 SEQUENCE (SIZE(1..maxUu-RelayRLC-ChannelID-r17)) OF Uu-RelayRLC-ChannelID-r17

OPTIONAL, -- Need N

simultaneousU-TCI-UpdateList1-r17 SEQUENCE (SIZE (1..maxNrofServingCellsTCI-r16)) OF ServCellIndex OPTIONAL, -- Need R

simultaneousU-TCI-UpdateList2-r17 SEQUENCE (SIZE (1..maxNrofServingCellsTCI-r16)) OF ServCellIndex OPTIONAL, -- Need R

simultaneousU-TCI-UpdateList3-r17 SEQUENCE (SIZE (1..maxNrofServingCellsTCI-r16)) OF ServCellIndex OPTIONAL, -- Need R

simultaneousU-TCI-UpdateList4-r17 SEQUENCE (SIZE (1..maxNrofServingCellsTCI-r16)) OF ServCellIndex OPTIONAL, -- Need R

rlc-BearerToReleaseListExt-r17 SEQUENCE (SIZE(1..maxLC-ID)) OF LogicalChannelIdentityExt-r17 OPTIONAL, -- Need N

iab-ResourceConfigToAddModList-r17 SEQUENCE (SIZE(1..maxNrofIABResourceConfig-r17)) OF IAB-ResourceConfig-r17 OPTIONAL, -- Need N

iab-ResourceConfigToReleaseList-r17 SEQUENCE (SIZE(1..maxNrofIABResourceConfig-r17)) OF IAB-ResourceConfigID-r17 OPTIONAL -- Need N

]]

}

-- Serving cell specific MAC and PHY parameters for a SpCell:

SpCellConfig ::= SEQUENCE {

servCellIndex ServCellIndex OPTIONAL, -- Cond SCG

reconfigurationWithSync ReconfigurationWithSync OPTIONAL, -- Cond ReconfWithSync

rlf-TimersAndConstants SetupRelease { RLF-TimersAndConstants } OPTIONAL, -- Need M

rlmInSyncOutOfSyncThreshold ENUMERATED {n1} OPTIONAL, -- Need S

spCellConfigDedicated ServingCellConfig OPTIONAL, -- Need M

...,

[[

lowMobilityEvaluationConnected-r17 SEQUENCE {

s-SearchDeltaP-Connected-r17 ENUMERATED {dB3, dB6, dB9, dB12, dB15, spare3, spare2, spare1},

t-SearchDeltaP-Connected-r17 ENUMERATED {s5, s10, s20, s30, s60, s120, s180, s240, s300, spare7, spare6, spare5,

spare4, spare3, spare2, spare1}

} OPTIONAL, -- Need R

goodServingCellEvaluationRLM-r17 GoodServingCellEvaluation-r17 OPTIONAL, -- Need R

goodServingCellEvaluationBFD-r17 GoodServingCellEvaluation-r17 OPTIONAL, -- Need R

deactivatedSCG-Config-r17 SetupRelease { DeactivatedSCG-Config-r17 } OPTIONAL -- Cond SCG-Opt

]]

}

ReconfigurationWithSync ::= SEQUENCE {

spCellConfigCommon ServingCellConfigCommon OPTIONAL, -- Need M

newUE-Identity RNTI-Value,

t304 ENUMERATED {ms50, ms100, ms150, ms200, ms500, ms1000, ms2000, ms10000},

rach-ConfigDedicated CHOICE {

uplink RACH-ConfigDedicated,

supplementaryUplink RACH-ConfigDedicated

} OPTIONAL, -- Need N

...,

[[

smtc SSB-MTC OPTIONAL -- Need S

]],

[[

daps-UplinkPowerConfig-r16 DAPS-UplinkPowerConfig-r16 OPTIONAL -- Need N

]],

[[

sl-PathSwitchConfig-r17 SL-PathSwitchConfig-r17 OPTIONAL -- Cond DirectToIndirect-PathSwitch

]]

}

DAPS-UplinkPowerConfig-r16 ::= SEQUENCE {

p-DAPS-Source-r16 P-Max,

p-DAPS-Target-r16 P-Max,

uplinkPowerSharingDAPS-Mode-r16 ENUMERATED {semi-static-mode1, semi-static-mode2, dynamic }

}

SCellConfig ::= SEQUENCE {

sCellIndex SCellIndex,

sCellConfigCommon ServingCellConfigCommon OPTIONAL, -- Cond SCellAdd

sCellConfigDedicated ServingCellConfig OPTIONAL, -- Cond SCellAddMod

...,

[[

smtc SSB-MTC OPTIONAL -- Need S

]],

[[

sCellState-r16 ENUMERATED {activated} OPTIONAL, -- Cond SCellAddSync

secondaryDRX-GroupConfig-r16 ENUMERATED {true} OPTIONAL -- Cond DRX-Config2

]],

[[

preConfGapStatus-r17 BIT STRING (SIZE (maxNrofGapId-r17)) OPTIONAL, -- Cond PreConfigMG

goodServingCellEvaluationBFD-r17 GoodServingCellEvaluation-r17 OPTIONAL, -- Need R

sCellSIB20-r17 SetupRelease { SCellSIB20-r17 } OPTIONAL -- Need M

]]

}

SCellSIB20-r17 ::= OCTET STRING (CONTAINING SystemInformation)

DeactivatedSCG-Config-r17 ::= SEQUENCE {

bfd-and-RLM BOOLEAN,

...

}

GoodServingCellEvaluation-r17 ::= SEQUENCE {

offset-r17 ENUMERATED {db2, db4, db6, db8} OPTIONAL -- Need S

}

SL-PathSwitchConfig-r17 ::= SEQUENCE {

targetRelayUE-Identity-r17 SL-SourceIdentity-r17,

t420-r17 ENUMERATED {ms50, ms100, ms150, ms200, ms500, ms1000, ms2000, ms10000},

...

}

IAB-ResourceConfig-r17 ::= SEQUENCE {

iab-ResourceConfigID-r17 IAB-ResourceConfigID-r17,

slotList-r17 SEQUENCE (SIZE (1..5120)) OF INTEGER (0..5119) OPTIONAL, -- Need M

periodicitySlotList-r17 ENUMERATED {ms0p5, ms0p625, ms1, ms1p25, ms2, ms2p5, ms5, ms10, ms20, ms40, ms80, ms160} OPTIONAL, -- Need M

slotListSubcarrierSpacing-r17 SubcarrierSpacing OPTIONAL, -- Need M

...

}

IAB-ResourceConfigID-r17 ::= INTEGER(0..maxNrofIABResourceConfig-1-r17)

-- TAG-CELLGROUPCONFIG-STOP

-- ASN1STOP

|  |
| --- |
| *CellGroupConfig* field descriptions |
| ***bap-Address***  BAP address of the parent node in cell group. |
| ***bh-RLC-ChannelToAddModList***  Configuration of the backhaul RLC entities and the corresponding MAC Logical Channels to be added and modified. |
| ***bh-RLC-ChannelToReleaseList***  List of the backhaul RLC entities and the corresponding MAC Logical Channels to be released. |
| ***f1c-TransferPath***  The F1-C transfer path that an EN-DC IAB-MT should use for transferring F1-C packets to the IAB-donor-CU. If IAB-MT is configured with *lte*, IAB-MT can only use LTE leg for F1-C transfer. If IAB-MT is configured with *nr*, IAB-MT can only use NR leg for F1-C transfer. If IAB-MT is configured with *both*, it is up to IAB-MT to select an LTE leg or a NR leg for F1-C transfer. If the field is not configured, the IAB node uses the NR leg as the default one. |
| ***f1c-TransferPathNRDC***  The F1-C transfer path that an NR-DC IAB-MT should use for transferring F1-C packets to the IAB-donor-CU. If IAB-MT is configured with *mcg*, IAB-MT can only use the MCG for F1-C transfer. If IAB-MT is configured with *scg*, IAB-MT can only use the SCG for F1-C transfer. If IAB-MT is configured with *both*, it is up to IAB-MT to select the MCG or the SCG for F1-C transfer. |
| ***mac-CellGroupConfig***  MAC parameters applicable for the entire cell group. |
| ***rlc-BearerToAddModList***  Configuration of the MAC Logical Channel, the corresponding RLC entities and association with radio bearers. |
| ***reportUplinkTxDirectCurrent***  Enables reporting of uplink and supplementary uplink Direct Current location information upon BWP configuration and reconfiguration. This field is only present when the BWP configuration is modified or any serving cell is added or removed. This field is absent in the IE *CellGroupConfig* when provided as part of *RRCSetup* message. If UE is configured with SUL carrier, UE reports both UL and SUL Direct Current locations. |
| ***reportUplinkTxDirectCurrentTwoCarrier***  Enables reporting of uplink Direct Current location information when the UE is configured with uplink intra-band CA with two carriers. This field is absent in the IE *CellGroupConfig* when provided as part of *RRCSetup* message. |
| ***rlc-BearerToReleaseListExt***  List of the RLC entities and the corresponding MAC Logical Channels to be released for multicast MRBs. |
| ***rlmInSyncOutOfSyncThreshold***  BLER threshold pair index for IS/OOS indication generation, see TS 38.133 [14], table 8.1.1-1. *n1* corresponds to the value 1. When the field is absent, the UE applies the value 0. Whenever this is reconfigured, UE resets N310 and N311, and stops T310, if running. Network does not include this field. |
| ***sCellSIB20***  This field is used to transfer *SIB20* of the SCell in order to allow the UE for MBS broadcast reception on SCell. The network configures this field only for a single SCell at a time. |
| ***sCellState***  Indicates whether the SCell shall be considered to be in activated state upon SCell configuration. If the field is included for an SCell configured with TRS for fast activation of the SCell, such TRS is not used for the corresponding SCell. |
| ***sCellToAddModList***  List of secondary serving cells (SCells) to be added or modified. |
| ***sCellToReleaseList***  List of secondary serving cells (SCells) to be released. |
| ***secondaryDRX-GroupConfig***  The field is used to indicate whether the SCell belongs to the secondary DRX group. All serving cells in the secondary DRX group shall belong to one Frequency Range and all serving cells in the legacy DRX group shall belong to another Frequency Range. |
| ***simultaneousSpatial-UpdatedList1, simultaneousSpatial-UpdatedList2***  List of serving cells which can be updated simultaneously for spatial relation with a MAC CE. The *simultaneousSpatial-UpdatedList1* and *simultaneousSpatial-UpdatedList2* shall not contain same serving cells. Network should not configure serving cells that are configured with a BWP with two different values for the *coresetPoolIndex* in these lists. |
| ***simultaneousTCI-UpdateList1, simultaneousTCI-UpdateList2***  List of serving cells which can be updated simultaneously for TCI relation with a MAC CE. The *simultaneousTCI-UpdateList1* and *simultaneousTCI-UpdateList2* shall not contain same serving cells. Network should not configure serving cells that are configured with a BWP with two different values for the *coresetPoolIndex* in these lists. |
| ***simultaneousU-TCI-UpdateList1, simultaneousU-TCI-UpdateList2, simultaneousU-TCI-UpdateList3, simultaneousU-TCI-UpdateList4***  List of serving cells for which the Unified TCI States Activation/Deactivation MAC CE applies simultaneously, as specified in TS 38.321 [3] clause 6.1.3.47. The different lists shall not contain same serving cells. Network only configures in these lists serving cells that are configured with *unifiedtci-StateType*. |
| ***spCellConfig***  Parameters for the SpCell of this cell group (PCell of MCG or PSCell of SCG). |
| ***uplinkTxSwitchingOption***  Indicates which option is configured for dynamic UL Tx switching for inter-band UL CA or (NG)EN-DC. The field is set to *switchedUL* if network configures option 1 as specified in TS 38.214 [19], or *dualUL* if network configures option 2 as specified in TS 38.214 [19]. Network always configures UE with a value for this field in inter-band UL CA case and (NG)EN-DC case where UE supports dynamic UL Tx switching. |
| ***uplinkTxSwitchingPowerBoosting***  Indicates whether the UE is allowed to enable 3dB boosting on the maximum output power for transmission on carrier2 under the operation state in which 2-port transmission can be supported on carrier2 for inter-band UL CA case with dynamic UL Tx switching as defined in TS 38.101-1 [15]. Network can only configure this field for dynamic UL Tx switching in inter-band UL CA case with power Class 3 as defined in TS 38.101-1 [15]. |
| ***uplinkTxSwitching-2T-Mode***  Indicates 2Tx-2Tx switching mode is configured for inter-band UL CA or SUL, in which the switching gap duration for a triggered uplink switching (as specified in TS 38.214 [19]) is equal to the switching time capability value reported for the switching mode.  If this field is absent and *uplinkTxSwitching* is configured, it is interpreted that 1Tx-2Tx UL Tx switching is configured as specified in TS 38.214 [19]. In this case, there is one uplink (or one uplink band in case of intra-band) configured with *uplinkTxSwitching*, on which the maximum number of antenna ports among all configured P-SRS/A-SRS and activated SP-SRS resources should be 1 and non-codebook based UL MIMO is not configured. |
| ***uplinkTxSwitching-DualUL-TxState***  Indicates the state of Tx chains if the state of Tx chains after the UL Tx switching is not unique (as specified in TS 38.214 [19]) in case of 2Tx-2Tx switching is configured and *uplinkTxSwitchingOption* is set to *dualUL*. Value *oneT* indicates 1Tx is assumed to be supported on the carriers on each band, value *twoT* indicates 2Tx is assumed to be supported on that carrier. |
| ***uu-RelayRLC-ChannelToAddModList***  List of the Uu RLC entities and the corresponding MAC Logical Channels to be added or modified. |
| ***uu-RelayRLC-ChannelToReleaseList***  List of the Uu RLC entities and the corresponding MAC Logical Channels to be released. |

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| *DeactivatedSCG-Config* field descriptions |
| ***bfd-and-RLM***  If the field is set to *true*, the UE shall perform RLM and BFD on the PSCell when the SCG is deactivated. If set to *false*, the UE is not required to perform RLM and BFD on the PSCell when the SCG is deactivated. |

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| *DAPS-UplinkPowerConfig* field descriptions |
| ***p-DAPS-Source***  The maximum total transmit power to be used by the UE in the source cell group during DAPS handover. |
| ***p-DAPS-Target***  The maximum total transmit power to be used by the UE in the target cell group during DAPS handover. |
| ***uplinkPowerSharingDAPS-Mode***  Indicates the uplink power sharing mode that the UE uses in DAPS handover (see TS 38.213 [13]). |

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| *GoodServingCellEvaluation* field descriptions |
| ***offset***  The parameter "X" (dB) for the good serving cell quality criterion in RRC\_CONNECTED, for a cell operating in FR1 and FR2, respectively. If this field is absent, the UE applies the (default) value of 0 dB for "X". |

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| *IAB-ResourceConfig* field descriptions |
| ***IAB-ResourceConfigID***  This ID is used to indicate the specific resource configuration addressed by the MAC CEs specified in TS 38.321 [3]. |
| ***periodicitySlotList***  Indicates the periodicity in ms of the list of slot indexes indicated in *slotList*. |
| ***slotList***  Indicates the list of slot indexes to which the information indicated in the specific MAC CE applies to, as specified in TS 38.321 [3]. The values of the entries in the *slotList* are strictly less than the value of the *periodicitySlotList*. |
| ***slotListSubcarrierSpacing***  Subcarrier spacing used as reference for the *slotList* configuration.  Only the following values are applicable depending on the used frequency:  FR1: 15 or 30 kHz  FR2-1: 60 or 120 kHz  FR2-2: 120 or 480 kHz |

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| *ReconfigurationWithSync* field descriptions |
| ***rach-ConfigDedicated***  Random access configuration to be used for the reconfiguration with sync (e.g. handover). The UE performs the RA according to these parameters in the *firstActiveUplinkBWP* (see *UplinkConfig*). |
| ***smtc***  The SSB periodicity/offset/duration configuration of target cell for NR PSCell change and NR PCell change. The network sets the *periodicityAndOffset* to indicate the same periodicity as *ssb-periodicityServingCell* in *spCellConfigCommon*.  For case of NR PCell change, the *smtc* is based on the timing reference of (source) PCell. For case of NR PSCell change, it is based on the timing reference of source PSCell.  If both this field and *targetCellSMTC-SCG* are absent, the UE uses the SMTC in the *measObjectNR* having the same SSB frequency and subcarrier spacing, as configured before the reception of the RRC message. For a RedCap UE, if the first active DL BWP included in this RRC message is configured with *nonCellDefiningSSB-r17*, this field corresponds to the NCD-SSB indicated by *nonCellDefiningSSB-r17*, otherwise, this field corresponds to the CD-SSB indicated by *absoluteFrequencySSB* in *frequencyInfoDL*. |

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| *SCellConfig* field descriptions |
| ***goodServingCellEvaluationBFD***  Indicates the criterion for a UE to detect the good serving cell quality for BFD relaxation in an SCell in RRC\_CONNECTED. This field is always configured when the network enables BFD relaxation for the UE in this SCell. |
| ***preConfGapStatus***  Indicates whether the pre-configured measurement gaps (i.e. the gaps configured with *preConfigInd*) are activated or deactivated while this SCell is deactivated. If this field is configured, the UE shall apply network-controlled mechanism for activation and deactivation of the pre-configured measurement gaps, otherwise the UE shall apply the autonomous activation/deactivation mechanism, as specified in TS 38.133 [14]. The first/leftmost bit corresponds to the measurement gap with gap ID 1, the second bit corresponds to measurement gap with gap ID 2, and so on. Value 0 indicates that the corresponding pre-configured measurement gap is deactivated while value 1 indicates that the corresponding pre-configured measurement gap is activated. The UE shall ignore the bit if the corresponding measurement gap is not a pre-configured measurement gap. |
| ***smtc***  The SSB periodicity/offset/duration configuration of target cell for NR SCell addition. The network sets the *periodicityAndOffset* to indicate the same periodicity as *ssb-periodicityServingCell* in *sCellConfigCommon*. The *smtc* is based on the timing of the SpCell of associated cell group. In case of inter-RAT handover to NR, the timing reference is the NR PCell. In case of intra-NR PCell change (standalone NR) or NR PSCell change (EN-DC), the timing reference is the target SpCell. If the field is absent, the UE uses the SMTC in the *measObjectNR* having the same SSB frequency and subcarrier spacing, as configured before the reception of the RRC message. |

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| --- |
| *SpCellConfig* field descriptions |
| ***deactivated-SCG-Config***  Configuration applicable when the SCG is deactivated. The network always configures this field before or when indicating that the SCG is deactivated in an *RRCReconfiguration*, *RRCResume*, E-UTRA *RRCConnectionReconfiguration* or E-UTRA *RRCConnectionResume* message. |
| ***goodServingCellEvaluationBFD***  Indicates the criterion for a UE to detect the good serving cell quality for BFD relaxation in the SpCell in RRC\_CONNECTED. The field is always configured when the network enables BFD relaxation for the UE in this SpCell. |
| ***goodServingCellEvaluationRLM***  Indicates the criterion for a UE to detect the good serving cell quality for RLM relaxation in the SpCell in RRC\_CONNECTED. The field is always configured when the network enables RLM relaxation for the UE in this SpCell. |
| ***lowMobilityEvaluationConnected***  Indicates the criterion for a UE to detect low mobility in RRC\_CONNECTED in an SpCell. The *s-SearchDeltaP-Connected* is the parameter "SSearchDeltaP-connected". Value *dB*3 corresponds to 3 dB, *dB*6 corresponds to 6 dB and so on. The *t-SearchDeltaP-Connected* is the parameter "TSearchDeltaP-Connected". Value *s5* means 5 seconds, value *s10* means 10 seconds and so on. Low mobility criterion is configured in NR PCell for the case of NR SA/ NR CA/ NE-DC/NR-DC, and in the NR PSCell for the case of EN-DC. |
| ***reconfigurationWithSync***  Parameters for the synchronous reconfiguration to the target SpCell. |
| ***rlf-TimersAndConstants***  Timers and constants for detecting and triggering cell-level radio link failure. For the SCG, *rlf-TimersAndConstants* can only be set to *setup* and is always included at SCG addition. |
| ***servCellIndex***  Serving cell ID of a PSCell. The PCell of the Master Cell Group uses ID = 0. |

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| --- |
| *SL-PathSwitchConfig* field descriptions |
| ***targetRelayUE-Identity***  Indicates the L2 source ID of the target L2 U2N Relay UE during path switch. |
| ***T420***  Indicates the timer value of T420 to be used during path switch. |

|  |  |
| --- | --- |
| Conditional Presence | Explanation |
| *2Tx* | The field is optionally present, Need R, if *uplinkTxSwitching* is configured; otherwise it is absent, Need R. |
| *BWP-Reconfig* | The field is optionally present, Need N, if the BWPs are reconfigured or if serving cells are added or removed. Otherwise it is absent. |
| *DirectToIndirect-PathSwitch* | The field is mandatory present for the L2 U2N remote UE at path switch to the target L2 U2N Relay UE. It is absent otherwise. |
| *DRX-Config2* | The field is optionally present, Need N, if *drx-ConfigSecondaryGroup* is configured. It is absent otherwise. |
| *PreConfigMG* | The field is optionally present, Need R, if there is at least one per UE gap configured with *preConfigInd* or there is at least one per FR gap of the same FR which the SCell belongs to and configured with *preConfigInd*. It is absent, Need R, otherwise. |
| *ReconfWithSync* | The field is mandatory present in the *RRCReconfiguration* message:  - in each configured *CellGroupConfig* for which the SpCell changes,  - in the *masterCellGroup:*  - at change of AS security key derived from KgNB,  - in an *RRCReconfiguration* message contained in a *DLInformationTransferMRDC* message,  - path switch of L2 U2N remote UE to the target PCell,  - path switch of L2 U2N remote UE to the target L2 U2N Relay UE,  - in the *secondaryCellGroup* at:  - PSCell addition,  - SCG resume with NR-DC or (NG)EN-DC,  - update of required SI for PSCell,  - change of AS security key derived from S-KgNB in NR-DC while the UE is configured with at least one radio bearer with *keyToUse* set to *secondary* and that is not released by this *RRCReconfiguration* message,  - MN handover in (NG)EN-DC.  Otherwise, it is optionally present, need M. The field is absent in the *masterCellGroup* in *RRCResume* and *RRCSetup* messages and is absent in the *masterCellGroup* in *RRCReconfiguration* messages if source configuration is not released during DAPS handover. |
| *SCellAdd* | The field is mandatory present upon SCell addition; otherwise it is absent, Need M. |
| *SCellAddMod* | The field is mandatory present upon SCell addition; otherwise it is optionally present, need M. |
| *SCellAddSync* | The field is optionally present, Need N, in the *masterCellGroup* and, if the SCG is not indicated as deactivated, in the *secondaryCellGroup* in case of SCell addition, reconfiguration with sync, and resuming an RRC connection. It is absent otherwise. |
| *SCG* | The field is mandatory present in an *SpCellConfig* for the PSCell. It is absent otherwise. |
| *SCG-Opt* | The field is optionally present, Need M, in an SpCellConfig for the PSCell. It is absent otherwise. |

NOTE: In case of change of AS security key derived from S-KgNB/S-KeNB, if *reconfigurationWithSync* is not included in the *masterCellGroup*, the network releases all existing MCG RLC bearers associated with a radio bearer with *keyToUse* set to *secondary*. In case of change of AS security key derived from KgNB/KeNB, if *reconfigurationWithSync* is not included in the *secondaryCellGroup*, the network releases all existing SCG RLC bearers associated with a radio bearer with *keyToUse* set to *primary*.

#### – *CellGroupId*

The IE *CellGroupId* is used to identify a cell group. Value 0 identifies the master cell group. Other values identify secondary cell groups. In this version of the specification only values 0 and 1 are supported.

*CellGroupId* information element

-- ASN1START

-- TAG-CELLGROUPID-START

CellGroupId ::= INTEGER (0.. maxSecondaryCellGroups)

-- TAG-CELLGROUPID-STOP

-- ASN1STOP

#### – *CellIdentity*

The IE *CellIdentity* is used to unambiguously identify a cell within a PLMN/SNPN.

*CellIdentity* information element

-- ASN1START

-- TAG-CELLIDENTITY-START

CellIdentity ::= BIT STRING (SIZE (36))

-- TAG-CELLIDENTITY-STOP

-- ASN1STOP

#### – *CellReselectionPriority*

The IE *CellReselectionPriority* concerns the absolute priority of the concerned carrier frequency, as used by the cell reselection procedure. Corresponds to parameter "priority" in TS 38.304 [20]. Value 0 means lowest priority. The UE behaviour for the case the field is absent, if applicable, is specified in TS 38.304 [20].

*CellReselectionPriority* information element

-- ASN1START

-- TAG-CELLRESELECTIONPRIORITY-START

CellReselectionPriority ::= INTEGER (0..7)

-- TAG-CELLRESELECTIONPRIORITY-STOP

-- ASN1STOP

#### – *CellReselectionSubPriority*

The IE *CellReselectionSubPriority* indicates a fractional value to be added to the value of *cellReselectionPriority* to obtain the absolute priority of the concerned carrier frequency for E-UTRA and NR. Value *oDot2* corresponds to 0.2, value *oDot4* corresponds to 0.4 and so on.

*CellReselectionSubPriority* information element

-- ASN1START

-- TAG-CELLRESELECTIONSUBPRIORITY-START

CellReselectionSubPriority ::= ENUMERATED {oDot2, oDot4, oDot6, oDot8}

-- TAG-CELLRESELECTIONSUBPRIORITY-STOP

-- ASN1STOP

#### – *CFR-ConfigMulticast*

The IE *CFR-ConfigMulticast* indicates UE specific common frequency resource configuration for multicast for one dedicated BWP.

*CFR-ConfigMulticast* information element

-- ASN1START

-- TAG-CFR-CONFIGMULTICAST-START

CFR-ConfigMulticast-r17::= SEQUENCE {

locationAndBandwidthMulticast-r17 INTEGER (0..37949) OPTIONAL, -- Need S

pdcch-ConfigMulticast-r17 PDCCH-Config OPTIONAL, -- Need M

pdsch-ConfigMulticast-r17 PDSCH-Config OPTIONAL, -- Need M

sps-ConfigMulticastToAddModList-r17 SPS-ConfigMulticastToAddModList-r17 OPTIONAL, -- Need N

sps-ConfigMulticastToReleaseList-r17 SPS-ConfigMulticastToReleaseList-r17 OPTIONAL -- Need N

}

SPS-ConfigMulticastToAddModList-r17 ::= SEQUENCE (SIZE (1..8)) OF SPS-Config

SPS-ConfigMulticastToReleaseList-r17 ::= SEQUENCE (SIZE (1..8)) OF SPS-ConfigIndex-r16

-- TAG-CFR-CONFIGMULTICAST-STOP

-- ASN1STOP

| *CFR-ConfigMulticast* field descriptions |
| --- |
| ***locationAndBandwidthMulticast***  Frequency domain location and bandwidth for MBS multicast. The value of the field shall be interpreted as resource indicator value (RIV) as defined TS 38.214 [19] with assumptions as described in TS 38.213 [13], clause 12, i.e. setting N^size\_BWP=275. The first PRB is a PRB determined by subcarrierSpacing of the associated BWP and offsetToCarrier corresponding to this subcarrier spacing. If not configured, the UE applies the value of locationAndBandwidth of the DL BWP in which the cfr-ConfigMulticast is configured. |
| ***pdcch-ConfigMulticast***  UE specific group-common PDCCH configuration for MBS multicast for one CFR. |
| ***pdsch-ConfigMulticast***  UE specific group-common PDSCH configuration for MBS multicast for one CFR. |
| ***sps-ConfigMulticastToAddModList***  Indicates a list of one or more DL SPS configurations for MBS multicast. |
| ***sps-ConfigMulticastToReleaseList***  Indicates a list of one or more DL SPS configurations to be released. The NW may release a SPS configuration at any time. |

#### *– CGI-InfoEUTRA*

The IE CGI-InfoEUTRA indicates EUTRA cell access related information, which is reported by the UE as part of E-UTRA report CGI procedure.

*CGI-InfoEUTRA* information element

-- ASN1START

-- TAG-CGI-INFOEUTRA-START

CGI-InfoEUTRA ::= SEQUENCE {

cgi-info-EPC SEQUENCE {

cgi-info-EPC-legacy CellAccessRelatedInfo-EUTRA-EPC,

cgi-info-EPC-list SEQUENCE (SIZE (1..maxPLMN)) OF CellAccessRelatedInfo-EUTRA-EPC OPTIONAL

} OPTIONAL,

cgi-info-5GC SEQUENCE (SIZE (1..maxPLMN)) OF CellAccessRelatedInfo-EUTRA-5GC OPTIONAL,

freqBandIndicator FreqBandIndicatorEUTRA,

multiBandInfoList MultiBandInfoListEUTRA OPTIONAL,

freqBandIndicatorPriority ENUMERATED {true} OPTIONAL

}

-- TAG-CGI-INFOEUTRA-STOP

-- ASN1STOP

#### *– CGI-InfoEUTRALogging*

The IE CGI-InfoEUTRALogging indicates EUTRA cell related information, which is reported by the UE as part of RLF reporting procedure.

*CGI-InfoEUTRALogging* information element

-- ASN1START

-- TAG-CGI-INFOEUTRALOGGING-START

CGI-InfoEUTRALogging ::= SEQUENCE {

plmn-Identity-eutra-5gc PLMN-Identity OPTIONAL,

trackingAreaCode-eutra-5gc TrackingAreaCode OPTIONAL,

cellIdentity-eutra-5gc BIT STRING (SIZE (28)) OPTIONAL,

plmn-Identity-eutra-epc PLMN-Identity OPTIONAL,

trackingAreaCode-eutra-epc BIT STRING (SIZE (16)) OPTIONAL,

cellIdentity-eutra-epc BIT STRING (SIZE (28)) OPTIONAL

}

-- TAG-CGI-INFOEUTRALOGGING-STOP

-- ASN1STOP

|  |
| --- |
| *CGI-InfoEUTRALogging* field descriptions |
| ***cellIdentity-eutra-epc, cellIdentity-eutra-5GC***  Unambiguously identify a cell within the context of the PLMN. It belongs the first PLMN entry of *plmn-IdentityList* (when connected to EPC) or of *plmn-IdentityList-r15* (when connected to 5GC) in *SystemInformationBlockType1*. |
| ***plmn-Identity-eutra-epc, plmn-Identity-eutra-5GC***  Identifies the PLMN of the cell for the reported *cellIdentity*: the first PLMN entry of *plmn-IdentityList* (when connected to EPC) or of *plmn-IdentityList-r15* (when connected to 5GC) in *SystemInformationBlockType1* that contained the reported *cellIdentity*. |
| ***trackingAreaCode-eutra-epc, trackingAreaCode-eutra-5gc***  Indicates Tracking Area Code to which the cell indicated by *cellIdentity-eutra-epc, cellIdentity-eutra-5GC* belongs. |

#### *– CGI-InfoNR*

The IE *CGI-InfoNR* indicates cell access related information, which is reported by the UE as part of report CGI procedure.

*CGI-InfoNR* information element

-- ASN1START

-- TAG-CGI-INFO-NR-START

CGI-InfoNR ::= SEQUENCE {

plmn-IdentityInfoList PLMN-IdentityInfoList OPTIONAL,

frequencyBandList MultiFrequencyBandListNR OPTIONAL,

noSIB1 SEQUENCE {

ssb-SubcarrierOffset INTEGER (0..15),

pdcch-ConfigSIB1 PDCCH-ConfigSIB1

} OPTIONAL,

...,

[[

npn-IdentityInfoList-r16 NPN-IdentityInfoList-r16 OPTIONAL

]],

[[

cellReservedForOtherUse-r16 ENUMERATED {true} OPTIONAL

]]

}

-- TAG-CGI-INFO-NR-STOP

-- ASN1STOP

| *CGI-InfoNR* field descriptions |
| --- |
| ***noSIB1***  Contains *ssb-SubcarrierOffset* and *pdcch-ConfigSIB1* fields acquired by the UE from *MIB* of the cell for which report CGI procedure was requested by the network in case *SIB1* was not broadcast by the cell. |
| ***cellReservedForOtherUse***  Contains *cellReservedForOtherUse* field acquired by the UE that supports *nr-CGI-Reporting-NPN* from *SIB1* of the cell for which report CGI procedure was requested by the network. |

#### – *CGI-Info-Logging*

The IE *CGI-Info-Logging* indicates the NR Cell Global Identifier (NCGI) for logging purposes (e.g. RLF report), the globally unique identity, and the TAC information of a cell in NR.

*CGI-Info-Logging* information element

-- ASN1START

-- TAG-CGI-INFO-LOGGING-START

CGI-Info-Logging-r16 ::= SEQUENCE {

plmn-Identity-r16 PLMN-Identity,

cellIdentity-r16 CellIdentity,

trackingAreaCode-r16 TrackingAreaCode OPTIONAL

}

-- TAG-CGI-INFO-LOGGING-STOP

-- ASN1STOP

|  |
| --- |
| *CGI-Info-Logging* field descriptions |
| ***cellIdentity***  Unambiguously identify a cell within the context of the PLMN. It belongs the first *PLMN-IdentityInfo* IE of *PLMN-IdentityInfoList* in *SIB1*. |
| ***plmn-Identity***  Identifies the PLMN of the cell for the reported *cellIdentity*: the first PLMN entry of *plmn-IdentityList* (in SIB1) in the instance of *PLMN-IdentityInfoList* that contained the reported *cellIdentity*. |
| ***trackingAreaCode***  Indicates Tracking Area Code to which the cell indicated by cellIdentity field belongs. |

#### – *CLI-RSSI-Range*

The IE *CLI-RSSI-Range* specifies the value range used in CLI-RSSI measurements and thresholds. The integer value for CLI-RSSI measurements is according to Table 10.1.22.2.2-1 in TS 38.133 [14].

*CLI-RSSI-Range* information element

-- ASN1START

-- TAG-CLI-RSSI-RANGE-START

CLI-RSSI-Range-r16 ::= INTEGER(0..76)

-- TAG-CLI-RSSI-RANGE-STOP

-- ASN1STOP

#### – *CodebookConfig*

The IE *CodebookConfig* is used to configure codebooks of Type-I and Type-II (see TS 38.214 [19], clause 5.2.2.2)

*CodebookConfig* information element

-- ASN1START

-- TAG-CODEBOOKCONFIG-START

CodebookConfig ::= SEQUENCE {

codebookType CHOICE {

type1 SEQUENCE {

subType CHOICE {

typeI-SinglePanel SEQUENCE {

nrOfAntennaPorts CHOICE {

two SEQUENCE {

twoTX-CodebookSubsetRestriction BIT STRING (SIZE (6))

},

moreThanTwo SEQUENCE {

n1-n2 CHOICE {

two-one-TypeI-SinglePanel-Restriction BIT STRING (SIZE (8)),

two-two-TypeI-SinglePanel-Restriction BIT STRING (SIZE (64)),

four-one-TypeI-SinglePanel-Restriction BIT STRING (SIZE (16)),

three-two-TypeI-SinglePanel-Restriction BIT STRING (SIZE (96)),

six-one-TypeI-SinglePanel-Restriction BIT STRING (SIZE (24)),

four-two-TypeI-SinglePanel-Restriction BIT STRING (SIZE (128)),

eight-one-TypeI-SinglePanel-Restriction BIT STRING (SIZE (32)),

four-three-TypeI-SinglePanel-Restriction BIT STRING (SIZE (192)),

six-two-TypeI-SinglePanel-Restriction BIT STRING (SIZE (192)),

twelve-one-TypeI-SinglePanel-Restriction BIT STRING (SIZE (48)),

four-four-TypeI-SinglePanel-Restriction BIT STRING (SIZE (256)),

eight-two-TypeI-SinglePanel-Restriction BIT STRING (SIZE (256)),

sixteen-one-TypeI-SinglePanel-Restriction BIT STRING (SIZE (64))

},

typeI-SinglePanel-codebookSubsetRestriction-i2 BIT STRING (SIZE (16)) OPTIONAL -- Need R

}

},

typeI-SinglePanel-ri-Restriction BIT STRING (SIZE (8))

},

typeI-MultiPanel SEQUENCE {

ng-n1-n2 CHOICE {

two-two-one-TypeI-MultiPanel-Restriction BIT STRING (SIZE (8)),

two-four-one-TypeI-MultiPanel-Restriction BIT STRING (SIZE (16)),

four-two-one-TypeI-MultiPanel-Restriction BIT STRING (SIZE (8)),

two-two-two-TypeI-MultiPanel-Restriction BIT STRING (SIZE (64)),

two-eight-one-TypeI-MultiPanel-Restriction BIT STRING (SIZE (32)),

four-four-one-TypeI-MultiPanel-Restriction BIT STRING (SIZE (16)),

two-four-two-TypeI-MultiPanel-Restriction BIT STRING (SIZE (128)),

four-two-two-TypeI-MultiPanel-Restriction BIT STRING (SIZE (64))

},

ri-Restriction BIT STRING (SIZE (4))

}

},

codebookMode INTEGER (1..2)

},

type2 SEQUENCE {

subType CHOICE {

typeII SEQUENCE {

n1-n2-codebookSubsetRestriction CHOICE {

two-one BIT STRING (SIZE (16)),

two-two BIT STRING (SIZE (43)),

four-one BIT STRING (SIZE (32)),

three-two BIT STRING (SIZE (59)),

six-one BIT STRING (SIZE (48)),

four-two BIT STRING (SIZE (75)),

eight-one BIT STRING (SIZE (64)),

four-three BIT STRING (SIZE (107)),

six-two BIT STRING (SIZE (107)),

twelve-one BIT STRING (SIZE (96)),

four-four BIT STRING (SIZE (139)),

eight-two BIT STRING (SIZE (139)),

sixteen-one BIT STRING (SIZE (128))

},

typeII-RI-Restriction BIT STRING (SIZE (2))

},

typeII-PortSelection SEQUENCE {

portSelectionSamplingSize ENUMERATED {n1, n2, n3, n4} OPTIONAL, -- Need R

typeII-PortSelectionRI-Restriction BIT STRING (SIZE (2))

}

},

phaseAlphabetSize ENUMERATED {n4, n8},

subbandAmplitude BOOLEAN,

numberOfBeams ENUMERATED {two, three, four}

}

}

}

CodebookConfig-r16 ::= SEQUENCE {

codebookType CHOICE {

type2 SEQUENCE {

subType CHOICE {

typeII-r16 SEQUENCE {

n1-n2-codebookSubsetRestriction-r16 CHOICE {

two-one BIT STRING (SIZE (16)),

two-two BIT STRING (SIZE (43)),

four-one BIT STRING (SIZE (32)),

three-two BIT STRING (SIZE (59)),

six-one BIT STRING (SIZE (48)),

four-two BIT STRING (SIZE (75)),

eight-one BIT STRING (SIZE (64)),

four-three BIT STRING (SIZE (107)),

six-two BIT STRING (SIZE (107)),

twelve-one BIT STRING (SIZE (96)),

four-four BIT STRING (SIZE (139)),

eight-two BIT STRING (SIZE (139)),

sixteen-one BIT STRING (SIZE (128))

},

typeII-RI-Restriction-r16 BIT STRING (SIZE(4))

},

typeII-PortSelection-r16 SEQUENCE {

portSelectionSamplingSize-r16 ENUMERATED {n1, n2, n3, n4},

typeII-PortSelectionRI-Restriction-r16 BIT STRING (SIZE (4))

}

},

numberOfPMI-SubbandsPerCQI-Subband-r16 INTEGER (1..2),

paramCombination-r16 INTEGER (1..8)

}

}

}

CodebookConfig-r17 ::= SEQUENCE {

codebookType CHOICE {

type1 SEQUENCE {

typeI-SinglePanel-Group1-r17 SEQUENCE {

nrOfAntennaPorts CHOICE {

two SEQUENCE {

twoTX-CodebookSubsetRestriction1-r17 BIT STRING (SIZE (6))

},

moreThanTwo SEQUENCE {

n1-n2 CHOICE {

two-one-TypeI-SinglePanel-Restriction1-r17 BIT STRING (SIZE (8)),

two-two-TypeI-SinglePanel-Restriction1-r17 BIT STRING (SIZE (64)),

four-one-TypeI-SinglePanel-Restriction1-r17 BIT STRING (SIZE (16)),

three-two-TypeI-SinglePanel-Restriction1-r17 BIT STRING (SIZE (96)),

six-one-TypeI-SinglePanel-Restriction1-r17 BIT STRING (SIZE (24)),

four-two-TypeI-SinglePanel-Restriction1-r17 BIT STRING (SIZE (128)),

eight-one-TypeI-SinglePanel-Restriction1-r17 BIT STRING (SIZE (32)),

four-three-TypeI-SinglePanel-Restriction1-r17 BIT STRING (SIZE (192)),

six-two-TypeI-SinglePanel-Restriction1-r17 BIT STRING (SIZE (192)),

twelve-one-TypeI-SinglePanel-Restriction1-r17 BIT STRING (SIZE (48)),

four-four-TypeI-SinglePanel-Restriction1-r17 BIT STRING (SIZE (256)),

eight-two-TypeI-SinglePanel-Restriction1-r17 BIT STRING (SIZE (256)),

sixteen-one-TypeI-SinglePanel-Restriction1-r17 BIT STRING (SIZE (64))

}

}

}

} OPTIONAL, -- Need R

typeI-SinglePanel-Group2-r17 SEQUENCE {

nrOfAntennaPorts CHOICE {

two SEQUENCE {

twoTX-CodebookSubsetRestriction2-r17 BIT STRING (SIZE (6))

},

moreThanTwo SEQUENCE {

n1-n2 CHOICE {

two-one-TypeI-SinglePanel-Restriction2-r17 BIT STRING (SIZE (8)),

two-two-TypeI-SinglePanel-Restriction2-r17 BIT STRING (SIZE (64)),

four-one-TypeI-SinglePanel-Restriction2-r17 BIT STRING (SIZE (16)),

three-two-TypeI-SinglePanel-Restriction2-r17 BIT STRING (SIZE (96)),

six-one-TypeI-SinglePanel-Restriction2-r17 BIT STRING (SIZE (24)),

four-two-TypeI-SinglePanel-Restriction2-r17 BIT STRING (SIZE (128)),

eight-one-TypeI-SinglePanel-Restriction2-r17 BIT STRING (SIZE (32)),

four-three-TypeI-SinglePanel-Restriction2-r17 BIT STRING (SIZE (192)),

six-two-TypeI-SinglePanel-Restriction2-r17 BIT STRING (SIZE (192)),

twelve-one-TypeI-SinglePanel-Restriction2-r17 BIT STRING (SIZE (48)),

four-four-TypeI-SinglePanel-Restriction2-r17 BIT STRING (SIZE (256)),

eight-two-TypeI-SinglePanel-Restriction2-r17 BIT STRING (SIZE (256)),

sixteen-one-TypeI-SinglePanel-Restriction2-r17 BIT STRING (SIZE (64))

}

}

}

} OPTIONAL, -- Need R

typeI-SinglePanel-ri-RestrictionSTRP-r17 BIT STRING (SIZE (8)) OPTIONAL, -- Need R

typeI-SinglePanel-ri-RestrictionSDM-r17 BIT STRING (SIZE (4)) OPTIONAL -- Need R

},

type2 SEQUENCE {

typeII-PortSelection-r17 SEQUENCE {

paramCombination-r17 INTEGER (1..8),

valueOfN-r17 ENUMERATED {n2, n4} OPTIONAL, -- Need R

numberOfPMI-SubbandsPerCQI-Subband-r17 INTEGER(1..2) OPTIONAL, -- Need R

typeII-PortSelectionRI-Restriction-r17 BIT STRING (SIZE (4))

}

}

}

}

-- TAG-CODEBOOKCONFIG-STOP

-- ASN1STOP

|  |
| --- |
| *CodebookConfig* field descriptions |
| ***codebookMode***  CodebookMode as specified in TS 38.214 [19], clause 5.2.2.2.2. |
| ***codebookType***  CodebookType including possibly sub-types and the corresponding parameters for each (see TS 38.214 [19], clause 5.2.2.2). |
| ***n1-n2-codebookSubsetRestriction***  Number of antenna ports in first (*n1*) and second (*n2*) dimension and codebook subset restriction (see TS 38.214 [19] clause 5.2.2.2.3).  Number of bits for codebook subset restriction is CEIL(log2(nchoosek(O1\*O2,4)))+8\*n1\*n2 where nchoosek(a,b) = a!/(b!(a-b)!). |
| ***n1-n2***  Number of antenna ports in first (n1) and second (n2) dimension and codebook subset restriction (see TS 38.214 [19] clause 5.2.2.2.1). |
| ***ng-n1-n2***  Codebook subset restriction for Type I Multi-panel codebook (see TS 38.214 [19], clause 5.2.2.2.2). |
| ***numberOfBeams***  Number of beams, L, used for linear combination. |
| ***numberOfPMI-SubbandsPerCQI-Subband***  Field indicates how PMI subbands are defined per CQI subband according to TS 38.214 [19], clause 5.2.2.2.5, and 5.2.2.2.7. |
| ***paramCombination***  Field describes supported parameter combination (*M, ,* ) as specified in TS 38.214. |
| ***phaseAlphabetSize***  The size of the PSK alphabet, QPSK or 8-PSK. |
| ***portSelectionSamplingSize***  The size of the port selection codebook (parameter d), see TS 38.214 [19] clause 5.2.2.2.6. |
| ***ri-Restriction***  Restriction for RI for *TypeI-MultiPanel-RI-Restriction* (see TS 38.214 [19], clause 5.2.2.2.2). |
| ***subbandAmplitude***  If subband amplitude reporting is activated (*true*). |
| ***twoTX-CodebookSubsetRestriction***  Codebook subset restriction for 2TX codebook (see TS 38.214 [19] clause 5.2.2.2.1). |
| ***typeI-SinglePanel-codebookSubsetRestriction-i2***  i2 codebook subset restriction for Type I Single-panel codebook used when *reportQuantity* is CRI/Ri/i1/CQI (see TS 38.214 [19] clause 5.2.2.2.1). |
| ***typeI-SinglePanel-ri-Restriction***  Restriction for RI for *TypeI-SinglePanel-RI-Restriction* (see TS 38.214 [19], clause 5.2.2.2.1). |
| ***typeI-SinglePanel-Group1, typeI-SinglePanel-Group2***  Configures codebooks for CSI calculation when UE is configured with two CMR Groups with *CMRGroupingAndPairing* in the *NZP-CSI-RS-ResourceSet* associated with the *CSI-ReportConfig*. Network configures the same number of ports for both codebooks. |
| ***typeI-SinglePanel-ri-RestrictionSDM, typeI-SinglePanel-ri-RestrictionSTRP***  Restriction for RI for *N* Resource Pairs when two CMR Groups are configured with *CMRGroupingAndPairing* in the *NZP-CSI-RS-ResourceSet* associated with the *CSI-ReportConfig* (see TS 38.214 [19], clause 5.2.1.4.2). |
| ***typeII-PortSelectionRI-Restriction***  Restriction for RI for *TypeII-PortSelection-RI-Restriction* (see TS 38.214 [19], clauses 5.2.2.2.4 and 5.2.2.2.6). |
| ***typeII-RI-Restriction***  Restriction for RI for *TypeII-RI-Restriction* (see TS 38.214 [19], clauses 5.2.2.2.3 and 5.2.2.2.5). |
| ***valueOfN-r17***  Field provides the value of parameter N as specified in TS 38.214 [19], clause 5.2.2.2.7. The field is present only when M=2 set by *paramCombination*, see TS 38.314. |

#### – *CommonLocationInfo*

The IE *CommonLocationInfo* is used to transfer detailed location information available at the UE to correlate measurements and UE position information.

*CommonLocationInfo* information element

-- ASN1START

-- TAG-COMMONLOCATIONINFO-START

CommonLocationInfo-r16 ::= SEQUENCE {

gnss-TOD-msec-r16 OCTET STRING OPTIONAL,

locationTimestamp-r16 OCTET STRING OPTIONAL,

locationCoordinate-r16 OCTET STRING OPTIONAL,

locationError-r16 OCTET STRING OPTIONAL,

locationSource-r16 OCTET STRING OPTIONAL,

velocityEstimate-r16 OCTET STRING OPTIONAL

}

-- TAG-COMMONLOCATIONINFO-STOP

-- ASN1STOP

|  |
| --- |
| *CommonLocationInfo* field descriptions |
| ***gnss-TOD-msec***  Parameter type *gnss-TOD-msec* defined in TS 37.355 [49]. The first/leftmost bit of the first octet contains the most significant bit. |
| ***locationTimeStamp***  Parameter type *DisplacementTimeStamp* defined in TS 37.355 [49]. The first/leftmost bit of the first octet contains the most significant bit. |
| ***locationCoordinate***  Parameter type *LocationCoordinates* defined in TS 37.355 [49]. The first/leftmost bit of the first octet contains the most significant bit. |
| ***locationError***  Parameter *LocationError* defined in TS 37.355 [49]. The first/leftmost bit of the first octet contains the most significant bit. |
| ***locationSource***  Parameter *LocationSource* defined in TS 37.355 [49]. The first/leftmost bit of the first octet contains the most significant bit. |
| ***velocityEstimate***  Parameter type *Velocity* defined in TS 37.355 [49]. The first/leftmost bit of the first octet contains the most significant bit. |

#### *– CondReconfigId*

The IE *CondReconfigId* is used to identify a CHO, CPA or CPC configuration.

*CondReconfigId* information element

-- ASN1START

-- TAG-CONDRECONFIGID-START

CondReconfigId-r16 ::= INTEGER (1.. maxNrofCondCells-r16)

-- TAG-CONDRECONFIGID-STOP

-- ASN1STOP

#### *– CondReconfigToAddModList*

The IE *CondReconfigToAddModList* concerns a list of conditional reconfigurations to add or modify, with for each entry the *condReconfigId* and the associated *condExecutionCond/condExecutionCondSCG* and *condRRCReconfig*.

*CondReconfigToAddModList* information element

-- ASN1START

-- TAG-CONDRECONFIGTOADDMODLIST-START

CondReconfigToAddModList-r16 ::= SEQUENCE (SIZE (1.. maxNrofCondCells-r16)) OF CondReconfigToAddMod-r16

CondReconfigToAddMod-r16 ::= SEQUENCE {

condReconfigId-r16 CondReconfigId-r16,

condExecutionCond-r16 SEQUENCE (SIZE (1..2)) OF MeasId OPTIONAL, -- Need M

condRRCReconfig-r16 OCTET STRING (CONTAINING RRCReconfiguration) OPTIONAL, -- Cond condReconfigAdd

...,

[[

condExecutionCondSCG-r17 OCTET STRING (CONTAINING CondReconfigExecCondSCG-r17) OPTIONAL -- Need M

]]

}

CondReconfigExecCondSCG-r17 ::= SEQUENCE (SIZE (1..2)) OF MeasId

-- TAG-CONDRECONFIGTOADDMODLIST-STOP

-- ASN1STOP

| *CondReconfigToAddMod* field descriptions |
| --- |
| ***condExecutionCond***  The execution condition that needs to be fulfilled in order to trigger the execution of a conditional reconfiguration for CHO, CPA, intra-SN CPC without MN involvement or MN initiated inter-SN CPC. When configuring 2 triggering events (Meas Ids) for a candidate cell, network ensures that both refer to the same *measObject.* For CHO, if network configures *condEventD1* or *condEventT1* for a candidate cell network configures a second triggering event *condEventA3, condEventA4* or *condEventA5* for the same candidate cell. Network does not configure both *condEventD1* and *condEventT1* for the same candidate cell. |
| ***condExecutionCondSCG***  Contains execution condition that needs to be fulfilled in order to trigger the execution of a conditional reconfiguration for SN initiated inter-SN CPC. The Meas Ids refer to the *measConfig* associated with the SCG. When configuring 2 triggering events (Meas Ids) for a candidate cell, network ensures that both refer to the same *measObject*. For each *condReconfigurationId*, the network always configures either *condExecutionCond* or *condExecutionCondSCG* (not both). |
| ***condRRCReconfig***  The *RRCReconfiguration* message to be applied when the condition(s) are fulfilled. The *RRCReconfiguration* message contained in *condRRCReconfig* cannot contain the field *conditionalReconfiguration* or the field *daps-Config*. For CPA and for CPC, the *RRCReconfiguration* message contained in *condRRCReconfig* cannot contain the field *scg-State*. |

|  |  |
| --- | --- |
| Conditional Presence | Explanation |
| *condReconfigAdd* | The field is mandatory present when a *condReconfigId* is being added. Otherwise the field is optional, need M. |

#### *– ConditionalReconfiguration*

The IE *ConditionalReconfiguration* is used to add, modify and release the configuration of conditional reconfiguration.

*ConditionalReconfiguration* information element

-- ASN1START

-- TAG-CONDITIONALRECONFIGURATION-START

ConditionalReconfiguration-r16 ::= SEQUENCE {

attemptCondReconfig-r16 ENUMERATED {true} OPTIONAL, -- Cond CHO

condReconfigToRemoveList-r16 CondReconfigToRemoveList-r16 OPTIONAL, -- Need N

condReconfigToAddModList-r16 CondReconfigToAddModList-r16 OPTIONAL, -- Need N

...

}

CondReconfigToRemoveList-r16 ::= SEQUENCE (SIZE (1.. maxNrofCondCells-r16)) OF CondReconfigId-r16

-- TAG-CONDITIONALRECONFIGURATION-STOP

-- ASN1STOP

| *ConditionalReconfiguration* field descriptions |
| --- |
| ***attemptCondReconfig***  If present, the UE shall perform conditional reconfiguration if selected cell is a target candidate cell and it is the first cell selection after failure as described in clause 5.3.7.3. |
| ***condReconfigToAddModList***  List of the configuration of candidate SpCells to be added or modified for CHO, CPA or CPC. |
| ***condReconfigToRemoveList***  List of the configuration of candidate SpCells to be removed. |

|  |  |
| --- | --- |
| Conditional Presence | Explanation |
| *CHO* | The field is optional present, Need R, if the UE is configured with at least a candidate SpCell for CHO. Otherwise the field is not present. |

#### – *ConfiguredGrantConfig*

The IE *ConfiguredGrantConfig* is used to configure uplink transmission without dynamic grant according to two possible schemes. The actual uplink grant may either be configured via RRC (*type1*) or provided via the PDCCH (addressed to CS-RNTI) (*type2*). Multiple Configured Grant configurations may be configured in one BWP of a serving cell.

*ConfiguredGrantConfig* information element

-- ASN1START

-- TAG-CONFIGUREDGRANTCONFIG-START

ConfiguredGrantConfig ::= SEQUENCE {

frequencyHopping ENUMERATED {intraSlot, interSlot} OPTIONAL, -- Need S

cg-DMRS-Configuration DMRS-UplinkConfig,

mcs-Table ENUMERATED {qam256, qam64LowSE} OPTIONAL, -- Need S

mcs-TableTransformPrecoder ENUMERATED {qam256, qam64LowSE} OPTIONAL, -- Need S

uci-OnPUSCH SetupRelease { CG-UCI-OnPUSCH } OPTIONAL, -- Need M

resourceAllocation ENUMERATED { resourceAllocationType0, resourceAllocationType1, dynamicSwitch },

rbg-Size ENUMERATED {config2} OPTIONAL, -- Need S

powerControlLoopToUse ENUMERATED {n0, n1},

p0-PUSCH-Alpha P0-PUSCH-AlphaSetId,

transformPrecoder ENUMERATED {enabled, disabled} OPTIONAL, -- Need S

nrofHARQ-Processes INTEGER(1..16),

repK ENUMERATED {n1, n2, n4, n8},

repK-RV ENUMERATED {s1-0231, s2-0303, s3-0000} OPTIONAL, -- Need R

periodicity ENUMERATED {

sym2, sym7, sym1x14, sym2x14, sym4x14, sym5x14, sym8x14, sym10x14, sym16x14, sym20x14,

sym32x14, sym40x14, sym64x14, sym80x14, sym128x14, sym160x14, sym256x14, sym320x14, sym512x14,

sym640x14, sym1024x14, sym1280x14, sym2560x14, sym5120x14,

sym6, sym1x12, sym2x12, sym4x12, sym5x12, sym8x12, sym10x12, sym16x12, sym20x12, sym32x12,

sym40x12, sym64x12, sym80x12, sym128x12, sym160x12, sym256x12, sym320x12, sym512x12, sym640x12,

sym1280x12, sym2560x12

},

configuredGrantTimer INTEGER (1..64) OPTIONAL, -- Need R

rrc-ConfiguredUplinkGrant SEQUENCE {

timeDomainOffset INTEGER (0..5119),

timeDomainAllocation INTEGER (0..15),

frequencyDomainAllocation BIT STRING (SIZE(18)),

antennaPort INTEGER (0..31),

dmrs-SeqInitialization INTEGER (0..1) OPTIONAL, -- Need R

precodingAndNumberOfLayers INTEGER (0..63),

srs-ResourceIndicator INTEGER (0..15) OPTIONAL, -- Need R

mcsAndTBS INTEGER (0..31),

frequencyHoppingOffset INTEGER (1.. maxNrofPhysicalResourceBlocks-1) OPTIONAL, -- Need R

pathlossReferenceIndex INTEGER (0..maxNrofPUSCH-PathlossReferenceRSs-1),

...,

[[

pusch-RepTypeIndicator-r16 ENUMERATED {pusch-RepTypeA,pusch-RepTypeB} OPTIONAL, -- Need M

frequencyHoppingPUSCH-RepTypeB-r16 ENUMERATED {interRepetition, interSlot} OPTIONAL, -- Cond RepTypeB

timeReferenceSFN-r16 ENUMERATED {sfn512} OPTIONAL -- Need S

]],

[[

pathlossReferenceIndex2-r17 INTEGER (0..maxNrofPUSCH-PathlossReferenceRSs-1) OPTIONAL, -- Need R

srs-ResourceIndicator2-r17 INTEGER (0..15) OPTIONAL, -- Need R

precodingAndNumberOfLayers2-r17 INTEGER (0..63) OPTIONAL, -- Need R

timeDomainAllocation-v1710 INTEGER (16..63) OPTIONAL, -- Need M

timeDomainOffset-r17 INTEGER (0..40959) OPTIONAL, -- Need R

cg-SDT-Configuration-r17 CG-SDT-Configuration-r17 OPTIONAL -- Need M

]]

} OPTIONAL, -- Need R

...,

[[

cg-RetransmissionTimer-r16 INTEGER (1..64) OPTIONAL, -- Need R

cg-minDFI-Delay-r16 ENUMERATED

{sym7, sym1x14, sym2x14, sym3x14, sym4x14, sym5x14, sym6x14, sym7x14, sym8x14,

sym9x14, sym10x14, sym11x14, sym12x14, sym13x14, sym14x14,sym15x14, sym16x14

} OPTIONAL, -- Need R

cg-nrofPUSCH-InSlot-r16 INTEGER (1..7) OPTIONAL, -- Need R

cg-nrofSlots-r16 INTEGER (1..40) OPTIONAL, -- Need R

cg-StartingOffsets-r16 CG-StartingOffsets-r16 OPTIONAL, -- Need R

cg-UCI-Multiplexing-r16 ENUMERATED {enabled} OPTIONAL, -- Need R

cg-COT-SharingOffset-r16 INTEGER (1..39) OPTIONAL, -- Need R

betaOffsetCG-UCI-r16 INTEGER (0..31) OPTIONAL, -- Need R

cg-COT-SharingList-r16 SEQUENCE (SIZE (1..1709)) OF CG-COT-Sharing-r16 OPTIONAL, -- Need R

harq-ProcID-Offset-r16 INTEGER (0..15) OPTIONAL, -- Need M

harq-ProcID-Offset2-r16 INTEGER (0..15) OPTIONAL, -- Need M

configuredGrantConfigIndex-r16 ConfiguredGrantConfigIndex-r16 OPTIONAL, -- Cond CG-List

configuredGrantConfigIndexMAC-r16 ConfiguredGrantConfigIndexMAC-r16 OPTIONAL, -- Cond CG-IndexMAC

periodicityExt-r16 INTEGER (1..5120) OPTIONAL, -- Need R

startingFromRV0-r16 ENUMERATED {on, off} OPTIONAL, -- Need R

phy-PriorityIndex-r16 ENUMERATED {p0, p1} OPTIONAL, -- Need R

autonomousTx-r16 ENUMERATED {enabled} OPTIONAL -- Cond LCH-BasedPrioritization

]],

[[

cg-betaOffsetsCrossPri0-r17 SetupRelease { BetaOffsetsCrossPriSelCG-r17 } OPTIONAL, -- Need M

cg-betaOffsetsCrossPri1-r17 SetupRelease { BetaOffsetsCrossPriSelCG-r17 } OPTIONAL, -- Need M

mappingPattern-r17 ENUMERATED {cyclicMapping, sequentialMapping} OPTIONAL, -- Cond SRSsets

sequenceOffsetForRV-r17 INTEGER (0..3) OPTIONAL, -- Need R

p0-PUSCH-Alpha2-r17 P0-PUSCH-AlphaSetId OPTIONAL, -- Need R

powerControlLoopToUse2-r17 ENUMERATED {n0, n1} OPTIONAL, -- Need R

cg-COT-SharingList-r17 SEQUENCE (SIZE (1..50722)) OF CG-COT-Sharing-r17 OPTIONAL, -- Need R

periodicityExt-r17 INTEGER (1..40960) OPTIONAL, -- Need R

repK-v1710 ENUMERATED {n12, n16, n24, n32} OPTIONAL, -- Need R

nrofHARQ-Processes-v1700 INTEGER(17..32) OPTIONAL, -- Need M

harq-ProcID-Offset2-v1700 INTEGER (16..31) OPTIONAL, -- Need R

configuredGrantTimer-v1700 INTEGER(33..288) OPTIONAL, -- Need R

cg-minDFI-Delay-v1710 INTEGER (238..3584) OPTIONAL -- Need R

]]

}

CG-UCI-OnPUSCH ::= CHOICE {

dynamic SEQUENCE (SIZE (1..4)) OF BetaOffsets,

semiStatic BetaOffsets

}

CG-COT-Sharing-r16 ::= CHOICE {

noCOT-Sharing-r16 NULL,

cot-Sharing-r16 SEQUENCE {

duration-r16 INTEGER (1..39),

offset-r16 INTEGER (1..39),

channelAccessPriority-r16 INTEGER (1..4)

}

}

CG-COT-Sharing-r17 ::= CHOICE {

noCOT-Sharing-r17 NULL,

cot-Sharing-r17 SEQUENCE {

duration-r17 INTEGER (1..319),

offset-r17 INTEGER (1..319)

}

}

CG-StartingOffsets-r16 ::= SEQUENCE {

cg-StartingFullBW-InsideCOT-r16 SEQUENCE (SIZE (1..7)) OF INTEGER (0..6) OPTIONAL, -- Need R

cg-StartingFullBW-OutsideCOT-r16 SEQUENCE (SIZE (1..7)) OF INTEGER (0..6) OPTIONAL, -- Need R

cg-StartingPartialBW-InsideCOT-r16 INTEGER (0..6) OPTIONAL, -- Need R

cg-StartingPartialBW-OutsideCOT-r16 INTEGER (0..6) OPTIONAL -- Need R

}

BetaOffsetsCrossPriSelCG-r17 ::= CHOICE {

dynamic-r17 SEQUENCE (SIZE (1..4)) OF BetaOffsetsCrossPri-r17,

semiStatic-r17 BetaOffsetsCrossPri-r17

}

CG-SDT-Configuration-r17 ::= SEQUENCE {

cg-SDT-RetransmissionTimer INTEGER (1..64) OPTIONAL, -- Need R

sdt-SSB-Subset-r17 CHOICE {

shortBitmap-r17 BIT STRING (SIZE (4)),

mediumBitmap-r17 BIT STRING (SIZE (8)),

longBitmap-r17 BIT STRING (SIZE (64))

} OPTIONAL, -- Need S

sdt-SSB-PerCG-PUSCH-r17 ENUMERATED {oneEighth, oneFourth, half, one, two, four, eight, sixteen} OPTIONAL, -- Need M

sdt-P0-PUSCH-r17 INTEGER (-16..15) OPTIONAL, -- Need M

sdt-Alpha-r17 ENUMERATED {alpha0, alpha04, alpha05, alpha06, alpha07, alpha08, alpha09, alpha1} OPTIONAL, -- Need M

sdt-DMRS-Ports-r17 CHOICE {

dmrsType1-r17 BIT STRING (SIZE (8)),

dmrsType2-r17 BIT STRING (SIZE (12))

} OPTIONAL, -- Need M

sdt-NrofDMRS-Sequences-r17 INTEGER (1..2) OPTIONAL -- Need M

}

-- TAG-CONFIGUREDGRANTCONFIG-STOP

-- ASN1STOP

|  |
| --- |
| *ConfiguredGrantConfig* field descriptions |
| ***antennaPort***  Indicates the antenna port(s) to be used for this configuration, and the maximum bitwidth is 5. See TS 38.214 [19], clause 6.1.2, and TS 38.212 [17], clause 7.3.1. The UE ignores this field in case of CG-SDT. |
| ***autonomousTx***  If this field is present, the Configured Grant configuration is configured with autonomous transmission, see TS 38.321 [3]. |
| ***betaOffsetCG-UCI***  Beta offset for CG-UCI in CG-PUSCH, see TS 38.213 [13], clause 9.3 |
| ***cg-betaOffsetsCrossPri0, cg-betaOffsetsCrossPri1***  Selection between and configuration of dynamic and semi-static beta-offset for multiplexing HARQ-ACK in CG-PUSCH with different priorities.  The field *cg-betaOffsetsCrossPri0* indicates multiplexing LP HARQ-ACK in HP CG-PUSCH. This field is configured only if *phy-PriorityIndex-r16* is configured with value *p1*.  The field *cg-betaOffsetsCrossPri1* indicates multiplexing HP HARQ-ACK in LP CG-PUSCH. This field is configured only if *phy-PriorityIndex-r16* is configured with value *p0*. |
| ***cg-COT-SharingList***  Indicates a table for COT sharing combinations (see 37.213 [48], clause 4.1.3). One row of the table can be set to noCOT-Sharing to indicate that there is no channel occupancy sharing. If the *cg-RetransmissionTimer-r16* is configured and the UE operates as an initiating device in semi-static channel access mode (see TS 37.213 [48], clause 4.3), then c*g-COT-SharingList-r16* is configured*.* |
| ***cg-COT-SharingOffset***  Indicates the offset from the end of the slot where the COT sharing indication in UCI is enabled where the offset in symbols is equal to 14\*n, where n is the signaled value for *cg-COT-SharingOffset*. Applicable when *ul-toDL-COT-SharingED-Threshold-r16* is not configured (see 37.213 [48], clause 4.1.3). |
| ***cg-DMRS-Configuration***  DMRS configuration (see TS 38.214 [19], clause 6.1.2.3). |
| ***cg-minDFI-Delay***  Indicates the minimum duration (in unit of symbols) from the ending symbol of the PUSCH to the starting symbol of the PDCCH containing the downlink feedback indication (DFI) carrying HARQ-ACK for this PUSCH. The HARQ-ACK received before this minimum duration is not considered as valid for this PUSCH (see TS 38.213 [13], clause 10.5). The following minimum duration values are supported, depending on the configured subcarrier spacing [symbols]:  15 kHz: 7, m\*14, where m = {1, 2, 3, 4}  30 kHz: 7, m\*14, where m = {1, 2, 3, 4, 5, 6, 7, 8}  60 kHz: 7, m\*14, where m = {1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16}  120 kHz: 7, m\*14, where m = {1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32}  480 kHz: m\*14, where m = {2, 4, 8, 12, 16, 20, 24, 28, 32, 36, 40, 44, 48, 52, 56, 60, 64, 68, 72, 76, 80, 84, 88, 92, 96, 100, 104, 108, 112, 116, 120, 124, 128}  960 kHz: m\*14, where m = {4, 8, 16, 24, 32, 40, 48, 56, 64, 72, 80, 88, 96, 104, 112, 120, 128, 136, 144, 152, 160, 168, 176, 184, 192, 200, 208, 216, 224, 232, 240, 248, 256} |
| ***cg-nrofPUSCH-InSlot***  Indicates the number of consecutive PUSCH configured to CG within a slot where the SLIV indicating the first PUSCH and additional PUSCH appended with the same length (see TS 38.214 [19], clause 6.1.2.3). The network can only configure this field if *cg-RetransmissionTimer* is configured. |
| ***cg-nrofSlots***  Indicates the number of allocated slots in a configured grant periodicity following the time instance of configured grant offset (see TS 38.214 [19], clause 6.1.2.3). The network can only configure this field if *cg-RetransmissionTimer* is configured. |
| ***cg-RetransmissionTimer***  Indicates the initial value of the configured retransmission timer (see TS 38.321 [3]) in multiples of *periodicity*. The value of *cg-RetransmissionTimer* is always less than or equal to the value of *configuredGrantTimer.* This field is always configured together with *harq-ProcID-Offset*. This field is not configured for operation in licensed spectrum or simultaneously with *harq-ProcID-Offset2.* |
| ***cg-StartingOffsets***  This field is not applicable for a UE which is allowed to operate as an initiating device in semi-static channel access mode, i.e., not applicable for a UE configured with UE FFP parameters (e.g. period, offset) regardless whether the UE would initiate its own COT or would share gNB's COT. |
| ***cg-UCI-Multiplexing***  If present, this field indicates that in the case of PUCCH overlapping with CG-PUSCH(s) within a PUCCH group, the CG-UCI and HARQ-ACK are jointly encoded (see TS 38.213 [13], clause 9). |
| ***configuredGrantConfigIndex***  Indicates the index of the Configured Grant configurations within the BWP. |
| ***configuredGrantConfigIndexMAC***  Indicates the index of the Configured Grant configurations within the MAC entity. |
| ***configuredGrantTimer***  Indicates the initial value of the configured grant timer (see TS 38.321 [3]) in multiples of periodicity. When *cg-RetransmissonTimer* is configured, if HARQ processes are shared among different configured grants on the same BWP, *configuredGrantTimer \* periodicity* is set to the same value for the configurations that share HARQ processes on this BWP. The value of the extension *configuredGrantTimer* is 2 times the configured value. |
| ***dmrs-SeqInitialization***  The network configures this field if *transformPrecoder* is disabled or when the value of *sdt-NrofDMRS-Sequences* is set to 1. Otherwise, the field is absent. |
| ***frequencyDomainAllocation***  Indicates the frequency domain resource allocation, see TS 38.214 [19], clause 6.1.2, and TS 38.212 [17], clause 7.3.1). |
| ***frequencyHopping***  The value *intraSlot* enables 'Intra-slot frequency hopping' and the value *interSlot* enables 'Inter-slot frequency hopping'. If the field is absent, frequency hopping is not configured. The field *frequencyHopping* applies to configured grant for 'pusch-RepTypeA' (see TS 38.214 [19], clause 6.3.1). |
| ***frequencyHoppingOffset***  Frequency hopping offset used when frequency hopping is enabled (see TS 38.214 [19], clause 6.1.2 and clause 6.3). |
| ***frequencyHoppingPUSCH-RepTypeB***  Indicates the frequency hopping scheme for Type 1 CG when *pusch-RepTypeIndicator* is set to 'pusch-RepTypeB' (see TS 38.214 [19], clause 6.1). The value *interRepetition* enables 'Inter-repetition frequency hopping', and the value *interSlot* enables 'Inter-slot frequency hopping'. If the field is absent, the frequency hopping is not enabled for Type 1 CG. |
| ***harq-ProcID-Offset***  For operation with shared spectrum channel access configured with *cg-RetransmissionTimer-r16*, this configures the range of HARQ process IDs which can be used for this configured grant where the UE can select a HARQ process ID within [*harq-procID-offset, ..,* (*harq-procID-offset + nrofHARQ-Processes* – 1)]. |
| ***harq-ProcID-Offset2***  Indicates the offset used in deriving the HARQ process IDs, see TS 38.321 [3], clause 5.4.1. This field is not configured together with *cg-RetransmissionTimer-r16*. If the field *harq-ProcID-Offset2-v1700* is present, the UE shall ignore the *harq-ProcID-Offset2-r16*. |
| ***mappingPattern***  Indicates whether the UE should follow Cyclical mapping pattern or Sequential mapping pattern when two SRS resource sets are configured in *srs-ResourceSetToAddModList* or *srs-ResourceSetToAddModListDCI-0-2* with usage 'codebook' or 'noncodebook' for PUSCH transmission with a Type 1 configured grant and/or a Type 2 configured grant as described in clause 6.1.2.3 of TS 38.214 [19] |
| ***mcs-Table***  Indicates the MCS table the UE shall use for PUSCH without transform precoding. If the field is absent the UE applies the value *qam64*. |
| ***mcs-TableTransformPrecoder***  Indicates the MCS table the UE shall use for PUSCH with transform precoding. If the field is absent the UE applies the value *qam64*. |
| ***mcsAndTBS***  The modulation order, target code rate and TB size (see TS 38.214 [19], clause 6.1.2). The NW does not configure the values 28~31 in this version of the specification. |
| ***nrofHARQ-Processes***  The number of HARQ processes configured. It applies for both Type 1 and Type 2. See TS 38.321 [3], clause 5.4.1. If the UE is configured with *nrofHARQ-Processes-v1700, the* UE shall ignore *nrofHARQ-Processes (without suffix)*. |
| ***pathlossReferenceIndex***  Indicates the reference signal index used as PUSCH pathloss reference (see TS 38.213 [13], clause 7.1.1). In case of CG-SDT, the UE does not use this field. |
| ***pathlossReferenceIndex2***  Indicates the reference signal used as PUSCH pathloss reference for the second SRS resource set. When this field is present, pathlossReferenceIndex indicates the reference signal used as PUSCH pathloss reference for the first SRS resource set |
| ***p0-PUSCH-Alpha***  Index of the *P0-PUSCH-AlphaSet* to be used for this configuration. |
| ***p0-PUSCH-Alpha2***  Index of the *P0-PUSCH-AlphaSet* to be used for second SRS resource set. If this field is present, the *p0-PUSCH-Alpha* provides index for the P0-PUSCH-AlphaSet to be used for first SRS resource set. |
| ***periodicity***  Periodicity for UL transmission without UL grant for type 1 and type 2 (see TS 38.321 [3], clause 5.8.2).  The following periodicities are supported depending on the configured subcarrier spacing [symbols]:  15 kHz: 2, 7, n\*14, where n={1, 2, 4, 5, 8, 10, 16, 20, 32, 40, 64, 80, 128, 160, 320, 640}  30 kHz: 2, 7, n\*14, where n={1, 2, 4, 5, 8, 10, 16, 20, 32, 40, 64, 80, 128, 160, 256, 320, 640, 1280}  60 kHz with normal CP 2, 7, n\*14, where n={1, 2, 4, 5, 8, 10, 16, 20, 32, 40, 64, 80, 128, 160, 256, 320, 512, 640, 1280, 2560}  60 kHz with ECP: 2, 6, n\*12, where n={1, 2, 4, 5, 8, 10, 16, 20, 32, 40, 64, 80, 128, 160, 256, 320, 512, 640, 1280, 2560}  120 kHz: 2, 7, n\*14, where n={1, 2, 4, 5, 8, 10, 16, 20, 32, 40, 64, 80, 128, 160, 256, 320, 512, 640, 1024, 1280, 2560, 5120}  480 and 960 kHz: n\*14, where n={1, 2, 4, 5, 8, 10, 16, 20, 32, 40, 64, 80, 128, 160, 256, 320, 512, 640, 1024, 1280, 2560, 5120} |
| ***periodicityExt***  This field is used to calculate the periodicity for UL transmission without UL grant for type 1 and type 2 (see TS 38.321 [3], clause 5,8.2). If this field is present, the field *periodicity* is ignored.  The following periodicites are supported depending on the configured subcarrier spacing [symbols]:  15 kHz: *periodicityExt*\*14, where *periodicityExt* has a value between 1 and 640.  30 kHz: *periodicityExt*\*14, where *periodicityExt* has a value between 1 and 1280.  60 kHz with normal CP: *periodicityExt*\*14, where *periodicityExt* has a value between 1 and 2560.  60 kHz with ECP: *periodicityExt*\*12, where *periodicityExt* has a value between 1 and 2560.  120 kHz: *periodicityExt*\*14, where *periodicityExt* has a value between 1 and 5120.  480 kHz: *periodicityExt*\*14, where *periodicityExt* has a value between 1 and 20480.  960 kHz: *periodicityExt*\*14, where *periodicityExt* has a value between 1 and 40960. |
| ***phy-PriorityIndex***  Indicates the PHY priority of CG PUSCH at least for PHY-layer collision handling. Value *p0* indicates low priority and value *p1* indicates high priority. The network does not configure this for CG-SDT. |
| ***powerControlLoopToUse***  Closed control loop to apply (see TS 38.213 [13], clause 7.1.1). |
| ***powerControlLoopToUse2***  Closed control loop to apply to second SRS resource set (see TS 38.213 [13], clause 7.1.1). If this field is present, the *powerControlLoopToUse* applies to the first SRS resource set. |
| ***precodingAndNumberOfLayers***  Indicates the precoding and number of layers (see TS 38.212 [17], clause 7.3.1.1.2, and TS 38.214 [19], clause 6.1.2.3). In case of CG-SDT, network sets this field to 1. |
| ***precodingAndNumberOfLayers2***  Indicates the precoding and number of layers for the second SRS resource set. When this field is present, *precodingAndNumberOfLayers* indicated the precoding and number of layers for the first SRS resource set. |
| ***pusch-RepTypeIndicator***  Indicates whether UE follows the behavior for PUSCH repetition type A or the behavior for PUSCH repetition type B for each Type 1 configured grant configuration. The value *pusch-RepTypeA* enables the 'PUSCH repetition type A' and the value *pusch-RepTypeB* enables the 'PUSCH repetition type B' (see TS 38.214 [19], clause 6.1.2.3). The value *pusch-RepTypeB* is not configured simultaneously with *cg-nrofPUSCH-InSlot-r16* and *cg-nrofSlots-r16*. The network does not configure this field if *cg-RetransmissionTimer-r16* is configured for CG operation with shared spectrum channel access. |
| ***rbg-Size***  Selection between configuration 1 and configuration 2 for RBG size for PUSCH. The UE does not apply this field if *resourceAllocation* is set to *resourceAllocationType1*. Otherwise, the UE applies the value *config1* when the field is absent. Note: *rbg-Size* is used when the *transformPrecoder* parameter is disabled. |
| ***repK-RV***  The redundancy version (RV) sequence to use. See TS 38.214 [19], clause 6.1.2. The network configures this field if repetitions are used, i.e., if *repK* is set to *n2*, *n4* or *n8*. This field is not configured when *cg-RetransmissionTimer* is configured. Otherwise, the field is absent. |
| ***repK***  Number of repetitions K, see TS 38.214 [19]. If the field *repK-v1710* is present, the UE shall ignore the *repK* (without suffix). |
| ***resourceAllocation***  Configuration of resource allocation type 0 and resource allocation type 1. For Type 1 UL data transmission without grant, *resourceAllocation* should be *resourceAllocationType0* or *resourceAllocationType1*. |
| ***rrc-ConfiguredUplinkGrant***  Configuration for "configured grant" transmission with fully RRC-configured UL grant (Type1). If this field is absent the UE uses UL grant configured by DCI addressed to CS-RNTI (Type2). |
| ***sequenceOffsetForRV***  Configures the RV offset for the starting RV for the first repetition (first actual repetition in PUSCH repetition Type B) towards the second 'SRS resource set' for PUSCH configured in either *srs-ResourceSetToAddModList* or *srs-ResourceSetToAddModListDCI-0-2* with usage 'codebook' or 'noncodebook'. |
| ***srs-ResourceIndicator***  Indicates the SRS resource to be used. The network does not configure this for CG-SDT. |
| ***srs-ResourceIndicator2***  Indicates the SRS resource to be used for the second SRS resource set. When this field is present, the srs-ResourceIndicator is used for the first SRS resource set. |
| ***startingFromRV0***  This field is used to determine the initial transmission occasion of a transport block for a given RV sequence, see TS 38.214 [19], clause 6.1.2.3.1. The network does not configure this field if *cg-RetransmissionTimer-r16* is configured for CG operation. |
| ***timeDomainAllocation, timeDomainAllocation-v1710***  Indicates a combination of start symbol and length and PUSCH mapping type, see TS 38.214 [19], clause 6.1.2 and TS 38.212 [17], clause 7.3.1.  If the field *timeDomainAllocation-v1710* is present, the UE shall ignore *timeDomainAllocation* field (without suffix). |
| ***timeDomainOffset***  Offset related to the reference SFN indicated by *timeReferenceSFN*, see TS 38.321 [3], clause 5.8.2. *timeDomainOffset-r17* is only applicable to 480 kHz and 960 kHz. If *timeDomainOffset-r17* is present, the UE shall ignore *timeDomainOffset* (without suffix). |
| ***timeReferenceSFN***  Indicates SFN used for determination of the offset of a resource in time domain. The UE uses the closest SFN with the indicated number preceding the reception of the configured grant configuration, see TS 38.321 [3], clause 5.8.2. If the field *timeReferenceSFN* is not present, the reference SFN is 0. |
| ***transformPrecoder***  Enables or disables transform precoding for *type1* and *type2*. If the field is absent, the UE enables or disables transform precoding in accordance with the field *msg3-transformPrecoder* in *RACH-ConfigCommon*, see TS 38.214 [19], clause 6.1.3. |
| ***uci-OnPUSCH***  Selection between and configuration of dynamic and semi-static beta-offset. For Type 1 UL data transmission without grant, *uci-OnPUSCH* should be set to *semiStatic.* |

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| --- |
| *CG-COT-Sharing* field descriptions |
| ***channelAccessPriority***  Indicates the Channel Access Priority Class that the gNB can assume when sharing the UE initiated COT (see 37.213 [48], clause 4.1.3). |
| ***duration***  Indicates the number of DL transmission slots within UE initiated COT (see 37.213 [48], clause 4.1.3). |
| ***offset***  Indicates the number of DL transmission slots from the end of the slot where CG-UCI is detected after which COT sharing can be used (see 37.213 [48], clause 4.1.3). |

|  |
| --- |
| *CG-StartingOffsets* field descriptions |
| ***cg-StartingFullBW-InsideCOT***  A set of configured grant PUSCH transmission starting offsets which indicates the length of a CP extension of the first symbol that is located before the configured resource when frequency domain resource allocation includes all interlaces in the allocated RB set(s) and the CG PUSCH resource is inside gNB COT (see TS 38.214 [19], clause 6.1.2.3). |
| ***cg-StartingFullBW-OutsideCOT***  A set of configured grant PUSCH transmission starting offset indices (see TS 38.211[16], Table 5.3.1-2) which indicates the length of a CP extension of the first symbol that is located before the configured resource when frequency domain resource allocation includes all interlaces in the allocated RB set(s) and the CG PUSCH resource is outside gNB COT (see TS 38.214 [19], clause 6.1.2.3). |
| ***cg-StartingPartialBW-InsideCOT***  A set of configured grant PUSCH transmission starting offset index (see TS 38.211[16], Table 5.3.1-2) which indicates the length of a CP extension of the first symbol that is located before the configured resource when frequency domain resource allocation does not include all interlaces in the allocated RB set(s) and the CG PUSCH resource is inside gNB COT (see TS 38.214 [19], clause 6.1.2.3). |
| ***cg-StartingPartialBW-OutsideCOT***  A set of configured grant PUSCH transmission starting offset index (see TS 38.211[16], Table 5.3.1-2) which indicates the length of a CP extension of the first symbol that is located before the configured resource when frequency domain resource allocation does not include all interlaces in the allocated RB set(s) and the CG PUSCH resource is outside gNB COT (see TS 38.214 [19], clause 6.1.2.3). |

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| *CG-SDT-Configuration* field descriptions |
| ***cg-SDT-RetransmissionTimer***  Indicates the initial value of the configured grant retransmission timer used for the initial transmission of CG-SDT with CCCH message (see TS 38.321 [3]) in multiples of *periodicity*. |
| ***sdt-DMRS-Ports***  Indicates the set of DMRS ports for SSB to PUSCH mapping (see TS 38.213 [13]). |
| ***sdt-NrofDMRS-Sequences***  Indicates the number of DMRS sequences for SSB to PUSCH mapping (see TS 38.213 [13]). |
| ***sdt-SSB-Subset***  Indicates SSB subset for SSB to CG PUSCH mapping within one CG configuration. If this field is absent, UE assumes the SSB set includes all actually transmitted SSBs configured by SIB1. |
| ***sdt-SSB-PerCG-PUSCH***  The number of SSBs per CG PUSCH (see TS 38.213 [13]). Value *one* corresponds to 1 SSBs per CG PUSCH, value *two* corresponds to 2 SSBs per CG PUSCH and so on. |
| ***sdt-P0-PUSCH***  Indicates P0 value for PUSCH for CG SDT in steps of 1dB (see TS 38.213 [13]). When this field is configured, the UE ignores the *p0-PUSCH-Alpha*. |
| ***sdt-Alpha***  Indicates alpha value for PUSCH for CG SDT. *alpha0* indicates value 0 is used *alpha04* indicates value 4 is used and so on (see TS 38.213 [13]). When this field is configured, the UE ignores the *p0-PUSCH-Alpha*. |

|  |  |
| --- | --- |
| Conditional Presence | Explanation |
| *LCH-BasedPrioritization* | This field is optionally present, Need R, if *lch-BasedPrioritization* is configured in the MAC entity. It is absent otherwise. |
| *RepTypeB* | The field is optionally present if pusch-RepTypeIndicator is set to pusch-RepTypeB, Need S, and absent otherwise. |
| *CG-List* | The field is mandatory present when included in *configuredGrantConfigToAddModList-r16*, otherwise the field is absent. |
| *CG-IndexMAC* | The field is mandatory present if at least one configured grant is configured by *configuredGrantConfigToAddModList-r16* in any BWP of this MAC entity, otherwise it is optionally present, need R. |
| *SRSsets* | This field is mandatory present when UE is configured with two SRS sets configured in either *srs-ResourceSetToAddModList* or *srs-ResourceSetToAddModListDCI-0-2* with usage codebook or non-codebook. Otherwise it is absent, Need R |

#### – *ConfiguredGrantConfigIndex*

The IE *ConfiguredGrantConfigIndex* is used to indicate the index of one of multiple UL Configured Grant configurations in one BWP.

*ConfiguredGrantConfigIndex* information element

-- ASN1START

-- TAG-CONFIGUREDGRANTCONFIGINDEX-START

ConfiguredGrantConfigIndex-r16 ::= INTEGER (0.. maxNrofConfiguredGrantConfig-1-r16)

-- TAG-CONFIGUREDGRANTCONFIGINDEX-STOP

-- ASN1STOP

#### – *ConfiguredGrantConfigIndexMAC*

The IE *ConfiguredGrantConfigIndexMAC* is used to indicate the unique Configured Grant configurations index per MAC entity.

*ConfiguredGrantConfigIndexMAC* information element

-- ASN1START

-- TAG-CONFIGUREDGRANTCONFIGINDEXMAC-START

ConfiguredGrantConfigIndexMAC-r16 ::= INTEGER (0.. maxNrofConfiguredGrantConfigMAC-1-r16)

-- TAG-CONFIGUREDGRANTCONFIGINDEXMAC-STOP

-- ASN1STOP

#### – *ConnEstFailureControl*

The IE *ConnEstFailureControl* is used to configure parameters for connection establishment failure control.

*ConnEstFailureControl* information element

-- ASN1START

-- TAG-CONNESTFAILURECONTROL-START

ConnEstFailureControl ::= SEQUENCE {

connEstFailCount ENUMERATED {n1, n2, n3, n4},

connEstFailOffsetValidity ENUMERATED {s30, s60, s120, s240, s300, s420, s600, s900},

connEstFailOffset INTEGER (0..15) OPTIONAL -- Need S

}

-- TAG-CONNESTFAILURECONTROL-STOP

-- ASN1STOP

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| --- |
| *ConnEstFailureControl* field descriptions |
| ***connEstFailCount***  Number of times that the UE detects T300 expiry on the same cell before applying *connEstFailOffset*. |
| ***connEstFailOffset***  Parameter "Qoffsettemp" in TS 38.304 [20]. If the field is absent, the value of infinity shall be used for "Qoffsettemp". |
| ***connEstFailOffsetValidity***  Amount of time that the UE applies *connEstFailOffset* before removing the offset from evaluation of the cell. Value *s30* corresponds to 30 seconds, value *s60* corresponds to 60 seconds, and so on. |

#### – *ControlResourceSet*

The IE *ControlResourceSet* is used to configure a time/frequency control resource set (CORESET) in which to search for downlink control information (see TS 38.213 [13], clause 10.1).

*ControlResourceSet* information element

-- ASN1START

-- TAG-CONTROLRESOURCESET-START

ControlResourceSet ::= SEQUENCE {

controlResourceSetId ControlResourceSetId,

frequencyDomainResources BIT STRING (SIZE (45)),

duration INTEGER (1..maxCoReSetDuration),

cce-REG-MappingType CHOICE {

interleaved SEQUENCE {

reg-BundleSize ENUMERATED {n2, n3, n6},

interleaverSize ENUMERATED {n2, n3, n6},

shiftIndex INTEGER(0..maxNrofPhysicalResourceBlocks-1) OPTIONAL -- Need S

},

nonInterleaved NULL

},

precoderGranularity ENUMERATED {sameAsREG-bundle, allContiguousRBs},

tci-StatesPDCCH-ToAddList SEQUENCE(SIZE (1..maxNrofTCI-StatesPDCCH)) OF TCI-StateId OPTIONAL, -- Cond NotSIB-initialBWP

tci-StatesPDCCH-ToReleaseList SEQUENCE(SIZE (1..maxNrofTCI-StatesPDCCH)) OF TCI-StateId OPTIONAL, -- Cond NotSIB-initialBWP

tci-PresentInDCI ENUMERATED {enabled} OPTIONAL, -- Need S

pdcch-DMRS-ScramblingID INTEGER (0..65535) OPTIONAL, -- Need S

...,

[[

rb-Offset-r16 INTEGER (0..5) OPTIONAL, -- Need S

tci-PresentDCI-1-2-r16 INTEGER (1..3) OPTIONAL, -- Need S

coresetPoolIndex-r16 INTEGER (0..1) OPTIONAL, -- Need S

controlResourceSetId-v1610 ControlResourceSetId-v1610 OPTIONAL -- Need S

]],

[[

followUnifiedTCIstate-r17 ENUMERATED {enabled} OPTIONAL -- Need R

]]

}

-- TAG-CONTROLRESOURCESET-STOP

-- ASN1STOP

|  |
| --- |
| *ControlResourceSet* field descriptions |
| ***cce-REG-MappingType***  Mapping of Control Channel Elements (CCE) to Resource Element Groups (REG) (see TS 38.211 [16], clauses 7.3.2.2 and 7.4.1.3.2). |
| ***controlResourceSetId***  Identifies the instance of the *ControlResourceSet* IE. Value 0 identifies the common CORESET configured in *MIB* and in *ServingCellConfigCommon* (*controlResourceSetZero*) and is hence not used here in the *ControlResourceSet* IE. Other values identify CORESETs configured by dedicated signalling or in *SIB1* or *SIB20*. The *controlResourceSetId* is unique among the BWPs of a serving cell.  If the field *controlResourceSetId-v1610* is present, the UE shall ignore the *controlResourceSetId* field (without suffix). |
| ***coresetPoolIndex***  The index of the CORESET pool for this CORESET as specified in TS 38.213 [13] (clauses 9 and 10) and TS 38.214 [19] (clauses 5.1 and 6.1). If the field is absent, the UE applies the value 0. |
| ***duration***  Contiguous time duration of the CORESET in number of symbols (see TS 38.211 [16], clause 7.3.2.2). |
| ***followUnifiedTCIstate***  When set to enabled, for PDCCH reception on this CORESET, the UE applies the "indicated" DL only TCI or joint TCI as specified in TS 38.214 clause 5.1.5. |
| ***frequencyDomainResources***  Frequency domain resources for the CORESET. Each bit corresponds a group of 6 RBs, with grouping starting from the first RB group in the BWP or MBS CFR where the CORESET is configured. When at least one search space is configured with *freqMonitorLocation-r16*, only the first bits are valid (see TS 38.213 [13], clause 10.1). The first (left-most / most significant) bit corresponds to the first RB group in the BWP or MBS CFR where the CORESET is configured, and so on. A bit that is set to 1 indicates that this RB group belongs to the frequency domain resource of this CORESET. Bits corresponding to a group of RBs not fully contained in the bandwidth part within which the CORESET is configured are set to zero (see TS 38.211 [16], clause 7.3.2.2). |
| ***interleaverSize***  Interleaver-size (see TS 38.211 [16], clause 7.3.2.2). |
| ***pdcch-DMRS-ScramblingID***  PDCCH DMRS scrambling initialization (see TS 38.211 [16], clause 7.4.1.3.1). When the field is absent the UE applies the value of the *physCellId* configured for this serving cell. |
| ***precoderGranularity***  Precoder granularity in frequency domain (see TS 38.211 [16], clauses 7.3.2.2 and 7.4.1.3.2). |
| ***rb-Offset***  Indicates the RB level offset in units of RB from the first RB of the first 6RB group to the first RB of BWP (see 38.213 [13], clause 10.1). |
| ***reg-BundleSize***  Resource Element Groups (REGs) can be bundled to create REG bundles. This parameter defines the size of such bundles (see TS 38.211 [16], clause 7.3.2.2). |
| ***shiftIndex***  When the field is absent the UE applies the value of the *physCellId*configured for this serving cell (see TS 38.211 [16], clause 7.3.2.2). |
| ***tci-PresentInDCI***  This field indicates if TCI field is present or absent in DCI format 1\_1 and DCI format 4\_2. When the field is absent the UE considers the TCI to be absent/disabled. In case of cross carrier scheduling, the network sets this field to enabled for the *ControlResourceSet* used for cross carrier scheduling in DCI format 1\_1 in the scheduling cell if *enableDefaultBeamForCCS* is not configured (see TS 38.214 [19], clause 5.1.5). |
| ***tci-PresentDCI-1-2***  Configures the number of bits for "Transmission configuration indicator" in DCI format 1\_2. When the field is absent the UE applies the value of 0 bit for the "Transmission configuration indicator" in DCI format 1\_2 (see TS 38.212, clause 7.3.1 and TS 38.214, clause 5.1.5). In case of cross carrier scheduling, the network configures this field for the *ControlResourceSet* used for cross carrier scheduling in DCI format 1\_2 in the scheduling cell if *enableDefaultBeamForCCS* is not configured (see TS 38.214 [19], clause 5.1.5). |
| ***tci-StatesPDCCH-ToAddList***  A subset of the TCI states defined in pdsch-Config included in the *BWP-DownlinkDedicated* corresponding to the serving cell and to the DL BWP to which the *ControlResourceSet* belong to. They are used for providing QCL relationships between the DL RS(s) in one RS Set (TCI-State) and the PDCCH DMRS ports (see TS 38.213 [13], clause 6.). The network configures at most *maxNrofTCI-StatesPDCCH* entries. The QCL relationships defined herein do not apply to MBS broadcast. |

|  |  |
| --- | --- |
| Conditional Presence | Explanation |
| *NotSIB-initialBWP* | The field is absent in *SIB1/SIB20* and in the *PDCCH-ConfigCommon* of the initial BWP in *ServingCellConfigCommon*, if *SIB1/SIB20* is broadcasted. Otherwise, it is optionally present, Need N. |

#### – *ControlResourceSetId*

The *ControlResourceSetId* IE concerns a short identity, used to identify a control resource set within a serving cell. The *ControlResourceSetId* = 0 identifies the ControlResourceSet#0 configured via PBCH (*MIB*) and in *controlResourceSetZero* (*ServingCellConfigCommon*). The ID space is used across the BWPs and MBS CFRs of a Serving Cell.

*ControlResourceSetId* information element

-- ASN1START

-- TAG-CONTROLRESOURCESETID-START

ControlResourceSetId ::= INTEGER (0..maxNrofControlResourceSets-1)

ControlResourceSetId-r16 ::= INTEGER (0..maxNrofControlResourceSets-1-r16)

ControlResourceSetId-v1610 ::= INTEGER (maxNrofControlResourceSets..maxNrofControlResourceSets-1-r16)

-- TAG-CONTROLRESOURCESETID-STOP

-- ASN1STOP

#### – *ControlResourceSetZero*

The IE *ControlResourceSetZero* is used to configure CORESET#0 of the initial BWP (see TS 38.213 [13], clause 13).

*ControlResourceSetZero* information element

-- ASN1START

-- TAG-CONTROLRESOURCESETZERO-START

ControlResourceSetZero ::= INTEGER (0..15)

-- TAG-CONTROLRESOURCESETZERO-STOP

-- ASN1STOP

#### – *CrossCarrierSchedulingConfig*

The IE *CrossCarrierSchedulingConfig* is used to specify the configuration when the cross-carrier scheduling is used in a cell.

*CrossCarrierSchedulingConfig* information element

-- ASN1START

-- TAG-CROSSCARRIERSCHEDULINGCONFIG-START

CrossCarrierSchedulingConfig ::= SEQUENCE {

schedulingCellInfo CHOICE {

own SEQUENCE { -- Cross carrier scheduling: scheduling cell

cif-Presence BOOLEAN

},

other SEQUENCE { -- Cross carrier scheduling: scheduled cell

schedulingCellId ServCellIndex,

cif-InSchedulingCell INTEGER (1..7)

}

},

...,

[[

carrierIndicatorSize-r16 SEQUENCE {

carrierIndicatorSizeDCI-1-2-r16 INTEGER (0..3),

carrierIndicatorSizeDCI-0-2-r16 INTEGER (0..3)

} OPTIONAL, -- Cond CIF-PRESENCE

enableDefaultBeamForCCS-r16 ENUMERATED {enabled} OPTIONAL -- Need S

]],

[[

ccs-BlindDetectionSplit-r17 ENUMERATED {oneSeventh, threeFourteenth, twoSeventh, threeSeventh,

oneHalf, fourSeventh, fiveSeventh, spare1} OPTIONAL -- Need R

]]

}

-- TAG-CROSSCARRIERSCHEDULINGCONFIG-STOP

-- ASN1STOP

| *CrossCarrierSchedulingConfig* field descriptions |
| --- |
| ***carrierIndicatorSizeDCI-0-2, carrierIndicatorSizeDCI-1-2***  Configures the number of bits for the field of carrier indicator in PDCCH DCI format 0\_2/1\_2. The field *carrierIndicatorSizeDCI-0-2* refers to DCI format 0\_2 and the field *carrierIndicatorSizeDCI-1-2* refers to DCI format 1\_2, respectively (see TS 38.212 [17], clause 7.3.1 and TS 38.213 [13], clause 10.1). |
| ***ccs-BlindDetectionSplit***  Indicates the share of blind detection candidates and non-overlapping CCEs for PDCCH monitoring on an SpCell and an SCell when cross-carrier scheduling is configured from the SCell for the SpCell (see TS 38.213 [13], clause 10.1.1). The network only configures this field when it sets the field *other* for an SpCell, i.e., when it configures cross-carrier scheduling of the SpCell by a PDCCH on an Scell. |
| ***cif-Presence***  The field is used to indicate whether carrier indicator field is present (value *true*) or not (value *false*) in PDCCH DCI formats, see TS 38.213 [13]. If *cif-Presence* is set to *true*, the CIF value indicating a grant or assignment for this cell is 0. |
| ***cif-InSchedulingCell***  The field indicates the CIF value used in the scheduling cell to indicate a grant or assignment applicable for this cell, see TS 38.213 [13]. If configured for an SpCell, the non-fallback DCI formats on the SpCell include same number of CIF bits as the corresponding non-fallback DCI formats on the scheduling cell, and the CIF bits are considered reserved. |
| ***enableDefaultBeamForCCS***  This field indicates whether default beam selection for cross-carrier scheduled PDSCH is enabled, see TS 38.214 [19]. If not present, the default beam selection behaviour is not applied, i.e. Rel-15 behaviour is applied. This field can only be configured in the cross-scheduled SCell or SpCell. |
| ***other***  Parameters for cross-carrier scheduling. If configured for an SpCell, the SpCell can be scheduled by the PDCCH on another SCell as well as by the PDCCH on the SpCell. If configured for an SCell, the SCell is scheduled by a PDDCH on another cell. |
| ***own***  Parameters for self-scheduling, i.e., a serving cell is scheduled by its own PDCCH. |
| ***schedulingCellId***  If configured for an SpCell, this field indicates which SCell, in addition to the SpCell, signals the downlink allocations and uplink grants, if applicable, for the concerned SpCell. If configured for an Scell, this field indicates which cell signals the downlink allocations and uplink grants, if applicable, for the concerned SCell. In case the UE is configured with DC, the scheduling cell is part of the same cell group (i.e. MCG or SCG) as the scheduled cell. In case the UE is configured with two PUCCH groups, the scheduling cell and the scheduled cell are within the same PUCCH group. If *drx-ConfigSecondaryGroup* is configured in the *MAC-CellGroupConfig* associated with this serving cell, the scheduling cell and the scheduled cell belong to the same Frequency Range. In addition, the serving cell with an aperiodic CSI trigger and the PUSCH resource scheduled for the report are on the same carrier and serving cell, but the cell for which CSI is reported may belong to the same or a different Frequency Range. The network should not trigger a CSI request for a serving cell in the other Frequency Range when that serving cell is outside Active Time. |

|  |  |
| --- | --- |
| Conditional Presence | Explanation |
| *CIF-PRESENCE* | The field is mandatory present if the *cif-Presence* is set to *true*. The field is absent otherwise. |

#### – *CSI-AperiodicTriggerStateList*

The *CSI-AperiodicTriggerStateList* IE is used to configure the UE with a list of aperiodic trigger states. Each codepoint of the DCI field "CSI request" is associated with one trigger state (see TS 38.321 [3], clause 6.1.3.13). Upon reception of the value associated with a trigger state, the UE will perform measurement of CSI-RS, CSI-IM and/or SSB (reference signals) and aperiodic reporting on L1 according to all entries in the *associatedReportConfigInfoList* for that trigger state.

*CSI-AperiodicTriggerStateList* information element

-- ASN1START

-- TAG-CSI-APERIODICTRIGGERSTATELIST-START

CSI-AperiodicTriggerStateList ::= SEQUENCE (SIZE (1..maxNrOfCSI-AperiodicTriggers)) OF CSI-AperiodicTriggerState

CSI-AperiodicTriggerState ::= SEQUENCE {

associatedReportConfigInfoList SEQUENCE (SIZE(1..maxNrofReportConfigPerAperiodicTrigger)) OF CSI-AssociatedReportConfigInfo,

...

}

CSI-AssociatedReportConfigInfo ::= SEQUENCE {

reportConfigId CSI-ReportConfigId,

resourcesForChannel CHOICE {

nzp-CSI-RS SEQUENCE {

resourceSet INTEGER (1..maxNrofNZP-CSI-RS-ResourceSetsPerConfig),

qcl-info SEQUENCE (SIZE(1..maxNrofAP-CSI-RS-ResourcesPerSet)) OF TCI-StateId

OPTIONAL -- Cond Aperiodic

},

csi-SSB-ResourceSet INTEGER (1..maxNrofCSI-SSB-ResourceSetsPerConfig)

},

csi-IM-ResourcesForInterference INTEGER(1..maxNrofCSI-IM-ResourceSetsPerConfig) OPTIONAL, -- Cond CSI-IM-ForInterference

nzp-CSI-RS-ResourcesForInterference INTEGER (1..maxNrofNZP-CSI-RS-ResourceSetsPerConfig) OPTIONAL, -- Cond NZP-CSI-RS-ForInterference

...,

[[

ap-CSI-MultiplexingMode-r17 ENUMERATED {enabled} OPTIONAL, -- Need R

resourcesForChannel2-r17 CHOICE {

nzp-CSI-RS2-r17 SEQUENCE {

resourceSet2-r17 INTEGER (1..maxNrofNZP-CSI-RS-ResourceSetsPerConfig),

qcl-info2-r17 SEQUENCE (SIZE(1..maxNrofAP-CSI-RS-ResourcesPerSet)) OF TCI-StateId

OPTIONAL -- Cond Aperiodic

},

csi-SSB-ResourceSet2-r17 INTEGER (1..maxNrofCSI-SSB-ResourceSetsPerConfigExt)

} OPTIONAL, -- Cond NoUnifiedTCI

csi-SSB-ResourceSetExt INTEGER (1..maxNrofCSI-SSB-ResourceSetsPerConfigExt) OPTIONAL -- Need R

]]

}

-- TAG-CSI-APERIODICTRIGGERSTATELIST-STOP

-- ASN1STOP

|  |
| --- |
| *CSI-AssociatedReportConfigInfo* field descriptions |
| ***ap-CSI-MultiplexingMode***  Indicates if the behavior of transmitting aperiodic CSI on the first PUSCH repetitions corresponding to two SRS resource sets configured in *srs-ResourceSetToAddModList* or *srs-ResourceSetToAddModListDCI-0-2* with usage '*codebook*' or '*noncodebook*' is enabled or not. |
| ***csi-IM-ResourcesForInterference***  *CSI-IM-ResourceSet* for interference measurement. Entry number in csi-IM-ResourceSetList in the CSI-ResourceConfig indicated by *csi-IM-ResourcesForInterference* in the *CSI-ReportConfig* indicated by *reportConfigId* above (value 1 corresponds to the first entry, value 2 to the second entry, and so on). The indicated *CSI-IM-ResourceSet* should have exactly the same number of resources like the *NZP-CSI-RS-ResourceSet* indicated in *resourceSet* within *nzp-CSI-RS*. |
| ***csi-SSB-ResourceSet,*** ***csi-SSB-ResourceSet2***  CSI-SSB-ResourceSet for channel measurements. Entry number in *csi-SSB-ResourceSetList* in the *CSI-ResourceConfig* indicated by *resourcesForChannelMeasurement* in the *CSI-ReportConfig* indicated by *reportConfigId* above (value 1 corresponds to the first entry, value 2 to the second entry, and so on). |
| ***nzp-CSI-RS-ResourcesForInterference***  *NZP-CSI-RS-ResourceSet* for interference measurement. Entry number in *nzp-CSI-RS-ResourceSetList* in the *CSI-ResourceConfig* indicated by *nzp-CSI-RS-ResourcesForInterference* in the *CSI-ReportConfig* indicated by *reportConfigId* above (value 1 corresponds to the first entry, value 2 to the second entry, and so on). |
| ***qcl-info, qcl-info2***  List of references to TCI-States for providing the QCL source and QCL type for each *NZP-CSI-RS-Resource* listed in *nzp-CSI-RS-Resources* of the *NZP-CSI-RS-ResourceSet* indicated by *resourceSet* within *nzp-CSI-RS*. Each *TCI-StateId* refers to the *TCI-State* which has this value for *tci-StateId* and is defined in *tci-StatesToAddModList* in the *PDSCH-Config* included in the *BWP-Downlink* corresponding to the serving cell and to the DL BWP to which the *resourcesForChannelMeasuremen*t (in the *CSI-ReportConfig* indicated by *reportConfigId* above) belong to. First entry in *qcl-info* corresponds to first entry in *nzp-CSI-RS-Resources* of that *NZP-CSI-RS-ResourceSet*, second entry in *qcl-info* corresponds to second entry in *nzp-CSI-RS-Resources*, and so on (see TS 38.214 [19], clause 5.2.1.5.1). When this field is absent for aperiodic CSI RS, the UE shall use QCL information included in the "indicated" DL only/Joint TCI state as specified in TS 38.214 |
| ***reportConfigId***  The *reportConfigId* of one of the *CSI-ReportConfigToAddMod* configured in *CSI-MeasConfig* |
| ***resourcesForChannel2***  Configures reference signals for channel measurement corresponding to the second resource set for L1-RSRP measurement as configured in IE *CSI-ResourceConfig* when *nrofReportedGroups-r17* is configured in IE *CSI-ReportConfig*. If this is present, network configures csi-SSB-ResourceSetExt instead of csi-SSB-ResourceSet and the UE ignores csi-SSB-ResourceSet in resourcesForChannel, and the *resourcesForChannel* configures the reference signals for channel measurement corresponding to the first resource set for L1-RSRP measurement (see TS 38.214 [19], clause 5.2.1.4). |
| ***resourceSet***  *NZP-CSI-RS-ResourceSet* for channel measurements. Entry number in *nzp-CSI-RS-ResourceSetList* in the *CSI-ResourceConfig* indicated by *resourcesForChannelMeasurement* in the *CSI-ReportConfig* indicated by r*eportConfigId* above (value 1 corresponds to the first entry, value 2 to the second entry, and so on). |

|  |  |
| --- | --- |
| Conditional Presence | Explanation |
| *Aperiodic* | The field is mandatory present if the *NZP-CSI-RS-Resources* in the associated *resourceSet* have the resourceType aperiodic. The field is absent otherwise. |
| *CSI-IM-ForInterference* | This field is mandatory present if the *CSI-ReportConfig* identified by *reportConfigId* is configured with *csi-IM-ResourcesForInterference*; otherwise it is absent. |
| *NZP-CSI-RS-ForInterference* | This field is mandatory present if the *CSI-ReportConfig* identified by *reportConfigId* is configured with *nzp-CSI-RS-ResourcesForInterference*; otherwise it is absent. |
| *NoUnifiedTCI* | This field is absent, Need R, if *unifiedTCI-StateType* is configured for the serving cell in which the *CSI-AperiodicTriggerStateList* is included. It is optionally present, Need R, otherwise. |

#### – *CSI-FrequencyOccupation*

The IE *CSI-FrequencyOccupation* is used to configure the frequency domain occupation of a channel state information measurement resource (e.g. *NZP-CSI-RS-Resource*, *CSI-IM-Resource*).

*CSI-FrequencyOccupation* information element

-- ASN1START

-- TAG-CSI-FREQUENCYOCCUPATION-START

CSI-FrequencyOccupation ::= SEQUENCE {

startingRB INTEGER (0..maxNrofPhysicalResourceBlocks-1),

nrofRBs INTEGER (24..maxNrofPhysicalResourceBlocksPlus1),

...

}

-- TAG-CSI-FREQUENCYOCCUPATION-STOP

-- ASN1STOP

|  |
| --- |
| *CSI-FrequencyOccupation* field descriptions |
| ***nrofRBs***  Number of PRBs across which this CSI resource spans. Only multiples of 4 are allowed. The smallest configurable number is the minimum of 24 and the width of the associated BWP. If the configured value is larger than the width of the corresponding BWP, the UE shall assume that the actual CSI-RS bandwidth is equal to the width of the BWP. |
| ***startingRB***  PRB where this CSI resource starts in relation to common resource block #0 (CRB#0) on the common resource block grid. Only multiples of 4 are allowed (0, 4, ...) |

#### – *CSI-IM-Resource*

The IE *CSI-IM-Resource* is used to configure one CSI Interference Management (IM) resource.

*CSI-IM-Resource* information element

-- ASN1START

-- TAG-CSI-IM-RESOURCE-START

CSI-IM-Resource ::= SEQUENCE {

csi-IM-ResourceId CSI-IM-ResourceId,

csi-IM-ResourceElementPattern CHOICE {

pattern0 SEQUENCE {

subcarrierLocation-p0 ENUMERATED { s0, s2, s4, s6, s8, s10 },

symbolLocation-p0 INTEGER (0..12)

},

pattern1 SEQUENCE {

subcarrierLocation-p1 ENUMERATED { s0, s4, s8 },

symbolLocation-p1 INTEGER (0..13)

}

} OPTIONAL, -- Need M

freqBand CSI-FrequencyOccupation OPTIONAL, -- Need M

periodicityAndOffset CSI-ResourcePeriodicityAndOffset OPTIONAL, -- Cond PeriodicOrSemiPersistent

...

}

-- TAG-CSI-IM-RESOURCE-STOP

-- ASN1STOP

|  |
| --- |
| *CSI-IM-Resource* field descriptions |
| ***csi-IM-ResourceElementPattern***  The resource element pattern (Pattern0 (2,2) or Pattern1 (4,1)) with corresponding parameters (see TS 38.214 [19], clause 5.2.2.4) |
| ***freqBand***  Frequency-occupancy of CSI-IM (see TS 38.214 [19], clause 5.2.2.4) |
| ***periodicityAndOffset***  Periodicity and slot offset for periodic/semi-persistent CSI-IM. Network always configures the UE with a value for this field for periodic and semi-persistent CSI-IM-Resources (as indicated in CSI-ResourceConfig). A change of configuration between periodic or semi-persistent and aperiodic for a CSI-IM-Resource is not supported without a release and add. |
| ***subcarrierLocation-p0***  OFDM subcarrier occupancy of the CSI-IM resource for Pattern0 (see TS 38.214 [19], clause 5.2.2.4) |
| ***subcarrierLocation-p1***  OFDM subcarrier occupancy of the CSI-IM resource for Pattern1 (see TS 38.214 [19], clause 5.2.2.4) |
| ***symbolLocation-p0***  OFDM symbol location of the CSI-IM resource for Pattern0 (see TS 38.214 [19], clause 5.2.2.4) |
| ***symbolLocation-p1***  OFDM symbol location of the CSI-IM resource for Pattern1 (see TS 38.214 [19], clause 5.2.2.4) |

|  |  |
| --- | --- |
| Conditional Presence | Explanation |
| *PeriodicOrSemiPersistent* | The field is optionally present, Need M, for periodic and semi-persistent CSI-IM-Resources (as indicated in CSI-ResourceConfig). The field is absent otherwise. |

#### – *CSI-IM-ResourceId*

The IE *CSI-IM-ResourceId* is used to identify one *CSI-IM-Resource*.

*CSI-IM-ResourceId* information element

-- ASN1START

-- TAG-CSI-IM-RESOURCEID-START

CSI-IM-ResourceId ::= INTEGER (0..maxNrofCSI-IM-Resources-1)

-- TAG-CSI-IM-RESOURCEID-STOP

-- ASN1STOP

#### – *CSI-IM-ResourceSet*

The IE *CSI-IM-ResourceSet* is used to configure a set of one or more CSI Interference Management (IM) resources (their IDs) and set-specific parameters.

*CSI-IM-ResourceSet* information element

-- ASN1START

-- TAG-CSI-IM-RESOURCESET-START

CSI-IM-ResourceSet ::= SEQUENCE {

csi-IM-ResourceSetId CSI-IM-ResourceSetId,

csi-IM-Resources SEQUENCE (SIZE(1..maxNrofCSI-IM-ResourcesPerSet)) OF CSI-IM-ResourceId,

...

}

-- TAG-CSI-IM-RESOURCESET-STOP

-- ASN1STOP

|  |
| --- |
| *CSI-IM-ResourceSet* field descriptions |
| ***csi-IM-Resources***  *CSI-IM-Resources* associated with this *CSI-IM-ResourceSet* (see TS 38.214 [19], clause 5.2). |

#### – *CSI-IM-ResourceSetId*

The IE *CSI-IM-ResourceSetId* is used to identify *CSI-IM-ResourceSet*s.

*CSI-IM-ResourceSetId* information element

-- ASN1START

-- TAG-CSI-IM-RESOURCESETID-START

CSI-IM-ResourceSetId ::= INTEGER (0..maxNrofCSI-IM-ResourceSets-1)

-- TAG-CSI-IM-RESOURCESETID-STOP

-- ASN1STOP

#### – *CSI-MeasConfig*

The IE *CSI-MeasConfig* is used to configure CSI-RS (reference signals) belonging to the serving cell in which *CSI-MeasConfig* is included, channel state information reports to be transmitted on PUCCH on the serving cell in which *CSI-MeasConfig* is included and channel state information reports on PUSCH triggered by DCI received on the serving cell in which *CSI-MeasConfig* is included. See also TS 38.214 [19], clause 5.2.

*CSI-MeasConfig* information element

-- ASN1START

-- TAG-CSI-MEASCONFIG-START

CSI-MeasConfig ::= SEQUENCE {

nzp-CSI-RS-ResourceToAddModList SEQUENCE (SIZE (1..maxNrofNZP-CSI-RS-Resources)) OF NZP-CSI-RS-Resource OPTIONAL, -- Need N

nzp-CSI-RS-ResourceToReleaseList SEQUENCE (SIZE (1..maxNrofNZP-CSI-RS-Resources)) OF NZP-CSI-RS-ResourceId OPTIONAL, -- Need N

nzp-CSI-RS-ResourceSetToAddModList SEQUENCE (SIZE (1..maxNrofNZP-CSI-RS-ResourceSets)) OF NZP-CSI-RS-ResourceSet

OPTIONAL, -- Need N

nzp-CSI-RS-ResourceSetToReleaseList SEQUENCE (SIZE (1..maxNrofNZP-CSI-RS-ResourceSets)) OF NZP-CSI-RS-ResourceSetId

OPTIONAL, -- Need N

csi-IM-ResourceToAddModList SEQUENCE (SIZE (1..maxNrofCSI-IM-Resources)) OF CSI-IM-Resource OPTIONAL, -- Need N

csi-IM-ResourceToReleaseList SEQUENCE (SIZE (1..maxNrofCSI-IM-Resources)) OF CSI-IM-ResourceId OPTIONAL, -- Need N

csi-IM-ResourceSetToAddModList SEQUENCE (SIZE (1..maxNrofCSI-IM-ResourceSets)) OF CSI-IM-ResourceSet OPTIONAL, -- Need N

csi-IM-ResourceSetToReleaseList SEQUENCE (SIZE (1..maxNrofCSI-IM-ResourceSets)) OF CSI-IM-ResourceSetId OPTIONAL, -- Need N

csi-SSB-ResourceSetToAddModList SEQUENCE (SIZE (1..maxNrofCSI-SSB-ResourceSets)) OF CSI-SSB-ResourceSet OPTIONAL, -- Need N

csi-SSB-ResourceSetToReleaseList SEQUENCE (SIZE (1..maxNrofCSI-SSB-ResourceSets)) OF CSI-SSB-ResourceSetId OPTIONAL, -- Need N

csi-ResourceConfigToAddModList SEQUENCE (SIZE (1..maxNrofCSI-ResourceConfigurations)) OF CSI-ResourceConfig

OPTIONAL, -- Need N

csi-ResourceConfigToReleaseList SEQUENCE (SIZE (1..maxNrofCSI-ResourceConfigurations)) OF CSI-ResourceConfigId

OPTIONAL, -- Need N

csi-ReportConfigToAddModList SEQUENCE (SIZE (1..maxNrofCSI-ReportConfigurations)) OF CSI-ReportConfig OPTIONAL, -- Need N

csi-ReportConfigToReleaseList SEQUENCE (SIZE (1..maxNrofCSI-ReportConfigurations)) OF CSI-ReportConfigId

OPTIONAL, -- Need N

reportTriggerSize INTEGER (0..6) OPTIONAL, -- Need M

aperiodicTriggerStateList SetupRelease { CSI-AperiodicTriggerStateList } OPTIONAL, -- Need M

semiPersistentOnPUSCH-TriggerStateList SetupRelease { CSI-SemiPersistentOnPUSCH-TriggerStateList } OPTIONAL, -- Need M

...,

[[

reportTriggerSizeDCI-0-2-r16 INTEGER (0..6) OPTIONAL -- Need R

]],

[[

sCellActivationRS-ConfigToAddModList-r17 SEQUENCE (SIZE (1..maxNrofSCellActRS-r17)) OF SCellActivationRS-Config-r17 OPTIONAL, -- Need N

sCellActivationRS-ConfigToReleaseList-r17 SEQUENCE (SIZE (1..maxNrofSCellActRS-r17)) OF SCellActivationRS-ConfigId-r17 OPTIONAL -- Need N

]]

}

-- TAG-CSI-MEASCONFIG-STOP

-- ASN1STOP

|  |
| --- |
| *CSI-MeasConfig* field descriptions |
| ***aperiodicTriggerStateList***  Contains trigger states for dynamically selecting one or more aperiodic and semi-persistent reporting configurations and/or triggering one or more aperiodic CSI-RS resource sets for channel and/or interference measurement (see TS 38.214 [19], clause 5.2.1). |
| ***csi-IM-ResourceSetToAddModList***  Pool of *CSI-IM-ResourceSet* which can be referred to from *CSI-ResourceConfig* or from MAC CEs. |
| ***csi-IM-ResourceToAddModList***  Pool of *CSI-IM-Resource* which can be referred to from *CSI-IM-ResourceSet*. |
| ***csi-ReportConfigToAddModList***  Configured CSI report settings as specified in TS 38.214 [19] clause 5.2.1.1. |
| ***csi-ResourceConfigToAddModList***  Configured CSI resource settings as specified in TS 38.214 [19] clause 5.2.1.2. |
| ***csi-SSB-ResourceSetToAddModList***  Pool of CSI-SSB-ResourceSet which can be referred to from *CSI-ResourceConfig*. |
| ***nzp-CSI-RS-ResourceSetToAddModList***  Pool of *NZP-CSI-RS-ResourceSet* which can be referred to from *CSI-ResourceConfig* or from MAC CEs. |
| ***nzp-CSI-RS-ResourceToAddModList***  Pool of *NZP-CSI-RS-Resource* which can be referred to from *NZP-CSI-RS-ResourceSet*. |
| ***reportTriggerSize, reportTriggerSizeDCI-0-2***  Size of CSI request field in DCI (bits) (see TS 38.214 [19], clause 5.2.1.5.1). The field *reportTriggerSize* applies to DCI format 0\_1 and the field *reportTriggerSizeDCI-0-2* applies to DCI format 0\_2 (see TS 38.214 [19], clause 5.2.1.5.1). |
| ***scellActivationRS-ConfigToAddModList***  Configured RS for fast SCell activation as specified in TS 38.214 [19] clause x.y.z. |

#### – *CSI-ReportConfig*

The IE *CSI-ReportConfig* is used to configure a periodic or semi-persistent report sent on PUCCH on the cell in which the *CSI-ReportConfig* is included, or to configure a semi-persistent or aperiodic report sent on PUSCH triggered by DCI received on the cell in which the *CSI-ReportConfig* is included (in this case, the cell on which the report is sent is determined by the received DCI). See TS 38.214 [19], clause 5.2.1.

*CSI-ReportConfig* information element

-- ASN1START

-- TAG-CSI-REPORTCONFIG-START

CSI-ReportConfig ::= SEQUENCE {

reportConfigId CSI-ReportConfigId,

carrier ServCellIndex OPTIONAL, -- Need S

resourcesForChannelMeasurement CSI-ResourceConfigId,

csi-IM-ResourcesForInterference CSI-ResourceConfigId OPTIONAL, -- Need R

nzp-CSI-RS-ResourcesForInterference CSI-ResourceConfigId OPTIONAL, -- Need R

reportConfigType CHOICE {

periodic SEQUENCE {

reportSlotConfig CSI-ReportPeriodicityAndOffset,

pucch-CSI-ResourceList SEQUENCE (SIZE (1..maxNrofBWPs)) OF PUCCH-CSI-Resource

},

semiPersistentOnPUCCH SEQUENCE {

reportSlotConfig CSI-ReportPeriodicityAndOffset,

pucch-CSI-ResourceList SEQUENCE (SIZE (1..maxNrofBWPs)) OF PUCCH-CSI-Resource

},

semiPersistentOnPUSCH SEQUENCE {

reportSlotConfig ENUMERATED {sl5, sl10, sl20, sl40, sl80, sl160, sl320},

reportSlotOffsetList SEQUENCE (SIZE (1.. maxNrofUL-Allocations)) OF INTEGER(0..32),

p0alpha P0-PUSCH-AlphaSetId

},

aperiodic SEQUENCE {

reportSlotOffsetList SEQUENCE (SIZE (1..maxNrofUL-Allocations)) OF INTEGER(0..32)

}

},

reportQuantity CHOICE {

none NULL,

cri-RI-PMI-CQI NULL,

cri-RI-i1 NULL,

cri-RI-i1-CQI SEQUENCE {

pdsch-BundleSizeForCSI ENUMERATED {n2, n4} OPTIONAL -- Need S

},

cri-RI-CQI NULL,

cri-RSRP NULL,

ssb-Index-RSRP NULL,

cri-RI-LI-PMI-CQI NULL

},

reportFreqConfiguration SEQUENCE {

cqi-FormatIndicator ENUMERATED { widebandCQI, subbandCQI } OPTIONAL, -- Need R

pmi-FormatIndicator ENUMERATED { widebandPMI, subbandPMI } OPTIONAL, -- Need R

csi-ReportingBand CHOICE {

subbands3 BIT STRING(SIZE(3)),

subbands4 BIT STRING(SIZE(4)),

subbands5 BIT STRING(SIZE(5)),

subbands6 BIT STRING(SIZE(6)),

subbands7 BIT STRING(SIZE(7)),

subbands8 BIT STRING(SIZE(8)),

subbands9 BIT STRING(SIZE(9)),

subbands10 BIT STRING(SIZE(10)),

subbands11 BIT STRING(SIZE(11)),

subbands12 BIT STRING(SIZE(12)),

subbands13 BIT STRING(SIZE(13)),

subbands14 BIT STRING(SIZE(14)),

subbands15 BIT STRING(SIZE(15)),

subbands16 BIT STRING(SIZE(16)),

subbands17 BIT STRING(SIZE(17)),

subbands18 BIT STRING(SIZE(18)),

...,

subbands19-v1530 BIT STRING(SIZE(19))

} OPTIONAL -- Need S

} OPTIONAL, -- Need R

timeRestrictionForChannelMeasurements ENUMERATED {configured, notConfigured},

timeRestrictionForInterferenceMeasurements ENUMERATED {configured, notConfigured},

codebookConfig CodebookConfig OPTIONAL, -- Need R

dummy ENUMERATED {n1, n2} OPTIONAL, -- Need R

groupBasedBeamReporting CHOICE {

enabled NULL,

disabled SEQUENCE {

nrofReportedRS ENUMERATED {n1, n2, n3, n4} OPTIONAL -- Need S

}

},

cqi-Table ENUMERATED {table1, table2, table3, table4-r17} OPTIONAL, -- Need R

subbandSize ENUMERATED {value1, value2},

non-PMI-PortIndication SEQUENCE (SIZE (1..maxNrofNZP-CSI-RS-ResourcesPerConfig)) OF PortIndexFor8Ranks OPTIONAL, -- Need R

...,

[[

semiPersistentOnPUSCH-v1530 SEQUENCE {

reportSlotConfig-v1530 ENUMERATED {sl4, sl8, sl16}

} OPTIONAL -- Need R

]],

[[

semiPersistentOnPUSCH-v1610 SEQUENCE {

reportSlotOffsetListDCI-0-2-r16 SEQUENCE (SIZE (1.. maxNrofUL-Allocations-r16)) OF INTEGER(0..32) OPTIONAL, -- Need R

reportSlotOffsetListDCI-0-1-r16 SEQUENCE (SIZE (1.. maxNrofUL-Allocations-r16)) OF INTEGER(0..32) OPTIONAL -- Need R

} OPTIONAL, -- Need R

aperiodic-v1610 SEQUENCE {

reportSlotOffsetListDCI-0-2-r16 SEQUENCE (SIZE (1.. maxNrofUL-Allocations-r16)) OF INTEGER(0..32) OPTIONAL, -- Need R

reportSlotOffsetListDCI-0-1-r16 SEQUENCE (SIZE (1.. maxNrofUL-Allocations-r16)) OF INTEGER(0..32) OPTIONAL -- Need R

} OPTIONAL, -- Need R

reportQuantity-r16 CHOICE {

cri-SINR-r16 NULL,

ssb-Index-SINR-r16 NULL

} OPTIONAL, -- Need R

codebookConfig-r16 CodebookConfig-r16 OPTIONAL -- Need R

]],

[[

cqi-BitsPerSubband-r17 ENUMERATED {bits4} OPTIONAL, -- Need R

groupBasedBeamReporting-v1710 SEQUENCE {

nrofReportedGroups-r17 ENUMERATED {n1, n2, n3, n4}

} OPTIONAL, -- Need R

codebookConfig-r17 CodebookConfig-r17 OPTIONAL, -- Need R

sharedCMR-r17 ENUMERATED {enable} OPTIONAL, -- Need R

csi-ReportMode-r17 ENUMERATED {mode1, mode2} OPTIONAL, -- Need R

numberOfSingleTRP-CSI-Mode1-r17 ENUMERATED {n0, n1, n2} OPTIONAL, -- Need R

reportQuantity-r17 CHOICE {

cri-RSRP-Index-r17 NULL,

ssb-Index-RSRP-Index-r17 NULL,

cri-SINR-Index-r17 NULL,

ssb-Index-SINR-Index-r17 NULL

} OPTIONAL -- Need R

]]

}

CSI-ReportPeriodicityAndOffset ::= CHOICE {

slots4 INTEGER(0..3),

slots5 INTEGER(0..4),

slots8 INTEGER(0..7),

slots10 INTEGER(0..9),

slots16 INTEGER(0..15),

slots20 INTEGER(0..19),

slots40 INTEGER(0..39),

slots80 INTEGER(0..79),

slots160 INTEGER(0..159),

slots320 INTEGER(0..319)

}

PUCCH-CSI-Resource ::= SEQUENCE {

uplinkBandwidthPartId BWP-Id,

pucch-Resource PUCCH-ResourceId

}

PortIndexFor8Ranks ::= CHOICE {

portIndex8 SEQUENCE{

rank1-8 PortIndex8 OPTIONAL, -- Need R

rank2-8 SEQUENCE(SIZE(2)) OF PortIndex8 OPTIONAL, -- Need R

rank3-8 SEQUENCE(SIZE(3)) OF PortIndex8 OPTIONAL, -- Need R

rank4-8 SEQUENCE(SIZE(4)) OF PortIndex8 OPTIONAL, -- Need R

rank5-8 SEQUENCE(SIZE(5)) OF PortIndex8 OPTIONAL, -- Need R

rank6-8 SEQUENCE(SIZE(6)) OF PortIndex8 OPTIONAL, -- Need R

rank7-8 SEQUENCE(SIZE(7)) OF PortIndex8 OPTIONAL, -- Need R

rank8-8 SEQUENCE(SIZE(8)) OF PortIndex8 OPTIONAL -- Need R

},

portIndex4 SEQUENCE{

rank1-4 PortIndex4 OPTIONAL, -- Need R

rank2-4 SEQUENCE(SIZE(2)) OF PortIndex4 OPTIONAL, -- Need R

rank3-4 SEQUENCE(SIZE(3)) OF PortIndex4 OPTIONAL, -- Need R

rank4-4 SEQUENCE(SIZE(4)) OF PortIndex4 OPTIONAL -- Need R

},

portIndex2 SEQUENCE{

rank1-2 PortIndex2 OPTIONAL, -- Need R

rank2-2 SEQUENCE(SIZE(2)) OF PortIndex2 OPTIONAL -- Need R

},

portIndex1 NULL

}

PortIndex8::= INTEGER (0..7)

PortIndex4::= INTEGER (0..3)

PortIndex2::= INTEGER (0..1)

-- TAG-CSI-REPORTCONFIG-STOP

-- ASN1STOP

|  |
| --- |
| *CSI-ReportConfig* field descriptions |
| ***carrier***  Indicates in which serving cell the *CSI-ResourceConfig* indicated below are to be found. If the field is absent, the resources are on the same serving cell as this report configuration. |
| ***codebookConfig***  Codebook configuration for Type-1 or Type-2 including codebook subset restriction. Network can only configure one of *codebookConfig*, *codebookConfig-r16* or *codebookConfig-r17* to a UE. |
| ***cqi-BitsPerSubband***  This field can only be present if *cqi-FormatIndicator* is set to *subbandCQI*. If the field is configured with *bits4*, the UE uses 4-bit sub-band CQI. If the field is not present and *cqi-FormatIndicator* is set to *subbandCQI*, the UE uses 2-bit sub-band differential CQI. |
| ***cqi-FormatIndicator***  Indicates whether the UE shall report a single (wideband) or multiple (subband) CQI (see TS 38.214 [19], clause 5.2.1.4). |
| ***cqi-Table***  Which CQI table to use for CQI calculation (see TS 38.214 [19], clause 5.2.2.1). For a RedCap UE, CQI table 2 is only supported if the UE indicates support of 256QAM for PUSCH. |
| ***csi-IM-ResourcesForInterference***  CSI IM resources for interference measurement. *csi-ResourceConfigId* of a *CSI-ResourceConfig* included in the configuration of the serving cell indicated with the field "carrier" above. The *CSI-ResourceConfig* indicated here contains only CSI-IM resources. The *bwp-Id* in that *CSI-ResourceConfig* is the same value as the *bwp-Id* in the *CSI-ResourceConfig* indicated by *resourcesForChannelMeasurement*. |
| ***csi-ReportingBand***  Indicates a contiguous or non-contiguous subset of subbands in the bandwidth part which CSI shall be reported for. Each bit in the bit-string represents one subband. The right-most bit in the bit string represents the lowest subband in the BWP. The choice determines the number of subbands (subbands3 for 3 subbands, subbands4 for 4 subbands, and so on) (see TS 38.214 [19], clause 5.2.1.4). This field is absent if there are less than 24 PRBs (no sub band) and present otherwise (see TS 38.214 [19], clause 5.2.1.4). |
| ***csi-ReportMode***  Configures the CSI report modes Mode1 or Mode 2 (see TS 38.214 [19], clause 5.2.1.4.2) |
| ***dummy***  This field is not used in the specification. If received it shall be ignored by the UE. |
| ***groupBasedBeamReporting***  Turning on/off group beam based reporting (see TS 38.214 [19], clause 5.2.1.4). If *groupBasedBeamReporting* (without suffix) is set to disabled, *groupBasedBeamReporting-v1710* is absent. |
| ***non-PMI-PortIndication***  Port indication for RI/CQI calculation. For each CSI-RS resource in the linked ResourceConfig for channel measurement, a port indication for each rank R, indicating which R ports to use. Applicable only for non-PMI feedback (see TS 38.214 [19], clause 5.2.1.4.2).  The first entry in *non-PMI-PortIndication* corresponds to the NZP-CSI-RS-Resource indicated by the first entry in *nzp-CSI-RS-Resources* in the *NZP-CSI-RS-ResourceSet* indicated in the first entry of *nzp-CSI-RS-ResourceSetList* of the *CSI-ResourceConfig* whose *CSI-ResourceConfigId* is indicated in a CSI-MeasId together with the above *CSI-ReportConfigId*; the second entry in *non-PMI-PortIndication* corresponds to the NZP-CSI-RS-Resource indicated by the second entry in *nzp-CSI-RS-Resources* in the *NZP-CSI-RS-ResourceSet* indicated in the first entry of *nzp-CSI-RS-ResourceSetList* of the same *CSI-ResourceConfig*, and so on until the NZP-CSI-RS-Resource indicated by the last entry in *nzp-CSI-RS-Resources* in the in the *NZP-CSI-RS-ResourceSet* indicated in the first entry of *nzp-CSI-RS-ResourceSetList* of the same *CSI-ResourceConfig*. Then the next entry corresponds to the NZP-CSI-RS-Resource indicated by the first entry in *nzp-CSI-RS-Resources* in the *NZP-CSI-RS-ResourceSet* indicated in the second entry of *nzp-CSI-RS-ResourceSetList* of the same *CSI-ResourceConfig* and so on. |
| ***nrofReportedGroups***  Number of reported resource groups per CSI-report *n1* means one resource group, *n2* means 2 resource groups, and so on. If *nrofReportedGroups* is configured, the UE ignores groupBasedBeamReporting (without suffix). |
| ***nrofReportedRS***  The number (N) of measured RS resources to be reported per report setting in a non-group-based report. N <= N\_max, where N\_max is either 2 or 4 depending on UE capability.  (see TS 38.214 [19], clause 5.2.1.4) When the field is absent the UE applies the value 1. |
| ***numberOfSingleTRP-CSI-Mode1***  Configures the number of reported X CSIs when *csi-ReportMode* is set to 'Mode 1' as described in TS 38.214 [19], clause 5.2.1.4.2. The field is present only if csi-ReportMode configures Mode 1. |
| ***nzp-CSI-RS-ResourcesForInterference***  NZP CSI RS resources for interference measurement. *csi-ResourceConfigId* of a *CSI-ResourceConfig* included in the configuration of the serving cell indicated with the field "carrier" above. The *CSI-ResourceConfig* indicated here contains only NZP-CSI-RS resources. The *bwp-Id* in that *CSI-ResourceConfig* is the same value as the *bwp-Id* in the *CSI-ResourceConfig* indicated by *resourcesForChannelMeasurement*. |
| ***p0alpha***  Index of the p0-alpha set determining the power control for this CSI report transmission (see TS 38.214 [19], clause 6.2.1.2). |
| ***pdsch-BundleSizeForCSI***  PRB bundling size to assume for CQI calculation when *reportQuantity* is CRI/RI/i1/CQI. If the field is absent, the UE assumes that no PRB bundling is applied (see TS 38.214 [19], clause 5.2.1.4.2). |
| ***pmi-FormatIndicator***  Indicates whether the UE shall report a single (wideband) or multiple (subband) PMI. (see TS 38.214 [19], clause 5.2.1.4). |
| ***pucch-CSI-ResourceList***  Indicates which PUCCH resource to use for reporting on PUCCH. |
| ***reportConfigType***  Time domain behavior of reporting configuration. |
| ***reportFreqConfiguration***  Reporting configuration in the frequency domain. (see TS 38.214 [19], clause 5.2.1.4). |
| ***reportQuantity***  The CSI related quantities to report. see TS 38.214 [19], clause 5.2.1. If the field *reportQuantity-r16* is present, UE shall ignore *reportQuantity* (without suffix). |
| ***reportSlotConfig***  Periodicity and slot offset (see TS 38.214 [19], clause 5.2.1.4). If the field *reportSlotConfig-v1530* is present, the UE shall ignore the value provided in *reportSlotConfig* (without suffix). |
| ***reportSlotOffsetList, reportSlotOffsetListDCI-0-1***, ***reportSlotOffsetListDCI-0-2***  Timing offset Y for semi persistent reporting using PUSCH. This field lists the allowed offset values. This list must have the same number of entries as the *pusch-TimeDomainAllocationList* in *PUSCH-Config*. A particular value is indicated in DCI. The network indicates in the DCI field of the UL grant, which of the configured report slot offsets the UE shall apply. The DCI value 0 corresponds to the first report slot offset in this list, the DCI value 1 corresponds to the second report slot offset in this list, and so on. The first report is transmitted in slot n+Y, second report in n+Y+P, where P is the configured periodicity.  Timing offset Y for aperiodic reporting using PUSCH. This field lists the allowed offset values. This list must have the same number of entries as the *pusch-TimeDomainAllocationList* in *PUSCH-Config*. A particular value is indicated in DCI. The network indicates in the DCI field of the UL grant, which of the configured report slot offsets the UE shall apply. The DCI value 0 corresponds to the first report slot offset in this list, the DCI value 1 corresponds to the second report slot offset in this list, and so on (see TS 38.214 [19], clause 6.1.2.1).  The field *reportSlotOffsetListDCI-0-1* applies to DCI format 0\_1 and the field *reportSlotOffsetListDCI-0-2* applies to DCI format 0\_2 (see TS 38.214 [19], clause 6.1.2.1). |
| ***resourcesForChannelMeasurement***  Resources for channel measurement. *csi-ResourceConfigId* of a *CSI-ResourceConfig* included in the configuration of the serving cell indicated with the field "carrier" above. The *CSI-ResourceConfig* indicated here contains only NZP-CSI-RS resources and/or SSB resources. This *CSI-ReportConfig* is associated with the DL BWP indicated by *bwp-Id* in that *CSI-ResourceConfig*. |
| ***sharedCMR***  Enables sharing of channel measurement resources between different CSI measurement hypotheses when (1) *csi-ReportMode* is set to 'Mode1' and *numberOfSingleTRP-CSI-Mode1* is set to 1 or 2; or (2) *csi-ReportMode* is set to 'Mode2' (see TS 38.214 [19], clause 5.2.1.4.2). |
| ***subbandSize***  Indicates one out of two possible BWP-dependent values for the subband size as indicated in TS 38.214 [19], table 5.2.1.4-2 . If *csi-ReportingBand* is absent, the UE shall ignore this field. |
| ***timeRestrictionForChannelMeasurements***  Time domain measurement restriction for the channel (signal) measurements (see TS 38.214 [19], clause 5.2.1.1). |
| ***timeRestrictionForInterferenceMeasurements***  Time domain measurement restriction for interference measurements (see TS 38.214 [19], clause 5.2.1.1). |

|  |
| --- |
| *PortIndexFor8Ranks* field descriptions |
| ***portIndex8***  Port-Index configuration for up to rank 8. If present, the network configures port indexes for at least one of the ranks. |
| ***portIndex4***  Port-Index configuration for up to rank 4. If present, the network configures port indexes for at least one of the ranks. |
| ***portIndex2***  Port-Index configuration for up to rank 2. If present, the network configures port indexes for at least one of the ranks. |
| ***portIndex1***  Port-Index configuration for rank 1. |

|  |
| --- |
| *PUCCH-CSI-Resource* field descriptions |
| ***pucch-Resource***  PUCCH resource for the associated uplink BWP. Only PUCCH-Resource of format 2, 3 and 4 is supported. The actual PUCCH-Resource is configured in *PUCCH-Config* and referred to by its ID. When two *PUCCH-Config* are configured within *PUCCH-ConfigurationList*, *PUCCH-ResourceId* in a *PUCCH-CSI-Resource* refers to a PUCCH-Resource in the *PUCCH-Config* used for HARQ-ACK with low priority. |

#### – *CSI-ReportConfigId*

The IE *CSI-ReportConfigId* is used to identify one *CSI-ReportConfig*.

*CSI-ReportConfigId* information element

-- ASN1START

-- TAG-CSI-REPORTCONFIGID-START

CSI-ReportConfigId ::= INTEGER (0..maxNrofCSI-ReportConfigurations-1)

-- TAG-CSI-REPORTCONFIGID-STOP

-- ASN1STOP

#### – *CSI-ResourceConfig*

The IE *CSI-ResourceConfig* defines a group of one or more *NZP-CSI-RS-ResourceSet*, *CSI-IM-ResourceSet* and/or *CSI-SSB-ResourceSet*.

*CSI-ResourceConfig* information element

-- ASN1START

-- TAG-CSI-RESOURCECONFIG-START

CSI-ResourceConfig ::= SEQUENCE {

csi-ResourceConfigId CSI-ResourceConfigId,

csi-RS-ResourceSetList CHOICE {

nzp-CSI-RS-SSB SEQUENCE {

nzp-CSI-RS-ResourceSetList SEQUENCE (SIZE (1..maxNrofNZP-CSI-RS-ResourceSetsPerConfig)) OF NZP-CSI-RS-ResourceSetId

OPTIONAL, -- Need R

csi-SSB-ResourceSetList SEQUENCE (SIZE (1..maxNrofCSI-SSB-ResourceSetsPerConfig)) OF CSI-SSB-ResourceSetId OPTIONAL -- Need R

},

csi-IM-ResourceSetList SEQUENCE (SIZE (1..maxNrofCSI-IM-ResourceSetsPerConfig)) OF CSI-IM-ResourceSetId

},

bwp-Id BWP-Id,

resourceType ENUMERATED { aperiodic, semiPersistent, periodic },

...,

[[

csi-SSB-ResourceSetListExt-r17 CSI-SSB-ResourceSetId OPTIONAL -- Need R

]]

}

-- TAG-CSI-RESOURCECONFIG-STOP

-- ASN1STOP

|  |
| --- |
| *CSI-ResourceConfig* field descriptions |
| ***bwp-Id***  The DL BWP which the CSI-RS associated with this *CSI-ResourceConfig* are located in (see TS 38.214 [19], clause 5.2.1.2. |
| ***csi-IM-ResourceSetList***  List of references to CSI-IM resources used for CSI measurement and reporting in a CSI-RS resource set. Contains up to *maxNrofCSI-IM-ResourceSetsPerConfig* resource sets if *resourceType* is 'aperiodic' and 1 otherwise (see TS 38.214 [19], clause 5.2.1.2). |
| ***csi-ResourceConfigId***  Used in *CSI-ReportConfig* to refer to an instance of *CSI-ResourceConfig.* |
| ***csi-SSB-ResourceSetList, csi-SSB-ResourceSetListExt***  List of references to SSB resources used for CSI measurement and reporting in a CSI-RS resource set (see TS 38.214 [19], clause 5.2.1.2). If *groupBasedBeamReporting-v1710* is configured in the IE *CSI-ReportConfig* that indicates this *CSI-ResourceConfig* as *resourceForChannelMeasurement*, the network configures 2 resource sets, which may be two NZP CSI-RS resource sets, two CSI SSB resource sets or one NZP CSI-RS resource set and one CSI-SSB resource set (see TS 38.214 [19], clause 5.2.1.2 and 5.2.1.4.2). In this case, in TS 38.212 [17] Table 6.3.1.1.2-8B:  - if the list has one CSI-SSB resource set, this resource set is indicated by a resource set indicator set to 1, while the resource set indicator of the *NZP CSI-RS resource* set is 0;  - if the list has two CSI-SSB resource sets, the first resource set is indicated by a resource set indicator set to 0 and the second resource set by a resource set indicator set to 1. |
| ***nzp-CSI-RS-ResourceSetList***  List of references to NZP CSI-RS resources used for beam measurement and reporting in a CSI-RS resource set. Contains up to *maxNrofNZP-CSI-RS-ResourceSetsPerConfig* resource sets if *resourceType* is 'aperiodic'. Otherwise, contains 1 resource set when *groupBasedBeamReporting-v1710* is not configured in IE *CSI-ReportConfig*. If *groupBasedBeamReporting-v1710* is configured and *resourceType* is set to 'periodic' or 'semipersistent', then the network configures 2 resource sets, which may be two NZP CSI-RS resource sets, two CSI SSB resource sets or one NZP CSI-RS resource set and one CSI-SSB resource set (see TS 38.214 [19], clause 5.2.1.2 and 5.2.1.4.2). In this case, in :TS 38.212 [17] Table 6.3.1.1.2-8B:  - if the list has one NZP CSI-RS resource set, this resource set is indicated by a resource set indicator set to 0;  - if the list has two NZP CSI-RS resource sets, the first resource set is indicated by a resource set indicator set to 0 and the second resource set by a resource set indicator set to 1. |
| ***resourceType***  Time domain behavior of resource configuration (see TS 38.214 [19], clause 5.2.1.2). It does not apply to resources provided in the *csi-SSB-ResourceSetList*. |

#### – *CSI-ResourceConfigId*

The IE *CSI-ResourceConfigId* is used to identify a *CSI-ResourceConfig*.

*CSI-ResourceConfigId* information element

-- ASN1START

-- TAG-CSI-RESOURCECONFIGID-START

CSI-ResourceConfigId ::= INTEGER (0..maxNrofCSI-ResourceConfigurations-1)

-- TAG-CSI-RESOURCECONFIGID-STOP

-- ASN1STOP

#### – *CSI-ResourcePeriodicityAndOffset*

The IE *CSI-ResourcePeriodicityAndOffset* is used to configure a periodicity and a corresponding offset for periodic and semi-persistent CSI resources, and for periodic and semi-persistent reporting on PUCCH. both, the periodicity and the offset are given in number of slots. The periodicity value *slots4* corresponds to 4 slots, value *slots5* corresponds to 5 slots, and so on.

*CSI-ResourcePeriodicityAndOffset* information element

-- ASN1START

-- TAG-CSI-RESOURCEPERIODICITYANDOFFSET-START

CSI-ResourcePeriodicityAndOffset ::= CHOICE {

slots4 INTEGER (0..3),

slots5 INTEGER (0..4),

slots8 INTEGER (0..7),

slots10 INTEGER (0..9),

slots16 INTEGER (0..15),

slots20 INTEGER (0..19),

slots32 INTEGER (0..31),

slots40 INTEGER (0..39),

slots64 INTEGER (0..63),

slots80 INTEGER (0..79),

slots160 INTEGER (0..159),

slots320 INTEGER (0..319),

slots640 INTEGER (0..639)

}

-- TAG-CSI-RESOURCEPERIODICITYANDOFFSET-STOP

-- ASN1STOP

#### – *CSI-RS-ResourceConfigMobility*

The IE *CSI-RS-ResourceConfigMobility* is used to configure CSI-RS based RRM measurements.

*CSI-RS-ResourceConfigMobility* information element

-- ASN1START

-- TAG-CSI-RS-RESOURCECONFIGMOBILITY-START

CSI-RS-ResourceConfigMobility ::= SEQUENCE {

subcarrierSpacing SubcarrierSpacing,

csi-RS-CellList-Mobility SEQUENCE (SIZE (1..maxNrofCSI-RS-CellsRRM)) OF CSI-RS-CellMobility,

...,

[[

refServCellIndex ServCellIndex OPTIONAL -- Need S

]]

}

CSI-RS-CellMobility ::= SEQUENCE {

cellId PhysCellId,

csi-rs-MeasurementBW SEQUENCE {

nrofPRBs ENUMERATED { size24, size48, size96, size192, size264},

startPRB INTEGER(0..2169)

},

density ENUMERATED {d1,d3} OPTIONAL, -- Need R

csi-rs-ResourceList-Mobility SEQUENCE (SIZE (1..maxNrofCSI-RS-ResourcesRRM)) OF CSI-RS-Resource-Mobility

}

CSI-RS-Resource-Mobility ::= SEQUENCE {

csi-RS-Index CSI-RS-Index,

slotConfig CHOICE {

ms4 INTEGER (0..31),

ms5 INTEGER (0..39),

ms10 INTEGER (0..79),

ms20 INTEGER (0..159),

ms40 INTEGER (0..319)

},

associatedSSB SEQUENCE {

ssb-Index SSB-Index,

isQuasiColocated BOOLEAN

} OPTIONAL, -- Need R

frequencyDomainAllocation CHOICE {

row1 BIT STRING (SIZE (4)),

row2 BIT STRING (SIZE (12))

},

firstOFDMSymbolInTimeDomain INTEGER (0..13),

sequenceGenerationConfig INTEGER (0..1023),

...

}

CSI-RS-Index ::= INTEGER (0..maxNrofCSI-RS-ResourcesRRM-1)

-- TAG-CSI-RS-RESOURCECONFIGMOBILITY-STOP

-- ASN1STOP

|  |
| --- |
| *CSI-RS-CellMobility* field descriptions |
| ***csi-rs-ResourceList-Mobility***  List of CSI-RS resources for mobility. The maximum number of CSI-RS resources that can be configured per *measObjectNR* depends on the configuration of *associatedSSB* and the support of *increasedNumberofCSIRSPerMO* capability (see TS 38.214 [19], clause 5.1.6.1.3). |
| ***density***  Frequency domain density for the 1-port CSI-RS for L3 mobility. See TS 38.211 [16], clause 7.4.1. |
| ***nrofPRBs***  Allowed size of the measurement BW in PRBs. See TS 38.211 [16], clause 7.4.1. |
| ***startPRB***  Starting PRB index of the measurement bandwidth. See TS 38.211 [16], clause 7.4.1. |

|  |
| --- |
| *CSI-RS-ResourceConfigMobility* field descriptions |
| ***csi-RS-CellList-Mobility***  List of cells for CSI-RS based RRM measurements. |
| ***refServCellIndex***  Indicates the serving cell providing the timing reference for CSI-RS resources without *associatedSSB*. The field may be present only if there is at least one CSI-RS resource configured without *associatedSSB*. If this field is absent, the UE shall use the timing of the PCell for measurements on the CSI-RS resources without *associatedSSB*. The CSI-RS resources and the serving cell indicated by *refServCellIndex* for timing reference should be located in the same band. |
| ***subcarrierSpacing***  Subcarrier spacing of CSI-RS.  Only the following values are applicable depending on the used frequency:  FR1: 15, 30, or 60 kHz  FR2-1: 120 or 240 kHz  FR2-2: 120, 480, or 960 kHz |

|  |
| --- |
| *CSI-RS-Resource-Mobility* field descriptions |
| ***associatedSSB***  If this field is present, the UE may base the timing of the CSI-RS resource indicated in *CSI-RS-Resource-Mobility* on the timing of the cell indicated by the *cellId* in the *CSI-RS-CellMobility*. In this case, the UE is not required to monitor that CSI-RS resource if the UE cannot detect the SS/PBCH block indicated by this *associatedSSB* and *cellId*. If this field is absent, the UE shall base the timing of the CSI-RS resource indicated in *CSI-RS-Resource-Mobility* on the timing of the serving cell indicated by *refServCellIndex*. In this case, the UE is required to measure the CSI-RS resource even if SS/PBCH block(s) with *cellId* in the *CSI-RS-CellMobility* are not detected.  CSI-RS resources with and without *associatedSSB* may be configured in accordance with the rules in TS 38.214 [19], clause 5.1.6.1.3. |
| ***csi-RS-Index***  CSI-RS resource index associated to the CSI-RS resource to be measured (and used for reporting). |
| ***firstOFDMSymbolInTimeDomain***  Time domain allocation within a physical resource block. The field indicates the first OFDM symbol in the PRB used for CSI-RS, see TS 38.211 [16], clause 7.4.1.5.3. Value 2 is supported only when *dmrs-TypeA-Position* equals *pos3*. |
| ***frequencyDomainAllocation***  Frequency domain allocation within a physical resource block in accordance with TS 38.211 [16], clause 7.4.1.5.3 including table 7.4.1.5.2-1. The number of bits that may be set to one depend on the chosen row in that table. |
| ***isQuasiColocated***  Indicates that the CSI-RS resource is quasi co-located with the associated SS/PBCH block, see TS 38.214 [19], clause 5.1.6.1.3. |
| ***sequenceGenerationConfig***  Scrambling ID for CSI-RS (see TS 38.211 [16], clause 7.4.1.5.2). |
| ***slotConfig***  Indicates the CSI-RS periodicity (in milliseconds) and for each periodicity the offset (in number of slots). When *subcarrierSpacing* is set to *kHz15*, the maximum offset values for periodicities *ms4/ms5/ms10/ms20/ms40* are 3/4/9/19/39 slots. When *subcarrierSpacing* is set to *kHz30*, the maximum offset values for periodicities *ms4/ms5/ms10/ms20/ms40* are 7/9/19/39/79 slots. When *subcarrierSpacing* is set to *kHz60*, the maximum offset values for periodicities *ms4/ms5/ms10/ms20/ms40* are 15/19/39/79/159 slots. When *subcarrierSpacing* is set *kHz120*, the maximum offset values for periodicities *ms4/ms5/ms10/ms20/ms40* are 31/39/79/159/319 slots. |

#### – *CSI-RS-ResourceMapping*

The IE *CSI-RS-ResourceMapping* is used to configure the resource element mapping of a CSI-RS resource in time- and frequency domain.

*CSI-RS-ResourceMapping* information element

-- ASN1START

-- TAG-CSI-RS-RESOURCEMAPPING-START

CSI-RS-ResourceMapping ::= SEQUENCE {

frequencyDomainAllocation CHOICE {

row1 BIT STRING (SIZE (4)),

row2 BIT STRING (SIZE (12)),

row4 BIT STRING (SIZE (3)),

other BIT STRING (SIZE (6))

},

nrofPorts ENUMERATED {p1,p2,p4,p8,p12,p16,p24,p32},

firstOFDMSymbolInTimeDomain INTEGER (0..13),

firstOFDMSymbolInTimeDomain2 INTEGER (2..12) OPTIONAL, -- Need R

cdm-Type ENUMERATED {noCDM, fd-CDM2, cdm4-FD2-TD2, cdm8-FD2-TD4},

density CHOICE {

dot5 ENUMERATED {evenPRBs, oddPRBs},

one NULL,

three NULL,

spare NULL

},

freqBand CSI-FrequencyOccupation,

...

}

-- TAG-CSI-RS-RESOURCEMAPPING-STOP

-- ASN1STOP

|  |
| --- |
| *CSI-RS-ResourceMapping* field descriptions |
| ***cdm-Type***  CDM type (see TS 38.214 [19], clause 5.2.2.3.1). |
| ***density***  Density of CSI-RS resource measured in RE/port/PRB (see TS 38.211 [16], clause 7.4.1.5.3).  Values 0.5 (*dot5*), 1 (*one*) and 3 (*three*) are allowed for X=1, values 0.5 (*dot5*) and 1 (*one*) are allowed for X=2, 16, 24 and 32, value 1 (*one*) is allowed for X=4, 8, 12.  For density = 1/2, includes 1-bit indication for RB level comb offset indicating whether odd or even RBs are occupied by CSI-RS. |
| ***firstOFDMSymbolInTimeDomain2***  Time domain allocation within a physical resource block. See TS 38.211 [16], clause 7.4.1.5.3. |
| ***firstOFDMSymbolInTimeDomain***  Time domain allocation within a physical resource block. The field indicates the first OFDM symbol in the PRB used for CSI-RS. See TS 38.211 [16], clause 7.4.1.5.3. Value 2 is supported only when *dmrs-TypeA-Position* equals *pos3*. |
| ***freqBand***  Wideband or partial band CSI-RS, (see TS 38.214 [19], clause 5.2.2.3.1). |
| ***frequencyDomainAllocation***  Frequency domain allocation within a physical resource block in accordance with TS 38.211 [16], clause 7.4.1.5.3. The applicable row number in table 7.4.1.5.3-1 is determined by the *frequencyDomainAllocation* for rows 1, 2 and 4, and for other rows by matching the values in the column Ports, Density and CDMtype in table 7.4.1.5.3-1 with the values of *nrofPorts*, *cdm-Type* and density below and, when more than one row has the 3 values matching, by selecting the row where the column (k bar, l bar) in table 7.4.1.5.3-1 has indexes for k ranging from 0 to 2\*n-1 where n is the number of bits set to 1 in *frequencyDomainAllocation*. |
| ***nrofPorts***  Number of ports (see TS 38.214 [19], clause 5.2.2.3.1). |

#### – *CSI-SemiPersistentOnPUSCH-TriggerStateList*

The *CSI-SemiPersistentOnPUSCH-TriggerStateList* IE is used to configure the UE with list of trigger states for semi-persistent reporting of channel state information on L1. See also TS 38.214 [19], clause 5.2.

*CSI-SemiPersistentOnPUSCH-TriggerStateList* information element

-- ASN1START

-- TAG-CSI-SEMIPERSISTENTONPUSCHTRIGGERSTATELIST-START

CSI-SemiPersistentOnPUSCH-TriggerStateList ::= SEQUENCE(SIZE (1..maxNrOfSemiPersistentPUSCH-Triggers)) OF CSI-SemiPersistentOnPUSCH-TriggerState

CSI-SemiPersistentOnPUSCH-TriggerState ::= SEQUENCE {

associatedReportConfigInfo CSI-ReportConfigId,

...,

[[

sp-CSI-MultiplexingMode-r17 ENUMERATED {enabled} OPTIONAL -- Need R

]]

}

-- TAG-CSI-SEMIPERSISTENTONPUSCHTRIGGERSTATELIST-STOP

-- ASN1STOP

|  |
| --- |
| *CSI-SemiPersistentOnPUSCH-TriggerStateList* field descriptions |
| ***sp-CSI-MultiplexingMode***  Indicates if the behavior of transmitting SP-CSI on the first PUSCH repetitions coresponding to two SRS resource sets configured in *srs-ResourceSetToAddModList* or *srs-ResourceSetToAddModListDCI-0-2* with usage 'codebook' or 'noncodebook' is enabled or not. |

#### – *CSI-SSB-ResourceSet*

The IE *CSI-SSB-ResourceSet* is used to configure one SS/PBCH block resource set which refers to SS/PBCH as indicated in *ServingCellConfigCommon* and *ServingCellConfig*.

*CSI-SSB-ResourceSet* information element

-- ASN1START

-- TAG-CSI-SSB-RESOURCESET-START

CSI-SSB-ResourceSet ::= SEQUENCE {

csi-SSB-ResourceSetId CSI-SSB-ResourceSetId,

csi-SSB-ResourceList SEQUENCE (SIZE(1..maxNrofCSI-SSB-ResourcePerSet)) OF SSB-Index,

...,

[[

servingAdditionalPCIList-r17 SEQUENCE (SIZE(1..maxNrofCSI-SSB-ResourcePerSet)) OF ServingAdditionalPCIIndex-r17 OPTIONAL -- Need R

]]

}

ServingAdditionalPCIIndex-r17 ::= INTEGER(0..maxNrofAdditionalPCI-r17)

-- TAG-CSI-SSB-RESOURCESET-STOP

-- ASN1STOP

|  |
| --- |
| *CSI-SSB-ResourceSet* field descriptions |
| ***servingAdditionalPCIList***  Indicates the physical cell IDs (PCI) of the SSBs in the *csi-SSB-ResourceList*. If present, the list has the same number of entries as *csi-SSB-ResourceList*. The first entry of the list indicates the value of the PCI for the first entry of *csi-SSB-ResourceList*, the second entry of this list indicates the value of the PCI for the second entry of *csi-SSB-ResourceList*, and so on. For each entry, the following applies:  - If the value is zero, the PCI is the PCI of the serving cell in which this *CSI-SSB-ResourceSet* is defined;  - otherwise, the value is *additionalPCIIndex-r17* of an *SSB-MTC-AdditionalPCI-r17* in the *additionalPCIList-r17* in *ServingCellConfig*, and the PCI is the *additionalPCI-r17* in this *SSB-MTC-AdditionalPCI-r17*. |

#### – *CSI-SSB-ResourceSetId*

The IE *CSI-SSB-ResourceSetId* is used to identify one SS/PBCH block resource set.

*CSI-SSB-ResourceId* information element

-- ASN1START

-- TAG-CSI-SSB-RESOURCESETID-START

CSI-SSB-ResourceSetId ::= INTEGER (0..maxNrofCSI-SSB-ResourceSets-1)

-- TAG-CSI-SSB-RESOURCESETID-STOP

-- ASN1STOP

#### – *DedicatedNAS-Message*

The IE *DedicatedNAS-Message* is used to transfer UE specific NAS layer information between the 5GC CN and the UE. The RRC layer is transparent for this information.

*DedicatedNAS-Message* information element

-- ASN1START

-- TAG-DEDICATED-NAS-MESSAGE-START

DedicatedNAS-Message ::= OCTET STRING

-- TAG-DEDICATED-NAS-MESSAGE-STOP

-- ASN1STOP

#### – *DL-PPW-PreConfig*

The IE *DL-PPW-PreConfig* provides configuration for a measurement window where a UE is expected to measure the DL PRS, if it is inside the active DL BWP and with the same numerology as the active DL BWP. Based upon the indication received in the configuration, the UE identifies whether the DL PRS priority is higher than that of the other DL signals or channels and accordingly determines, for example, the UE is expected to measure the DL PRS and is not expected to receive other DL signals and channels.

*DL-PPW-PreConfig* information element

-- ASN1START

-- TAG-DL-PPW-PRECONFIG-START

DL-PPW-PreConfig-r17 ::= SEQUENCE {

dl-PPW-ID-r17 DL-PPW-ID-r17,

dl-PPW-Periodicity-and-StartSlot-r17 DL-PPW-Periodicity-and-StartSlot-r17,

length-r17 INTEGER (1..160),

type-r17 ENUMERATED {type1A, type1B, type2} OPTIONAL, -- Cond MultiType

priority-r17 ENUMERATED {st1, st2, st3} OPTIONAL -- Cond MultiState

}

DL-PPW-ID-r17 ::= INTEGER (0..maxNrofPPW-ID-1-r17)

DL-PPW-Periodicity-and-StartSlot-r17 ::= CHOICE {

scs15-r17 CHOICE {

n4-r17 INTEGER (0..3),

n5-r17 INTEGER (0..4),

n8-r17 INTEGER (0..7),

n10-r17 INTEGER (0..9),

n16-r17 INTEGER (0..15),

n20-r17 INTEGER (0..19),

n32-r17 INTEGER (0..31),

n40-r17 INTEGER (0..39),

n64-r17 INTEGER (0..63),

n80-r17 INTEGER (0..79),

n160-r17 INTEGER (0..159),

n320-r17 INTEGER (0..319),

n640-r17 INTEGER (0..639),

n1280-r17 INTEGER (0..1279),

n2560-r17 INTEGER (0..2559),

n5120-r17 INTEGER (0..5119),

n10240-r17 INTEGER (0..10239),

...

},

scs30-r17 CHOICE {

n8-r17 INTEGER (0..7),

n10-r17 INTEGER (0..9),

n16-r17 INTEGER (0..15),

n20-r17 INTEGER (0..19),

n32-r17 INTEGER (0..31),

n40-r17 INTEGER (0..39),

n64-r17 INTEGER (0..63),

n80-r17 INTEGER (0..79),

n128-r17 INTEGER (0..127),

n160-r17 INTEGER (0..159),

n320-r17 INTEGER (0..319),

n640-r17 INTEGER (0..639),

n1280-r17 INTEGER (0..1279),

n2560-r17 INTEGER (0..2559),

n5120-r17 INTEGER (0..5119),

n10240-r17 INTEGER (0..10239),

n20480-r17 INTEGER (0..20479),

...

},

scs60-r17 CHOICE {

n16-r17 INTEGER (0..15),

n20-r17 INTEGER (0..19),

n32-r17 INTEGER (0..31),

n40-r17 INTEGER (0..39),

n64-r17 INTEGER (0..63),

n80-r17 INTEGER (0..79),

n128-r17 INTEGER (0..127),

n160-r17 INTEGER (0..159),

n256-r17 INTEGER (0..255),

n320-r17 INTEGER (0..319),

n640-r17 INTEGER (0..639),

n1280-r17 INTEGER (0..1279),

n2560-r17 INTEGER (0..2559),

n5120-r17 INTEGER (0..5119),

n10240-r17 INTEGER (0..10239),

n20480-r17 INTEGER (0..20479),

n40960-r17 INTEGER (0..40959),

...

},

scs120-r17 CHOICE {

n32-r17 INTEGER (0..31),

n40-r17 INTEGER (0..39),

n64-r17 INTEGER (0..63),

n80-r17 INTEGER (0..79),

n128-r17 INTEGER (0..127),

n160-r17 INTEGER (0..159),

n256-r17 INTEGER (0..255),

n320-r17 INTEGER (0..319),

n512-r17 INTEGER (0..511),

n640-r17 INTEGER (0..639),

n1280-r17 INTEGER (0..1279),

n2560-r17 INTEGER (0..2559),

n5120-r17 INTEGER (0..5119),

n10240-r17 INTEGER (0..10239),

n20480-r17 INTEGER (0..20479),

n40960-r17 INTEGER (0..40959),

n81920-r17 INTEGER (0..81919),

...

},

...

}

-- TAG-DL-PPW-PRECONFIG-STOP

-- ASN1STOP

| *DL-PPW-PreConfig* field descriptions |
| --- |
| ***dl-PPW-ID***  Indicates the pre-configured ID for DL-PRS processing window configuration. |
| ***length***  Indicates the length of DL-PRS-processing window in slots. Value 1 indicates *length* of one slot, value 2 indicates *length* of two slots and so on. |
| ***periodicity***  Indicates the periodicty of the DL-PRS\_processing window. |
| ***priority***  Indicates the priority between PDCCH/PDSCH/CSI-RS and PRS as specified in TS 38.214 [19]. |
| ***type***  Indicates the DL-PRS processing window type as specified in TS 38.214 [19]. |

|  |  |
| --- | --- |
| Conditional Presence | Explanation |
| *MultiType* | The field is mandatory present when the UE reports its capability on supporting multiple processing types, otherwise it is absent. |
| *MultiState* | The field is mandatory present when the UE reports its capability on supporting option 1 or option 2 for the configured type, otherwise it is absent |

#### – *DMRS-BundlingPUCCH-Config*

The IE *DMRS-BundlingPUCCH-Config-r17* is used to configure DMRS bundling for PUCCH.

*DMRS-BundlingPUCCH-Config* information element

-- ASN1START

-- TAG-DMRS-BUNDLINGPUCCH-CONFIG-START

DMRS-BundlingPUCCH-Config-r17 ::= SEQUENCE {

pucch-DMRS-Bundling-r17 ENUMERATED {enabled} OPTIONAL, -- Need S

pucch-TimeDomainWindowLength-r17 INTEGER (2..8) OPTIONAL, -- Need S

pucch-WindowRestart-r17 ENUMERATED {enabled} OPTIONAL, -- Need S

pucch-FrequencyHoppingInterval-r17 ENUMERATED {s2, s4, s5, s10} OPTIONAL, -- Need S

...

}

-- TAG-DMRS-BUNDLINGPUCCH-CONFIG-STOP

-- ASN1STOP

|  |
| --- |
| *DMRS-BundlingPUCCH-Config* field descriptions |
| ***pucch-DMRS-Bundling***  Indicates whether DMRS bundling and time domain window for PUCCH are jointly enabled. If the field is absent, DMRS bundling and time domain window for PUCCH are jointly disabled. |
| ***pucch-FrequencyHoppingInterval***  Configures the number of consecutive slots for the UE to perform inter-slot frequency hopping with inter-slot bundling for PUCCH. When both inter-frequency hopping and DMRS bundling are enabled for PUCCH repetitions, the UE is expected to be configured with at least one *pucch-FrequencyHoppingInterval-r17* and *pucch-TimeDomainWindowLength-r17*. When DMRS bundling for PUCCH is enabled by *pucch-DMRS-Bundling-r17,* PUCCH frequency hopping interval is only determined by the configuration of PUCCH hopping interval if PUCCH hopping interval is configured. If the field is absent, the number of consecutive slots for the UE to perform inter-slot PUCCH frequency hopping is indicated by *pucch-TimeDomainWindowLength-r17.* |
| ***pucch-TimeDomainWindowLength***  Configures the length of a nominal time domain window in slots for DMRS bundling for PUCCH. The value shall not exceed the maximum duration for DMRS bundling for PUCCH as specified in TS 38.306 [26]. If this field is absent, the UE shall apply the default value that is the minimum value in the unit of consecutive slots of the time duration for the transmission of all PUCCH repetitions and the maximum duration for DMRS bundling for PUCCH as specified in TS 38.306 [26]. |
| ***pucch-WindowRestart***  Indicates whether UE bundles PUCCH DMRS remaining in a nominal time domain window after event(s) triggered by DCI or MAC CE that violate power consistency and phase continuity requirements is enabled. If the field is absent, PUCCH DMRS bundling remaining in a bundling window after event(s) triggered by DCI or MAC CE that violate power consistency and phase continuity requirements is disabled (see 38.214 [19], clause 6.1.7).  NOTE: Events, which are triggered by DCI or MAC CE, but regarded as semi-static events, e.g. frequency hopping, UL beam switching for multi-TRP operation, or other if defined, are excluded. |

#### – *DMRS-BundlingPUSCH-Config*

The IE *DMRS-BundlingPUSCH-Config-r17* is used to configure DMRS bundling for PUSCH.

*DMRS-BundlingPUSCH-Config* information element

-- ASN1START

-- TAG-DMRS-BUNDLINGPUSCH-CONFIG-START

DMRS-BundlingPUSCH-Config-r17 ::= SEQUENCE {

pusch-DMRS-Bundling-r17 ENUMERATED {enabled} OPTIONAL, -- Need S

pusch-TimeDomainWindowLength-r17 INTEGER (2..32) OPTIONAL, -- Need S

pusch-WindowRestart-r17 ENUMERATED {enabled} OPTIONAL, -- Need S

pusch-FrequencyHoppingInterval-r17 ENUMERATED {s2, s4, s5, s6, s8, s10, s12, s14, s16, s20} OPTIONAL, -- Need S

...

}

-- TAG-DMRS-BUNDLINGPUSCH-CONFIG-STOP

-- ASN1STOP

|  |
| --- |
| *DMRS-BundlingPUSCH-Config* field descriptions |
| ***pusch-DMRS-Bundling***  Indicates whether DMRS bundling and time domain window for PUSCH are jointly enabled. If the field is absent, DMRS bundling and time domain window for PUSCH are jointly disabled. |
| ***pusch-FrequencyHoppingInterval***  Configures the number of consecutive slots for the UE to perform inter-slot frequency hopping with inter-slot bundling for PUSCH. When both inter-frequency hopping and DMRS bundling are enabled for PUSCH repetitions, the UE is expected to be configured with at least one *pusch-FrequencyHoppingInterval-r17* and *pusch-TimeDomainWindowLength-r17*. This parameter is shared for both DG-PUSCH and CG-PUSCH. When DMRS bundling for PUSCH is enabled by *pusch-DMRS-Bundling-r17,* PUSCH frequency hopping interval is only determined by the configuration of PUSCH hopping interval if PUSCH hopping interval is configured. If the field is absent, the number of consecutive slots for the UE to perform inter-slot PUSCH frequency hopping is indicated by *pusch-TimeDomainWindowLength-r17.*  Note: For unpaired spectrum, the UE is not expected to be configured the value of s6, s8, s12, s14 and s16. |
| ***pusch-TimeDomainWindowLength***  Configures the length of a nominal time domain window in number of consecutive slots for DMRS bundling for PUSCH. The value shall not exceed the maximum duration for DMRS bundling for PUSCH as specified in TS 38.306 [26]. For PUSCH repetition type A/B, if this field is absent, the UE shall apply the default value that is the minimum value in the unit of consecutive slots of the time duration for the transmission of all PUSCH repetitions and the maximum duration for DMRS bundling for PUSCH as specified in TS 38.306 [26]. For TBoMS, if this field is absent, the UE shall apply the default value that is the minimum value in the unit of consecutive slots of the duration of TBoMS transmission (including repetition of TBoMS) and the maximum duration for DMRS bundling for PUSCH as specified in TS 38.306 [26]. |
| ***pusch-WindowRestart***  Indicates whether UE bundles PUSCH DMRS remaining in a nominal time domain window after event(s) triggered by DCI or MAC CE that violate power consistency and phase continuity requirements is enabled. If the field is absent, PUSCH DMRS bundling remaining in a bundling window after event(s) triggered by DCI or MAC CE that violate power consistency and phase continuity requirements is disabled (see 38.214 [19], clause 6.1.7).  Note: Events, which are triggered by DCI or MAC CE, but regarded as semi-static events, e.g. frequency hopping, UL beam switching for multi-TRP operation, or other if defined, are excluded. |

#### – *DMRS-DownlinkConfig*

The IE *DMRS-DownlinkConfig* is used to configure downlink demodulation reference signals for PDSCH.

*DMRS-DownlinkConfig* information element

-- ASN1START

-- TAG-DMRS-DOWNLINKCONFIG-START

DMRS-DownlinkConfig ::= SEQUENCE {

dmrs-Type ENUMERATED {type2} OPTIONAL, -- Need S

dmrs-AdditionalPosition ENUMERATED {pos0, pos1, pos3} OPTIONAL, -- Need S

maxLength ENUMERATED {len2} OPTIONAL, -- Need S

scramblingID0 INTEGER (0..65535) OPTIONAL, -- Need S

scramblingID1 INTEGER (0..65535) OPTIONAL, -- Need S

phaseTrackingRS SetupRelease { PTRS-DownlinkConfig } OPTIONAL, -- Need M

...,

[[

dmrs-Downlink-r16 ENUMERATED {enabled} OPTIONAL -- Need R

]]

}

-- TAG-DMRS-DOWNLINKCONFIG-STOP

-- ASN1STOP

|  |
| --- |
| *DMRS-DownlinkConfig* field descriptions |
| ***dmrs-AdditionalPosition***  Position for additional DM-RS in DL, see Tables 7.4.1.1.2-3 and 7.4.1.1.2-4 in TS 38.211 [16]. If the field is absent, the UE applies the value pos2. See also clause 7.4.1.1.2 for additional constraints on how the network may set this field depending on the setting of other fields. |
| ***dmrs-Downlink***  This field indicates whether low PAPR DMRS is used, as specified in TS38.211 [16], clause 7.4.1.1.1. |
| ***dmrs-Type***  Selection of the DMRS type to be used for DL (see TS 38.211 [16], clause 7.4.1.1.1). If the field is absent, the UE uses DMRS type 1. |
| ***maxLength***  The maximum number of OFDM symbols for DL front loaded DMRS. *len1* corresponds to value 1. *len2* corresponds to value 2. If the field is absent, the UE applies value *len1*. If set to *len2*, the UE determines the actual number of DM-RS symbols by the associated DCI. (see TS 38.211 [16], clause 7.4.1.1.2). |
| ***phaseTrackingRS***  Configures downlink PTRS. If the field is not configured, the UE assumes that downlink PTRS are absent. See TS 38.214 [19] clause 5.1.6.3. |
| ***scramblingID0***  DL DMRS scrambling initialization (see TS 38.211 [16], clause 7.4.1.1.1). When the field is absent the UE applies the value *physCellId* configured for this serving cell. |
| ***scramblingID1***  DL DMRS scrambling initialization (see TS 38.211 [16], clause 7.4.1.1.1). When the field is absent the UE applies the value *physCellId* configured for this serving cell. |

#### – *DMRS-UplinkConfig*

The IE *DMRS-UplinkConfig* is used to configure uplink demodulation reference signals for PUSCH.

*DMRS-UplinkConfig* information element

-- ASN1START

-- TAG-DMRS-UPLINKCONFIG-START

DMRS-UplinkConfig ::= SEQUENCE {

dmrs-Type ENUMERATED {type2} OPTIONAL, -- Need S

dmrs-AdditionalPosition ENUMERATED {pos0, pos1, pos3} OPTIONAL, -- Need S

phaseTrackingRS SetupRelease { PTRS-UplinkConfig } OPTIONAL, -- Need M

maxLength ENUMERATED {len2} OPTIONAL, -- Need S

transformPrecodingDisabled SEQUENCE {

scramblingID0 INTEGER (0..65535) OPTIONAL, -- Need S

scramblingID1 INTEGER (0..65535) OPTIONAL, -- Need S

...,

[[

dmrs-Uplink-r16 ENUMERATED {enabled} OPTIONAL -- Need R

]]

} OPTIONAL, -- Need R

transformPrecodingEnabled SEQUENCE {

nPUSCH-Identity INTEGER(0..1007) OPTIONAL, -- Need S

sequenceGroupHopping ENUMERATED {disabled} OPTIONAL, -- Need S

sequenceHopping ENUMERATED {enabled} OPTIONAL, -- Need S

...,

[[

dmrs-UplinkTransformPrecoding-r16 SetupRelease {DMRS-UplinkTransformPrecoding-r16} OPTIONAL -- Need M

]]

} OPTIONAL, -- Need R

...

}

DMRS-UplinkTransformPrecoding-r16 ::= SEQUENCE {

pi2BPSK-ScramblingID0 INTEGER(0..65535) OPTIONAL, -- Need S

pi2BPSK-ScramblingID1 INTEGER(0..65535) OPTIONAL -- Need S

}

-- TAG-DMRS-UPLINKCONFIG-STOP

-- ASN1STOP

|  |
| --- |
| *DMRS-UplinkConfig* field descriptions |
| ***dmrs-AdditionalPosition***  Position for additional DM-RS in UL (see TS 38.211 [16], clause 6.4.1.1.3). If the field is absent, the UE applies the value pos2. See also clause 6.4.1.1.3 for additional constraints on how the network may set this field depending on the setting of other fields. |
| ***dmrs-Type***  Selection of the DMRS type to be used for UL (see TS 38.211 [16], clause 6.4.1.1.3) If the field is absent, the UE uses DMRS type 1. |
| ***dmrs-Uplink***  This field indicates whether low PAPR DMRS is used, as specified in TS38.211 [16], clause 6.4.1.1.1.1. |
| ***dmrs-UplinkTransformPrecoding***  This field indicates whether low PAPR DMRS is used for PUSCH with pi/2 BPSK modulation, as specified in TS38.211 [16], clause 6.4.1.1.1.2. The network configures this field only if *tp-pi2BPSK* is configured in *PUSCH-Config*. |
| ***maxLength***  The maximum number of OFDM symbols for UL front loaded DMRS. *len1* corresponds to value 1. *len2* corresponds to value 2. If the field is absent, the UE applies value *len1*. If set to *len2*, the UE determines the actual number of DM-RS symbols by the associated DCI. (see TS 38.211 [16], clause 6.4.1.1.3). |
| ***nPUSCH-Identity***  Parameter: N\_ID^(PUSCH) for DFT-s-OFDM DMRS. If the value is absent or released, the UE uses the value Physical cell ID (*physCellId*). See TS 38.211 [16]. |
| ***phaseTrackingRS***  Configures uplink PTRS (see TS 38.211 [16]). |
| ***pi2BPSK-ScramblingID0, pi2BPSK-ScramblingID1***  UL DMRS scrambling initialization for pi/2 BPSK DMRS for PUSCH (see TS 38.211 [16], Clause 6.4.1.1.2). When the field is absent the UE applies the value Physical cell ID (physCellId) of the serving cell. |
| ***scramblingID0***  UL DMRS scrambling initialization for CP-OFDM (see TS 38.211 [16], clause 6.4.1.1.1.1). When the field is absent the UE applies the value Physical cell ID (*physCellId*). |
| ***scramblingID1***  UL DMRS scrambling initialization for CP-OFDM. (see TS 38.211 [16], clause 6.4.1.1.1.1). When the field is absent the UE applies the value Physical cell ID (*physCellId*). |
| ***sequenceGroupHopping***  For DMRS transmission with transform precoder the NW may configure group hopping by the cell-specific parameter *groupHoppingEnabledTransformPrecoding* in *PUSCH-ConfigCommon*. In this case, the NW may include this UE specific field to disable group hopping for PUSCH transmission except for Msg3, i.e., to override the configuration in *PUSCH-ConfigCommon* (see TS 38.211 [16]). If the field is absent, the UE uses the same hopping mode as for Msg3. |
| ***sequenceHopping***  Determines if sequence hopping is enabled for DMRS transmission with transform precoder for PUSCH transmission other than Msg3 (sequence hopping is always disabled for Msg3). If the field is absent, the UE uses the same hopping mode as for msg3. The network does not configure simultaneous group hopping and sequence hopping. See TS 38.211 [16], clause 6.4.1.1.1.2. |
| ***transformPrecodingDisabled***  DMRS related parameters for Cyclic Prefix OFDM. |
| ***transformPrecodingEnabled***  DMRS related parameters for DFT-s-OFDM (Transform Precoding). |

#### *– DownlinkConfigCommon*

The IE *DownlinkConfigCommon* provides common downlink parameters of a cell.

*DownlinkConfigCommon* information element

-- ASN1START

-- TAG-DOWNLINKCONFIGCOMMON-START

DownlinkConfigCommon ::= SEQUENCE {

frequencyInfoDL FrequencyInfoDL OPTIONAL, -- Cond InterFreqHOAndServCellAdd

initialDownlinkBWP BWP-DownlinkCommon OPTIONAL, -- Cond ServCellAdd

...,

[[

initialDownlinkBWP-RedCap-r17 BWP-DownlinkCommon OPTIONAL -- Need R

]]

}

-- TAG-DOWNLINKCONFIGCOMMON-STOP

-- ASN1STOP

|  |
| --- |
| *DownlinkConfigCommon* field descriptions |
| ***frequencyInfoDL***  Basic parameters of a downlink carrier and transmission thereon. |
| ***initialDownlinkBWP***  The initial downlink BWP configuration for a serving cell. The network configures the *locationAndBandwidth* so that the initial downlink BWP contains the entire CORESET#0 of this serving cell in the frequency domain. |
| ***initialDownlinkBWP-RedCap***  If present, RedCap UEs use this DL BWP instead of *initialDownlinkBWP*.  If absent, RedCap UEs use *initialDownlinkBWP* provided that it does not exceed the RedCap UE maximum bandwidth (see also clause 5.2.2.4.2). |

|  |  |
| --- | --- |
| Conditional Presence | Explanation |
| *InterFreqHOAndServCellAdd* | This field is mandatory present for inter-frequency handover, and upon serving cell (PSCell/SCell) addition. Otherwise, the field is optionally present, Need M. |
| *ServCellAdd* | This field is mandatory present upon serving cell addition (for PSCell and SCell) and upon handover from E-UTRA to NR. It is optionally present, Need M otherwise. |

#### – *DownlinkConfigCommonSIB*

The IE *DownlinkConfigCommonSIB* provides common downlink parameters of a cell.

*DownlinkConfigCommonSIB* information element

-- ASN1START

-- TAG-DOWNLINKCONFIGCOMMONSIB-START

DownlinkConfigCommonSIB ::= SEQUENCE {

frequencyInfoDL FrequencyInfoDL-SIB,

initialDownlinkBWP BWP-DownlinkCommon,

bcch-Config BCCH-Config,

pcch-Config PCCH-Config,

...,

[[

pei-Config-r17 PEI-Config-r17 OPTIONAL, -- Need R

initialDownlinkBWP-RedCap-r17 BWP-DownlinkCommon OPTIONAL -- Need R

]]

}

BCCH-Config ::= SEQUENCE {

modificationPeriodCoeff ENUMERATED {n2, n4, n8, n16},

...

}

PCCH-Config ::= SEQUENCE {

defaultPagingCycle PagingCycle,

nAndPagingFrameOffset CHOICE {

oneT NULL,

halfT INTEGER (0..1),

quarterT INTEGER (0..3),

oneEighthT INTEGER (0..7),

oneSixteenthT INTEGER (0..15)

},

ns ENUMERATED {four, two, one},

firstPDCCH-MonitoringOccasionOfPO CHOICE {

sCS15KHZoneT SEQUENCE (SIZE (1..maxPO-perPF)) OF INTEGER (0..139),

sCS30KHZoneT-SCS15KHZhalfT SEQUENCE (SIZE (1..maxPO-perPF)) OF INTEGER (0..279),

sCS60KHZoneT-SCS30KHZhalfT-SCS15KHZquarterT SEQUENCE (SIZE (1..maxPO-perPF)) OF INTEGER (0..559),

sCS120KHZoneT-SCS60KHZhalfT-SCS30KHZquarterT-SCS15KHZoneEighthT SEQUENCE (SIZE (1..maxPO-perPF)) OF INTEGER (0..1119),

sCS120KHZhalfT-SCS60KHZquarterT-SCS30KHZoneEighthT-SCS15KHZoneSixteenthT SEQUENCE (SIZE (1..maxPO-perPF)) OF INTEGER (0..2239),

sCS480KHZoneT-SCS120KHZquarterT-SCS60KHZoneEighthT-SCS30KHZoneSixteenthT SEQUENCE (SIZE (1..maxPO-perPF)) OF INTEGER (0..4479),

sCS480KHZhalfT-SCS120KHZoneEighthT-SCS60KHZoneSixteenthT SEQUENCE (SIZE (1..maxPO-perPF)) OF INTEGER (0..8959),

sCS480KHZquarterT-SCS120KHZoneSixteenthT SEQUENCE (SIZE (1..maxPO-perPF)) OF INTEGER (0..17919)

} OPTIONAL, -- Need R

...,

[[

nrofPDCCH-MonitoringOccasionPerSSB-InPO-r16 INTEGER (2..4) OPTIONAL -- Cond SharedSpectrum2

]],

[[

ranPagingInIdlePO-r17 ENUMERATED {true} OPTIONAL, -- Need R

firstPDCCH-MonitoringOccasionOfPO-v1710 CHOICE {

sCS480KHZoneEighthT SEQUENCE (SIZE (1..maxPO-perPF)) OF INTEGER (0..35839),

sCS480KHZoneSixteenthT SEQUENCE (SIZE (1..maxPO-perPF)) OF INTEGER (0..71679)

} OPTIONAL -- Need R

]]

}

PEI-Config-r17 ::= SEQUENCE {

po-NumPerPEI-r17 ENUMERATED {po1, po2, po4, po8},

payloadSizeDCI-2-7-r17 INTEGER (1..maxDCI-2-7-Size-r17),

pei-FrameOffset-r17 INTEGER (0..16),

subgroupConfig-r17 SubgroupConfig-r17,

lastUsedCellOnly-r17 ENUMERATED {true} OPTIONAL, -- Need R

...

}

SubgroupConfig-r17 ::= SEQUENCE {

subgroupsNumPerPO-r17 INTEGER (1.. maxNrofPagingSubgroups-r17),

subgroupsNumForUEID-r17 INTEGER (1.. maxNrofPagingSubgroups-r17) OPTIONAL, -- Need S

...

}

-- TAG-DOWNLINKCONFIGCOMMONSIB-STOP

-- ASN1STOP

|  |
| --- |
| *DownlinkConfigCommonSIB* field descriptions |
| ***bcch-Config***  The modification period related configuration. |
| ***frequencyInfoDL-SIB***  Basic parameters of a downlink carrier and transmission thereon. |
| ***initialDownlinkBWP***  The initial downlink BWP configuration for a PCell. The network configures the *locationAndBandwidth* so that the initial downlink BWP contains the entire CORESET#0 of this serving cell in the frequency domain. The UE applies the *locationAndBandwidth* upon reception of this field (e.g. to determine the frequency position of signals described in relation to this *locationAndBandwidth*) but it keeps CORESET#0 until after reception of *RRCSetup*/*RRCResume/RRCReestablishment*. |
| ***initialDownlinkBWP-RedCap***  If present, RedCap UEs use this DL BWP instead of *initialDownlinkBWP*. If the *locationAndBandwidth* of this BWP contains the entire CORESET#0, the UE applies the *locationAndBandwidth* upon reception of this field (e.g. to determine the frequency position of signals described in relation to this *locationAndBandwidth*) but it keeps CORESET#0 until after reception of *RRCSetup*/*RRCResume/RRCReestablishment*. Otherwise, i.e., if the *locationAndBandwidth* of this BWP does not contain the entire CORESET#0, the UE uses this BWP for receiving DL messages during initial access (Msg2, MsgB, Msg4) and after initial access.  If absent, RedCap UEs use *initialDownlinkBWP* provided that it does not exceed the RedCap UE maximum bandwidth (see also clause 5.2.2.4.2). |
| ***lastUsedCellOnly***  When present, the field indicates that the UE monitors PEI only if the latest received *RRCRelease* without *noLastCellUpdate* is from this cell. A PEI-capable UE stores its last used cell information. |
| ***nrofPDCCH-MonitoringOccasionPerSSB-InPO***  The number of PDCCH monitoring occasions corresponding to an SSB within a Paging Occasion, see TS 38.304 [20], clause 7.1. |
| ***pcch-Config***  The paging related configuration. |
| ***pei-Config***  The PEI related configuration. |
| ***subgroupConfig***  The paging subgroup related configuration. |

|  |
| --- |
| *BCCH-Config* field descriptions |
| ***modificationPeriodCoeff***  Actual modification period, expressed in number of radio frames m = *modificationPeriodCoeff* \* *defaultPagingCycle*, see clause 5.2.2.2.2. *n2* corresponds to value 2, *n4* corresponds to value 4, and so on. |

|  |
| --- |
| *PCCH-Config* field descriptions |
| ***defaultPagingCycle***  Default paging cycle, used to derive 'T' in TS 38.304 [20]. Value *rf32* corresponds to 32 radio frames, value *rf64* corresponds to 64 radio frames and so on. |
| ***firstPDCCH-MonitoringOccasionOfPO***  Points out the first PDCCH monitoring occasion for paging of each PO of the PF, see TS 38.304 [20]. |
| ***nAndPagingFrameOffset***  Used to derive the number of total paging frames in T (corresponding to parameter N in TS 38.304 [20]) and paging frame offset (corresponding to parameter PF\_offset in TS 38.304 [20]). A value of *oneSixteenthT* corresponds to T / 16, a value of oneEighthT corresponds to T / 8, and so on.  If *pagingSearchSpace* is set to zero and if SS/PBCH block and CORESET multiplexing pattern is 2 or 3 (as specified in TS 38.213 [13]):  - for *ssb-periodicityServingCell* of 5 or 10 ms, N can be set to one of {*oneT, halfT, quarterT, oneEighthT, oneSixteenthT*}  - for *ssb-periodicityServingCell* of 20 ms, N can be set to one of {*halfT, quarterT, oneEighthT, oneSixteenthT*}  - for *ssb-periodicityServingCell* of 40 ms, N can be set to one of {*quarterT, oneEighthT, oneSixteenthT*}  - for *ssb-periodicityServingCell* of 80 ms, N can be set to one of {*oneEighthT, oneSixteenthT*}  - for *ssb-periodicityServingCell* of 160 ms, N can be set to *oneSixteenthT*  If *pagingSearchSpace* is set to zero and if SS/PBCH block and CORESET multiplexing pattern is 1 (as specified in TS 38.213 [13]), N can be set to one of {*halfT, quarterT, oneEighthT, oneSixteenthT*}  If *pagingSearchSpace* is not set to zero, N can be configured to one of {*oneT, halfT, quarterT, oneEighthT, oneSixteenthT*} |
| ***ns***  Number of paging occasions per paging frame. |
| ***ranPagingInIdlePO***  Indicates that the network supports to send RAN paging in PO that corresponds to the i\_s as determined by UE in RRC\_IDLE state, see TS38.304 [20]. |

|  |
| --- |
| *PEI-Config* field descriptions |
| ***payloadSizeDCI-2-7***  Payload size of PEI DCI, i.e., DCI format 2\_7. The size is no larger than the payload size of paging DCI which has maximum of 41 bits and 43 bits for licensed and unlicensed spectrums, respectively. |
| ***pei-FrameOffset***  Offset, in number of frames from the start of a reference frame for PEI-O to the start of a first paging frame of the paging frames associated with the PEI-O, see TS 38.213 [13], clause 10.4A. |
| ***po-NumPerPEI***  The number of PO(s) associated with one PEI monitoring occasion. It is a factor of the total PO number in a paging cycle, i.e N x Ns, as specified in TS 38.304 [20]. The maximum number of PF associated with one PEI monitoring occasion is 2. The number of PO mapping to one PEI should be multiple of Ns when *po-NumPerPEI* is larger than Ns. |

|  |
| --- |
| *SubgroupConfig* field descriptions |
| ***subgroupsNumPerPO***  Total number of subgroups per Paging Occasion (PO) for UE to read subgroups indication from physical-layer signaling. The field represents the sum of CN-assigned and UEID-based subgroups supported by the network. When *PEI-Config* is configured, there is always at least one subgroup (UEID-based subgroup or CN-assigned subgroup) configured. |
| ***subgroupsNumForUEID***  Number of subgroups per Paging Occasion (PO) for UE to read subgroups indication from physical-layer signaling, for UEID-based subgrouping method. When present, the fieldis set to an integer smaller than or equal to *subgroupsNumPerPO. subgroupsNumPerPO* equals to *subgroupsNumForUEID* when the network does not support CN-assigned subgrouping. The field is absent when the network only supports CN-assigned subgrouping. Both this field and *subgroupsNumPerPO* are equal to 1 when the network does not support subgrouping. |

|  |  |
| --- | --- |
| Conditional Presence | Explanation |
| *SharedSpectrum2* | The field is optional present, Need R, if this cell operates with shared spectrum channel access. Otherwise, it is absent, Need R. |

#### – *DownlinkPreemption*

The IE *DownlinkPreemption* is used to configure the UE to monitor PDCCH for the INT-RNTI (interruption).

*DownlinkPreemption* information element

-- ASN1START

-- TAG-DOWNLINKPREEMPTION-START

DownlinkPreemption ::= SEQUENCE {

int-RNTI RNTI-Value,

timeFrequencySet ENUMERATED {set0, set1},

dci-PayloadSize INTEGER (0..maxINT-DCI-PayloadSize),

int-ConfigurationPerServingCell SEQUENCE (SIZE (1..maxNrofServingCells)) OF INT-ConfigurationPerServingCell,

...

}

INT-ConfigurationPerServingCell ::= SEQUENCE {

servingCellId ServCellIndex,

positionInDCI INTEGER (0..maxINT-DCI-PayloadSize-1)

}

-- TAG-DOWNLINKPREEMPTION-STOP

-- ASN1STOP

|  |
| --- |
| *DownlinkPreemption* field descriptions |
| ***dci-PayloadSize***  Total length of the DCI payload scrambled with INT-RNTI (see TS 38.213 [13], clause 11.2). |
| ***int-ConfigurationPerServingCell***  Indicates (per serving cell) the position of the 14 bit INT values inside the DCI payload (see TS 38.213 [13], clause 11.2). |
| ***int-RNTI***  RNTI used for indication pre-emption in DL (see TS 38.213 [13], clause 10). |
| ***timeFrequencySet***  Set selection for DL-preemption indication (see TS 38.213 [13], clause 11.2) The set determines how the UE interprets the DL preemption DCI payload. |

|  |
| --- |
| *INT-ConfigurationPerServingCell* field descriptions |
| ***positionInDCI***  Starting position (in number of bit) of the 14 bit INT value applicable for this serving cell (*servingCellId*) within the DCI payload (see TS 38.213 [13], clause 11.2). Must be multiples of 14 (bit). |

#### – *DRB-Identity*

The IE *DRB-Identity* is used to identify a DRB used by a UE.

*DRB-Identity* information element

-- ASN1START

-- TAG-DRB-IDENTITY-START

DRB-Identity ::= INTEGER (1..32)

-- TAG-DRB-IDENTITY-STOP

-- ASN1STOP

#### – *DRX-Config*

The IE *DRX-Config* is used to configure DRX related parameters.

*DRX-Config* information element

-- ASN1START

-- TAG-DRX-CONFIG-START

DRX-Config ::= SEQUENCE {

drx-onDurationTimer CHOICE {

subMilliSeconds INTEGER (1..31),

milliSeconds ENUMERATED {

ms1, ms2, ms3, ms4, ms5, ms6, ms8, ms10, ms20, ms30, ms40, ms50, ms60,

ms80, ms100, ms200, ms300, ms400, ms500, ms600, ms800, ms1000, ms1200,

ms1600, spare8, spare7, spare6, spare5, spare4, spare3, spare2, spare1 }

},

drx-InactivityTimer ENUMERATED {

ms0, ms1, ms2, ms3, ms4, ms5, ms6, ms8, ms10, ms20, ms30, ms40, ms50, ms60, ms80,

ms100, ms200, ms300, ms500, ms750, ms1280, ms1920, ms2560, spare9, spare8,

spare7, spare6, spare5, spare4, spare3, spare2, spare1},

drx-HARQ-RTT-TimerDL INTEGER (0..56),

drx-HARQ-RTT-TimerUL INTEGER (0..56),

drx-RetransmissionTimerDL ENUMERATED {

sl0, sl1, sl2, sl4, sl6, sl8, sl16, sl24, sl33, sl40, sl64, sl80, sl96, sl112, sl128,

sl160, sl320, spare15, spare14, spare13, spare12, spare11, spare10, spare9,

spare8, spare7, spare6, spare5, spare4, spare3, spare2, spare1},

drx-RetransmissionTimerUL ENUMERATED {

sl0, sl1, sl2, sl4, sl6, sl8, sl16, sl24, sl33, sl40, sl64, sl80, sl96, sl112, sl128,

sl160, sl320, spare15, spare14, spare13, spare12, spare11, spare10, spare9,

spare8, spare7, spare6, spare5, spare4, spare3, spare2, spare1 },

drx-LongCycleStartOffset CHOICE {

ms10 INTEGER(0..9),

ms20 INTEGER(0..19),

ms32 INTEGER(0..31),

ms40 INTEGER(0..39),

ms60 INTEGER(0..59),

ms64 INTEGER(0..63),

ms70 INTEGER(0..69),

ms80 INTEGER(0..79),

ms128 INTEGER(0..127),

ms160 INTEGER(0..159),

ms256 INTEGER(0..255),

ms320 INTEGER(0..319),

ms512 INTEGER(0..511),

ms640 INTEGER(0..639),

ms1024 INTEGER(0..1023),

ms1280 INTEGER(0..1279),

ms2048 INTEGER(0..2047),

ms2560 INTEGER(0..2559),

ms5120 INTEGER(0..5119),

ms10240 INTEGER(0..10239)

},

shortDRX SEQUENCE {

drx-ShortCycle ENUMERATED {

ms2, ms3, ms4, ms5, ms6, ms7, ms8, ms10, ms14, ms16, ms20, ms30, ms32,

ms35, ms40, ms64, ms80, ms128, ms160, ms256, ms320, ms512, ms640, spare9,

spare8, spare7, spare6, spare5, spare4, spare3, spare2, spare1 },

drx-ShortCycleTimer INTEGER (1..16)

} OPTIONAL, -- Need R

drx-SlotOffset INTEGER (0..31)

}

DRX-ConfigExt-v1700 ::= SEQUENCE {

drx-HARQ-RTT-TimerDL-r17 INTEGER (0..448),

drx-HARQ-RTT-TimerUL-r17 INTEGER (0..448)

}

-- TAG-DRX-CONFIG-STOP

-- ASN1STOP

|  |
| --- |
| *DRX-Config* field descriptions |
| ***drx-HARQ-RTT-TimerDL***  Value in number of symbols of the BWP where the transport block was received. *drx-HARQ-RTT-TimerDL-r17* is only applicable for SCS 480 kHz and 960 kHz. If configured, the UE shall ignore *drx-HARQ-RTT-TimerDL* (without suffix) for SCS 480 kHz and 960 kHz. |
| ***drx-HARQ-RTT-TimerUL***  Value in number of symbols of the BWP where the transport block was transmitted. *drx-HARQ-RTT-TimerUL-r17* is only applicable for SCS 480 kHz and 960 kHz. If configured, the UE shall ignore *drx-HARQ-RTT-TimerUL* (without suffix) for SCS 480 kHz and 960 kHz. |
| ***drx-InactivityTimer***  Value in multiple integers of 1 ms. *ms0* corresponds to 0, *ms1* corresponds to 1 ms, *ms2* corresponds to 2 ms, and so on. |
| ***drx-LongCycleStartOffset***  *drx-LongCycle* in ms and *drx-StartOffset* in multiples of 1 ms. If *drx-ShortCycle* is configured, the value of *drx-LongCycle* shall be a multiple of the *drx-ShortCycle* value. |
| ***drx-onDurationTimer***  Value in multiples of 1/32 ms (subMilliSeconds) or in ms (milliSecond). For the latter, value *ms1* corresponds to 1 ms, value *ms2* corresponds to 2 ms, and so on. |
| ***drx-RetransmissionTimerDL***  Value in number of slot lengths of the BWP where the transport block was received. value *sl0* corresponds to 0 slots, *sl1* corresponds to 1 slot, *sl2* corresponds to 2 slots, and so on. |
| ***drx-RetransmissionTimerUL***  Value in number of slot lengths of the BWP where the transport block was transmitted. *sl0* corresponds to 0 slots, *sl1* corresponds to 1 slot, *sl2* corresponds to 2 slots, and so on. |
| ***drx-ShortCycleTimer***  Value in multiples of *drx-ShortCycle*. A value of 1 corresponds to *drx-ShortCycle*, a value of 2 corresponds to 2 \* *drx-ShortCycle* and so on. |
| ***drx-ShortCycle***  Value in ms. *ms1* corresponds to 1 ms, *ms2* corresponds to 2 ms, and so on. |
| ***drx-SlotOffset***  Value in 1/32 ms. Value 0 corresponds to 0 ms, value 1 corresponds to 1/32 ms, value 2 corresponds to 2/32 ms, and so on. |

#### – *DRX-ConfigSecondaryGroup*

The IE *DRX-ConfigSecondaryGroup* is used to configure DRX related parameters for the second DRX group as specified in TS 38.321 [3].

DRX-ConfigSecondaryGroup information element

-- ASN1START

-- TAG-DRX-CONFIGSECONDARYGROUP-START

DRX-ConfigSecondaryGroup ::= SEQUENCE {

drx-onDurationTimer CHOICE {

subMilliSeconds INTEGER (1..31),

milliSeconds ENUMERATED {

ms1, ms2, ms3, ms4, ms5, ms6, ms8, ms10, ms20, ms30, ms40, ms50, ms60,

ms80, ms100, ms200, ms300, ms400, ms500, ms600, ms800, ms1000, ms1200,

ms1600, spare8, spare7, spare6, spare5, spare4, spare3, spare2, spare1 }

},

drx-InactivityTimer ENUMERATED {

ms0, ms1, ms2, ms3, ms4, ms5, ms6, ms8, ms10, ms20, ms30, ms40, ms50, ms60, ms80,

ms100, ms200, ms300, ms500, ms750, ms1280, ms1920, ms2560, spare9, spare8,

spare7, spare6, spare5, spare4, spare3, spare2, spare1}

}

-- TAG-DRX-CONFIGSECONDARYGROUP-STOP

-- ASN1STOP

|  |
| --- |
| *DRX-ConfigSecondaryGroup* field descriptions |
| ***drx-InactivityTimer***  Value in multiple integers of 1 ms. *ms0* corresponds to 0, *ms1* corresponds to 1 ms, *ms2* corresponds to 2 ms, and so on, as specified in TS 38.321 [3]. The network configures a *drx-InactivityTimer* value for the second DRX group that is smaller than the *drx-InactivityTimer* configured for the default DRX group in IE *DRX-Config*. |
| **drx-onDurationTimer**  Value in multiples of 1/32 ms (subMilliSeconds) or in ms (milliSecond). For the latter, value *ms1* corresponds to 1 ms, value *ms2* corresponds to 2 ms, and so on, as specified in TS 38.321 [3]. The network configures a *drx-onDurationTimer* value for the second DRX group that is smaller than the *drx-onDurationTimer* configured for the default DRX group in IE *DRX-Config*. |

#### *– DRX-ConfigSL*

The IE *DRX-ConfigSL* is used to configure additional DRX parameters for the UE performing sidelink operation with resource allocation mode 1, as specified in TS 38.321 [3].

*DRX-ConfigSL information element*

-- ASN1START

-- TAG-DRX-CONFIGSL-START

DRX-ConfigSL-r17 ::= SEQUENCE {

drx-HARQ-RTT-TimerSL-r17 INTEGER (0..56),

drx-RetransmissionTimerSL-r17 ENUMERATED {sl0, sl1, sl2, sl4, sl6, sl8, sl16, sl24, sl33, sl40, sl64, sl80, sl96, sl112, sl128,

sl160, sl320, spare15, spare14, spare13, spare12, spare11, spare10, spare9, spare8,

spare7, spare6, spare5, spare4, spare3, spare2, spare1}

}

-- TAG-DRX-CONFIGSL-STOP

-- ASN1STOP

|  |
| --- |
| *DRX-ConfigSL field descriptions* |
| ***drx-HARQ-RTT-TimerSL***  Value in number of symbols of the BWP where the PDCCH was transmitted. |
| *drx-RetransmissionTimerSL*  Value in number of slot lengths of the BWP where the PDCCH was transmitted. *sl0* corresponds to 0 slots, *sl1* corresponds to 1 slot, *sl2* corresponds to 2 slots, and so on. |

#### – *EphemerisInfo*

The IE *EphemerisInfo* provides satellite ephemeris. Ephemeris may be expressed either in format of position and velocity state vector or in format of orbital parameters. FFS more detailed description.

*EphemerisInfo* information element

-- ASN1START

-- TAG-EPHEMERISINFO-START

EphemerisInfo-r17 ::= CHOICE {

positionVelocity-r17 PositionVelocity-r17,

orbital-r17 Orbital-r17

}

PositionVelocity-r17 ::= SEQUENCE {

positionX-r17 PositionStateVector-r17,

positionY-r17 PositionStateVector-r17,

positionZ-r17 PositionStateVector-r17,

velocityVX-r17 VelocityStateVector-r17,

velocityVY-r17 VelocityStateVector-r17,

velocityVZ-r17 VelocityStateVector-r17

}

Orbital-r17 ::= SEQUENCE {

semiMajorAxis-r17 INTEGER (0..8589934591),

eccentricity-r17 INTEGER (0..1048575),

periapsis-r17 INTEGER (0..268435455),

longitude-r17 INTEGER (0..268435455),

inclination-r17 INTEGER (-67108864..67108863),

meanAnomaly-r17 INTEGER (0..268435455)

}

PositionStateVector-r17 ::= INTEGER (-33554432..33554431)

VelocityStateVector-r17 ::= INTEGER (-131072..131071)

-- TAG-EPHEMERISINFO-STOP

-- ASN1STOP

|  |
| --- |
| *EphemerisInfo* field descriptions |
| ***anomaly***  Satellite orbital parameter: Mean anomaly M at epoch time, see NIMA TR 8350.2 [71]. Unit is radian.  Step of 2.341\* 10-8 rad. Actual value = field value \* (2.341\* 10-8). |
| ***eccentricity***  Satellite orbital parameter: eccentricity e, see NIMA TR 8350.2 [71].  Step 1.431 \* 10-8. Actual value = field value \* (1.431 \* 10-8). |
| ***inclination***  Satellite orbital parameter: inclination i, see NIMA TR 8350.2 [71]. Unit is radian.  Step of 2.341\* 10-8 rad. Actual value = field value \* (2.341\* 10-8). |
| ***longitude***  Satellite orbital parameter: longitude of ascending node Ω, see NIMA TR 8350.2 [71]. Unit is radian.  Step of 2.341\* 10-8 rad. Actual value = field value \* (2.341\* 10-8). |
| ***periapsis***  Satellite orbital parameter: argument of periapsis ω, see NIMA TR 8350.2 [71]. Unit is radian.  Step of 2.341\* 10-8 rad. Actual value = field value \* (2.341\* 10-8). |
| ***positionX, positionY, positionZ***  X, Y, Z coordinate of satellite position state vector in ECEF. Unit is meter.  Step of 1.3 m. Actual value = field value \* 1.3. |
| ***semiMajorAxis***  Satellite orbital parameter: semi major axis α, see NIMA TR 8350.2 [71]. Unit is meter.  Stepof 4.249 \* 10-3 m. Actual value = 6500000 + field value \* (4.249 \* 10-3). |
| ***velocityVX, velocityVY, velocityVZ***  X, Y, Z coordinate of satellite velocity state vector in ECEF. Unit is meter/second.  Step of 0.06 m/s. Actual value = field value \* 0.06. |

#### – *FeatureCombination*

The IE *FeatureCombination* indicates a feature or a combination of features to be associated with a set of Random Access resources (i.e. an instance of *FeatureCombinationPreambles*).

*FeatureCombination* information element

-- ASN1START

-- TAG-FEATURECOMBINATION-START

FeatureCombination-r17 ::= SEQUENCE {

redCap-r17 ENUMERATED {true} OPTIONAL, -- Need R

smallData-r17 ENUMERATED {true} OPTIONAL, -- Need R

nsag-r17 NSAG-List-r17 OPTIONAL, -- Need R

msg3-Repetitions-r17 ENUMERATED {true} OPTIONAL, -- Need R

spare4 ENUMERATED {true} OPTIONAL, -- Need R

spare3 ENUMERATED {true} OPTIONAL, -- Need R

spare2 ENUMERATED {true} OPTIONAL, -- Need R

spare1 ENUMERATED {true} OPTIONAL -- Need R

}

NSAG-List-r17 ::= SEQUENCE (SIZE (1.. maxSliceInfo-r17)) OF NSAG-ID-r17

-- TAG-FEATURECOMBINATION-STOP

-- ASN1STOP

|  |
| --- |
| *FeatureCombinationIndication* field descriptions |
| ***redCap***  If present, this field indicates that RedCap is part of this feature combination. |
| ***smallData***  If present, this field indicates that Small Data is part of this feature combination. |
| ***nsag***  If present, this field indicates NSAG(s) that are part of this feature combination. |
| ***msg3-Repetitions***  If present, this field indicates that signalling of msg3 repetition is part of this feature combination. This field is not configured in a set of preambles that is configured with 2-step random-access type. |

#### – *FeatureCombinationPreambles*

The IE *FeatureCombinationPreambles* associatesa set of preambles with a feature combination. For parameters which can be provided in this IE, the UE applies this field value when performing Random Access using a preamble in this featureCombinationPreambles, otherwise the UE applies the corresponding value as determined by applicable Need Code, e.g. Need S. On a specific BWP, there can be at most one set of preambles associated with a given feature combination per RA Type (i.e. 4-step RACH or 2-step RACH).

*FeatureCombinationPreambles* information element

-- ASN1START

-- TAG-FEATURECOMBINATIONPREAMBLES-START

FeatureCombinationPreambles-r17 ::= SEQUENCE {

featureCombination-r17 FeatureCombination-r17,

startPreambleForThisPartition-r17 INTEGER (1..64),

numberOfPreamblesPerSSB-ForThisPartition-r17 INTEGER (1..64),

ssb-SharedRO-MaskIndex-r17 INTEGER (1..15) OPTIONAL, -- Need S

groupBconfigured-r17 SEQUENCE {

ra-SizeGroupA-r17 ENUMERATED {b56, b144, b208, b256, b282, b480, b640,

b800, b1000, b72, spare6, spare5,spare4, spare3, spare2, spare1},

messagePowerOffsetGroupB ENUMERATED { minusinfinity, dB0, dB5, dB8, dB10, dB12, dB15, dB18},

numberOfRA-PreamblesGroupA INTEGER (1..64)

} OPTIONAL, -- Need S

separateMsgA-PUSCH-Config-r17 MsgA-PUSCH-Config-r16 OPTIONAL, -- Cond MsgAConfigCommon

msgA-RSRP-Threshold-r17 RSRP-Range OPTIONAL, -- Need R

rsrp-ThresholdSSB-r17 RSRP-Range OPTIONAL, -- Need R

deltaPreamble-r17 INTEGER (-1..6) OPTIONAL, -- Need R

...

}

-- TAG-FEATURECOMBINATIONPREAMBLES-STOP

-- ASN1STOP

|  |
| --- |
| *FeatureCombinationPreambles* field descriptions |
| ***deltaPreamble***  Power offset between msg3 or msgA-PUSCH and RACH preamble transmission. If configured, this parameter overrides *msg3-DeltaPreamble* or *msgA-DeltaPreamble*, Actual value = field value \* 2 [dB] (see TS 38.213 [13], clause 7.1). If *msgA-DeltaPreamble* is configured in *separateMsgA-PUSCH-Config-r17*, this field is absent. |
| ***featureCombination***  Indicates which combination of features that the preambles indicated by this IE are associated with. The UE ignores a RACH resource defined by this *FeatureCombinationPreambles* if any feature within the *featureCombination* is not supported by the UE or has an unknown value. |
| ***messagePowerOffsetGroupB***  Threshold for preamble selection. Value is in dB. Value *minusinfinity* corresponds to –infinity. Value *dB0* corresponds to 0 dB, *dB5* corresponds to 5 dB and so on (see TS 38.321 [3], clause 5.1.2). |
| ***msgA-RSRP-Threshold***  The UE selects 2-step random access type to perform random access based on this threshold (see TS 38.321 [3], clause 5.1.1). This field is only present if partition specific RSRP threshold for 2-step and 4-step RA type is configured for the BWP. If configured, this parameter overrides *msgA-RSRP-Threshold-r16*. If absent, the UE applies *msgA-RSRP-Threshold-r16*, if configured |
| ***numberOfPreamblesForThisPartition***  It determines how many consecutive preambles are associated to the Feature Combination starting from the starting preamble(s) per SSB. |
| ***numberOfRA-PreamblesGroupA***  It determines how many consecutive preambles per SSB are associated to Group A starting from the starting preamble(s). The remaining preambles associated to the Feature Combination are associated to Group B |
| ***ra-SizeGroupA***  Transport Blocks size threshold in bits below which the UE shall use a contention-based RA preamble of group A. (see TS 38.321 [3], clause 5.1.2). If this feature combination preambles are associated to a *RACH-ConfigCommon-twostepRA*, this field correspond to *ra-MsgA-SizeGroupA*, otherwise it corresponds to *ra-Msg3SizeGroupA*. |
| ***rsrp-ThresholdSSB***  L1-RSRP threshold used for determining whether a candidate beam may be used by the UE. If this parameter is included in *FeatureCombinationPreambles* which is included in *RACH-ConfigCommonTwoStepRA*, it corresponds to *msgA-RSRP-ThresholdSSB*, as defined in TS 38.321 [3]. If this parameter is included in *FeatureCombinationPreambles* which is included in *RACH-ConfigCommon*, it it corresponds to *rsrp-ThresholdSSB*, as defined in TS 38.321 [3]. |
| ***separateMsgA-PUSCH-Config***  If present it specifies how the 2-step RACH preambles identified by this *FeatureCombinationPreambles* are mapped to a PUSCH slot separate from the one defined in MsgA-ConfigCommon-r16. If the field is absent, the UE should apply the corresponding parameter in the *RACH-ConfigCommonTwoStepRA* of the BWP which includes the *FeatureCombinationPreambles IE*. |
| ***ssb-SharedRO-MaskIndex***  Mask index (see TS 38.321 [3]).  Indicates a subset of ROs where preambles are allocated for this feature combination. If this field is configured within *FeatureCombinationPreambles* which is included in *RACH-ConfigCommonTwoStepRA*, it indicates a subset of ROs configured within this *RACH-ConfigCommonTwoStepRA*. This field is configured when there is more than one RO per SSB. If the field is absent, all ROs configured in *RACH-ConfigCommon* or *RACH-ConfigCommonTwoStepRA* containing this *FeatureCombinationPreambles* are shared. |
| ***startPreambleForThisPartition***  It defines the first preamble associated with the Feature Combination. If N<1 the first preamble in each PRACH occasion is the one having the same index indicated by this field. If N>=1 in each PRACH occasion N blocks of preambles associated with the Feature Combination are define, each having start index + startPreambleForThisPartition (see 38.213). |

|  |  |
| --- | --- |
| Conditional Presence | Explanation |
| *MsgAConfigCommon* | The field is optionally present, Need S, if *FeatureCombinationPreambles* is included in *RACH-ConfigCommonTwoStepRA*. Otherwise, it is absent. If the field is absent in *FeatureCombinationPreambles* included in *RACH-ConfigCommonTwoStepRA*, the UE applies *MsgA-PUSCH-Config* included in the corresponding *MsgA-ConfigCommon*. |

#### – *FilterCoefficient*

The IE *FilterCoefficient* specifies the measurement filtering coefficient. Value *fc0* corresponds to k = 0, *fc1* corresponds to k = 1, and so on.

*FilterCoefficient* information element

-- ASN1START

-- TAG-FILTERCOEFFICIENT-START

FilterCoefficient ::= ENUMERATED { fc0, fc1, fc2, fc3, fc4, fc5, fc6, fc7, fc8, fc9, fc11, fc13, fc15, fc17, fc19, spare1, ...}

-- TAG-FILTERCOEFFICIENT-STOP

-- ASN1STOP

#### – *FreqBandIndicatorNR*

The IE *FreqBandIndicatorNR* is used to convey an NR frequency band number as defined in TS 38.101-1 [15] and TS 38.101-2 [39].

*FreqBandIndicatorNR* information element

-- ASN1START

-- TAG-FREQBANDINDICATORNR-START

FreqBandIndicatorNR ::= INTEGER (1..1024)

-- TAG-FREQBANDINDICATORNR-STOP

-- ASN1STOP

#### – *FreqPriorityListDedicatedSlicing*

The IE *FreqPriorityListDedicatedSlicing* indicates dedicated cell reselection priorities for slicing.

*FreqPriorityListDedicatedSlicing* information element

-- ASN1START

-- TAG-FREQPRIORITYLISTDEDICATEDSLICING-START

FreqPriorityListDedicatedSlicing-r17 ::= SEQUENCE (SIZE (1.. maxFreq)) OF FreqPriorityDedicatedSlicing-r17

FreqPriorityDedicatedSlicing-r17 ::= SEQUENCE {

dl-ExplicitCarrierFreq-r17 ARFCN-ValueNR,

sliceInfoListDedicated-r17 SliceInfoListDedicated-r17 OPTIONAL -- Need R

}

SliceInfoListDedicated-r17 ::= SEQUENCE (SIZE (1..maxSliceInfo-r17)) OF SliceInfoDedicated-r17

SliceInfoDedicated-r17 ::= SEQUENCE {

nsag-IdentityInfo-r17 NSAG-IdentityInfo-r17,

nsag-CellReselectionPriority-r17 CellReselectionPriority OPTIONAL, -- Need R

nsag-CellReselectionSubPriority-r17 CellReselectionSubPriority OPTIONAL -- Need R

}

-- TAG-FREQPRIORITYLISTDEDICATEDSLICING-STOP

-- ASN1STOP

| *FreqPriorityDedicatedSlicing* field descriptions |
| --- |
| ***dl-ExplicitCarrierFreq***  Indicates the downlink carrier frequency to which *SliceInfoListDedicated* is associated. |

| *SliceInfoDedicated* field descriptions |
| --- |
| ***nsag-IdentityInfo***  This is the NSAG identifier of the NSAG. |

#### – *FreqPriorityListSlicing*

The IE *FreqPriorityListSlicing* indicates cell reselection priorities for slicing in SIB16.

*FreqPriorityListSlicing* information element

-- ASN1START

-- TAG-FREQPRIORITYLISTSLICING-START

FreqPriorityListSlicing-r17 ::= SEQUENCE (SIZE (1..maxFreqPlus1)) OF FreqPrioritySlicing-r17

FreqPrioritySlicing-r17 ::= SEQUENCE {

dl-ImplicitCarrierFreq-r17 INTEGER (0..maxFreq),

sliceInfoList-r17 SliceInfoList-r17 OPTIONAL -- Need R

}

SliceInfoList-r17 ::= SEQUENCE (SIZE (1..maxSliceInfo-r17)) OF SliceInfo-r17

SliceInfo-r17 ::= SEQUENCE {

nsag-IdentityInfo-r17 NSAG-IdentityInfo-r17,

nsag-CellReselectionPriority-r17 CellReselectionPriority OPTIONAL, -- Need R

nsag-CellReselectionSubPriority-r17 CellReselectionSubPriority OPTIONAL, -- Need R

sliceCellListNR-r17 CHOICE {

sliceAllowedCellListNR-r17 SliceCellListNR-r17,

sliceExcludedCellListNR-r17 SliceCellListNR-r17

} OPTIONAL -- Need R

}

SliceCellListNR-r17 ::= SEQUENCE (SIZE (1..maxCellSlice-r17)) OF PCI-Range

-- TAG-FREQPRIORITYLISTSLICING-STOP

-- ASN1STOP

| *FreqPriorityListSlicing* field descriptions |
| --- |
| ***dl-ImplicitCarrierFreq***  Indicates the downlink carrier frequency to which *sliceInfoList* is associated with. The frequency is signalled implicitly, value 0 corresponds to the serving frequency, value 1 corresponds to the first frequency indicated by the *InterFreqCarrierFreqList* in SIB4, and value 2 coresponds to the second frequency indicated by the *InterFreqCarrierFreqList* in SIB4, and so on. |

| *SliceInfo* field descriptions |
| --- |
| ***nsag-IdentityInfo***  This is the NSAG identifier of the NSAG. |
| ***sliceAllowedCellListNR***  List of allow-listed neighbouring cells for slicing. If present, cells not listed in this list do not support the corresponding nsag-frequency pair, according to 38.304 [20], clause 5.2.4.11. |
| ***sliceCellListNR***  Contains either the list of allow-listed or exclude-listed neighbour cells for slicing. |
| ***sliceExcludedCellListNR***  List of exclude-listed neighbouring cells for slicing. If present, cells not listed in this list support the corresponding slice nsag-frequency pair, according to 38.304 [20], clause 5.2.4.11. |

#### – *FrequencyInfoDL*

The IE *FrequencyInfoDL* provides basic parameters of a downlink carrier and transmission thereon.

*FrequencyInfoDL* information element

-- ASN1START

-- TAG-FREQUENCYINFODL-START

FrequencyInfoDL ::= SEQUENCE {

absoluteFrequencySSB ARFCN-ValueNR OPTIONAL, -- Cond SpCellAdd

frequencyBandList MultiFrequencyBandListNR,

absoluteFrequencyPointA ARFCN-ValueNR,

scs-SpecificCarrierList SEQUENCE (SIZE (1..maxSCSs)) OF SCS-SpecificCarrier,

...

}

-- TAG-FREQUENCYINFODL-STOP

-- ASN1STOP

|  |
| --- |
| *FrequencyInfoDL* field descriptions |
| ***absoluteFrequencyPointA***  Absolute frequency position of the reference resource block (Common RB 0). Its lowest subcarrier is also known as Point A (see TS 38.211 [16], clause 4.4.4.2). Note that the lower edge of the actual carrier is not defined by this field but rather in the *scs-SpecificCarrierList*. |
| ***absoluteFrequencySSB***  Frequency of the SSB to be used for this serving cell. SSB related parameters (e.g. SSB index) provided for a serving cell refer to this SSB frequency unless mentioned otherwise. The cell-defining SSB of the PCell is always on the sync raster. Frequencies are considered to be on the sync raster if they are also identifiable with a GSCN value (see TS 38.101-1 [15]). If the field is absent, the SSB related parameters should be absent, e.g. *ssb-PositionsInBurst*, *ssb-periodicityServingCell* and *subcarrierSpacing* in *ServingCellConfigCommon* IE. If the field is absent, the UE obtains timing reference from the SpCell or an SCell if applicable as described in TS 38.213 [13], clause 4.1. This is only supported in case the SCell for which the UE obtains the timing reference is in the same frequency band as the cell (i.e. the SpCell or the SCell, respectively) from which the UE obtains the timing reference.  For cells supporting RedCap, if *FrequencyInfoDL* is included in the *ReconfigurationWithSync*, this field corresponds to the cell-defining SSB. |
| ***frequencyBandList***  List containing only one frequency band to which this carrier(s) belongs. Multiple values are not supported. |
| ***scs-SpecificCarrierList***  A set of carriers for different subcarrier spacings (numerologies). Defined in relation to Point A. The network configures a *scs-SpecificCarrier* at least for each numerology (SCS) that is used e.g. in a BWP (see TS 38.211 [16], clause 5.3). |

|  |  |
| --- | --- |
| Conditional Presence | Explanation |
| *SpCellAdd* | The field is mandatory present if this *FrequencyInfoDL* is for SpCell. Otherwise the field is optionally present, Need S. |

#### *– FrequencyInfoDL-SIB*

The IE *FrequencyInfoDL-SIB* provides basic parameters of a downlink carrier and transmission thereon.

*FrequencyInfoDL-SIB* information element

-- ASN1START

-- TAG-FREQUENCYINFODL-SIB-START

FrequencyInfoDL-SIB ::= SEQUENCE {

frequencyBandList MultiFrequencyBandListNR-SIB,

offsetToPointA INTEGER (0..2199),

scs-SpecificCarrierList SEQUENCE (SIZE (1..maxSCSs)) OF SCS-SpecificCarrier

}

-- TAG-FREQUENCYINFODL-SIB-STOP

-- ASN1STOP

|  |
| --- |
| *FrequencyInfoDL-SIB* field descriptions |
| ***offsetToPointA***  Represents the offset to Point A as defined in TS 38.211 [16], clause 4.4.4.2. |
| ***frequencyBandList***  List of one or multiple frequency bands to which this carrier(s) belongs. |
| ***scs-SpecificCarrierList***  A set of carriers for different subcarrier spacings (numerologies). Defined in relation to Point A (see TS 38.211 [16], clause 5.3). The network configures this for all SCSs that are used in DL BWPs in this serving cell. |

#### – *FrequencyInfoUL*

The IE *FrequencyInfoUL* provides basic parameters of an uplink carrier and transmission thereon.

*FrequencyInfoUL* information element

-- ASN1START

-- TAG-FREQUENCYINFOUL-START

FrequencyInfoUL ::= SEQUENCE {

frequencyBandList MultiFrequencyBandListNR OPTIONAL, -- Cond FDD-OrSUL

absoluteFrequencyPointA ARFCN-ValueNR OPTIONAL, -- Cond FDD-OrSUL

scs-SpecificCarrierList SEQUENCE (SIZE (1..maxSCSs)) OF SCS-SpecificCarrier,

additionalSpectrumEmission AdditionalSpectrumEmission OPTIONAL, -- Need S

p-Max P-Max OPTIONAL, -- Need S

frequencyShift7p5khz ENUMERATED {true} OPTIONAL, -- Cond FDD-TDD-OrSUL-Optional

...

}

-- TAG-FREQUENCYINFOUL-STOP

-- ASN1STOP

|  |
| --- |
| *FrequencyInfoUL* field descriptions |
| ***absoluteFrequencyPointA***  Absolute frequency of the reference resource block (Common RB 0). Its lowest subcarrier is also known as Point A. Note that the lower edge of the actual carrier is not defined by this field but rather in the *scs-SpecificCarrierList* (see TS 38.211 [16], clause 4.4.4.2). |
| ***additionalSpectrumEmission***  The additional spectrum emission requirements to be applied by the UE on this uplink. If the field is absent, the UE uses value 0 for the *additionalSpectrumEmission* (see TS 38.101-1 [15], table 6.2.3.1-1A, and TS 38.101-2 [39], table 6.2.3.1-2). Network configures the same value in *additionalSpectrumEmission* for all uplink carrier(s) of the same band with UL configured. The *additionalSpectrumEmission* is applicable for all uplink carriers of the same band with UL configured. |
| ***frequencyBandList***  List containing only one frequency band to which this carrier(s) belongs. Multiple values are not supported. |
| ***frequencyShift7p5khz***  Enable the NR UL transmission with a 7.5 kHz shift to the LTE raster. If the field is absent, the frequency shift is disabled. |
| ***p-Max***  Maximum transmit power allowed in this serving cell. The maximum transmit power that the UE may use on this serving cell may be additionally limited by *p-NR-FR1* (configured for the cell group) and by *p-UE-FR1* (configured total for all serving cells operating on FR1). If absent, the UE applies the maximum power according to TS 38.101-1 [15] in case of an FR1 cell or TS 38.101-2 [39] in case of an FR2 cell. In this release of the specification, if p-Max is present on a carrier frequency in FR2, the UE shall ignore the field and applies the maximum power according to TS 38.101-2 [39]. Value in dBm. This field is ignored by IAB-MT, the IAB-MT applies output power and emissions requirements, as specified in TS 38.174 [63]. |
| ***scs-SpecificCarrierList***  A set of carriers for different subcarrier spacings (numerologies). Defined in relation to Point A. The network configures a *scs-SpecificCarrier* at least for each numerology (SCS) that is used e.g. in a BWP (see TS 38.211 [16], clause 5.3). |

|  |  |
| --- | --- |
| Conditional Presence | Explanation |
| *FDD-OrSUL* | The field is mandatory present if this *FrequencyInfoUL* is for the paired UL for a DL (defined in a *FrequencyInfoDL*) or if this *FrequencyInfoUL* is for a supplementary uplink (SUL). It is absent, Need R, otherwise (if this *FrequencyInfoUL* is for an unpaired UL (TDD). |
| *FDD-TDD-OrSUL-Optional* | The field is optionally present, Need R, if this *FrequencyInfoUL* is for the paired UL for a DL (defined in a *FrequencyInfoDL*), or if this *FrequencyInfoUL* is for an unpaired UL (TDD) in certain bands (as defined in clause 5.4.2.1 of TS 38.101-1 and in clause 5.4.2.1 of TS 38.104 [12]), or if this *FrequencyInfoUL* is for a supplementary uplink (SUL). It is absent, Need R, otherwise. |

#### *– FrequencyInfoUL-SIB*

The IE *FrequencyInfoUL-SIB* provides basic parameters of an uplink carrier and transmission thereon.

*FrequencyInfoUL-SIB* information element

-- ASN1START

-- TAG-FREQUENCYINFOUL-SIB-START

FrequencyInfoUL-SIB ::= SEQUENCE {

frequencyBandList MultiFrequencyBandListNR-SIB OPTIONAL, -- Cond FDD-OrSUL

absoluteFrequencyPointA ARFCN-ValueNR OPTIONAL, -- Cond FDD-OrSUL

scs-SpecificCarrierList SEQUENCE (SIZE (1..maxSCSs)) OF SCS-SpecificCarrier,

p-Max P-Max OPTIONAL, -- Need S

frequencyShift7p5khz ENUMERATED {true} OPTIONAL, -- Cond FDD-TDD-OrSUL-Optional

...

}

-- TAG-FREQUENCYINFOUL-SIB-STOP

-- ASN1STOP

|  |
| --- |
| *FrequencyInfoUL-SIB* field descriptions |
| ***absoluteFrequencyPointA***  Absolute frequency of the reference resource block (Common RB 0). Its lowest subcarrier is also known as Point A. Note that the lower edge of the actual carrier is not defined by this field but rather in the *scs-SpecificCarrierList* (see TS 38.211 [16], clause 4.4.4.2). |
| ***frequencyBandList***  Provides the frequency band indicator and a list of *additionalPmax* and *additionalSpectrumEmission* values as defined in TS 38.101-1 [15], table 6.2.3.1-1, and TS 38.101-2 [39], table 6.2.3.1-2. The UE shall apply the first listed band which it supports in the *frequencyBandList* field. |
| ***frequencyShift7p5khz***  Enable the NR UL transmission with a 7.5 kHz shift to the LTE raster. If the field is absent, the frequency shift is disabled. |
| ***p-Ma***x  Value in dBm applicable for the cell. If absent the UE applies the maximum power according to TS 38.101-1 [15] in case of an FR1 cell or TS 38.101-2 [39] in case of an FR2 cell. In this release of the specification, if p-Max is present on a carrier frequency in FR2, the UE shall ignore the field and applies the maximum power according to TS 38.101-2 [39]. This field is ignored by IAB-MT, the IAB-MT applies output power and emissions requirements, as specified in TS 38.174 [63]. |
| ***scs-SpecificCarrierList***  A set of carriers for different subcarrier spacings (numerologies). Defined in relation to Point A (see TS 38.211 [16], clause 5.3). The network configures this for all SCSs that are used in UL BWPs configured in this serving cell. |

|  |  |
| --- | --- |
| Conditional Presence | Explanation |
| *FDD-OrSUL* | The field is mandatory present if this *FrequencyInfoUL-SIB* is for the paired UL for a DL (defined in a *FrequencyInfoDL-SIB*) or if this *FrequencyInfoUL-SIB* is for a supplementary uplink (SUL). It is absent otherwise (if this *FrequencyInfoUL-SIB* is for an unpaired UL (TDD). |
| *FDD-TDD-OrSUL-Optional* | The field is optionally present, Need R, if this *FrequencyInfoUL-SIB* is for the paired UL for a DL (defined in a *FrequencyInfoDL-SIB*), or if this *FrequencyInfoUL-SIB* is for an unpaired UL (TDD) in certain bands (as defined in clause 5.4.2.1 of TS 38.101-1 and in clause 5.4.2.1 of TS 38.104 [12]), or if this *FrequencyInfoUL-SIB* is for a supplementary uplink (SUL). It is absent otherwise. |

#### – *GapPriority*

The IE *GapPriority* is used to identify the priority of a gap configuration.

*GapPriority* information element

-- ASN1START

-- TAG-GAPPRIORITY-START

GapPriority-r17 ::= INTEGER (1..maxNrOfGapPri-r17)

-- TAG-GAPPRIORITY-STOP

-- ASN1STOP

#### – *HighSpeedConfig*

The IE *HighSpeedConfig* is used to configure parameters for high speed scenarios.

*HighSpeedConfig* information element

-- ASN1START

-- TAG-HIGHSPEEDCONFIG-START

HighSpeedConfig-r16 ::= SEQUENCE {

highSpeedMeasFlag-r16 ENUMERATED {true} OPTIONAL, -- Need R

highSpeedDemodFlag-r16 ENUMERATED {true} OPTIONAL, -- Need R

...

}

HighSpeedConfig-v1700 ::= SEQUENCE {

highSpeedMeasCA-Scell-r17 ENUMERATED {true} OPTIONAL, -- Need R

highSpeedMeasInterFreq-r17 ENUMERATED {true} OPTIONAL, -- Need R

highSpeedDemodCA-Scell-r17 ENUMERATED {true} OPTIONAL, -- Need R

...

}

HighSpeedConfigFR2-r17 ::= SEQUENCE {

highSpeedMeasFlagFR2-r17 ENUMERATED {set1, set2} OPTIONAL, -- Need R

highSpeedDeploymentTypeFR2-r17 ENUMERATED {unidirectional, bidirectional} OPTIONAL, -- Need R

highSpeedLargeOneStepUL-TimingFR2-r17 ENUMERATED {true} OPTIONAL, -- Need R

...

}

-- TAG-HIGHSPEEDCONFIG-STOP

-- ASN1STOP

| *HighSpeedConfig* field descriptions |
| --- |
| ***HighSpeedDemodCA-Scell***  If the field is present and UE supports *demodulationEnhancementCA-r17*, the UE shall apply the enhanced demodulation processing for HST-SFN joint transmission scheme with velocity up to 500km/h as specified in TS 38.101-4 [59]. This parameter only applies to SCell. |
| ***highSpeedDemodFlag***  If the field is present and UE supports *demodulationEnhancement-r16*, the UE shall apply the enhanced demodulation processing for HST-SFN joint transmission scheme with velocity up to 500km/h as specified in TS 38.101-4 [59]. This parameter only applies to SpCell. |
| ***highSpeedDeploymentTypeFR2***  If the field is present, and field value is *unidirectional*, the UE shall assume uni-directional deployment or if field value is *birectional* the UE shall assume bidirectional deployment for FR2 up to 350km/h as specified in TS 38.133 [14]. |
| ***highSpeedLargeOneSteptUL-TimingFR2***  If the field is present, large one step UE autonomous uplink transmit timing adjustment for FR2 up to 350km/h as specified in TS 38.133 [14] is enabled. |
| ***highSpeedMeasCA-Scell***  If the field is present and UE supports *measurementEnhancementCA-r17*, the UE shall apply the enhanced RRM requirements to SCell for carrier aggregation to support high speed up to 500 km/h as specified in TS 38.133 [14]. This parameter only applies to SCell. |
| ***highSpeedMeasFlag***  If the field is present and UE supports *measurementEnhancement-r16*, the UE shall apply the enhanced intra-NR and inter-RAT EUTRAN RRM requirements to support high speed up to 500 km/h as specified in TS 38.133 [14].  If the field is present and UE supports *intraNR-MeasurementEnhancement-r16*, the UE shall apply enhanced intra-NR RRM requirement to support high speed up to 500 km/h as specified in TS 38.133 [14].  If the field is present and UE supports *interRAT-MeasurementEnhancement-r16*, the UE shall apply enhanced inter-RAT EUTRAN RRM requirement to support high speed up to 500 km/h as specified in TS 38.133 [14].  This parameter only applies to SpCell. |
| ***highSpeedMeasFlagFR2***  If the field is present, the UE shall apply enhanced intra-NR RRM requirement set one to support high speed up to 350 km/h for FR2 as specified in TS 38.133 [14], if the field value is set1 or RRM requirement set two if the field value is set2. |
| ***highSpeedMeasInterFreq***  If the field is present and UE supports *measurementEnhancementInterFreq-r17*, the UE shall apply the enhanced RRM requirements for inter-frequency measurement in RRC\_CONNECTED to support high speed up to 500 km/h as specified in TS 38.133 [14]. |

#### – *Hysteresis*

The IE *Hysteresis* is a parameter used within the entry and leave condition of an event triggered reporting condition. The actual value is field value \* 0.5 dB.

*Hysteresis* information element

-- ASN1START

-- TAG-HYSTERESIS-START

Hysteresis ::= INTEGER (0..30)

-- TAG-HYSTERESIS-STOP

-- ASN1STOP

#### – *HysteresisLocation*

The *HysteresisLocation* is a parameter used within entry and leave condition of a location based event triggered reporting condition. The actual value of field *HysteresisLocation* is field value \* 10 meters.

*HysteresisLocation* information element

-- ASN1START

-- TAG-HYSTERESISLOCATION-START

HysteresisLocation-r17 ::= INTEGER (0..32768)

-- TAG-HYSTERESISLOCATION-STOP

-- ASN1STOP

#### – *InvalidSymbolPattern*

The IE *InvalidSymbolPattern* is used to configure one invalid symbol pattern for PUSCH transmission repetition type B applicable for both DCI format 0\_1 and 0\_2, see TS 38.214 [19], clause 6.1.

*InvalidSymbolPattern* information element

-- ASN1START

-- TAG-INVALIDSYMBOLPATTERN-START

InvalidSymbolPattern-r16 ::= SEQUENCE {

symbols-r16 CHOICE {

oneSlot BIT STRING (SIZE (14)),

twoSlots BIT STRING (SIZE (28))

},

periodicityAndPattern-r16 CHOICE {

n2 BIT STRING (SIZE (2)),

n4 BIT STRING (SIZE (4)),

n5 BIT STRING (SIZE (5)),

n8 BIT STRING (SIZE (8)),

n10 BIT STRING (SIZE (10)),

n20 BIT STRING (SIZE (20)),

n40 BIT STRING (SIZE (40))

} OPTIONAL, -- Need M

...

}

-- TAG-INVALIDSYMBOLPATTERN-STOP

-- ASN1STOP

|  |
| --- |
| *InvalidSymbolPattern* field descriptions |
| ***periodicityAndPattern***  A time domain repetition pattern at which the pattern defined by *symbols* recurs. This slot pattern repeats itself continuously. When the field is not configured, the UE uses the value n1 (see TS 38.214 [19], clause 6.1). |
| ***symbols***  A symbol level bitmap in time domain (see TS 38.214[19], clause 6.1).  For *oneSlot*, if ECP is configured, the first 12 bits represent the symbols within the slot and the last two bits within the bitstring are ignored by the UE; Otherwise, the 14 bits represent the symbols within the slot.  For *twoSlots*, if ECP is configured, the first 12 bits represent the symbols within the first slot and the next 12 bits represent the symbols in the second slot and the last four bits within the bit string are ignored by the UE; Otherwise, the first 14 bits represent the symbols within the first slot and the next 14 bits represent the symbols in the second slot.  For the bits representing symbols in a slot, the most significant bit of the bit string represents the first symbol in the slot and the second most significant bit represents the second symbol in the slot and so on.  This pattern recurs (in time domain) with the configured *periodicityAndPattern*. |

#### – *I-RNTI-Value*

The IE *I-RNTI-Value* is used to identify the suspended UE context of a UE in RRC\_INACTIVE.

*I-RNTI-Value* information element

-- ASN1START

-- TAG-I-RNTI-VALUE-START

I-RNTI-Value ::= BIT STRING (SIZE(40))

-- TAG-I-RNTI-VALUE-STOP

-- ASN1STOP

#### – *LBT-FailureRecoveryConfig*

The IE *LBT-FailureRecoveryConfig-r16* is used to configure the parameters used for detection of consistent uplink LBT failures for operation with shared spectrum channel access, as specified in TS 38.321 [3].

*LBT-FailureRecoveryConfig* information element

-- ASN1START

-- TAG-LBT-FAILURERECOVERYCONFIG-START

LBT-FailureRecoveryConfig-r16 ::= SEQUENCE {

lbt-FailureInstanceMaxCount-r16 ENUMERATED {n4, n8, n16, n32, n64, n128},

lbt-FailureDetectionTimer-r16 ENUMERATED {ms10, ms20, ms40, ms80, ms160, ms320},

...

}

-- TAG-LBT-FAILURERECOVERYCONFIG-STOP

-- ASN1STOP

|  |
| --- |
| *LBT-FailureRecoveryConfig* field descriptions |
| ***lbt-FailureDetectionTimer***  Timer for consistent uplink LBT failure detection (see TS 38.321 [3]). Value *ms10* corresponds to 10 ms, value *ms20* corresponds to 20 ms, and so on. |
| ***lbt-FailureInstanceMaxCount***  This field determines after how many LBT failure indications received from the physical layer the UE triggers uplink LBT failure recovery (see TS 38.321 [3]). Value *n4* corresponds to 4, value *n8* corresponds to 8, and so on. |

#### – *LocationInfo*

The IE *LocationInfo* is used to transfer available detailed location information, Bluetooth, WLAN and sensor available measurement results at the UE.

*LocationInfo* information element

-- ASN1START

-- TAG-LOCATIONINFO-START

LocationInfo-r16 ::= SEQUENCE {

commonLocationInfo-r16 CommonLocationInfo-r16 OPTIONAL,

bt-LocationInfo-r16 LogMeasResultListBT-r16 OPTIONAL,

wlan-LocationInfo-r16 LogMeasResultListWLAN-r16 OPTIONAL,

sensor-LocationInfo-r16 Sensor-LocationInfo-r16 OPTIONAL,

...

}

-- TAG-LOCATIONINFO-STOP

-- ASN1STOP

#### – *LocationMeasurementInfo*

The IE *LocationMeasurementInfo* defines the information sent by the UE to the network to assist with the configuration of measurement gaps for location related measurements.

*LocationMeasurementInfo* information element

-- ASN1START

-- TAG-LOCATIONMEASUREMENTINFO-START

LocationMeasurementInfo ::= CHOICE {

eutra-RSTD EUTRA-RSTD-InfoList,

...,

eutra-FineTimingDetection NULL,

nr-PRS-Measurement-r16 NR-PRS-MeasurementInfoList-r16

}

EUTRA-RSTD-InfoList ::= SEQUENCE (SIZE (1..maxInterRAT-RSTD-Freq)) OF EUTRA-RSTD-Info

EUTRA-RSTD-Info ::= SEQUENCE {

carrierFreq ARFCN-ValueEUTRA,

measPRS-Offset INTEGER (0..39),

...

}

NR-PRS-MeasurementInfoList-r16 ::= SEQUENCE (SIZE (1..maxFreqLayers)) OF NR-PRS-MeasurementInfo-r16

NR-PRS-MeasurementInfo-r16 ::= SEQUENCE {

dl-PRS-PointA-r16 ARFCN-ValueNR,

nr-MeasPRS-RepetitionAndOffset-r16 CHOICE {

ms20-r16 INTEGER (0..19),

ms40-r16 INTEGER (0..39),

ms80-r16 INTEGER (0..79),

ms160-r16 INTEGER (0..159),

...

},

nr-MeasPRS-length-r16 ENUMERATED {ms1dot5, ms3, ms3dot5, ms4, ms5dot5, ms6, ms10, ms20},

...

}

-- TAG-LOCATIONMEASUREMENTINFO-STOP

-- ASN1STOP

| *LocationMeasurementInfo* field descriptions |
| --- |
| ***carrierFreq***  The EARFCN value of the carrier received from upper layers for which the UE needs to perform the inter-RAT RSTD measurements. |
| ***measPRS-Offset***  Indicates the requested gap offset for performing RSTD measurements towards E-UTRA. It is the smallest subframe offset from the beginning of subframe 0 of SFN=0 of the serving cell of the requested gap for measuring PRS positioning occasions in the carrier frequency *carrierFreq* for which the UE needs to perform the inter-RAT RSTD measurements. The PRS positioning occasion information is received from upper layers. The value of *measPRS-Offset* is obtained by mapping the starting subframe of the PRS positioning occasion in the measured cell onto the corresponding subframe in the serving cell and is calculated as the serving cell's number of subframes from SFN=0 mod 40.  The UE shall take into account any additional time required by the UE to start PRS measurements on the other carrier when it does this mapping for determining the *measPRS-Offset*.  NOTE: Figure 6.2.2-1 in TS 36.331[10] illustrates the *measPRS-Offset* field. |
| ***dl-PRS-PointA***  The ARFCN value of the carrier received from upper layers for which the UE needs to perform the NR DL-PRS measurements. |
| ***nr-MeasPRS-RepetitionAndOffset***  Indicates the gap periodicity in ms and offset in number of subframes of the requested measurement gap for performing NR DL-PRS measurements. |
| ***nr-MeasPRS-length***  Indicates measurement gap length in ms of the requested measurement gap for performing NR DL-PRS measurements. The measurement gap length is according to in Table 9.1.2-1 in TS 38.133 [14]. |

#### – *LogicalChannelConfig*

The IE *LogicalChannelConfig* is used to configure the logical channel parameters.

*LogicalChannelConfig* information element

-- ASN1START

-- TAG-LOGICALCHANNELCONFIG-START

LogicalChannelConfig ::= SEQUENCE {

ul-SpecificParameters SEQUENCE {

priority INTEGER (1..16),

prioritisedBitRate ENUMERATED {kBps0, kBps8, kBps16, kBps32, kBps64, kBps128, kBps256, kBps512,

kBps1024, kBps2048, kBps4096, kBps8192, kBps16384, kBps32768, kBps65536, infinity},

bucketSizeDuration ENUMERATED {ms5, ms10, ms20, ms50, ms100, ms150, ms300, ms500, ms1000,

spare7, spare6, spare5, spare4, spare3,spare2, spare1},

allowedServingCells SEQUENCE (SIZE (1..maxNrofServingCells-1)) OF ServCellIndex

OPTIONAL, -- Cond PDCP-CADuplication

allowedSCS-List SEQUENCE (SIZE (1..maxSCSs)) OF SubcarrierSpacing OPTIONAL, -- Need R

maxPUSCH-Duration ENUMERATED {ms0p02, ms0p04, ms0p0625, ms0p125, ms0p25, ms0p5, ms0p01-v1700, spare1}

OPTIONAL, -- Need R

configuredGrantType1Allowed ENUMERATED {true} OPTIONAL, -- Need R

logicalChannelGroup INTEGER (0..maxLCG-ID) OPTIONAL, -- Need R

schedulingRequestID SchedulingRequestId OPTIONAL, -- Need R

logicalChannelSR-Mask BOOLEAN,

logicalChannelSR-DelayTimerApplied BOOLEAN,

...,

bitRateQueryProhibitTimer ENUMERATED {s0, s0dot4, s0dot8, s1dot6, s3, s6, s12, s30} OPTIONAL, -- Need R

[[

allowedCG-List-r16 SEQUENCE (SIZE (0.. maxNrofConfiguredGrantConfigMAC-1-r16)) OF ConfiguredGrantConfigIndexMAC-r16

OPTIONAL, -- Need S

allowedPHY-PriorityIndex-r16 ENUMERATED {p0, p1} OPTIONAL -- Need S

]],

[[

logicalChannelGroupIAB-Ext-r17 INTEGER (0..maxLCG-ID-IAB-r17) OPTIONAL, -- Need R

allowedHARQ-mode-r17 ENUMERATED {harqModeA, harqModeB} OPTIONAL -- Need R

]]

} OPTIONAL, -- Cond UL

...,

[[

channelAccessPriority-r16 INTEGER (1..4) OPTIONAL, -- Need R

bitRateMultiplier-r16 ENUMERATED {x40, x70, x100, x200} OPTIONAL -- Need R

]]

}

-- TAG-LOGICALCHANNELCONFIG-STOP

-- ASN1STOP

|  |
| --- |
| *LogicalChannelConfig* field descriptions |
| ***allowedCG-List***  This restriction applies only when the UL grant is a configured grant. If present, UL MAC SDUs from this logical channel can only be mapped to the indicated configured grant configuration. If the size of the sequence is zero, then UL MAC SDUs from this logical channel cannot be mapped to any configured grant configurations. If the field is not present, UL MAC SDUs from this logical channel can be mapped to any configured grant configurations. If the field configuredGrantType1Allowed is present, only those configured grant type 1 configuration indicated in this sequence are allowed for use by this logical channel; otherwise, this sequence shall not include any configured grant type 1 configuration. Corresponds to "allowedCG-List" as specified in TS 38.321 [3]. |
| ***allowedHARQ-mode***  Indicates the allowed HARQ mode of a HARQ process mapped to this logical channel. If the parameter is absent, there is no restriction for HARQ mode for the mapping. This field applies to SRB1, SRB2 and DRBs. |
| ***allowedPHY-PriorityIndex***  This restriction applies only when the UL grant is a dynamic grant. If the field is present and the dynamic grant has a PHY-priority index, UL MAC SDUs from this logical channel can only be mapped to the dynamic grants indicating PHY-priority index equal to the values configured by this field. If the field is present and the dynamic grant does not have a PHY-priority index, UL MAC SDUs from this logical channel can only be mapped to this dynamic grant if the value of the field is *p0*, see TS 38.213 [13], clause 9. If the field is not present, UL MAC SDUs from this logical channel can be mapped to any dynamic grants. Corresponds to "allowedPHY-PriorityIndex" as specified in TS 38.321 [3]. |
| ***allowedSCS-List***  If present, UL MAC SDUs from this logical channel can only be mapped to the indicated numerology. Otherwise, UL MAC SDUs from this logical channel can be mapped to any configured numerology. Corresponds to *'allowedSCS-List'* as specified in TS 38.321 [3].  Only the following values are applicable depending on the used frequency:  FR1: 15, 30, or 60 kHz  FR2-1: 60 or 120 kHz  FR2-2: 120, 480, or 960 kHz |
| ***allowedServingCells***  If present, UL MAC SDUs from this logical channel can only be mapped to the serving cells indicated in this list. Otherwise, UL MAC SDUs from this logical channel can be mapped to any configured serving cell of this cell group. Corresponds to 'allowedServingCells' in TS 38.321 [3]. |
| ***bitRateMultiplier***  Bit rate multiplier for recommended bit rate MAC CE as specified in TS 38.321 [3]. Value *x40* indicates bit rate multiplier 40, value *x70* indicates bit rate multiplier 70 and so on. |
| ***bitRateQueryProhibitTimer***  The timer is used for bit rate recommendation query in TS 38.321 [3], in seconds. Value *s0* means 0 s, *s0dot4* means 0.4 s and so on. |
| ***bucketSizeDuration***  Value in ms. *ms5* corresponds to 5 ms, value *ms10* corresponds to 10 ms, and so on. |
| ***channelAccessPriority***  Indicates the Channel Access Priority Class (CAPC), as specified in TS 38.300 [2], to be used on uplink transmissions for operation with shared spectrum channel access. The network configures this field only for SRB2 and DRBs. |
| ***configuredGrantType1Allowed***  If present, or if the capability *lcp-Restriction* as specified in TS 38.306 [26] is not supported, UL MAC SDUs from this logical channel can be transmitted on a configured grant type 1. Otherwise, UL MAC SDUs from this logical channel cannot be transmitted on a configured grant type 1. Corresponds to 'configuredGrantType1Allowed' in TS 38.321 [3]. |
| ***logicalChannelGroup, logicalChannelGroupIAB-Ext***  ID of the logical channel group, as specified in TS 38.321 [3], which the logical channel belongs to. The *logicalChannelGroupIAB-Ext* is only applicable to the IAB-MT. When *logicalChannelGroupIAB-Ext* is configured, *logicalChannelGroup* shall be ignored. |
| ***logicalChannelSR-Mask***  Controls SR triggering when a configured uplink grant of *type1* or *type2* is configured. *true* indicates that SR masking is configured for this logical channel as specified in TS 38.321 [3]. |
| ***logicalChannelSR-DelayTimerApplied***  Indicates whether to apply the delay timer for SR transmission for this logical channel. Set to *false* if *logicalChannelSR-DelayTimer* is not included in *BSR-Config*. |
| ***maxPUSCH-Duration***  If present, UL MAC SDUs from this logical channel can only be transmitted using uplink grants that result in a PUSCH duration shorter than or equal to the duration indicated by this field. Otherwise, UL MAC SDUs from this logical channel can be transmitted using an uplink grant resulting in any PUSCH duration. Corresponds to "maxPUSCH-Duration" in TS 38.321 [3]. The PUSCH duration is calculated based on the same length of all symbols, and the shortest length applies if the symbol lengths are different. |
| ***priority***  Logical channel priority, as specified in TS 38.321 [3]. |
| ***prioritisedBitRate***  Value in kiloBytes/s. Value *kBps0* corresponds to 0 kiloBytes/s, value *kBps8* corresponds to 8 kiloBytes/s, value *kBps16* corresponds to 16 kiloBytes/s, and so on. For SRBs, the value can only be set to *infinity*. |
| ***schedulingRequestId***  If present, it indicates the scheduling request configuration applicable for this logical channel, as specified in TS 38.321 [3]. |

|  |  |
| --- | --- |
| Conditional Presence | Explanation |
| *PDCP-CADuplication* | The field is mandatory present if the DRB/SRB associated with this logical channel is configured with PDCP CA duplication in UL in the cell group in which this IE is included (i.e. the PDCP entity is associated with multiple RLC entities belonging to this cell group). Otherwise the field is optionally present, need R. |
| *UL* | The field is mandatory present for a logical channel with uplink if it serves DRB. It is optionally present, Need R, for a logical channel with uplink if it serves an SRB. Otherwise it is absent. |

#### – *LogicalChannelIdentity*

The IE *LogicalChannelIdentity* is used to identify one logical channel (*LogicalChannelConfig*) and the corresponding RLC bearer (*RLC-BearerConfig*) or BH RLC channel (*BH-RLC-ChannelConfig*) or Uu Relay RLC channel (*Uu-RelayRLC-ChannelConfig*) or PC5 Relay RLC channel (*SL-RLC-ChannelConfig*).

*LogicalChannelIdentity* information element

-- ASN1START

-- TAG-LOGICALCHANNELIDENTITY-START

LogicalChannelIdentity ::= INTEGER (1..maxLC-ID)

-- TAG-LOGICALCHANNELIDENTITY-STOP

-- ASN1STOP

#### – LTE-NeighCellsCRS-AssistInfoList

The IE *LTE-NeighCellsCRS-AssistInfoList-r17* is used to provide configuration information of neighbour LTE cells to assist the UE to perform CRS interference mitigation (CRS-IM) in scenarios with overlapping spectrum for LTE and NR.

*LTE-NeighCellsCRS-AssistInfoList* information element

-- ASN1START

-- TAG-LTE-NEIGHCELLSCRS-ASSISTINFOLIST-START

LTE-NeighCellsCRS-AssistInfoList-r17 ::= SEQUENCE (SIZE (1..maxNrofCRS-IM-InterfCell-r17)) OF LTE-NeighCellsCRS-AssistInfo-r17

LTE-NeighCellsCRS-AssistInfo-r17 ::= SEQUENCE {

neighCarrierBandwidthDL-r17 ENUMERATED {n6, n15, n25, n50, n75, n100, spare2, spare1} OPTIONAL, -- Cond CRS-IM

neighCarrierFreqDL-r17 INTEGER (0..16383) OPTIONAL, -- Need S

neighCellId-r17 EUTRA-PhysCellId OPTIONAL, -- Need M

neighCRS-muting-r17 ENUMERATED {enabled} OPTIONAL, -- Need R

neighMBSFN-SubframeConfigList-r17 EUTRA-MBSFN-SubframeConfigList OPTIONAL, -- Need S

neighNrofCRS-Ports–r17 ENUMERATED {n1, n2, n4} OPTIONAL, -- Need S

neighV-Shift-r17 ENUMERATED {n0, n1, n2, n3, n4, n5} OPTIONAL -- Cond NotCellID

}

-- TAG-LTE-NEIGHCELLSCRS-ASSISTINFOLIST-STOP

-- ASN1STOP

|  |
| --- |
| LTE-NeighCellsCRS-AssistInfoList field descriptions |
| ***neighCarrierBandwidthDL***  Indicates the channel bandwidth of the neighbour LTE cell in number of PRBs. If the field is absent, the UE applies the value of *carrierBandwidthDL* indicated in *RateMatchPatternLTE-CRS* for this serving cell, if configured. |
| ***neighCarrierFreqDL***  Indicates the downlink centre frequency of the neighbour LTE cell. If the field is absent, the UE applies the value of *carrierFreqDL* indicated in *RateMatchPatternLTE-CRS* for this serving cell, if configured. |
| ***neighCellId***  Indicates the physciall cell ID the neighbour LTE cell. |
| ***neighCRS-muting***  Indicates whether the CRS interference mitigation is enabled in the neighbour LTE cell, as specified in TS 36.133 [40], clause 3.6.1.1. |
| ***neighMBSFN-SubframeConfigList***  Indicates the MBSFN subframe configuration of the neighbour LTE cell. If *RateMatchPatternLTE-CRS* is configured for this serving cell and the field is absent, the UE applies the value of *mbsfn-SubframeConfigList* indicated in *RateMatchPatternLTE-CRS* for this serving cell if configured; otherwise, if the field is absent, the UE assumes MBSFN is not configured in the neighbour LTE cell. |
| ***neighNrofCRS-Ports***  Indicates the CRS antenna ports number of the neighbour LTE cell. If the field is absent, the UE applies the value of *nrofCRS-Ports* indicated in *RateMatchPatternLTE-CRS* for this serving cell, if configured. If *RateMatchPatternLTE-CRS* is not configured for this serving cell and the field is absent, the UE applies the default value n4. |
| ***neighV-Shift***  Indicates the shifting value v-shift of the neighbour LTE cell. |

|  |  |
| --- | --- |
| Conditional Presence | Explanation |
| *CRS-IM* | For the serving cell with 15kHz SCS, this field is mandatory present for the UE supporting the capability of *CRS-IM-nonDSS-NWA-15kHzSCS-r17*, but not supporting *CRS-IM-nonDSS-15kHzSCS-r17*, if *RateMatchPatternLTE-CRS* is not configured for this serving cell. Otherwise it is optionally present, Need S if *RateMatchPatternLTE-CRS* is configured for this serving cell; Need M otherwise.  For the serving cell with 30kHz SCS, this field is mandatory present for the UE supporting the capability of *CRS-IM-nonDSS-NWA-30kHzSCS-r17*, but not supporting *CRS-IM-nonDSS-30kHzSCS-r17*, if *RateMatchPatternLTE-CRS* is not configured for this serving cell. Otherwise it is optionally present, Need S if *RateMatchPatternLTE-CRS* is configured for this serving cell; Need M otherwise. |
| *NotCellID* | If the field *neighCellId* is present, this field shall be absent; otherwise, it is optionally present, Need M. |

#### – *MAC-CellGroupConfig*

The IE *MAC-CellGroupConfig* is used to configure MAC parameters for a cell group, including DRX.

*MAC-CellGroupConfig* information element

-- ASN1START

-- TAG-MAC-CELLGROUPCONFIG-START

MAC-CellGroupConfig ::= SEQUENCE {

drx-Config SetupRelease { DRX-Config } OPTIONAL, -- Need M

schedulingRequestConfig SchedulingRequestConfig OPTIONAL, -- Need M

bsr-Config BSR-Config OPTIONAL, -- Need M

tag-Config TAG-Config OPTIONAL, -- Need M

phr-Config SetupRelease { PHR-Config } OPTIONAL, -- Need M

skipUplinkTxDynamic BOOLEAN,

...,

[[

csi-Mask BOOLEAN OPTIONAL, -- Need M

dataInactivityTimer SetupRelease { DataInactivityTimer } OPTIONAL -- Cond MCG-Only

]],

[[

usePreBSR-r16 ENUMERATED {true} OPTIONAL, -- Need R

schedulingRequestID-LBT-SCell-r16 SchedulingRequestId OPTIONAL, -- Need R

lch-BasedPrioritization-r16 ENUMERATED {enabled} OPTIONAL, -- Need R

schedulingRequestID-BFR-SCell-r16 SchedulingRequestId OPTIONAL, -- Need R

drx-ConfigSecondaryGroup-r16 SetupRelease { DRX-ConfigSecondaryGroup } OPTIONAL -- Need M

]],

[[

enhancedSkipUplinkTxDynamic-r16 ENUMERATED {true} OPTIONAL, -- Need R

enhancedSkipUplinkTxConfigured-r16 ENUMERATED {true} OPTIONAL -- Need R

]],

[[

intraCG-Prioritization-r17 ENUMERATED {enabled} OPTIONAL, -- Cond LCH-PrioWithReTxTimer

drx-ConfigSL-r17 SetupRelease { DRX-ConfigSL-r17 } OPTIONAL, -- Need M

drx-ConfigExt-v1700 SetupRelease { DRX-ConfigExt-v1700 } OPTIONAL, -- Need M

schedulingRequestID-BFR-r17 SchedulingRequestId OPTIONAL, -- Need R

schedulingRequestID-BFR2-r17 SchedulingRequestId OPTIONAL, -- Need R

schedulingRequestConfig-v1700 SchedulingRequestConfig-v1700 OPTIONAL, -- Need M

tar-Config-r17 SetupRelease { TAR-Config-r17 } OPTIONAL, -- Need M

g-RNTI-ConfigToAddModList-r17 SEQUENCE (SIZE (1..maxG-RNTI-r17)) OF MBS-RNTI-SpecificConfig-r17 OPTIONAL, -- Need N

g-RNTI-ConfigToReleaseList-r17 SEQUENCE (SIZE (1..maxG-RNTI-r17)) OF MBS-RNTI-SpecificConfigId-r17 OPTIONAL, -- Need N

g-CS-RNTI-ConfigToAddModList-r17 SEQUENCE (SIZE (1..maxG-CS-RNTI-r17)) OF MBS-RNTI-SpecificConfig-r17 OPTIONAL, -- Need N

g-CS-RNTI-ConfigToReleaseList-r17 SEQUENCE (SIZE (1..maxG-CS-RNTI-r17)) OF MBS-RNTI-SpecificConfigId-r17 OPTIONAL, -- Need N

allowCSI-SRS-Tx-MulticastDRX-Active-r17 BOOLEAN OPTIONAL -- Need M

]]

}

DataInactivityTimer ::= ENUMERATED {s1, s2, s3, s5, s7, s10, s15, s20, s40, s50, s60, s80, s100, s120, s150, s180}

MBS-RNTI-SpecificConfig-r17 ::= SEQUENCE {

mbs-RNTI-SpecificConfigId-r17 MBS-RNTI-SpecificConfigId-r17,

groupCommon-RNTI-r17 CHOICE {

g-RNTI RNTI-Value,

g-CS-RNTI RNTI-Value

},

drx-ConfigPTM-r17 SetupRelease { DRX-ConfigPTM-r17 } OPTIONAL, -- Need M

harq-FeedbackEnablerMulticast-r17 ENUMERATED {dci-enabler, enabled} OPTIONAL, -- Need S

harq-FeedbackOptionMulticast-r17 ENUMERATED {ack-nack, nack-only} OPTIONAL, -- Cond HARQFeedback

pdsch-AggregationFactorMulticast-r17 ENUMERATED {n2, n4, n8} OPTIONAL -- Cond G-RNTI

}

MBS-RNTI-SpecificConfigId-r17 ::= INTEGER (0..maxG-RNTI-1-r17)

-- TAG-MAC-CELLGROUPCONFIG-STOP

-- ASN1STOP

|  |
| --- |
| *MAC-CellGroupConfig* field descriptions |
| ***allowCSI-SRS-Tx-MulticastDRX-Active***  Used to control the CSI/SRS transmission during MBS multicast DRX ActiveTime, see TS 38.321 [3]. |
| ***csi-Mask***  If set to true, the UE limits CSI reports to the on-duration period of the DRX cycle, see TS 38.321 [3]. |
| ***dataInactivityTimer***  Releases the RRC connection upon data inactivity as specified in clause 5.3.8.5 and in TS 38.321 [3]. Value *s1* corresponds to 1 second, value s2 corresponds to 2 seconds, and so on. |
| ***drx-Config, drx-ConfigExt***  Used to configure DRX as specified in TS 38.321 [3]. Network only configures *drx-ConfigExt* when *drx-Config* is configured. |
| ***drx-ConfigSecondaryGroup***  Used to configure DRX related parameters for the second DRX group as specified in TS 38.321 [3]. The network does not configure secondary DRX group with DCP simultaneously nor secondary DRX group with a dormant BWP simultaneously. |
| ***drx-ConfigSL***  Used to configure additional DRX parameters for the UE performing sidelink operation with resource allocation mode 1, as specified in TS 38.321 [3]. Network only configures this field if *sl-ScheduledConfig* is configured and *drx-Config* is configured. |
| ***g-RNTI-ConfigToAddModList***  List of G-RNTI configurations to add or modify. |
| ***g-RNTI-ConfigToReleaseList***  List of G-RNTI configurations to release. |
| ***g-CS-RNTI-ConfigToAddModList***  List of G-CS-RNTI configurations to add or modify. |
| ***g-CS-RNTI-ConfigToReleaseList***  List of G-CS-RNTI configurations to release. |
| ***intraCG-Prioritization***  Used to enable HARQ process ID selection based on LCH-priority for one CG as specified in TS 38.321 [3]. |
| ***lch-BasedPrioritization***  If this field is present, the corresponding MAC entity of the UE is configured with prioritization between overlapping grants and between scheduling request and overlapping grants based on LCH priority, see TS 38.321 [3]. The network does not configure *lch-BasedPrioritization* with *enhancedSkipUplinkTxDynamic* simultaneously nor *lch-BasedPrioritization* with *enhancedSkipUplinkTxConfigured* simultaneously. |
| ***schedulingRequestID-BFR-SCell***  Indicates the scheduling request configuration applicable for BFR on SCell, as specified in TS 38.321 [3]. |
| ***schedulingRequestID-BFR-r17***  Indicates the scheduling request configuration (SchedulingRequestConfig) that the UE shall use upon detecting a beam failure on the detection resources configured in BFDset of a serving cell but not on resources configured in BFDset2 of the same serving cell.  *Editor's note: BFDset and BFDset2 configuration is pending on LS response from RAN1.* |
| ***schedulingRequestID-BFR2-r17***  Indicates the scheduling request configuration (SchedulingRequestConfig) that the UE shall use upon detecting a beam failure on the detection resources configured in BFDset2 of a serving cell but not on resources configured in BFDset of the same serving cell.  *Editor's note: BFDset and BFDset2 configuration is pending on LS response from RAN1.* |
| ***schedulingRequestID-LBT-SCell***  Indicates the scheduling request configuration applicable for consistent uplink LBT recovery on SCell, as specified in TS 38.321 [3]. |
| ***skipUplinkTxDynamic, enhancedSkipUplinkTxDynamic, enhancedSkipUplinkTxConfigured***  If set to *true*, the UE skips UL transmissions as described in TS 38.321 [3]. If the UE is configured with *enhancedSkipUplinkTxDynamic* or *enhancedSkipUplinkTxConfigured* with value *true*, REPETITION\_NUMBER (as specified in TS 38.321 [3], clause 5.4.2.1) of the corresponding PUSCH transmission of the uplink grant shall be equal to 1. |
| ***tag-Config***  The field is used to configure parameters for a time-alignment group. The field is not present if any DAPS bearer is configured. |
| ***usePreBSR***  If set to true, the MAC entity of the IAB-MT may use the Pre-emptive BSR, see TS 38.321 [3]. |

|  |
| --- |
| *MBS-RNTI-SpecificConfig* field descriptions |
| ***drx-ConfigPTM***  Used to configure DRX for PTM transmission as specified in TS 38.321 [3]. |
| ***g-CS-RNTI***  Used to scramble the SPS group-common PDSCH and activation/deactivation of SPS group-common PDSCH for one or more MBS multicast services. |
| ***g-RNTI***  Used to scramble the scheduling and transmission of PTM for one or more MBS multicast services. |
| ***groupCommon-RNTI***  Used to configure g-RNTI or g-CS-RNTI. |
| ***harq-FeedbackEnablerMulticast***  Indicates whether the UE shall provide HARQ feedback for MBS multicast. Value *dci-enabler* means that whether the UE shall provide HARQ feedback for MBS multicast is indicated by DCI. Value *enabled* means the UE shall always provide HARQ feedback for MBS multicast. When the field is absent, the value "*disabled*" is used as defined in TS 38.213 [3]. |
| ***harq-FeedbackOptionMulticast***  Indicates the feedback mode for MBS multicast dynamically scheduled PDSCH or SPS PDSCH. |
| ***mbs-RNTI-SpecificConfigId***  An identifier of the RNTI specific configuration for MBS multicast. |
| ***pdsch-AggregationFactorMulticast***  Number of repetitions for dynamically scheduled MBS multicast data (see TS 38.214 [19], clause 5.1.2.1). When the field is absent and *groupCommon-RNTI* is set to *g-RNTI*, the UE applies the value 1. |

|  |  |
| --- | --- |
| Conditional Presence | Explanation |
| *G-RNTI* | This field is optionally present, Need S, if *groupCommon-RNTI* is set to *g-RNTI*. The field is absent when *groupCommon-RNTI* is set to *g-CS-RNTI*. |
| *HARQFeedback* | The field is mandatory present when *harq-FeedbackEnablerMulticast* is present. It is absent otherwise. |
| *MCG-Only* | This field is optionally present, Need M, for the *MAC-CellGroupConfig* of the MCG. It is absent otherwise. |
| *LCH-PrioWithReTxTimer* | This field is optionally present, Need R, if lch-BasedPrioritization-r16 is configured in this MAC entity and cg-RetransmissionTimer-r16 is configured for any configured grant configuration associated with this MAC entity. It is absent otherwise, Need R. |

#### – *MeasConfig*

The IE *MeasConfig* specifies measurements to be performed by the UE, and covers intra-frequency, inter-frequency and inter-RAT mobility as well as configuration of measurement gaps.

*MeasConfig* information element

-- ASN1START

-- TAG-MEASCONFIG-START

MeasConfig ::= SEQUENCE {

measObjectToRemoveList MeasObjectToRemoveList OPTIONAL, -- Need N

measObjectToAddModList MeasObjectToAddModList OPTIONAL, -- Need N

reportConfigToRemoveList ReportConfigToRemoveList OPTIONAL, -- Need N

reportConfigToAddModList ReportConfigToAddModList OPTIONAL, -- Need N

measIdToRemoveList MeasIdToRemoveList OPTIONAL, -- Need N

measIdToAddModList MeasIdToAddModList OPTIONAL, -- Need N

s-MeasureConfig CHOICE {

ssb-RSRP RSRP-Range,

csi-RSRP RSRP-Range

} OPTIONAL, -- Need M

quantityConfig QuantityConfig OPTIONAL, -- Need M

measGapConfig MeasGapConfig OPTIONAL, -- Need M

measGapSharingConfig MeasGapSharingConfig OPTIONAL, -- Need M

...,

[[

interFrequencyConfig-NoGap-r16 ENUMERATED {true} OPTIONAL -- Need R

]]

}

MeasObjectToRemoveList ::= SEQUENCE (SIZE (1..maxNrofObjectId)) OF MeasObjectId

MeasIdToRemoveList ::= SEQUENCE (SIZE (1..maxNrofMeasId)) OF MeasId

ReportConfigToRemoveList ::= SEQUENCE (SIZE (1..maxReportConfigId)) OF ReportConfigId

-- TAG-MEASCONFIG-STOP

-- ASN1STOP

| *MeasConfig* field descriptions |
| --- |
| ***interFrequencyConfig-NoGap-r16***  If the field is set to true, UE is configured to perform SSB based inter-frequency measurement without measurement gaps when the inter-frequency SSB is completely contained in the active DL BWP of the UE, as specified in TS 38.133 [14], clause 9.3. Otherwise, the SSB based inter-frequency measurement is performed within measurement gaps. In NR-DC, the field can only be configured in the *measConfig* associated with MCG, and when configured, it applies to all the inter-frequency measurements configured by MN and SN. |
| ***measGapConfig***  Used to setup and release measurement gaps in NR. |
| ***measIdToAddModList***  List of measurement identities to add and/or modify. |
| ***measIdToRemoveList***  List of measurement identities to remove. |
| ***measObjectToAddModList***  List of measurement objects to add and/or modify. |
| ***measObjectToRemoveList***  List of measurement objects to remove. |
| ***reportConfigToAddModList***  List of measurement reporting configurations to add and/or modify. |
| ***reportConfigToRemoveList***  List of measurement reporting configurations to remove. |
| ***s-MeasureConfig***  Threshold for NR SpCell RSRP measurement controlling when the UE is required to perform measurements on non-serving cells. Choice of *ssb-RSRP* corresponds to cell RSRP based on SS/PBCH block and choice of *csi-RSRP* corresponds to cell RSRP of CSI-RS. |
| ***measGapSharingConfig***  Specifies the measurement gap sharing scheme and controls setup/ release of measurement gap sharing. |

#### – *MeasGapConfig*

The IE *MeasGapConfig* specifies the measurement gap configuration and controls setup/release of measurement gaps.

*MeasGapConfig* information element

-- ASN1START

-- TAG-MEASGAPCONFIG-START

MeasGapConfig ::= SEQUENCE {

gapFR2 SetupRelease { GapConfig } OPTIONAL, -- Need M

...,

[[

gapFR1 SetupRelease { GapConfig } OPTIONAL, -- Need M

gapUE SetupRelease { GapConfig } OPTIONAL -- Need M

]],

[[

gapToAddModList-r17 SEQUENCE (SIZE (1..maxNrofGapId-r17)) OF GapConfig-r17 OPTIONAL, -- Need N

gapToReleaseList-r17 SEQUENCE (SIZE (1..maxNrofGapId-r17)) OF MeasGapId-r17 OPTIONAL, -- Need N

posMeasGapPreConfigToAddModList-r17 PosMeasGapPreConfigToAddModList-r17 OPTIONAL, -- Need N

posMeasGapPreConfigToReleaseList-r17 PosMeasGapPreConfigToReleaseList-r17 OPTIONAL -- Need N

]]

}

GapConfig ::= SEQUENCE {

gapOffset INTEGER (0..159),

mgl ENUMERATED {ms1dot5, ms3, ms3dot5, ms4, ms5dot5, ms6},

mgrp ENUMERATED {ms20, ms40, ms80, ms160},

mgta ENUMERATED {ms0, ms0dot25, ms0dot5},

...,

[[

refServCellIndicator ENUMERATED {pCell, pSCell, mcg-FR2} OPTIONAL -- Cond NEDCorNRDC

]],

[[

refFR2ServCellAsyncCA-r16 ServCellIndex OPTIONAL, -- Cond AsyncCA

mgl-r16 ENUMERATED {ms10, ms20} OPTIONAL -- Cond PRS

]]

}

GapConfig-r17 ::= SEQUENCE {

measGapId-r17 MeasGapId-r17,

gapType-r17 ENUMERATED {perUE, perFR1, perFR2},

gapOffset-r17 INTEGER (0..159),

mgl-r17 ENUMERATED {ms1, ms1dot5, ms2, ms3, ms3dot5, ms4, ms5, ms5dot5, ms6, ms10, ms20},

mgrp-r17 ENUMERATED {ms20, ms40, ms80, ms160},

mgta-r17 ENUMERATED {ms0, ms0dot25, ms0dot5, ms0dot75},

refServCellIndicator-r17 ENUMERATED {pCell, pSCell, mcg-FR2} OPTIONAL, -- Cond NEDCorNRDC

refFR2-ServCellAsyncCA-r17 ServCellIndex OPTIONAL, -- Cond AsyncCA

preConfigInd-r17 ENUMERATED {true} OPTIONAL, -- Need R

ncsgInd-r17 ENUMERATED {true} OPTIONAL, -- Need R

gapAssociationPRS-r17 ENUMERATED {true} OPTIONAL, -- Need R

gapSharing-r17 MeasGapSharingScheme OPTIONAL, -- Need R

gapPriority-r17 GapPriority-r17 OPTIONAL, -- Need R

...

}

PosMeasGapPreConfigToAddModList-r17 ::= SEQUENCE (SIZE (1..maxNrofPreConfigPosGapId-r17)) OF PosGapConfig-r17

PosMeasGapPreConfigToReleaseList-r17 ::= SEQUENCE (SIZE (1..maxNrofPreConfigPosGapId-r17)) OF MeasPosPreConfigGapId-r17

PosGapConfig-r17 ::= SEQUENCE {

measPosPreConfigGapId-r17 MeasPosPreConfigGapId-r17,

gapOffset-r17 INTEGER (0..159),

mgl-r17 ENUMERATED {ms1dot5, ms3, ms3dot5, ms4, ms5dot5, ms6, ms10, ms20},

mgrp-r17 ENUMERATED {ms20, ms40, ms80, ms160},

mgta-r17 ENUMERATED {ms0, ms0dot25, ms0dot5},

gapType-r17 ENUMERATED {perUE, perFR1, perFR2},

...

}

MeasPosPreConfigGapId-r17 ::= INTEGER (1..maxNrofPreConfigPosGapId-r17)

-- TAG-MEASGAPCONFIG-STOP

-- ASN1STOP

| *MeasGapConfig* field descriptions |
| --- |
| ***gapAssociationPRS***  Indicates that PRS measurement is associated with this measurement gap. The network only includes this field for one per UE gap. If concurrent gap (i.e. one of the gap combination as defined in Table 9.1.8-1 in TS 38.133 [14]) is configured and no gap is configured with this field, the PRS measurement is associated with the gap configured via *gapUE*, if available. |
| ***gapFR1***  Indicates measurement gap configuration that applies to FR1 only. In (NG)EN-DC, *gapFR1* cannot be set up by NR RRC (i.e. only LTE RRC can configure FR1 measurement gap). In NE-DC, *gapFR1* can only be set up by NR RRC (i.e. LTE RRC cannot configure FR1 gap). In NR-DC, *gapFR1* can only be set up in the *measConfig* associated with MCG. *gapFR1* can not be configured together with *gapUE*. The applicability of the FR1 measurement gap is according to Table 9.1.2-2 and Table 9.1.2-3 in TS 38.133 [14]. |
| ***gapFR2***  Indicates measurement gap configuration applies to FR2 only. In (NG)EN-DC or NE-DC, *gapFR2* can only be set up by NR RRC (i.e. LTE RRC cannot configure FR2 gap). In NR-DC, *gapFR2* can only be set up in the *measConfig* associated with MCG. *gapFR2* cannot be configured together with *gapUE*. The applicability of the FR2 measurement gap is according to Table 9.1.2-2 and Table 9.1.2-3 in TS 38.133 [14]. |
| ***gapOffset***  Value *gapOffset* is the gap offset of the gap pattern with MGRP indicated in the field *mgrp*. The value range is from 0 to *mgrp*-1. If *ncsgInd-r17* is present, this offset value refers to the starting point of VIL1 (the visible interruption length before the ML). |
| ***gapPriority***  Indicates the priority of this measurement gap (see TS 38.133 [14], clause FFS). *Value 1* indicates highest priority, *value* 2 indicates second level priority, and so on. |
| ***gapSharing***  Indicates the measurement gap sharing scheme that applies to this *GapConfig*. For applicability of the different gap sharing schemes, see TS 38.133 [14]. Value *scheme00* corresponds to scheme "00", value *scheme01* corresponds to scheme "01", and so on. |
| ***gapToAddModList***  A list of of measurement gap configuartion to be added or modified. If more than one measurement gap is configured (i.e. concurrent measurement gap as specified in TS 38.133[14], clause 9.1.8), the maximum number of configured measurement gap is limited by the gap combinations defined in Table 9.1.8-1 in TS 38.133 [14]. The network configures at most one NCSG or pre-configured measurement gap for a given gap type. In this version of the specification, the network configures this field only in NR standalone. |
| ***gapToReleaseList***  A list of measurement gap configuration to be released. |
| ***gapType***  Indicates the type of this measurement gap. Value *perUE* indicates that it is a per UE measurement gap, value *perFR1* indicates that it is an FR1 measurement gap, and value *perFR2* indicates that it is an FR2 measurement gap. |
| ***gapUE***  Indicates measurement gap configuration that applies to all frequencies (FR1 and FR2). In (NG)EN-DC, *gapUE* cannot be set up by NR RRC (i.e. only LTE RRC can configure per UE measurement gap). In NE-DC, *gapUE* can only be set up by NR RRC (i.e. LTE RRC cannot configure per UE gap). In NR-DC, *gapUE* can only be set up in the *measConfig* associated with MCG. If *gapUE* is configured, then neither *gapFR1* nor *gapFR2* can be configured. The applicability of the per UE measurement gap is according to Table 9.1.2-2 and Table 9.1.2-3 in TS 38.133 [14]. |
| ***measGapId***  The ID of this measurement gap configuration. |
| ***mgl***  Value *mgl* is the measurement gap length in ms of the measurement gap. If *ncsgInd-r17* is not present, the measurement gap length is according to in Table 9.1.2-1 in TS 38.133 [14]. If *ncsgInd-r17* is present, this field indicates the measurement length (ML) in NCSG pattern and is configured according to Table 9.1.2C-1 in TS 38.133 [14]. Value *ms1dot5* corresponds to 1.5 ms, *ms3* corresponds to 3 ms and so on. If *mgl-r16* is present, UE shall ignore the *mgl* (without suffix). Value *ms1*, *ms2*, and *ms5* can only be configured if *ncsgInd* is present. |
| ***mgrp***  Value *mgrp* is measurement gap repetition period in (ms) of the measurement gap. The measurement gap repetition period is according to Table 9.1.2-1 in TS 38.133 [14]. |
| ***mgta***  Value *mgta* is the measurement gap timing advance in ms. The applicability of the measurement gap timing advance is according to clause 9.1.2 of TS 38.133 [14]. Value *ms0* corresponds to 0 ms, *ms0dot25* corresponds to 0.25 ms and *ms0dot5* corresponds to 0.5 ms. For FR2, the network only configures 0 ms and 0.25 ms. If *ncsgInd* is present, value *ms0dot25* can not be configured. Value *ms0dot75* can only be configured if *ncsgInd* is present. |
| ***ncsgInd***  Indicates that the measurement gap is a NCSG as specified in 38.133 [14]. |
| ***posMeasGapPreConfigToAddModList***  List of preconfigured measurement gap for positioning to add and/or modify. All the gaps configured are associated with the measurement of PRS for RSTD, UE-RxTx Time Difference, PRS-RSRP and PRS-RSRPP as defined in TS 38.215 [9]. |
| ***posMeasGapPreConfigToReleasList***  List of preconfigured measurement gap for positioning to release. |
| ***preConfigInd***  Indicates whether the measurement gap is a pre-configured measurement gap. |
| ***refFR2ServCellAsyncCA***  Indicates the FR2 serving cell identifier whose SFN and subframe is used for FR2 gap calculation for this gap pattern with asynchronous CA involving FR2 carrier(s). |
| ***refServCellIndicator***  Indicates the serving cell whose SFN and subframe are used for gap calculation for this gap pattern. Value pCell corresponds to the PCell, pSCell corresponds to the PSCell, and mcg-FR2 corresponds to a serving cell on FR2 frequency in MCG. |

|  |  |
| --- | --- |
| Conditional Presence | Explanation |
| *AsyncCA* | This field is mandatory present when configuring FR2 gap pattern to UE in:  - (NG)EN-DC or NR SA with asynchronous CA involving FR2 carrier(s);  - NE-DC or NR-DC with asynchronous CA involving FR2 carrier(s), if the field *refServCellIndicator* is set to *mcg-FR2*.  In case the gap pattern to UE in NE-DC and NR-DC is already configured and the serving cell used for the gap calculation corresponds to a serving cell on FR2 frequency in MCG, then the field is optionally present, need M. Otherwise, it is absent, Need R. |
| *NEDCorNRDC* | This field is mandatory present when configuring gap pattern to UE in NE-DC or NR-DC. In case the gap pattern to UE in NE-DC and NR-DC is already configured, then the field is absent, need M. Otherwise, it is absent. |
| *PRS* | This field is optionally present, Need R, when configuring gap pattern to UE for measurements of DL-PRS configured via LPP (TS 37.355 [49]). Otherwise, it is absent. |

#### – *MeasGapId*

The IE *MeasGapId* used to identify a per UE or per FR measurement gap configuration.

*MeasGapId* information element

-- ASN1START

-- TAG-MEASGAPID-START

MeasGapId-r17 ::= INTEGER (1..maxNrofGapId-r17)

-- TAG-MEASGAPID-STOP

-- ASN1STOP

#### – *MeasGapSharingConfig*

The IE *MeasGapSharingConfig* specifies the measurement gap sharing scheme and controls setup/ release of measurement gap sharing.

*MeasGapSharingConfig* information element

-- ASN1START

-- TAG-MEASGAPSHARINGCONFIG-START

MeasGapSharingConfig ::= SEQUENCE {

gapSharingFR2 SetupRelease { MeasGapSharingScheme } OPTIONAL, -- Need M

...,

[[

gapSharingFR1 SetupRelease { MeasGapSharingScheme } OPTIONAL, --Need M

gapSharingUE SetupRelease { MeasGapSharingScheme } OPTIONAL --Need M

]]

}

MeasGapSharingScheme::= ENUMERATED {scheme00, scheme01, scheme10, scheme11}

-- TAG-MEASGAPSHARINGCONFIG-STOP

-- ASN1STOP

|  |
| --- |
| *MeasGapSharingConfig* field descriptions |
| ***gapSharingFR1***  Indicates the measurement gap sharing scheme that applies to the gap set via *gapFR1*. In (NG)EN-DC, *gapSharingFR1* cannot be set up by NR RRC (i.e. only LTE RRC can configure FR1 gap sharing). In NE-DC, *gapSharingFR1* can only be set up by NR RRC (i.e. LTE RRC cannot configure FR1 gap sharing). In NR-DC, *gapSharingFR1* can only be set up in the *measConfig* associated with MCG. *gapSharingFR1* can not be configured together with *gapSharingUE*. For the applicability of the different gap sharing schemes, see TS 38.133 [14]. Value *scheme00* corresponds to scheme "00", value *scheme01* corresponds to scheme "01", and so on. |
| ***gapSharingFR2***  Indicates the measurement gap sharing scheme that applies to the gap set via *gapFR2*. In (NG)EN-DC or NE-DC, *gapSharingFR2* can only be set up by NR RRC (i.e. LTE RRC cannot configure FR2 gap sharing). In NR-DC, *gapSharingFR2* can only be set up by MCG in the *measConfig* associated with MCG. *gapSharingFR2* cannot be configured together with *gapSharingUE*. For applicability of the different gap sharing schemes, see TS 38.133 [14]. Value *scheme00* corresponds to scheme "00", value *scheme01* corresponds to scheme "01", and so on. |
| ***gapSharingUE***  Indicates the measurement gap sharing scheme that applies to the gap set via *gapUE*. In (NG)EN-DC, *gapSharingUE* cannot be set up by NR RRC (i.e. only LTE RRC can configure per UE gap sharing). In NE-DC, *gapSharingUE* can only be set up by NR RRC (i.e. LTE RRC cannot configure per UE gap sharing). In NR-DC, *gapSharingUE* can only be set up in the *measConfig* associated with MCG. If *gapSharingUE* is configured, then neither *gapSharingFR1* nor *gapSharingFR2* can be configured. For the applicability of the different gap sharing schemes, see TS 38.133 [14]. Value *scheme00* corresponds to scheme "00", value *scheme01* corresponds to scheme "01", and so on. |

#### – *MeasId*

The IE *MeasId* is used to identify a measurement configuration, i.e., linking of a measurement object and a reporting configuration.

*MeasId* information element

-- ASN1START

-- TAG-MEASID-START

MeasId ::= INTEGER (1..maxNrofMeasId)

-- TAG-MEASID-STOP

-- ASN1STOP

#### – *MeasIdleConfig*

The IE *MeasIdleConfig* is used to convey information to UE about measurements requested to be done while in RRC\_IDLE or RRC\_INACTIVE.

*MeasIdleConfig* information element

-- ASN1START

-- TAG-MEASIDLECONFIG-START

MeasIdleConfigSIB-r16 ::= SEQUENCE {

measIdleCarrierListNR-r16 SEQUENCE (SIZE (1..maxFreqIdle-r16)) OF MeasIdleCarrierNR-r16 OPTIONAL, -- Need S

measIdleCarrierListEUTRA-r16 SEQUENCE (SIZE (1..maxFreqIdle-r16)) OF MeasIdleCarrierEUTRA-r16 OPTIONAL, -- Need S

...

}

MeasIdleConfigDedicated-r16 ::= SEQUENCE {

measIdleCarrierListNR-r16 SEQUENCE (SIZE (1..maxFreqIdle-r16)) OF MeasIdleCarrierNR-r16 OPTIONAL, -- Need N

measIdleCarrierListEUTRA-r16 SEQUENCE (SIZE (1..maxFreqIdle-r16)) OF MeasIdleCarrierEUTRA-r16 OPTIONAL, -- Need N

measIdleDuration-r16 ENUMERATED{sec10, sec30, sec60, sec120, sec180, sec240, sec300, spare},

validityAreaList-r16 ValidityAreaList-r16 OPTIONAL, -- Need N

...

}

ValidityAreaList-r16 ::= SEQUENCE (SIZE (1..maxFreqIdle-r16)) OF ValidityArea-r16

ValidityArea-r16 ::= SEQUENCE {

carrierFreq-r16 ARFCN-ValueNR,

validityCellList-r16 ValidityCellList OPTIONAL -- Need N

}

ValidityCellList ::= SEQUENCE (SIZE (1.. maxCellMeasIdle-r16)) OF PCI-Range

MeasIdleCarrierNR-r16 ::= SEQUENCE {

carrierFreq-r16 ARFCN-ValueNR,

ssbSubcarrierSpacing-r16 SubcarrierSpacing,

frequencyBandList MultiFrequencyBandListNR OPTIONAL, -- Need R

measCellListNR-r16 CellListNR-r16 OPTIONAL, -- Need R

reportQuantities-r16 ENUMERATED {rsrp, rsrq, both},

qualityThreshold-r16 SEQUENCE {

idleRSRP-Threshold-NR-r16 RSRP-Range OPTIONAL, -- Need R

idleRSRQ-Threshold-NR-r16 RSRQ-Range OPTIONAL -- Need R

} OPTIONAL, -- Need R

ssb-MeasConfig-r16 SEQUENCE {

nrofSS-BlocksToAverage-r16 INTEGER (2..maxNrofSS-BlocksToAverage) OPTIONAL, -- Need S

absThreshSS-BlocksConsolidation-r16 ThresholdNR OPTIONAL, -- Need S

smtc-r16 SSB-MTC OPTIONAL, -- Need S

ssb-ToMeasure-r16 SSB-ToMeasure OPTIONAL, -- Need S

deriveSSB-IndexFromCell-r16 BOOLEAN,

ss-RSSI-Measurement-r16 SS-RSSI-Measurement OPTIONAL -- Need S

} OPTIONAL, -- Need S

beamMeasConfigIdle-r16 BeamMeasConfigIdle-NR-r16 OPTIONAL, -- Need R

...

}

MeasIdleCarrierEUTRA-r16 ::= SEQUENCE {

carrierFreqEUTRA-r16 ARFCN-ValueEUTRA,

allowedMeasBandwidth-r16 EUTRA-AllowedMeasBandwidth,

measCellListEUTRA-r16 CellListEUTRA-r16 OPTIONAL, -- Need R

reportQuantitiesEUTRA-r16 ENUMERATED {rsrp, rsrq, both},

qualityThresholdEUTRA-r16 SEQUENCE {

idleRSRP-Threshold-EUTRA-r16 RSRP-RangeEUTRA OPTIONAL, -- Need R

idleRSRQ-Threshold-EUTRA-r16 RSRQ-RangeEUTRA-r16 OPTIONAL -- Need R

} OPTIONAL, -- Need S

...

}

CellListNR-r16 ::= SEQUENCE (SIZE (1..maxCellMeasIdle-r16)) OF PCI-Range

CellListEUTRA-r16 ::= SEQUENCE (SIZE (1..maxCellMeasIdle-r16)) OF EUTRA-PhysCellIdRange

BeamMeasConfigIdle-NR-r16 ::= SEQUENCE {

reportQuantityRS-Indexes-r16 ENUMERATED {rsrp, rsrq, both},

maxNrofRS-IndexesToReport-r16 INTEGER (1.. maxNrofIndexesToReport),

includeBeamMeasurements-r16 BOOLEAN

}

RSRQ-RangeEUTRA-r16 ::= INTEGER (-30..46)

-- TAG-MEASIDLECONFIG-STOP

-- ASN1STOP

|  |
| --- |
| *MeasIdleConfig* field descriptions |
| ***absThreshSS-BlocksConsolidation***  Threshold for consolidation of L1 measurements per RS index. |
| ***beamMeasConfigIdle***  Indicates the beam level measurement configuration. |
| ***carrierFreq***  Indicates the NR carrier frequency to be used for measurements during RRC\_IDLE or RRC\_INACTIVE. |
| ***carrierFreqEUTRA***  Indicates the E-UTRA carrier frequency to be used for measurements during RRC\_IDLE or RRC\_INACTIVE. |
| ***deriveSSB-IndexFromCell***  This field indicates whether the UE may use the timing of any detected cell on that frequency to derive the SSB index of all neighbour cells on that frequency. If this field is set to true, the UE assumes SFN and frame boundary alignment across cells on the neighbor frequency as specified in TS 38.133 [14]. |
| ***frequencyBandList***  Indicates the list of frequency bands for which the NR idle/inactive measurement parameters apply. The UE shall select the first listed band which it supports in the frequencyBandList field to represent the NR neighbour carrier frequency. |
| ***includeBeamMeasurements***  Indicates whether or not the UE shall include beam measurements in the NR idle/inactive measurement results. |
| ***maxNrofRS-IndexesToReport***  Max number of beam indices to include in the idle/inactive measurement result. |
| ***measCellListEUTRA***  Indicates the list of E-UTRA cells which the UE is requested to measure and report for idle/inactive measurements. |
| ***measCellListNR***  Indicates the list of NR cells which the UE is requested to measure and report for idle/inactive measurements. |
| ***measIdleCarrierListEUTRA***  Indicates the E-UTRA carriers to be measured during RRC\_IDLE or RRC\_INACTIVE. |
| ***measIdleCarrierListNR***  Indicates the NR carriers to be measured during RRC\_IDLE or RRC\_INACTIVE. |
| ***measIdleDuration***  Indicates the duration for performing idle/inactive measurements while in RRC\_IDLE or RRC\_INACTIVE. Value sec10 correspond to 10 seconds, value sec30 to 30 seconds and so on. |
| ***nrofSS-BlocksToAverage***  Number of SS blocks to average for cell measurement derivation. |
| ***qualityThreshold***  Indicates the quality thresholds for reporting the measured cells for idle/inactive NR measurements. |
| ***qualityThresholdEUTRA***  Indicates the quality thresholds for reporting the measured cells for idle/inactive E-UTRA measurements. |
| ***reportQuantities***  Indicates which measurement quantities UE is requested to report in the idle/inactive measurement report. |
| ***reportQuantitiesEUTRA***  Indicates which E-UTRA measurement quantities the UE is requested to report in the idle/inactive measurement report. |
| ***reportQuantityRS-Indexes***  Indicates which measurement information per beam index the UE shall include in the NR idle/inactive measurement results. |
| ***smtc***  Indicates the measurement timing configuration for inter-frequency measurement. If this field is absent in *VarMeasIdleConfig*, the UE assumes that SSB periodicity is 5 ms in this frequency. |
| ***ssbSubcarrierSpacing***  Indicates subcarrier spacing of SSB.  Only the following values are applicable depending on the used frequency:  FR1: 15 or 30 kHz  FR2-1: 120 or 240 kHz  FR2-2: 120, 480, or 960 kHz |
| ***ssb-ToMeasure***  The set of SS blocks to be measured within the SMTC measurement duration (see TS 38.215 [9]). When the field is absent in *VarMeasIdleConfig*, the UE measures on all SS-blocks. |
| ***ss-RSSI-Measurement***  Indicates the SSB-based RSSI measurement configuration. If the field is absent in *VarMeasIdleConfig*, the UE behaviour is defined in TS 38.215 [89], clause 5.1.3. |
| ***validityAreaList***  Indicates the list of frequencies and optionally, for each frequency, a list of cells within which the UE is required to perform measurements while in RRC\_IDLE and RRC\_INACTIVE. |

#### – *MeasIdToAddModList*

The IE *MeasIdToAddModList* concerns a list of measurement identities to add or modify, with for each entry the measId, the associated *measObjectId* and the associated *reportConfigId*.

*MeasIdToAddModList* information element

-- ASN1START

-- TAG-MEASIDTOADDMODLIST-START

MeasIdToAddModList ::= SEQUENCE (SIZE (1..maxNrofMeasId)) OF MeasIdToAddMod

MeasIdToAddMod ::= SEQUENCE {

measId MeasId,

measObjectId MeasObjectId,

reportConfigId ReportConfigId

}

-- TAG-MEASIDTOADDMODLIST-STOP

-- ASN1STOP

#### *– MeasObjectCLI*

The IE *MeasObjectCLI* specifies information applicable for SRS-RSRP measurements and/or CLI-RSSI measurements.

*MeasObjectCLI* information element

-- ASN1START

-- TAG-MEASOBJECTCLI-START

MeasObjectCLI-r16 ::= SEQUENCE {

cli-ResourceConfig-r16 CLI-ResourceConfig-r16,

...

}

CLI-ResourceConfig-r16 ::= SEQUENCE {

srs-ResourceConfig-r16 SetupRelease { SRS-ResourceListConfigCLI-r16 } OPTIONAL, -- Need M

rssi-ResourceConfig-r16 SetupRelease { RSSI-ResourceListConfigCLI-r16 } OPTIONAL -- Need M

}

SRS-ResourceListConfigCLI-r16 ::= SEQUENCE (SIZE (1.. maxNrofCLI-SRS-Resources-r16)) OF SRS-ResourceConfigCLI-r16

RSSI-ResourceListConfigCLI-r16 ::= SEQUENCE (SIZE (1.. maxNrofCLI-RSSI-Resources-r16)) OF RSSI-ResourceConfigCLI-r16

SRS-ResourceConfigCLI-r16 ::= SEQUENCE {

srs-Resource-r16 SRS-Resource,

srs-SCS-r16 SubcarrierSpacing,

refServCellIndex-r16 ServCellIndex OPTIONAL, -- Need S

refBWP-r16 BWP-Id,

...

}

RSSI-ResourceConfigCLI-r16 ::= SEQUENCE {

rssi-ResourceId-r16 RSSI-ResourceId-r16,

rssi-SCS-r16 SubcarrierSpacing,

startPRB-r16 INTEGER (0..2169),

nrofPRBs-r16 INTEGER (4..maxNrofPhysicalResourceBlocksPlus1),

startPosition-r16 INTEGER (0..13),

nrofSymbols-r16 INTEGER (1..14),

rssi-PeriodicityAndOffset-r16 RSSI-PeriodicityAndOffset-r16,

refServCellIndex-r16 ServCellIndex OPTIONAL, -- Need S

...

}

RSSI-ResourceId-r16 ::= INTEGER (0.. maxNrofCLI-RSSI-Resources-1-r16)

RSSI-PeriodicityAndOffset-r16 ::= CHOICE {

sl10 INTEGER(0..9),

sl20 INTEGER(0..19),

sl40 INTEGER(0..39),

sl80 INTEGER(0..79),

sl160 INTEGER(0..159),

sl320 INTEGER(0..319),

s1640 INTEGER(0..639),

...

}

-- TAG-MEASOBJECTCLI-STOP

-- ASN1STOP

|  |
| --- |
| *CLI-ResourceConfig* field descriptions |
| ***srs-ResourceConfig***  SRS resources to be used for CLI measurements. |
| ***rssi-ResourceConfig***  CLI-RSSI resources to be used for CLI measurements. |

|  |
| --- |
| *MeasObjectCLI* field descriptions |
| ***cli-ResourceConfig***  SRS and/or CLI-RSSI resource configuration for CLI measurement. |

|  |
| --- |
| *SRS-ResourceConfigCLI* field descriptions |
| ***refBWP***  DL BWP id that is used to derive the reference point of the SRS resource (see TS 38.211[16], clause 6.4.1.4.3) |
| ***refServCellIndex***  The index of the reference serving cell that the *refBWP* belongs to. If this field is absent, the reference serving cell is PCell. |
| ***srs-SCS***  Subcarrier spacing for SRS.  Only the following values are applicable depending on the used frequency:  FR1: 15, 30, or 60 kHz  FR2-1: 60 or 120 kHz  FR2-2: 120, 480, or 960 kHz |

|  |
| --- |
| *RSSI-ResourceConfigCLI* field descriptions |
| ***nrofPRBs***  Allowed size of the measurement BW. Only multiples of 4 are allowed. The smallest configurable number is the minimum of 4 and the width of the active DL BWP. If the configured value is larger than the width of the active DL BWP, the UE shall assume that the actual CLI-RSSI resource bandwidth is within the active DL BWP. |
| ***nrofSymbols***  Within a slot that is configured for CLI-RSSI measurement (see slotConfiguration), the UE measures the RSSI from *startPosition* to *startPosition* + *nrofSymbols* - 1. The configured CLI-RSSI resource does not exceed the slot boundary of the reference SCS. If the SCS of configured DL BWP(s) is larger than the reference SCS, network configures *startPosition* and *nrofSymbols* such that the configured CLI-RSSI resource not to exceed the slot boundary corresponding to the configured BWP SCS. If the reference SCS is larger than SCS of configured DL BWP(s), network ensures *startPosition* and *nrofSymbols* are integer multiple of reference SCS divided by configured BWP SCS. |
| ***refServCellIndex***  The index of the reference serving cell. Frequency reference point of the RSSI resource is subcarrier 0 of CRB0 of the reference serving cell. If this field is absent, the reference serving cell is PCell. |
| ***rssi-PeriodicityAndOffset***  Periodicity and slot offset for this CLI-RSSI resource. All values are in "number of slots". Value *sl1* corresponds to a periodicity of 1 slot, value *sl2* corresponds to a periodicity of 2 slots, and so on. For each periodicity the corresponding offset is given in number of slots. |
| ***rssi-SCS***  Reference subcarrier spacing for CLI-RSSI measurement.  Only the following values are applicable depending on the used frequency:  FR1: 15, 30, or 60 kHz  FR2-1: 60 or 120 kHz  FR2-2: 120, 480, or 960 kHz  UE performs CLI-RSSI measurement with the SCS of the active bandwidth part within the configured CLI-RSSI resource in the active BWP regardless of the reference SCS of the measurement resource. |
| ***startPosition***  OFDM symbol location of the CLI-RSSI resource within a slot. |
| ***startPRB***  Starting PRB index of the measurement bandwidth. For the case where the reference subcarrier spacing is smaller than subcarrier spacing of active DL BWP(s), network configures startPRB and nrofPRBs are as a multiple of active BW SCS divided by reference SCS. |

#### *– MeasObjectEUTRA*

The IE *MeasObjectEUTRA* specifies information applicable for E‑UTRA cells.

*MeasObjectEUTRA* information element

-- ASN1START

-- TAG-MEASOBJECTEUTRA-START

MeasObjectEUTRA::= SEQUENCE {

carrierFreq ARFCN-ValueEUTRA,

allowedMeasBandwidth EUTRA-AllowedMeasBandwidth,

cellsToRemoveListEUTRAN EUTRA-CellIndexList OPTIONAL, -- Need N

cellsToAddModListEUTRAN SEQUENCE (SIZE (1..maxCellMeasEUTRA)) OF EUTRA-Cell OPTIONAL, -- Need N

excludedCellsToRemoveListEUTRAN EUTRA-CellIndexList OPTIONAL, -- Need N

excludedCellsToAddModListEUTRAN SEQUENCE (SIZE (1..maxCellMeasEUTRA)) OF EUTRA-ExcludedCell OPTIONAL, -- Need N

eutra-PresenceAntennaPort1 EUTRA-PresenceAntennaPort1,

eutra-Q-OffsetRange EUTRA-Q-OffsetRange OPTIONAL, -- Need R

widebandRSRQ-Meas BOOLEAN,

...,

[[

associatedMeasGap-r17 MeasGapId-r17 OPTIONAL -- Need R

]]

}

EUTRA-CellIndexList ::= SEQUENCE (SIZE (1..maxCellMeasEUTRA)) OF EUTRA-CellIndex

EUTRA-CellIndex ::= INTEGER (1..maxCellMeasEUTRA)

EUTRA-Cell ::= SEQUENCE {

cellIndexEUTRA EUTRA-CellIndex,

physCellId EUTRA-PhysCellId,

cellIndividualOffset EUTRA-Q-OffsetRange

}

EUTRA-ExcludedCell ::= SEQUENCE {

cellIndexEUTRA EUTRA-CellIndex,

physCellIdRange EUTRA-PhysCellIdRange

}

-- TAG-MEASOBJECTEUTRA-STOP

-- ASN1STOP

|  |
| --- |
| *EUTRAN-ExcludedCell* field descriptions |
| ***cellIndexEUTRA***  Entry index in the cell list. |
| ***physicalCellIdRange***  Physical cell identity or a range of physical cell identities. |

|  |
| --- |
| *EUTRAN-Cell* field descriptions |
| ***physicalCellId***  Physical cell identity of a cell in the cell list. |
| ***cellIndividualOffset***  Cell individual offset applicable to a specific cell. Value *dB-24* corresponds to -24 dB, *dB-22* corresponds to -22 dB and so on. |

|  |
| --- |
| *MeasObjectEUTRA* field descriptions |
| ***allowedMeasBandwidth***  The maximum allowed measurement bandwidth on a carrier frequency as defined by the parameter Transmission Bandwidth Configuration "NRB" TS 36.104 [33]. |
| ***associatedMeasGap***  Indicates the associated measurement gap for measuring this EUTRA frequency. If this field is absent, the associated meaurment gap is the gap configured via *gapFR1* or *gapUE*. |
| ***carrierFreq***  Identifies E‑UTRA carrier frequency for which this configuration is valid. Network does not configure more than one *MeasObjectEUTRA* for the same physical frequency, regardless of the E-ARFCN used to indicate this. |
| ***cellsToAddModListEUTRAN***  List of cells to add/ modify in the cell list. |
| ***cellsToRemoveListEUTRAN***  List of cells to remove from the cell list. |
| ***eutra-PresenceAntennaPort1***  When set to *true*, the UE may assume that at least two cell-specific antenna ports are used in all neighbouring cells. |
| ***eutra-Q-OffsetRange***  Used to indicate a cell, or frequency specific offset to be applied when evaluating triggering conditions for measurement reporting. The value is in dB. Value *dB-24* corresponds to -24 dB, value *dB-22* corresponds to -22 dB and so on. |
| ***excludedCellsToAddModListEUTRAN***  List of cells to add/ modify in the exclude-list of cells. |
| ***excludedCellsToRemoveListEUTRAN***  List of cells to remove from the exclude-list of cells. |
| ***widebandRSRQ-Meas***  If set to *true*, the UE shall, when performing RSRQ measurements, use a wider bandwidth in accordance with TS 36.133 [40]. The network may set the field to *true* if the measurement bandwidth indicated by *allowedMeasBandwidth* is 50 resource blocks or larger; otherwise the network sets this field to *false*. |

#### *– MeasObjectId*

The IE *MeasObjectId* used to identify a measurement object configuration.

*MeasObjectId* information element

-- ASN1START

-- TAG-MEASOBJECTID-START

MeasObjectId ::= INTEGER (1..maxNrofObjectId)

-- TAG-MEASOBJECTID-STOP

-- ASN1STOP

#### *– MeasObjectNR*

The IE *MeasObjectNR* specifies information applicable for SS/PBCH block(s) intra/inter-frequency measurements and/or CSI-RS intra/inter-frequency measurements.

*MeasObjectNR* information element

-- ASN1START

-- TAG-MEASOBJECTNR-START

MeasObjectNR ::= SEQUENCE {

ssbFrequency ARFCN-ValueNR OPTIONAL, -- Cond SSBorAssociatedSSB

ssbSubcarrierSpacing SubcarrierSpacing OPTIONAL, -- Cond SSBorAssociatedSSB

smtc1 SSB-MTC OPTIONAL, -- Cond SSBorAssociatedSSB

smtc2 SSB-MTC2 OPTIONAL, -- Cond IntraFreqConnected

refFreqCSI-RS ARFCN-ValueNR OPTIONAL, -- Cond CSI-RS

referenceSignalConfig ReferenceSignalConfig,

absThreshSS-BlocksConsolidation ThresholdNR OPTIONAL, -- Need R

absThreshCSI-RS-Consolidation ThresholdNR OPTIONAL, -- Need R

nrofSS-BlocksToAverage INTEGER (2..maxNrofSS-BlocksToAverage) OPTIONAL, -- Need R

nrofCSI-RS-ResourcesToAverage INTEGER (2..maxNrofCSI-RS-ResourcesToAverage) OPTIONAL, -- Need R

quantityConfigIndex INTEGER (1..maxNrofQuantityConfig),

offsetMO Q-OffsetRangeList,

cellsToRemoveList PCI-List OPTIONAL, -- Need N

cellsToAddModList CellsToAddModList OPTIONAL, -- Need N

excludedCellsToRemoveList PCI-RangeIndexList OPTIONAL, -- Need N

excludedCellsToAddModList SEQUENCE (SIZE (1..maxNrofPCI-Ranges)) OF PCI-RangeElement OPTIONAL, -- Need N

allowedCellsToRemoveList PCI-RangeIndexList OPTIONAL, -- Need N

allowedCellsToAddModList SEQUENCE (SIZE (1..maxNrofPCI-Ranges)) OF PCI-RangeElement OPTIONAL, -- Need N

...,

[[

freqBandIndicatorNR FreqBandIndicatorNR OPTIONAL, -- Need R

measCycleSCell ENUMERATED {sf160, sf256, sf320, sf512, sf640, sf1024, sf1280} OPTIONAL -- Need R

]],

[[

smtc3list-r16 SSB-MTC3List-r16 OPTIONAL, -- Need R

rmtc-Config-r16 SetupRelease {RMTC-Config-r16} OPTIONAL, -- Need M

t312-r16 SetupRelease { T312-r16 } OPTIONAL -- Need M

]],

[[

associatedMeasGapSSB-r17 MeasGapId-r17 OPTIONAL, -- Need R

associatedMeasGapCSIRS-r17 MeasGapId-r17 OPTIONAL, -- Need R

smtc4list-r17 SSB-MTC4List-r17 OPTIONAL, -- Need R

measCyclePSCell-r17 ENUMERATED {ms160, ms256, ms320, ms512, ms640, ms1024, ms1280, spare1}

OPTIONAL, -- Need R

cellsToAddModListExt-v1710 CellsToAddModListExt-v1710 OPTIONAL -- Need N

]]

}

SSB-MTC3List-r16::= SEQUENCE (SIZE(1..4)) OF SSB-MTC3-r16

SSB-MTC4List-r17::= SEQUENCE (SIZE(1..3)) OF SSB-MTC4-r17

T312-r16 ::= ENUMERATED { ms0, ms50, ms100, ms200, ms300, ms400, ms500, ms1000}

ReferenceSignalConfig::= SEQUENCE {

ssb-ConfigMobility SSB-ConfigMobility OPTIONAL, -- Need M

csi-rs-ResourceConfigMobility SetupRelease { CSI-RS-ResourceConfigMobility } OPTIONAL -- Need M

}

SSB-ConfigMobility::= SEQUENCE {

ssb-ToMeasure SetupRelease { SSB-ToMeasure } OPTIONAL, -- Need M

deriveSSB-IndexFromCell BOOLEAN,

ss-RSSI-Measurement SS-RSSI-Measurement OPTIONAL, -- Need M

...,

[[

ssb-PositionQCL-Common-r16 SSB-PositionQCL-Relation-r16 OPTIONAL, -- Cond SharedSpectrum

ssb-PositionQCL-CellsToAddModList-r16 SSB-PositionQCL-CellsToAddModList-r16 OPTIONAL, -- Need N

ssb-PositionQCL-CellsToRemoveList-r16 PCI-List OPTIONAL -- Need N

]],

[[

deriveSSB-IndexFromCellInter-r17 ServCellIndex OPTIONAL, -- Need R

ssb-PositionQCL-Common-r17 SSB-PositionQCL-Relation-r17 OPTIONAL, -- Cond SharedSpectrum2

ssb-PositionQCL-Cells-r17 SetupRelease {SSB-PositionQCL-CellList-r17} OPTIONAL -- Need M

]]

}

Q-OffsetRangeList ::= SEQUENCE {

rsrpOffsetSSB Q-OffsetRange DEFAULT dB0,

rsrqOffsetSSB Q-OffsetRange DEFAULT dB0,

sinrOffsetSSB Q-OffsetRange DEFAULT dB0,

rsrpOffsetCSI-RS Q-OffsetRange DEFAULT dB0,

rsrqOffsetCSI-RS Q-OffsetRange DEFAULT dB0,

sinrOffsetCSI-RS Q-OffsetRange DEFAULT dB0

}

ThresholdNR ::= SEQUENCE{

thresholdRSRP RSRP-Range OPTIONAL, -- Need R

thresholdRSRQ RSRQ-Range OPTIONAL, -- Need R

thresholdSINR SINR-Range OPTIONAL -- Need R

}

CellsToAddModList ::= SEQUENCE (SIZE (1..maxNrofCellMeas)) OF CellsToAddMod

CellsToAddModListExt-v1710 ::= SEQUENCE (SIZE (1..maxNrofCellMeas)) OF CellsToAddModExt-v1710

CellsToAddMod ::= SEQUENCE {

physCellId PhysCellId,

cellIndividualOffset Q-OffsetRangeList

}

CellsToAddModExt-v1710 ::= SEQUENCE {

ntn-PolarizationDL-r17 ENUMERATED {rhcp,lhcp,linear} OPTIONAL, -- Need R

ntn-PolarizationUL-r17 ENUMERATED {rhcp,lhcp,linear} OPTIONAL -- Need R

}

RMTC-Config-r16 ::= SEQUENCE {

rmtc-Periodicity-r16 ENUMERATED {ms40, ms80, ms160, ms320, ms640},

rmtc-SubframeOffset-r16 INTEGER(0..639) OPTIONAL, -- Need M

measDurationSymbols-r16 ENUMERATED {sym1, sym14or12, sym28or24, sym42or36, sym70or60},

rmtc-Frequency-r16 ARFCN-ValueNR,

ref-SCS-CP-r16 ENUMERATED {kHz15, kHz30, kHz60-NCP, kHz60-ECP},

...,

[[

rmtc-Bandwidth-r17 ENUMERATED {mhz100, mhz400, mhz800, mhz1600, mhz2000} OPTIONAL, -- Need R

measDurationSymbols-v1700 ENUMERATED {sym140, sym560, sym1120} OPTIONAL, -- Need R

ref-SCS-CP-v1700 ENUMERATED {kHz120, kHz480, kHz960} OPTIONAL, -- Need R

tci-StateInfo-r17 SEQUENCE {

tci-StateId TCI-StateId,

ref-ServCellId ServCellIndex OPTIONAL -- Need R

} OPTIONAL -- Need R

]]

}

SSB-PositionQCL-CellsToAddModList-r16 ::= SEQUENCE (SIZE (1..maxNrofCellMeas)) OF SSB-PositionQCL-CellsToAddMod-r16

SSB-PositionQCL-CellsToAddMod-r16 ::= SEQUENCE {

physCellId-r16 PhysCellId,

ssb-PositionQCL-r16 SSB-PositionQCL-Relation-r16

}

SSB-PositionQCL-CellList-r17 ::= SEQUENCE (SIZE (1..maxNrofCellMeas)) OF SSB-PositionQCL-Cell-r17

SSB-PositionQCL-Cell-r17 ::= SEQUENCE {

physCellId-r17 PhysCellId,

ssb-PositionQCL-r17 SSB-PositionQCL-Relation-r17

}

-- TAG-MEASOBJECTNR-STOP

-- ASN1STOP

|  |
| --- |
| *CellsToAddMod* field descriptions |
| ***cellIndividualOffset***  Cell individual offsets applicable to a specific cell. |
| ***physCellId***  Physical cell identity of a cell in the cell list. |

|  |
| --- |
| *MeasObjectNR* field descriptions |
| ***absThreshCSI-RS-Consolidation***  Absolute threshold for the consolidation of measurement results per CSI-RS resource(s) from L1 filter(s). The field is used for the derivation of cell measurement results as described in 5.5.3.3 and the reporting of beam measurement information per CSI-RS resource as described in 5.5.5.2. |
| ***absThreshSS-BlocksConsolidation***  Absolute threshold for the consolidation of measurement results per SS/PBCH block(s) from L1 filter(s). The field is used for the derivation of cell measurement results as described in 5.5.3.3 and the reporting of beam measurement information per SS/PBCH block index as described in 5.5.5.2. |
| ***allowedCellsToAddModList***  List of cells to add/modify in the allow-list of cells. It applies only to SSB resources. |
| ***allowedCellsToRemoveList***  List of cells to remove from the allow-list of cells. |
| ***associatedMeasGapSSB***  Indicates the associated measurement gap for SSB measuring identified by *ssb-ConfigMobility* in this measurement object. When multiple *MeasObjectNR* with the same SSB frequency are configured, the network configures the same measurement gap ID in this field for each *MeasObjectNR*. If this field is absent, the associated measurement gap is the gap configured via *gapFR1*, *gapFR2*, or *gapUE*. |
| ***associatedMeasGapCSIRS***  Indicates the associated measurement gap for CSI-RS measuring identified by *csi-rs-ResourceConfigMobility* in this measurement object. If this field is absent, the associated measurement gap is the gap configured via *gapFR1*, *gapFR2*, or *gapUE*. |
| ***cellsToAddModList***  List of cells to add/modify in the cell list. |
| ***cellsToRemoveList***  List of cells to remove from the cell list. |
| ***excludedCellsToAddModList***  List of cells to add/modify in the exclude-list of cells. It applies only to SSB resources. |
| ***excludedCellsToRemoveList***  List of cells to remove from the exclude-list of cells. |
| ***freqBandIndicatorNR***  The frequency band in which the SSB and/or CSI-RS indicated in this *MeasObjectNR* are located and according to which the UE shall perform the RRM measurements. This field is always provided when the network configures measurements with this *MeasObjectNR*. |
| ***measCyclePSCell***  The parameter is used only when the PSCell is configured on the frequency indicated by the *measObjectNR* and the SCG is deactivated, see TS 38.133 [14]. The field may also be configured when the PSCell is not configured on that frequency. Value ms*160* corresponds to 160 ms, value *ms256* corresponds to 256 ms and so on. |
| ***measCycleSCell***  The parameter is used only when an SCell is configured on the frequency indicated by the measObjectNR and is in deactivated state, see TS 38.133 [14]. gNB configures the parameter whenever an SCell is configured on the frequency indicated by the *measObjectNR*, but the field may also be signalled when an SCell is not configured. Value *sf160* corresponds to 160 sub-frames, value *sf256* corresponds to 256 sub-frames and so on. |
| ***nrofCSInrofCSI-RS-ResourcesToAverage***  Indicates the maximum number of measurement results per beam based on CSI-RS resources to be averaged. The same value applies for each detected cell associated with this *MeasObjectNR*. |
| ***nrofSS-BlocksToAverage***  Indicates the maximum number of measurement results per beam based on SS/PBCH blocks to be averaged. The same value applies for each detected cell associated with this *MeasObject*. |
| ***ntn-PolarizationDL***  If present, this parameter indicates polarization information for downlink transmission on service link: including Right hand, Left hand circular polarizations (RHCP, LHCP) and Linear polarization. |
| ***ntn-PolarizationUL***  If present, this parameter indicates polarization information for uplink transmission on service link. If not present and *ntnPolarizationDL* is present, UE assumes the same polarization for UL and DL. |
| ***offsetMO***  Offset values applicable to all measured cells with reference signal(s) indicated in this *MeasObjectNR*. |
| ***quantityConfigIndex***  Indicates the n-*th* element of *quantityConfigNR-List* provided in *MeasConfig*. |
| ***referenceSignalConfig***  RS configuration for SS/PBCH block and CSI-RS. |
| ***refFreqCSI-RS***  Point A which is used for mapping of CSI-RS to physical resources according to TS 38.211 [16] clause 7.4.1.5.3. |
| ***smtc1***  Primary measurement timing configuration. (see clause 5.5.2.10). |
| ***smtc2***  Secondary measurement timing configuration for SS corresponding to this *MeasObjectNR* with PCI listed in *pci-List*. For these SS, the periodicity is indicated by *periodicity* in *smtc2* and the timing offset is equal to the offset indicated in *periodicityAndOffset* modulo *periodicity*. *periodicity* in smtc2 can only be set to a value strictly shorter than the periodicity indicated by *periodicityAndOffset* in *smtc1* (e.g. if *periodicityAndOffset* indicates *sf10*, *periodicity* can only be set of *sf5*, if *periodicityAndOffset* indicates *sf5*, *smtc2* cannot be configured). |
| ***smtc3list***  Measurement timing configuration list for SS corresponding to IAB-MT. This is used for the IAB-node's discovery of other IAB-nodes and the IAB-Donor-DUs. |
| ***smtc4list***  Measurement timing configuration list for NTN deployments. |
| ***ssbFrequency*** Indicates the frequency of the SS associated to this *MeasObjectNR*. For operation with shared spectrum channel access, this field is a k\*30 kHz shift from the sync raster where k = 0,1,2, and so on if the *reportType* within the corresponding *ReportConfigNR* is set to reportCGI (see TS 38.211 [16], clause 7.4.3.1). Frequencies are considered to be on the sync raster if they are also identifiable with a GSCN value (see TS 38.101-1 [15]). |
| ***ssb-PositionQCL-Common***  Indicates the QCL relationship between SS/PBCH blocks for all measured cells as specified in TS 38.213 [13], clause 4.1. |
| ***ssbSubcarrierSpacing***  Subcarrier spacing of SSB.  Only the following values are applicable depending on the used frequency:  FR1: 15 or 30 kHz  FR2-1: 120 or 240 kHz  FR2-2: 120, 480, or 960 kHz |
| ***t312***  The value of timer T312. Value ms0 represents 0 ms, ms50 represents 50 ms and so on. |

|  |
| --- |
| *RMTC-Config* field descriptions |
| ***measDurationSymbols***  Number of consecutive symbols for which the Physical Layer reports samples of RSSI (see TS 38.215 [9], clause 5.1.21). Value *sym1* corresponds to one symbol, *sym14or12* corresponds to 14 symbols of the reference numerology for NCP and 12 symbols for ECP, and so on.  If *measDurationSymbols-v1700* is signalled, the UE ignores *measDurationSymbols-r16*. |
| ***ref-SCS-CP***  Indicates a reference subcarrier spacing and cyclic prefix to be used for RSSI measurements (see TS 38.215 [9]). Value kHz15 corresponds to 15kHz, kHz30 corresponds to 30 kHz, value kHz60-NCP corresponds to 60 kHz using normal cyclic prefix (NCP), and kHz60-ECP corresponds to 60 kHz using extended cyclic prefix (ECP).  If *ref-SCS-CP-v1700* is signalled, the UE ignores *ref-SCS-CP-r16*. |
| ***rmtc-Bandwidth***  Indicates the bandwidth for the RSSI measurement (see TS 38. 215 [9], clause 5.1.21). |
| ***rmtc-Frequency***  Indicates the center frequency of the measured bandwidth for a frequency which operates with shared spectrum channel access (see TS 38. 215 [9], clause 5.1.21). |
| ***rmtc-Periodicity***  Indicates the RSSI measurement timing configuration (RMTC) periodicity (see TS 38.215 [9], clause 5.1.21). |
| ***rmtc-SubframeOffset***  Indicates the RSSI measurement timing configuration (RMTC) subframe offset for this frequency (see TS 38.215 [9], clause 5.1.21). For inter-frequency measurements, this field is optional present and if it is not configured, the UE chooses a random value as *rmtc-SubframeOffset* for *measDurationSymbols* which shall be selected to be between 0 and the configured *rmtc-Periodicity* with equal probability. |
| ***servCellId***  Indicates the reference serving cell index for the TCI state. |
| ***tci-StateId***  Indicates the TCI state to be used for RSSI measurements. This field is only applicable for shared spectrum channel access in FR2-2. |

|  |
| --- |
| *ReferenceSignalConfig* field descriptions |
| ***csi-rs-ResourceConfigMobility***  CSI-RS resources to be used for CSI-RS based RRM measurements. |
| ***ssb-ConfigMobility***  SSB configuration for mobility (nominal SSBs, timing configuration). |

|  |
| --- |
| *SSB-ConfigMobility* field descriptions |
| ***deriveSSB-IndexFromCell***  If this field is set to *true*, UE assumes SFN and frame boundary alignment across cells on the same frequency carrier as specified in TS 38.133 [14]. Hence, if the UE is configured with a serving cell for which (*absoluteFrequencySSB*, *subcarrierSpacing*) in *ServingCellConfigCommon* is equal to (*ssbFrequency*, *ssbSubcarrierSpacing*) in this *MeasObjectNR*, this field indicates whether the UE can utilize the timing of this serving cell to derive the index of SS block transmitted by neighbour cell. Otherwise, this field indicates whether the UE may use the timing of any detected cell on that target frequency to derive the SSB index of all neighbour cells on that frequency. |
| ***deriveSSB-IndexFromCellInter***  If this field is present, UE assumes SFN and frame boundary alignment between the reference serving cell indicated by *ServCellIndex* and all neighbour cells in this *MeasObjectNR* as specified in TS 38.133 [14]. This field also indicates that the UE can utilize the timing of the reference serving cell indicated by *ServCellIndex* to derive the index of SS block transmitted by all inter-frequency neighbour cells on the frequency indicated by the *MeasObjectNR*. When this field is included, the network should set *deriveSSB-IndexFromCell* to *true*. |
| ***ssb-ToMeasure***  The set of SS blocks to be measured within the SMTC measurement duration. The first/leftmost bit corresponds to SS/PBCH block index 0, the second bit corresponds to SS/PBCH block index 1, and so on. Value 0 in the bitmap indicates that the corresponding SS/PBCH block is not to be measured while value 1 indicates that the corresponding SS/PBCH block is to be measured (see TS 38.215 [9]). When the field is not configured the UE measures on all SS blocks. Regardless of the value of this field, SS/PBCH blocks outside of the applicable *smtc* are not to be measured. See TS 38.215 [9] clause 5.1.1. |

|  |
| --- |
| *SSB-PositionQCL-CellsToAddMod* field descriptions |
| ***physCellId***  Physical cell identity of a cell in the cell list. |
| ***ssb-PositionQCL***  Indicates the QCL relation between SS/PBCH blocks for a specific cell as specified in TS 38.213 [13], clause 4.1. If provided, the cell specific value overwrites the value signalled by *ssb-PositionQCL-Common*. |

|  |  |
| --- | --- |
| Conditional Presence | Explanation |
| *CSI-RS* | This field is mandatory present if *csi-rs-ResourceConfigMobility* is configured, otherwise, it is absent. |
| *SSBorAssociatedSSB* | This field is mandatory present if *ssb-ConfigMobility* is configured or *associatedSSB* is configured in at least one cell. Otherwise, it is absent, Need R. |
| *IntraFreqConnected* | This field is optionally present, Need R if the UE is configured with a serving cell for which (absoluteFrequencySSB, subcarrierSpacing) in ServingCellConfigCommon is equal to (*ssbFrequency*, *ssbSubcarrierSpacing*) in this *MeasObjectNR*, otherwise, it is absent. |
| *SharedSpectrum* | This field is mandatory present if this *MeasObject* is for a frequency which operates with shared spectrum channel access in FR1. Otherwise, it is absent, Need R. |
| *SharedSpectrum2* | This field is optionally present if this *MeasObject* is for a frequency which operates with shared spectrum channel access in FR2-2. Otherwise, it is absent, Need R. |

#### – *MeasObjectNR-SL*

The IE *MeasObjectNR-SL* concerns a measurement object including a list of transmission resource pool(s) for which CBR measurement is performed for NR sidelink communication.

*MeasObjectNR-SL* information element

-- ASN1START

-- TAG-MEASOBJECTNR-SL-START

MeasObjectNR-SL-r16 ::= SEQUENCE {

tx-PoolMeasToRemoveList-r16 Tx-PoolMeasList-r16 OPTIONAL, -- Need N

tx-PoolMeasToAddModList-r16 Tx-PoolMeasList-r16 OPTIONAL -- Need N

}

Tx-PoolMeasList-r16 ::= SEQUENCE (SIZE (1..maxNrofSL-PoolToMeasureNR-r16)) OF SL-ResourcePoolID-r16

-- TAG-MEASOBJECTNR-SL-STOP

-- ASN1STOP

#### – *MeasObjectRxTxDiff*

The IE *MeasObjectRxTxDiff* is used to configure the measurement object for UE Rx-Tx time difference measurement.

*MeasObjectRxTxDiff* information element

-- ASN1START

-- TAG-MEASOBJECTRXTXDIFF-START

MeasObjectRxTxDiff-r17 ::= SEQUENCE {

dl-Ref-r17 CHOICE {

prs-Ref-r17 NULL,

csi-RS-Ref-r17 NULL,

...

} OPTIONAL, -- Need R

...

}

-- TAG-MEASOBJECTRXTXDIFF-STOP

-- ASN1STOP

|  |
| --- |
| *MeasObjectRxTxDiff field descriptions* |
| ***dl-Ref***  configures the DL references signals to measure Rx-Tx time difference. *prs-Ref-r17* indicates PRS is chosen, and *csi-RS-Ref-r17* indicates that CSI-RS for tracking is chosen.  Only one PRS resource set is configured by the network. Only one *NZP-CSI-RS-ResourceSet* can be configured with *pdc-Info-r17* set to *true* and it is used for UE Rx-Tx time difference measurement. Only reference signals from the PCell of the MCG can be configured by the network. |

#### – *MeasObjectToAddModList*

The IE *MeasObjectToAddModList* concerns a list of measurement objects to add or modify.

*MeasObjectToAddModList* information element

-- ASN1START

-- TAG-MEASOBJECTTOADDMODLIST-START

MeasObjectToAddModList ::= SEQUENCE (SIZE (1..maxNrofObjectId)) OF MeasObjectToAddMod

MeasObjectToAddMod ::= SEQUENCE {

measObjectId MeasObjectId,

measObject CHOICE {

measObjectNR MeasObjectNR,

...,

measObjectEUTRA MeasObjectEUTRA,

measObjectUTRA-FDD-r16 MeasObjectUTRA-FDD-r16,

measObjectNR-SL-r16 MeasObjectNR-SL-r16,

measObjectCLI-r16 MeasObjectCLI-r16,

measObjectRxTxDiff-r17 MeasObjectRxTxDiff-r17,

measObjectRelay-r17 SL-MeasObject-r16

}

}

-- TAG-MEASOBJECTTOADDMODLIST-STOP

-- ASN1STOP

#### – *MeasObjectUTRA-FDD*

The IE *MeasObjectUTRA-FDD* specifies information applicable for inter-RAT UTRA-FDD neighbouring cells.

*MeasObjectUTRA-FDD* information element

-- ASN1START

-- TAG-MEASOBJECTUTRA-FDD-START

MeasObjectUTRA-FDD-r16 ::= SEQUENCE {

carrierFreq-r16 ARFCN-ValueUTRA-FDD-r16,

utra-FDD-Q-OffsetRange-r16 UTRA-FDD-Q-OffsetRange-r16 OPTIONAL, -- Need R

cellsToRemoveList-r16 UTRA-FDD-CellIndexList-r16 OPTIONAL, -- Need N

cellsToAddModList-r16 CellsToAddModListUTRA-FDD-r16 OPTIONAL, -- Need N

...

}

CellsToAddModListUTRA-FDD-r16 ::= SEQUENCE (SIZE (1..maxCellMeasUTRA-FDD-r16)) OF CellsToAddModUTRA-FDD-r16

CellsToAddModUTRA-FDD-r16 ::= SEQUENCE {

cellIndexUTRA-FDD-r16 UTRA-FDD-CellIndex-r16,

physCellId-r16 PhysCellIdUTRA-FDD-r16

}

UTRA-FDD-CellIndexList-r16 ::= SEQUENCE (SIZE (1..maxCellMeasUTRA-FDD-r16)) OF UTRA-FDD-CellIndex-r16

UTRA-FDD-CellIndex-r16 ::= INTEGER (1..maxCellMeasUTRA-FDD-r16)

-- TAG-MEASOBJECTUTRA-FDD-STOP

-- ASN1STOP

| *MeasObjectUTRA-FDD* field descriptions |
| --- |
| ***carrierFreq***  Identifies UTRA-FDD carrier frequency for which this configuration is valid. NR does not configure more than one measurement object for the same physical frequency regardless of the ARFCN used to indicate this. |
| ***cellIndexUTRA-FDD***  Entry index in the neighbouring cell list. |
| ***cellsToAddModList***  List of UTRA-FDD cells to add/modify in the neighbouring cell list. |
| ***cellsToRemoveList***  List of cells to remove from the neighbouring cell list. |
| ***utra*-*FDD-Q-OffsetRange***  Used to indicate a frequency specific offset to be applied when evaluating triggering conditions for measurement reporting. The value is in dB. |

#### *– MeasResultCellListSFTD-NR*

The IE *MeasResultCellListSFTD-NR* consists of SFN and radio frame boundary difference between the PCell and an NR cell as specified in TS 38.215 [9] and TS 38.133 [14].

*MeasResultCellListSFTD-NR* information element

-- ASN1START

-- TAG-MEASRESULTCELLLISTSFTD-NR-START

MeasResultCellListSFTD-NR ::= SEQUENCE (SIZE (1..maxCellSFTD)) OF MeasResultCellSFTD-NR

MeasResultCellSFTD-NR ::= SEQUENCE {

physCellId PhysCellId,

sfn-OffsetResult INTEGER (0..1023),

frameBoundaryOffsetResult INTEGER (-30720..30719),

rsrp-Result RSRP-Range OPTIONAL

}

-- TAG-MEASRESULTCELLLISTSFTD-NR-STOP

-- ASN1STOP

| *MeasResultCellSFTD-NR* field descriptions |
| --- |
| ***sfn-OffsetResult***  Indicates the SFN difference between the PCell and the NR cell as an integer value according to TS 38.215 [9]. |
| ***frameBoundaryOffsetResult***  Indicates the frame boundary difference between the PCell and the NR cell as an integer value according to TS 38.215 [9]. |

#### *– MeasResultCellListSFTD-EUTRA*

The IE *MeasResultCellListSFTD-EUTRA* consists of SFN and radio frame boundary difference between the PCell and an E-UTRA PSCell.

*MeasResultCellListSFTD-EUTRA* information element

-- ASN1START

-- TAG-MEASRESULTCELLLISTSFTD-EUTRA-START

MeasResultCellListSFTD-EUTRA ::= SEQUENCE (SIZE (1..maxCellSFTD)) OF MeasResultSFTD-EUTRA

MeasResultSFTD-EUTRA ::= SEQUENCE {

eutra-PhysCellId EUTRA-PhysCellId,

sfn-OffsetResult INTEGER (0..1023),

frameBoundaryOffsetResult INTEGER (-30720..30719),

rsrp-Result RSRP-Range OPTIONAL

}

-- TAG-MEASRESULTCELLLISTSFTD-EUTRA-STOP

-- ASN1STOP

| *MeasResultSFTD-EUTRA* field descriptions |
| --- |
| ***eutra-PhysCellId***  Identifies the physical cell identity of the E-UTRA cell for which the reporting is being performed. |
| ***sfn-OffsetResult***  Indicates the SFN difference between the PCell and the E-UTRA cell as an integer value according to TS 38.215 [9]. |
| ***frameBoundaryOffsetResult***  Indicates the frame boundary difference between the PCell and the E-UTRA cell as an integer value according to TS 38.215 [9]. |

#### – *MeasResults*

The IE *MeasResults* covers measured results for intra-frequency, inter-frequency, inter-RAT mobility and measured results for NR sidelink communication.

*MeasResults* information element

-- ASN1START

-- TAG-MEASRESULTS-START

MeasResults ::= SEQUENCE {

measId MeasId,

measResultServingMOList MeasResultServMOList,

measResultNeighCells CHOICE {

measResultListNR MeasResultListNR,

...,

measResultListEUTRA MeasResultListEUTRA,

measResultListUTRA-FDD-r16 MeasResultListUTRA-FDD-r16,

sl-MeasResultsCandRelay-r17 OCTET STRING -- Contains PC5 SL-MeasResultListRelay-r17

} OPTIONAL,

...,

[[

measResultServFreqListEUTRA-SCG MeasResultServFreqListEUTRA-SCG OPTIONAL,

measResultServFreqListNR-SCG MeasResultServFreqListNR-SCG OPTIONAL,

measResultSFTD-EUTRA MeasResultSFTD-EUTRA OPTIONAL,

measResultSFTD-NR MeasResultCellSFTD-NR OPTIONAL

]],

[[

measResultCellListSFTD-NR MeasResultCellListSFTD-NR OPTIONAL

]],

[[

measResultForRSSI-r16 MeasResultForRSSI-r16 OPTIONAL,

locationInfo-r16 LocationInfo-r16 OPTIONAL,

ul-PDCP-DelayValueResultList-r16 UL-PDCP-DelayValueResultList-r16 OPTIONAL,

measResultsSL-r16 MeasResultsSL-r16 OPTIONAL,

measResultCLI-r16 MeasResultCLI-r16 OPTIONAL

]],

[[

measResultRxTxTimeDiff-r17 MeasResultRxTxTimeDiff-r17 OPTIONAL,

sl-MeasResultServingRelay-r17 OCTET STRING OPTIONAL,

-- Contains PC5 SL-MeasResultRelay-r17

ul-PDCP-ExcessDelayResultList-r17 UL-PDCP-ExcessDelayResultList-r17 OPTIONAL,

coarseLocationInfo-r17 OCTET STRING OPTIONAL

]]

}

MeasResultServMOList ::= SEQUENCE (SIZE (1..maxNrofServingCells)) OF MeasResultServMO

MeasResultServMO ::= SEQUENCE {

servCellId ServCellIndex,

measResultServingCell MeasResultNR,

measResultBestNeighCell MeasResultNR OPTIONAL,

...

}

MeasResultListNR ::= SEQUENCE (SIZE (1..maxCellReport)) OF MeasResultNR

MeasResultNR ::= SEQUENCE {

physCellId PhysCellId OPTIONAL,

measResult SEQUENCE {

cellResults SEQUENCE{

resultsSSB-Cell MeasQuantityResults OPTIONAL,

resultsCSI-RS-Cell MeasQuantityResults OPTIONAL

},

rsIndexResults SEQUENCE{

resultsSSB-Indexes ResultsPerSSB-IndexList OPTIONAL,

resultsCSI-RS-Indexes ResultsPerCSI-RS-IndexList OPTIONAL

} OPTIONAL

},

...,

[[

cgi-Info CGI-InfoNR OPTIONAL

]] ,

[[

choCandidate-r17 ENUMERATED {true} OPTIONAL,

choConfig-r17 SEQUENCE (SIZE (1..2)) OF CondTriggerConfig-r16 OPTIONAL,

triggeredEvent-r17 SEQUENCE {

timeBetweenEvents-r17 TimeBetweenEvent-r17 OPTIONAL,

firstTriggeredEvent ENUMERATED {condFirstEvent, condSecondEvent} OPTIONAL

} OPTIONAL

]]

}

MeasResultListEUTRA ::= SEQUENCE (SIZE (1..maxCellReport)) OF MeasResultEUTRA

MeasResultEUTRA ::= SEQUENCE {

eutra-PhysCellId PhysCellId,

measResult MeasQuantityResultsEUTRA,

cgi-Info CGI-InfoEUTRA OPTIONAL,

...

}

MultiBandInfoListEUTRA ::= SEQUENCE (SIZE (1..maxMultiBands)) OF FreqBandIndicatorEUTRA

MeasQuantityResults ::= SEQUENCE {

rsrp RSRP-Range OPTIONAL,

rsrq RSRQ-Range OPTIONAL,

sinr SINR-Range OPTIONAL

}

MeasQuantityResultsEUTRA ::= SEQUENCE {

rsrp RSRP-RangeEUTRA OPTIONAL,

rsrq RSRQ-RangeEUTRA OPTIONAL,

sinr SINR-RangeEUTRA OPTIONAL

}

ResultsPerSSB-IndexList::= SEQUENCE (SIZE (1..maxNrofIndexesToReport2)) OF ResultsPerSSB-Index

ResultsPerSSB-Index ::= SEQUENCE {

ssb-Index SSB-Index,

ssb-Results MeasQuantityResults OPTIONAL

}

ResultsPerCSI-RS-IndexList::= SEQUENCE (SIZE (1..maxNrofIndexesToReport2)) OF ResultsPerCSI-RS-Index

ResultsPerCSI-RS-Index ::= SEQUENCE {

csi-RS-Index CSI-RS-Index,

csi-RS-Results MeasQuantityResults OPTIONAL

}

MeasResultServFreqListEUTRA-SCG ::= SEQUENCE (SIZE (1..maxNrofServingCellsEUTRA)) OF MeasResult2EUTRA

MeasResultServFreqListNR-SCG ::= SEQUENCE (SIZE (1..maxNrofServingCells)) OF MeasResult2NR

MeasResultListUTRA-FDD-r16 ::= SEQUENCE (SIZE (1..maxCellReport)) OF MeasResultUTRA-FDD-r16

MeasResultUTRA-FDD-r16 ::= SEQUENCE {

physCellId-r16 PhysCellIdUTRA-FDD-r16,

measResult-r16 SEQUENCE {

utra-FDD-RSCP-r16 INTEGER (-5..91) OPTIONAL,

utra-FDD-EcN0-r16 INTEGER (0..49) OPTIONAL

}

}

MeasResultForRSSI-r16 ::= SEQUENCE {

rssi-Result-r16 RSSI-Range-r16,

channelOccupancy-r16 INTEGER (0..100)

}

MeasResultCLI-r16 ::= SEQUENCE {

measResultListSRS-RSRP-r16 MeasResultListSRS-RSRP-r16 OPTIONAL,

measResultListCLI-RSSI-r16 MeasResultListCLI-RSSI-r16 OPTIONAL

}

MeasResultListSRS-RSRP-r16 ::= SEQUENCE (SIZE (1.. maxCLI-Report-r16)) OF MeasResultSRS-RSRP-r16

MeasResultSRS-RSRP-r16 ::= SEQUENCE {

srs-ResourceId-r16 SRS-ResourceId,

srs-RSRP-Result-r16 SRS-RSRP-Range-r16

}

MeasResultListCLI-RSSI-r16 ::= SEQUENCE (SIZE (1.. maxCLI-Report-r16)) OF MeasResultCLI-RSSI-r16

MeasResultCLI-RSSI-r16 ::= SEQUENCE {

rssi-ResourceId-r16 RSSI-ResourceId-r16,

cli-RSSI-Result-r16 CLI-RSSI-Range-r16

}

UL-PDCP-DelayValueResultList-r16 ::= SEQUENCE (SIZE (1..maxDRB)) OF UL-PDCP-DelayValueResult-r16

UL-PDCP-DelayValueResult-r16 ::= SEQUENCE {

drb-Id-r16 DRB-Identity,

averageDelay-r16 INTEGER (0..10000),

...

}

UL-PDCP-ExcessDelayResultList-r17 ::= SEQUENCE (SIZE (1..maxDRB)) OF UL-PDCP-ExcessDelayResult-r17

UL-PDCP-ExcessDelayResult-r17 ::= SEQUENCE {

drb-Id-r17 DRB-Identity,

excessDelay-r17 INTEGER (0..31),

...

}

TimeBetweenEvent-r17 ::= INTEGER (0..1023)

-- TAG-MEASRESULTS-STOP

-- ASN1STOP

|  |
| --- |
| *MeasResultEUTRA* field descriptions |
| ***eutra-PhysCellId***  Identifies the physical cell identity of the E-UTRA cell for which the reporting is being performed. The UE reports a value in the range 0..503, other values are reserved. |

|  |
| --- |
| *MeasResultNR* field descriptions |
| ***averageDelay***  Indicates average delay for the packets during the reporting period, as specified in TS 38.314 [53]. Value 0 corresponds to 0 millisecond, value 1 corresponds to 0.1 millisecond, value 2 corresponds to 0.2 millisecond, and so on. |
| ***cellResults***  Cell level measurement results. |
| ***choCandidate***  This field indicates whether the associated cell is a candidate target cell for conditional handover. This field may be included only in the *SuccessHO-Report* within *UEInformationResponse* message. |
| ***choConfig***  If the associated cell is a candidate target cell for conditional handover, this field indicates the conditional handover execution condition for each *measId* within *condTriggerConfig* associated to the cell. This field may be included only in the *rlf-report* within *UEInformationResponse* message. |
| ***drb-Id***  Indicates DRB value for which uplink PDCP delay ratio or value is provided, according to TS 38.314 [53]. |
| ***firstTriggeredEvent***  This field is set to *condFirstEvent* if the execution condition associated to the first entry of *choConfig* was fulfilled first in time. This field is set to *condSecondEvent* if the execution condition associated to the second entry of *choConfig* was fulfilled first in time. This field may be included only in *rlf-report* within *UEInformationResponse* message. |
| ***locationInfo***  Positioning related information and measurements. |
| ***physCellId***  The physical cell identity of the NR cell for which the reporting is being performed. |
| ***resultsSSB-Cell***  Cell level measurement results based on SS/PBCH related measurements. |
| ***resultsSSB-Indexes***  Beam level measurement results based on SS/PBCH related measurements. |
| ***resultsCSI-RS-Cell***  Cell level measurement results based on CSI-RS related measurements. |
| ***resultsCSI-RS-Indexes***  Beam level measurement results based on CSI-RS related measurements. |
| ***rsIndexResults***  Beam level measurement results. |
| ***timeBetweenEvents***  Indicates the time elapsed between fulfilling the conditional execution conditions included in *choConfig*. Value in milliseconds. The maximum value 1023 means 1023ms or longer. This field may be included only in the reports associated to *UEInformationResponse* message, e.g., *rlf-Report*. |

|  |
| --- |
| *MeasResultUTRA-FDD* field descriptions |
| ***physCellId***  The physical cell identity of the UTRA-FDD cell for which the reporting is being performed. |
| ***utra-FDD-EcN0***  According to CPICH\_Ec/No in TS 25.133 [46] for FDD. |
| ***utra-FDD-RSCP***  According to CPICH\_RSCP in TS 25.133 [46] for FDD. |

| *MeasResults* field descriptions |
| --- |
| ***coarseLocationInfo***  Parameter type *Ellipsoid-Point* defined in TS 37.355 [49]. The first/leftmost bit of the first octet contains the most significant bit. The least significant bits of *degreesLatitude* and *degreesLongitude* are set to 0 to meet the accuracy requirement corresponds to a granularity of approximately 2 km.  It is up to UE implementation how many LSBs are set to 0 to meet the accuracy requirement |
| ***excessDelay***  Indicates the ratio of packets in UL per DRB exceeding the configured delay threshold among the UL PDCP SDUs, according to the UL PDCP Excess Packet Delay per DRB mapping table, as defined in TS 38.314 [53], Table 4.3.1.e-1. |
| ***measId***  Identifies the measurement identity for which the reporting is being performed. |
| ***measQuantityResults***  The value sinr is not included when it is used for *LogMeasReport-r16*. |
| ***measResultCellListSFTD-NR***  SFTD measurement results between the PCell and the NR neighbour cell(s) in NR standalone. |
| ***measResultCLI***  CLI measurement results. |
| ***measResultEUTRA***  Measured results of an E-UTRA cell. |
| ***measResultForRSSI***  Includes measured RSSI result in dBm (see TS 38.215 [9]) and *channelOccupancy* which is the percentage of samples when the RSSI was above the configured *channelOccupancyThreshold* for the associated *reportConfig*. |
| ***measResultListEUTRA***  List of measured results for the maximum number of reported best cells for an E-UTRA measurement identity. |
| ***measResultListNR***  List of measured results for the maximum number of reported best cells for an NR measurement identity. |
| ***measResultListUTRA-FDD***  List of measured results for the maximum number of reported best cells for a UTRA-FDD measurement identity. |
| ***measResultNR***  Measured results of an NR cell. |
| ***measResultServFreqListEUTRA-SCG***  Measured results of the E-UTRA SCG serving frequencies: the measurement result of PSCell and each SCell, if any, and of the best neighbouring cell on each E-UTRA SCG serving frequency. |
| ***measResultServFreqListNR-SCG***  Measured results of the NR SCG serving frequencies: the measurement result of PSCell and each SCell, if any, and of the best neighbouring cell on each NR SCG serving frequency. |
| ***measResultServingMOList***  Measured results of measured cells with reference signals indicated in the serving cell measurement objects including measurement results of SpCell, configured SCell(s) and best neighbouring cell within measured cells with reference signals indicated in on each serving cell measurement object. If the sending of the *MeasurementReport* message is triggered by a measurement configured by the field *sl-ConfigDedicatedForNR* received within an E-UTRA *RRCConnectionReconfiguration* message (i.e. CBR measurements), this field is not applicable and its contents is ignored by the network. |
| ***measResultSFTD-EUTRA***  SFTD measurement results between the PCell and the E-UTRA PScell in NE-DC. |
| ***measResultSFTD-NR***  SFTD measurement results between the PCell and the NR PScell in NR-DC. |
| ***measResultsSL***  CBR measurements results for NR sidelink communication. |
| ***measResultUTRA-FDD***  Measured result of a UTRA-FDD cell. |
| ***sl-MeasResultsCandRelay***  Measurement result(s) of candiate L2 U2N relay UE(s). |
| ***sl-MeasResultsServingRelay***  Measurement result of serving L2 U2N relay UE. |

#### *– MeasResult2EUTRA*

The IE *MeasResult2EUTRA* contains measurements on E-UTRA frequencies.

*MeasResult2EUTRA* information element

-- ASN1START

-- TAG-MEASRESULT2EUTRA-START

MeasResult2EUTRA ::= SEQUENCE {

carrierFreq ARFCN-ValueEUTRA,

measResultServingCell MeasResultEUTRA OPTIONAL,

measResultBestNeighCell MeasResultEUTRA OPTIONAL,

...

}

-- TAG-MEASRESULT2EUTRA-STOP

-- ASN1STOP

#### *– MeasResult2NR*

The IE *MeasResult2NR* contains measurements on NR frequencies.

*MeasResult2NR* information element

-- ASN1START

-- TAG-MEASRESULT2NR-START

MeasResult2NR ::= SEQUENCE {

ssbFrequency ARFCN-ValueNR OPTIONAL,

refFreqCSI-RS ARFCN-ValueNR OPTIONAL,

measResultServingCell MeasResultNR OPTIONAL,

measResultNeighCellListNR MeasResultListNR OPTIONAL,

...

}

-- TAG-MEASRESULT2NR-STOP

-- ASN1STOP

#### – *MeasResultIdleEUTRA*

The IE *MeasResultIdleEUTRA* covers the E-UTRA measurement results performed in RRC\_IDLE and RRC\_INACTIVE.

*MeasResultIdleEUTRA* information element

-- ASN1START

-- TAG-MEASRESULTIDLEEUTRA-START

MeasResultIdleEUTRA-r16 ::= SEQUENCE {

measResultsPerCarrierListIdleEUTRA-r16 SEQUENCE (SIZE (1.. maxFreqIdle-r16)) OF MeasResultsPerCarrierIdleEUTRA-r16,

...

}

MeasResultsPerCarrierIdleEUTRA-r16 ::= SEQUENCE {

carrierFreqEUTRA-r16 ARFCN-ValueEUTRA,

measResultsPerCellListIdleEUTRA-r16 SEQUENCE (SIZE (1..maxCellMeasIdle-r16)) OF MeasResultsPerCellIdleEUTRA-r16,

...

}

MeasResultsPerCellIdleEUTRA-r16 ::= SEQUENCE {

eutra-PhysCellId-r16 EUTRA-PhysCellId,

measIdleResultEUTRA-r16 SEQUENCE {

rsrp-ResultEUTRA-r16 RSRP-RangeEUTRA OPTIONAL,

rsrq-ResultEUTRA-r16 RSRQ-RangeEUTRA-r16 OPTIONAL

},

...

}

-- TAG-MEASRESULTIDLEEUTRA-STOP

-- ASN1STOP

|  |
| --- |
| *MeasResultIdleEUTRA field descriptions* |
| ***carrierFreqEUTRA***  Indicates the E-UTRA carrier frequency. |
| ***eutra-PhysCellId***  Indicates the physical cell identity of an E-UTRA cell. |
| ***measIdleResultEUTRA***  Idle/inactive measurement results for an E-UTRA cell. |
| ***measResultsPerCarrierListIdleEUTRA***  List of idle/inactive measured results for the maximum number of reported E-UTRA carriers. |
| ***measResultsPerCellListIdleEUTRA***  List of idle/inactive measured results for the maximum number of reported best cells for a given E-UTRA carrier. |

#### – *MeasResultIdleNR*

The IE *MeasResultIdleNR* covers the NR measurement results performed in RRC\_IDLE and RRC\_INACTIVE.

*MeasResultIdleNR* information element

-- ASN1START

-- TAG-MEASRESULTIDLENR-START

MeasResultIdleNR-r16 ::= SEQUENCE {

measResultServingCell-r16 SEQUENCE {

rsrp-Result-r16 RSRP-Range OPTIONAL,

rsrq-Result-r16 RSRQ-Range OPTIONAL,

resultsSSB-Indexes-r16 ResultsPerSSB-IndexList-r16 OPTIONAL

},

measResultsPerCarrierListIdleNR-r16 SEQUENCE (SIZE (1.. maxFreqIdle-r16)) OF MeasResultsPerCarrierIdleNR-r16 OPTIONAL,

...

}

MeasResultsPerCarrierIdleNR-r16 ::= SEQUENCE {

carrierFreq-r16 ARFCN-ValueNR,

measResultsPerCellListIdleNR-r16 SEQUENCE (SIZE (1..maxCellMeasIdle-r16)) OF MeasResultsPerCellIdleNR-r16,

...

}

MeasResultsPerCellIdleNR-r16 ::= SEQUENCE {

physCellId-r16 PhysCellId,

measIdleResultNR-r16 SEQUENCE {

rsrp-Result-r16 RSRP-Range OPTIONAL,

rsrq-Result-r16 RSRQ-Range OPTIONAL,

resultsSSB-Indexes-r16 ResultsPerSSB-IndexList-r16 OPTIONAL

},

...

}

ResultsPerSSB-IndexList-r16 ::= SEQUENCE (SIZE (1.. maxNrofIndexesToReport)) OF ResultsPerSSB-IndexIdle-r16

ResultsPerSSB-IndexIdle-r16 ::= SEQUENCE {

ssb-Index-r16 SSB-Index,

ssb-Results-r16 SEQUENCE {

ssb-RSRP-Result-r16 RSRP-Range OPTIONAL,

ssb-RSRQ-Result-r16 RSRQ-Range OPTIONAL

} OPTIONAL

}

-- TAG-MEASRESULTIDLENR-STOP

-- ASN1STOP

|  |
| --- |
| *MeasResultIdleNR* field descriptions |
| ***carrierFreq***  Indicates the NR carrier frequency. |
| ***measIdleResultNR***  Idle/inactive measurement results for an NR cell (optionally including beam level measurements). |
| ***measResultServingCell***  Measured results of the serving cell (i.e., PCell) from idle/inactive measurements. |
| ***measResultsPerCellListIdleNR***  List of idle/inactive measured results for the maximum number of reported best cells for a given NR carrier. |
| ***resultsSSB-Indexes***  Beam level measurement results (indexes and optionally, beam measurements). |

#### – *MeasResultRxTxTimeDiff*

The IE *MeasResultRxTxTimeDiff* is used to provide Rx-Tx time difference measurement result.

*MeasResultRxTxTimeDiff* information element

-- ASN1START

-- TAG-MEASRESULTRXTXTIMEDIFF-START

MeasResultRxTxTimeDiff-r17 ::= SEQUENCE {

rxTxTimeDiff-ue-r17 RxTxTimeDiff-r17 OPTIONAL,

...

}

-- TAG-MEASRESULTRXTXTIMEDIFF-STOP

-- ASN1STOP

|  |
| --- |
| *MeasResultRxTxTimeDiff field descriptions* |
| ***rxTxTimeDiff-ue***  indicates the Rx-Tx Time difference measurement at the UE (see clause 5.1.30, TS 38.215 [9]). |

#### *– MeasResultSCG-Failure*

The IE *MeasResultSCG-Failure* is used to provide information regarding failures detected by the UE in (NG)EN-DC and NR-DC.

*MeasResultSCG-Failure* information element

-- ASN1START

-- TAG-MEASRESULTSCG-FAILURE-START

MeasResultSCG-Failure ::= SEQUENCE {

measResultPerMOList MeasResultList2NR,

...,

[[

locationInfo-r16 LocationInfo-r16 OPTIONAL

]]

}

MeasResultList2NR ::= SEQUENCE (SIZE (1..maxFreq)) OF MeasResult2NR

-- TAG-MEASRESULTSCG-FAILURE-STOP

-- ASN1STOP

#### – *MeasResultsSL*

The IE *MeasResultsSL* covers measured results for NR sidelink communication.

*MeasResultsSL* information element

-- ASN1START

-- TAG-MEASRESULTSSL-START

MeasResultsSL-r16 ::= SEQUENCE {

measResultsListSL-r16 CHOICE {

measResultNR-SL-r16 MeasResultNR-SL-r16,

...

},

...

}

MeasResultNR-SL-r16 ::= SEQUENCE {

measResultListCBR-NR-r16 SEQUENCE (SIZE (1.. maxNrofSL-PoolToMeasureNR-r16)) OF MeasResultCBR-NR-r16,

...

}

MeasResultCBR-NR-r16 ::= SEQUENCE {

sl-poolReportIdentity-r16 SL-ResourcePoolID-r16,

sl-CBR-ResultsNR-r16 SL-CBR-r16,

...

}

-- TAG-MEASRESULTSSL-STOP

-- ASN1STOP

| *MeasResultsSL* field descriptions |
| --- |
| ***measResultNR-SL***  Include the measured results for NR sidelink communication. |

|  |
| --- |
| *MeasResultNR-SL* field descriptions |
| ***measResultListCBR-NR***  CBR measurement results for NR sidelink communication. |
| ***sl-poolReportIdentity***  The identity of the transmission resource pool which is corresponding to the *sl-ResourcePoolID* configured in a resource pool for NR sidelink communication. |

#### – *MeasTriggerQuantityEUTRA*

The IE *MeasTriggerQuantityEUTRA* is used to configure the trigger quantity and reporting range for E-UTRA measurements. The RSRP, RSRQ and SINR ranges correspond to *RSRP-Range*, *RSRQ-Range* and *RS-SINR-Range* in TS 36.331 [10], respectively.

*MeasTriggerQuantityEUTRA* information element

-- ASN1START

-- TAG-MEASTRIGGERQUANTITYEUTRA-START

MeasTriggerQuantityEUTRA::= CHOICE {

rsrp RSRP-RangeEUTRA,

rsrq RSRQ-RangeEUTRA,

sinr SINR-RangeEUTRA

}

RSRP-RangeEUTRA ::= INTEGER (0..97)

RSRQ-RangeEUTRA ::= INTEGER (0..34)

SINR-RangeEUTRA ::= INTEGER (0..127)

-- TAG-MEASTRIGGERQUANTITYEUTRA-STOP

-- ASN1STOP

#### – *MobilityStateParameters*

The IE *MobilityStateParameters* contains parameters to determine UE mobility state.

*MobilityStateParameters* information element

-- ASN1START

-- TAG-MOBILITYSTATEPARAMETERS-START

MobilityStateParameters ::= SEQUENCE{

t-Evaluation ENUMERATED {

s30, s60, s120, s180, s240, spare3, spare2, spare1},

t-HystNormal ENUMERATED {

s30, s60, s120, s180, s240, spare3, spare2, spare1},

n-CellChangeMedium INTEGER (1..16),

n-CellChangeHigh INTEGER (1..16)

}

-- TAG-MOBILITYSTATEPARAMETERS-STOP

-- ASN1STOP

| *MobilityStateParameters* field descriptions |
| --- |
| ***n-CellChangeHigh***  The number of cell changes to enter high mobility state. Corresponds to NCR\_H in TS 38.304 [20]. |
| ***n-CellChangeMedium***  The number of cell changes to enter medium mobility state. Corresponds to NCR\_M in TS 38.304 [20]. |
| ***t-Evaluation***  The duration for evaluating criteria to enter mobility states. Corresponds to TCRmax in TS 38.304 [20]. Value in seconds, *s30* corresponds to 30 s and so on. |
| ***t-HystNormal***  The additional duration for evaluating criteria to enter normal mobility state. Corresponds to TCRmaxHyst in TS 38.304 [20]. Value in seconds, value *s30* corresponds to 30 seconds and so on. |

#### – *MRB-Identity*

The IE *MRB-Identity* is used to identify a multicast MRB used by a UE.

*MRB-Identity* information element

-- ASN1START

-- TAG-MRB-IDENTITY-START

MRB-Identity-r17 ::= INTEGER (1..512)

-- TAG-MRB-IDENTITY-STOP

-- ASN1STOP

#### – *MsgA-ConfigCommon*

The IE *MsgA-ConfigCommon* is used to configure the PRACH and PUSCH resource for transmission of MsgA in 2-step random access type procedure.

-- ASN1START

-- TAG-MSGACONFIGCOMMON-START

MsgA-ConfigCommon-r16 ::= SEQUENCE {

rach-ConfigCommonTwoStepRA-r16 RACH-ConfigCommonTwoStepRA-r16,

msgA-PUSCH-Config-r16 MsgA-PUSCH-Config-r16 OPTIONAL --Cond InitialBWPConfig

}

-- TAG-MSGACONFIGCOMMON-STOP

-- ASN1STOP

| *MsgA-ConfigCommon* field descriptions |
| --- |
| ***msgA-PUSCH-Config***  Configuration of cell-specific MsgA PUSCH parameters which the UE uses for contention-based MsgA PUSCH transmission of this BWP. If the field is not configured for the selected UL BWP, the UE shall use the MsgA PUSCH configuration of initial UL BWP. |
| ***rach-ConfigCommonTwoStepRA***  Configuration of cell specific random access parameters which the UE uses for contention based and contention free 2-step random access type procedure as well as for 2-step RA type contention based beam failure recovery in this BWP. |

|  |  |
| --- | --- |
| Conditional Presence | Explanation |
| *InitialBWPConfig* | The field is mandatory present when *MsgA-ConfigCommon* is configured for the initial uplink BWP, or when *MsgA-ConfigCommon* is configured for a non-initial uplink BWP and *MsgA-ConfigCommon* is not configured for the initial uplink BWP, otherwise the field is optionally present, Need S. |

#### – *MsgA-PUSCH-Config*

The IE *MsgA-PUSCH-Config* is used to specify the PUSCH allocation for MsgA in 2-step random access type procedure.

*MsgA-PUSCH-Config* information element

-- ASN1START

-- TAG-MSGA-PUSCH-CONFIG-START

MsgA-PUSCH-Config-r16 ::= SEQUENCE {

msgA-PUSCH-ResourceGroupA-r16 MsgA-PUSCH-Resource-r16 OPTIONAL, -- Cond InitialBWPConfig

msgA-PUSCH-ResourceGroupB-r16 MsgA-PUSCH-Resource-r16 OPTIONAL, -- Cond GroupBConfigured

msgA-TransformPrecoder-r16 ENUMERATED {enabled, disabled} OPTIONAL, -- Need R

msgA-DataScramblingIndex-r16 INTEGER (0..1023) OPTIONAL, -- Need S

msgA-DeltaPreamble-r16 INTEGER (-1..6) OPTIONAL -- Need R

}

MsgA-PUSCH-Resource-r16 ::= SEQUENCE {

msgA-MCS-r16 INTEGER (0..15),

nrofSlotsMsgA-PUSCH-r16 INTEGER (1..4),

nrofMsgA-PO-PerSlot-r16 ENUMERATED {one, two, three, six},

msgA-PUSCH-TimeDomainOffset-r16 INTEGER (1..32),

msgA-PUSCH-TimeDomainAllocation-r16 INTEGER (1..maxNrofUL-Allocations) OPTIONAL, -- Need S

startSymbolAndLengthMsgA-PO-r16 INTEGER (0..127) OPTIONAL, -- Need S

mappingTypeMsgA-PUSCH-r16 ENUMERATED {typeA, typeB} OPTIONAL, -- Need S

guardPeriodMsgA-PUSCH-r16 INTEGER (0..3) OPTIONAL, -- Need R

guardBandMsgA-PUSCH-r16 INTEGER (0..1),

frequencyStartMsgA-PUSCH-r16 INTEGER (0..maxNrofPhysicalResourceBlocks-1),

nrofPRBs-PerMsgA-PO-r16 INTEGER (1..32),

nrofMsgA-PO-FDM-r16 ENUMERATED {one, two, four, eight},

msgA-IntraSlotFrequencyHopping-r16 ENUMERATED {enabled} OPTIONAL, -- Need R

msgA-HoppingBits-r16 BIT STRING (SIZE(2)) OPTIONAL, -- Cond FreqHopConfigured

msgA-DMRS-Config-r16 MsgA-DMRS-Config-r16,

nrofDMRS-Sequences-r16 INTEGER (1..2),

msgA-Alpha-r16 ENUMERATED {alpha0, alpha04, alpha05, alpha06,

alpha07, alpha08, alpha09, alpha1} OPTIONAL, -- Need S

interlaceIndexFirstPO-MsgA-PUSCH-r16 INTEGER (1..10) OPTIONAL, -- Need R

nrofInterlacesPerMsgA-PO-r16 INTEGER (1..10) OPTIONAL, -- Need R

...

}

MsgA-DMRS-Config-r16 ::= SEQUENCE {

msgA-DMRS-AdditionalPosition-r16 ENUMERATED {pos0, pos1, pos3} OPTIONAL, -- Need S

msgA-MaxLength-r16 ENUMERATED {len2} OPTIONAL, -- Need S

msgA-PUSCH-DMRS-CDM-Group-r16 INTEGER (0..1) OPTIONAL, -- Need S

msgA-PUSCH-NrofPorts-r16 INTEGER (0..1) OPTIONAL, -- Need S

msgA-ScramblingID0-r16 INTEGER (0..65535) OPTIONAL, -- Need S

msgA-ScramblingID1-r16 INTEGER (0..65535) OPTIONAL -- Need S

}

-- TAG-MSGA-PUSCH-CONFIG-STOP

-- ASN1STOP

|  |
| --- |
| *MsgA-PUSCH-Config* field descriptions |
| ***msgA-DataScramblingIndex***  Identifier used to initiate data scrambling (c\_init) for msgA PUSCH. If the field is absent the UE applies the value Physical cell ID (*physCellID*). |
| ***msgA-DeltaPreamble***  Power offset of msgA PUSCH relative to the preamble received target power. Actual value = field value \* 2 [dB] (see TS 38.213 [13], clause 7.1). |
| ***msgA-PUSCH-ResourceGroupA***  MsgA PUSCH resources that the UE shall use when performing MsgA transmission using preambles group A. If field is not configured for the selected UL BWP, the UE shall use the MsgA PUSCH configuration for group A of initial UL BWP. |
| ***msgA-PUSCH-ResourceGroupB***  MsgA PUSCH resources that the UE shall use when performing MsgA transmission using preambles group B. |
| ***msgA-TransformPrecoder***  Enables or disables the transform precoder for MsgA transmission (see clause 6.1.3 of TS 38.214 [19]). |

|  |
| --- |
| *MsgA-PUSCH-Resource* field descriptions |
| ***guardBandMsgA-PUSCH***  PRB-level guard band between FDMed PUSCH occasions (see TS 38.213 [13], clause 8.1A). If interlaced PUSCH is configured, value 0 is applied. |
| ***guardPeriodMsgA-PUSCH***  Guard period between PUSCH occasions in the unit of symbols (see TS 38.213 [13], clause 8.1A). |
| ***frequencyStartMsgA-PUSCH***  Offset of lowest PUSCH occasion in frequency domain with respect to PRB 0 (see TS 38.213 [13], clause 8.1A). |
| ***interlaceIndexFirstPO-MsgA-PUSCH***  Interlace index of the first PUSCH occasion in frequency domain if interlaced PUSCH is configured. For 30kHz SCS only the integers 1, 2, 3, 4, 5 are applicable (see TS 38.213 [13], clause 8.1A). |
| ***mappingTypeMsgA-PUSCH***  PUSCH mapping type A or B. If the field is absent, the UE shall use the parameter *msgA-PUSCH-TimeDomainAllocation* (see TS 38.213 [13], clause 8.1A). |
| ***msgA-Alpha***  Dedicated alpha value for MsgA PUSCH. If the field is absent, the UE shall use the value of *msg3-Alpha* if configured, else UE applies value 1 (see TS 38.213 [13], clause 7.1.1). |
| ***msgA-DMRS-Config***  DMRS configuration for msgA PUSCH (see TS 38.213 [13], clause 8.1A and TS 38.214 [19] clause 6.2.2). |
| ***msgA-HoppingBits***  Value of hopping bits to indicate which frequency offset to be used for second hop. See Table 8.3-1 in TS 38.213 [13]. |
| ***msgA-IntraSlotFrequencyHopping***  Intra-slot frequency hopping per PUSCH occasion (see TS 38.213 [13], clause 8.1A). |
| ***msgA-MCS***  Indicates the MCS index for msgA PUSCH from the Table 6.1.4.1-1 for DFT-s-OFDM and Table 5.1.3.1-1 for CP-OFDM in TS 38.214 [19]. |
| ***msgA-PUSCH-TimeDomainAllocation***  Indicates a combination of start symbol and length and PUSCH mapping type from the TDRA table (*PUSCH-TimeDomainResourceAllocationList* if provided in *PUSCH-ConfigCommon*, or else the default Table 6.1.2.1.1-2 in 38.214 [19] is used if *pusch-TimeDomainAllocationList* is not provided in PUSCH-ConfigCommon). The parameter K2 in the table is not used for msgA PUSCH. The network configures one of *msgA-PUSCH-TimeDomainAllocation* and *startSymbolAndLengthMsgA-PO,* but not both. If the field is absent, the UE shall use the value of startSymbolAndLenghtMsgA-PO. |
| ***msgA-PUSCH-TimeDomainOffset***  A single time offset with respect to the start of each PRACH slot (with at least one valid RO), counted as the number of slots (based on the numerology of active UL BWP). See TS 38.213 [13], clause 8.1A. |
| ***nrofDMRS-Sequences***  Number of DMRS sequences for MsgA PUSCH for CP-OFDM. In case of single PUSCH configuration or if the DMRS symbols of multiple configurations are not overlapped, if the DMRS resources configured in one PUSCH occasion is no larger than 8 (for *len2*) or 4 (for *len1*), then only DMRS port is configured. |
| ***nrofInterlacesPerMsgA-PO***  Number of consecutive interlaces per PUSCH occasion if interlaced PUSCH is configured. For 30kHz SCS only the integers 1, 2, 3, 4, 5 are applicable (see TS 38.213 [13], clause 8.1A). |
| ***nrofMsgA-PO-FDM***  The number of msgA PUSCH occasions FDMed in one time instance (see TS 38.213 [13], clause 8.1A). |
| ***nrofMsgA-PO-PerSlot***  Number of time domain PUSCH occasions in each slot. PUSCH occasions including guard period are contiguous in time domain within a slot (see TS 38.213 [13], clause 8.1A). |
| ***nrofPRBs-PerMsgA-PO***  Number of PRBs per PUSCH occasion (see TS 38.213 [13], clause 8.1A). |
| ***nrofSlotsMsgA-PUSCH***  Number of slots (in active UL BWP numerology) containing one or multiple PUSCH occasions, each slot has the same time domain resource allocation (see TS 38.213 [13], clause 8.1A). |
| ***startSymbolAndLengthMsgA-PO***  An index giving valid combinations of start symbol, length and mapping type as start and length indicator (SLIV) for the first msgA PUSCH occasion, for RRC\_CONNECTED UEs in non-initial BWP as described in TS 38.214 [19] clause 6.1.2. The network configures the field so that the allocation does not cross the slot boundary. The number of occupied symbols excludes the guard period. If the field is absent, the UE shall use the value in *msgA-PUSCH-TimeDomainAllocation* (see TS 38.213 [13], clause 8.1A). The network configures one of *msgA-PUSCH-TimeDomainAllocation* and *startSymbolAndLengthMsgA-PO,* but not both. If the field is absent, the UE shall use the value of *msgA-PUSCH-TimeDomainAllocation****.*** |

|  |
| --- |
| *MsgA-DMRS-Config* field descriptions |
| ***msgA-DMRS-AdditionalPosition***  Indicates the position for additional DM-RS. If the field is absent, the UE applies value *pos2*. |
| ***msgA-MaxLength***  indicates single-symbol or double-symbol DMRS. If the field is absent, the UE applies value *len1*. |
| ***msgA-PUSCH-DMRS-CDM-Group***  1-bit indication of indices of CDM group(s). If the field is absent, then both CDM groups are used. |
| ***msgA-PUSCH-NrofPorts***  0 indicates 1 port per CDM group, 1 indicates 2 ports per CDM group. If the field is absent then 4 ports per CDM group are used (see TS 38.213 [13], clause 8.1A). |
| ***msgA-ScramblingID0***  UL DMRS scrambling initialization for CP-OFDM. If the field is absent the UE applies the value Physical cell ID (*physCellID*). |
| ***msgA-ScramblingID1***  UL DMRS scrambling initialization for CP-OFDM. If the field is absent the UE applies the value Physical cell ID (*physCellID*). |

|  |  |
| --- | --- |
| Conditional Presence | Explanation |
| *FreqHopConfigured* | This field is mandatory present when the field *msgA-IntraSlotFrequencyHopping* is configured. Otherwise, the field is absent. |
| *GroupBConfigured* | The field is mandatory present if *groupB-ConfiguredTwoStepRA* is configured in *RACH-ConfigCommonTwoStepRA*, otherwise the field is absent. |
| *InitialBWPConfig* | The field is mandatory present when *MsgA-ConfigCommon* is configured for the initial uplink BWP, or when *MsgA-ConfigCommon* is configured for a non-initial uplink BWP and *MsgA-ConfigCommon* is not configured for the initial uplink BWP, otherwise the field is optionally present, Need S. |

#### – *MultiFrequencyBandListNR*

The IE *MultiFrequencyBandListNR* is used to configure a list of one or multiple NR frequency bands.

*MultiFrequencyBandListNR* information element

-- ASN1START

-- TAG-MULTIFREQUENCYBANDLISTNR-START

MultiFrequencyBandListNR ::= SEQUENCE (SIZE (1..maxNrofMultiBands)) OF FreqBandIndicatorNR

-- TAG-MULTIFREQUENCYBANDLISTNR-STOP

-- ASN1STOP

#### – *MultiFrequencyBandListNR-SIB*

The IE *MultiFrequencyBandListNR-SIB* indicates the list of frequency bands, for which cell (re-)selection parameters are common, and a list of *additionalPmax* and *additionalSpectrumEmission.*

*MultiFrequencyBandListNR-SIB* information element

-- ASN1START

-- TAG-MULTIFREQUENCYBANDLISTNR-SIB-START

MultiFrequencyBandListNR-SIB ::= SEQUENCE (SIZE (1.. maxNrofMultiBands)) OF NR-MultiBandInfo

NR-MultiBandInfo ::= SEQUENCE {

freqBandIndicatorNR FreqBandIndicatorNR OPTIONAL, -- Cond OptULNotSIB2

nr-NS-PmaxList NR-NS-PmaxList OPTIONAL -- Need S

}

-- TAG-MULTIFREQUENCYBANDLISTNR-SIB-STOP

-- ASN1STOP

|  |
| --- |
| *NR-MultiBandInfo* field descriptions |
| ***freqBandIndicatorNR***  Provides an NR frequency band number as defined in TS 38.101-1 [15] and TS 38.101-2 [39], table 5.2-1. |
| ***nr-NS-PmaxList***  Provides a list of *additionalPmax* and *additionalSpectrumEmission* values. If the field is absent the UE uses value 0 for the *additionalSpectrumEmission* (see TS 38.101-1 [15] table 6.2.3.1-1A , and TS 38.101-2 [39], table 6.2.3.1-2). This field is ignored by IAB-MT, the IAB-MT applies output power and emissions requirements, as specified in TS 38.174 [63]. |

|  |  |
| --- | --- |
| Conditional Presence | Explanation |
| *OptULNotSIB2* | The field is absent for *SIB2* and is mandatory present in *SIB4* and *frequencyInfoDL-SIB*. Otherwise, if the field is absent in *frequencyInfoUL-SIB* in *UplinkConfigCommonSIB*, the UE will use the frequency band indicated in *frequencyInfoDL-SIB* in *DownlinkConfigCommonSIB*. |

#### – *MUSIM-GapConfig*

The IE *MUSIM-GapConfig* specifies the MUSIM gap configuration and controls setup/release of MUSIM gaps.

*MUSIM-GapConfig* information element

-- ASN1START

-- TAG-MUSIM-GAPCONFIG-START

MUSIM-GapConfig-r17 ::= SEQUENCE {

musim-GapToReleaseList-r17 SEQUENCE (SIZE (1..3)) OF MUSIM-GapID-r17 OPTIONAL, -- Need N

musim-GapToAddModList-r17 SEQUENCE (SIZE (1..3)) OF MUSIM-Gap-r17 OPTIONAL, -- Need N

musim-AperiodicGap-r17 MUSIM-GapInfo-r17 OPTIONAL, -- Need N

...

}

MUSIM-Gap-r17 ::= SEQUENCE {

musim-GapID-r17 MUSIM-GapID-r17,

musim-GapInfo-r17 MUSIM-GapInfo-r17

}

-- TAG-MUSIM-GAPCONFIG-STOP

-- ASN1STOP

| *MUSIM-GapConfig* field descriptions |
| --- |
| ***musim-AperiodicGap***  Indicates the MUSIM aperiodic gap as specified in TS 38.133 [14] clause 9.1.2D. |
| ***musim-GapInfo***  Indicates the values for *musim-GapLength*, *musim-GapRepetitionAndOffset*, *starting-SFN*, and *startingSubframe*. If UE indicates the *musim-PrefStarting-SFN-AndSubframe* when requesting aperiodic gap the network can only configure the aperiodic Gap with the same start point or no aperiodic gap. If the field *musim-PrefStarting-SFN-AndSubframe* is absent for aperiodic gaps, network can configure any timing. When network provides aperiodic gap, network always signals the *musim-Starting-SFN-AndSubframe* and *musim-GapLength*. |
| ***musim-GapToAddModList***  List of MUSIM periodic gap patterns to add or modify. |
| ***musim-GapToReleaseList***  List of MUSIM periodic gap patterns to release. |

#### – *MUSIM-GapID*

The *MUSIM-GapID* is used to identify UE periodic MUSIM gap(s) to add, modify or release.

*MUSIM-GapID* information element

-- ASN1START

-- TAG-MUSIM-GAPID-START

MUSIM-GapID-r17 ::= INTEGER (0..2)

-- TAG-MUSIM-GAPID-STOP

-- ASN1STOP

#### – *MUSIM-GapInfo*

The IE *MUSIM-GapInfo* is used to indicate MUSIM gap parameters.

*MUSIM-GapInfo* information element

-- ASN1START

-- TAG-MUSIM-GAPINFO-START

MUSIM-GapInfo-r17 ::= SEQUENCE {

musim-Starting-SFN-AndSubframe-r17 MUSIM-Starting-SFN-AndSubframe-r17 OPTIONAL, -- Cond aperiodic

musim-GapLength-r17 ENUMERATED {ms3, ms4, ms6, ms10, ms20} OPTIONAL, -- Need S

musim-GapRepetitionAndOffset-r17 CHOICE {

ms20-r17 INTEGER (0..19),

ms40-r17 INTEGER (0..39),

ms80-r17 INTEGER (0..79),

ms160-r17 INTEGER (0..159),

ms320-r17 INTEGER (0..319),

ms640-r17 INTEGER (0..639),

ms1280-r17 INTEGER (0..1279),

ms2560-r17 INTEGER (0..2559),

ms5120-r17 INTEGER (0..5119),

...

} OPTIONAL -- Cond periodic

}

MUSIM-Starting-SFN-AndSubframe-r17 ::= SEQUENCE {

starting-SFN-r17 INTEGER (0..1023),

startingSubframe-r17 INTEGER (0..9)

}

-- TAG-MUSIM-GAPINFO-STOP

-- ASN1STOP

| *MUSIM-GapInfo* field descriptions |
| --- |
| ***musim-GapLength***  Indicates the length of the UE's preferred MUSIM gap as specified in TS 38.133 [14] clause 9.1.2D. |
| ***musim-GapRepetitionAndOffset***  Indicates the gap repetition period in ms and gap offset in number of subframes for the periodic MUSIM gap preference as specified in TS 38.133 [14] clause 9.1.2D. |
| ***musim-Starting-SFN-AndSubframe***  Indicates gap starting position for the aperiodic MUSIM gap preference. |
| ***starting-SFN***  indicates gap starting SFN number for the aperiodic MUSIM gap preference. |
| ***startingSubframe***  indicates gap starting subframe number for the aperiodic MUSIM gap. |

|  |  |
| --- | --- |
| Conditional Presence | Explanation |
| a*periodic* | This field is mandatory present in case of aperiodic MUSIM gap configuration. Otherwise it is absent. |
| *periodic* | This field is mandatory present in case of periodic MUSIM gap configuration. Otherwise it is absent. |

#### – *NeedForGapsConfigNR*

The IE *NeedForGapsConfigNR* contains configuration related to the reporting of measurement gap requirement information.

*NeedForGapsConfigNR* information element

-- ASN1START

-- TAG-NeedForGapsConfigNR-START

NeedForGapsConfigNR-r16 ::= SEQUENCE {

requestedTargetBandFilterNR-r16 SEQUENCE (SIZE (1..maxBands)) OF FreqBandIndicatorNR OPTIONAL -- Need R

}

-- TAG-NeedForGapsConfigNR-STOP

-- ASN1STOP

|  |
| --- |
| *NeedForGapsConfigNR field descriptions* |
| ***requestedTargetBandFilterNR***  Indicates the target NR bands that the UE is requested to report the gap requirement information. |

– *NeedForGapsInfoNR*

The IE *NeedForGapsInfoNR* indicates whether measurement gap is required for the UE to perform SSB based measurements on an NR target band while NR-DC or NE-DC is not configured.

*NeedForGapsInfoNR* information element

-- ASN1START

-- TAG-NeedForGapsInfoNR-START

NeedForGapsInfoNR-r16 ::= SEQUENCE {

intraFreq-needForGap-r16 NeedForGapsIntraFreqList-r16,

interFreq-needForGap-r16 NeedForGapsBandListNR-r16

}

NeedForGapsIntraFreqList-r16 ::= SEQUENCE (SIZE (1.. maxNrofServingCells)) OF NeedForGapsIntraFreq-r16

NeedForGapsBandListNR-r16 ::= SEQUENCE (SIZE (1..maxBands)) OF NeedForGapsNR-r16

NeedForGapsIntraFreq-r16 ::= SEQUENCE {

servCellId-r16 ServCellIndex,

gapIndicationIntra-r16 ENUMERATED {gap, no-gap}

}

NeedForGapsNR-r16 ::= SEQUENCE {

bandNR-r16 FreqBandIndicatorNR,

gapIndication-r16 ENUMERATED {gap, no-gap}

}

-- TAG-NeedForGapsInfoNR-STOP

-- ASN1STOP

|  |
| --- |
| *NeedForGapsInfoNR* field descriptions |
| ***intraFreq-needForGap***  Indicates the measurement gap requirement information for NR intra-frequency measurement. |
| ***interFreq-needForGap***  Indicates the measurement gap requirement information for NR inter-frequency measurement. |

|  |
| --- |
| *NeedForGapsIntraFreq field descriptions* |
| ***servCellId***  Indicates the serving cell which contains the target SSB (associated with the initial DL BWP) to be measured. |
| ***gapIndicationIntra***  Indicates whether measurement gap is required for the UE to perform intra-frequency SSB based measurements on the concerned serving cell. Value *gap* indicates that a measurement gap is needed if any of the UE configured BWPs do not contain the frequency domain resources of the SSB associated to the initial DL BWP. Value *no-gap* indicates a measurement gap is not needed to measure the SSB associated to the initial DL BWP for all configured BWPs, no matter the SSB is within the configured BWP or not. |

|  |
| --- |
| *NeedForGapsNR* field descriptions |
| ***bandNR***  Indicates the NR target band to be measured. |
| ***gapIndication***  Indicates whether measurement gap is required for the UE to perform SSB based measurements on the concerned NR target band while NR-DC or NE-DC is not configured. The UE determines this information based on the resultant configuration of the *RRCReconfiguration* or *RRCResume* message that triggers this response. Value *gap* indicates that a measurement gap is needed, value *no-gap* indicates a measurement gap is not needed. |

#### – *NeedForGapNCSG-ConfigEUTRA*

The IE *NeedForGapNCSG-ConfigEUTRA* contains configuration related to the reporting of measurement gap and NCSG requirement information.

*NeedForGapNCSG-ConfigEUTRA* information element

-- ASN1START

-- TAG-NeedForGapNCSG-ConfigEUTRA-START

NeedForGapNCSG-ConfigEUTRA-r17 ::= SEQUENCE {

requestedTargetBandFilterNCSG-EUTRA-r17 SEQUENCE (SIZE (1..maxBandsEUTRA)) OF FreqBandIndicatorEUTRA OPTIONAL -- Need R

}

-- TAG-NeedForGapNCSG-ConfigEUTRA-STOP

-- ASN1STOP

|  |
| --- |
| *NeedForGapNCSG-ConfigEUTRA field descriptions* |
| ***requestedTargetBandFilterNCSG-EUTRA***  Indicates the target E-UTRA bands that the UE is requested to report the measurement gap and NCSG requirement information. |

#### – *NeedForGapNCSG-ConfigNR*

The IE *NeedForGapNCSG-ConfigNR* contains configuration related to the reporting of measurement gap and NCSG requirement information.

*NeedForGapNCSG-ConfigNR* information element

-- ASN1START

-- TAG-NEEDFORGAPNCSG-CONFIGNR-START

NeedForGapNCSG-ConfigNR-r17 ::= SEQUENCE {

requestedTargetBandFilterNCSG-NR-r17 SEQUENCE (SIZE (1..maxBands)) OF FreqBandIndicatorNR OPTIONAL -- Need R

}

-- TAG-NEEDFORGAPNCSG-CONFIGNR-STOP

-- ASN1STOP

|  |
| --- |
| *NeedForGapNCSG-ConfigNR field descriptions* |
| ***requestedTargetBandFilterNCSG-NR***  Indicates the target NR bands that the UE is requested to report the measurement gap and NCSG requirement information. |

#### – *NeedForGapNCSG-InfoEUTRA*

The IE *NeedForGapNCSG-InfoEUTRA* indicates whether measurement gap or NCSG is required for the UE to perform measurements on an E‑UTRA target band while NR-DC or NE-DC is not configured.

*NeedForGapNCSG-InfoEUTRA* information element

-- ASN1START

-- TAG-NEEDFORGAPNCSG-INFOEUTRA-START

NeedForGapNCSG-InfoEUTRA-r17 ::= SEQUENCE {

needForNCSG-EUTRA-r17 SEQUENCE (SIZE (1..maxBandsEUTRA)) OF NeedForNCSG-EUTRA-r17

}

NeedForNCSG-EUTRA-r17 ::= SEQUENCE {

bandEUTRA-r17 FreqBandIndicatorEUTRA,

gapIndication-r17 ENUMERATED {gap, ncsg, nogap-noncsg}

}

-- TAG-NEEDFORGAPNCSG-INFOEUTRA-STOP

-- ASN1STOP

|  |
| --- |
| *NeedForGapNCSG-InfoEUTRA* field descriptions |
| ***needForNCSG-EUTRA***  Indicates the measurement gap and NCSG requirement information for E-UTRA measurement. |

|  |
| --- |
| *NeedForNCSG-EUTRA* field descriptions |
| ***bandEUTRA***  Indicates the E‑UTRA target band to be measured. |
| ***gapIndication***  Indicates whether measurement gap or NCSG is required for the UE to perform measurements on the concerned E‑UTRA target band while NR-DC or NE-DC is not configured. The UE determines this information based on the resultant configuration of the *RRCReconfiguration* message or *RRCResume* message that triggers this response. Value *gap* indicates that a measurement gap is needed, value *ncsg* indicates that NCSG is needed, value *nogap-noncsg* indicates neither a measurement gap nor a NCSG is needed. |

#### – *NeedForGapNCSG-InfoNR*

The IE *NeedForGapNCSG-InfoNR* indicates whether measurement gap or NCSG is required for the UE to perform SSB based measurements on an NR target band while NR-DC or NE-DC is not configured.

*NeedForGapNCSG-InfoNR* information element

-- ASN1START

-- TAG-NEEDFORGAPNCSG-INFONR-START

NeedForGapNCSG-InfoNR-r17 ::= SEQUENCE {

intraFreq-needForNCSG-r17 NeedForNCSG-IntraFreqList-r17,

interFreq-needForNCSG-r17 NeedForNCSG-BandListNR-r17

}

NeedForNCSG-IntraFreqList-r17 ::= SEQUENCE (SIZE (1.. maxNrofServingCells)) OF NeedForNCSG-IntraFreq-r17

NeedForNCSG-BandListNR-r17 ::= SEQUENCE (SIZE (1..maxBands)) OF NeedForNCSG-NR-r17

NeedForNCSG-IntraFreq-r17 ::= SEQUENCE {

servCellId-r17 ServCellIndex,

gapIndicationIntra-r17 ENUMERATED {gap, ncsg, nogap-noncsg}

}

NeedForNCSG-NR-r17 ::= SEQUENCE {

bandNR-r17 FreqBandIndicatorNR,

gapIndication-r17 ENUMERATED {gap, ncsg, nogap-noncsg}

}

-- TAG-NEEDFORGAPNCSG-INFONR-STOP

-- ASN1STOP

|  |
| --- |
| *NeedForGapNCSG-InfoNR* field descriptions |
| ***intraFreq-needForNCSG***  Indicates the measurement gap and NCSG requirement information for NR intra-frequency measurement. |
| ***interFreq-needForNCSG***  Indicates the measurement gap and NCSG requirement information for NR inter-frequency measurement. |

|  |
| --- |
| *NeedForNCSG-IntraFreq field descriptions* |
| ***servCellId***  Indicates the serving cell which contains the target SSB (associated with the initial DL BWP) to be measured. |
| ***gapIndicationIntra***  Indicates whether measurement gap or NCSG is required for the UE to perform intra-frequency SSB based measurements on the concerned serving cell. Value *gap* indicates that a measurement gap is needed if any of the UE configured BWPs do not contain the frequency domain resources of the SSB associated to the initial DL BWP. Value *ncsg* indicates that a NCSG is needed if any of the UE configured BWPs do not contain the frequency domain resources of the SSB associated to the initial DL BWP. Value *nogap-noncsg* indicates that neither a measurement gap nor a NCSG is needed to measure the SSB associated to the initial DL BWP for all configured BWPs, no matter the SSB is within the configured BWP or not. |

|  |
| --- |
| *NeedForNCSG-NR* field descriptions |
| ***bandNR***  Indicates the NR target band to be measured. |
| ***gapIndication***  Indicates whether measurement gap or NCSG is required for the UE to perform SSB based measurements on the concerned NR target band while NR-DC or NE-DC is not configured. The UE determines this information based on the resultant configuration of the *RRCReconfiguration* or *RRCResume* message that triggers this response. Value *gap* indicates that a measurement gap is needed, value *ncsg* indicates that a NCSG is needed, and value *nogap-noncsg* indicates neither a measurement gap nor a NCSG is needed. |

#### – *NextHopChainingCount*

The IE *NextHopChainingCount* is used to update the KgNB key and corresponds to parameter NCC: See TS 33.501 [11].

*NextHopChainingCount* information element

-- ASN1START

-- TAG-NEXTHOPCHAININGCOUNT-START

NextHopChainingCount ::= INTEGER (0..7)

-- TAG-NEXTHOPCHAININGCOUNT-STOP

-- ASN1STOP

#### – *NG-5G-S-TMSI*

The IE *NG-5G-S-TMSI* contains a 5G S-Temporary Mobile Subscription Identifier (5G-S-TMSI), a temporary UE identity provided by the 5GC which uniquely identifies the UE within the tracking area, see TS 23.003 [21].

*NG-5G-S-TMSI* information element

-- ASN1START

-- TAG-NG-5G-S-TMSI-START

NG-5G-S-TMSI ::= BIT STRING (SIZE (48))

-- TAG-NG-5G-S-TMSI-STOP

-- ASN1STOP

#### – *NonCellDefiningSSB*

The IE *NonCellDefiningSSB* is used to configure a non-cell-defining SSB to be used while the UE operates in a a RedCap-specific initial BWP or dedicated BWP.

*NonCellDefiningSSB* information element

-- ASN1START

-- TAG-NONCELLDEFININGSSB-START

NonCellDefiningSSB-r17 ::= SEQUENCE {

absoluteFrequencySSB-r17 ARFCN-ValueNR,

ssb-Periodicity-r17 ENUMERATED { ms5, ms10, ms20, ms40, ms80, ms160, spare2, spare1 } OPTIONAL, -- Need S

ssb-TimeOffset-r17 ENUMERATED { sf5, sf10, sf15, spare5, spare4, spare3, spare2, spare1 } OPTIONAL, -- Need S

...

}

-- TAG-NONCELLDEFININGSSB-STOP

-- ASN1STOP

|  |
| --- |
| *NonCellDefiningSSB-r17 field descriptions* |
| ***absoluteFrequencySSB***  Frequency of the non-cell-defining SSB. The network configures this field so that the SSB is within the bandwidth of the BWP configured in *BWP-DownlinkCommon*. |
| ***ssb-Periodicity***  The periodicity of this Non-Cell-Defining SSB. The network configures only periodicities that are larger than the periodicity of serving cell's CD-SSB. If the field is absent, the UE applies the SSB periodicity of the cell-defining SSB (*ssb-periodicityServingCell* configured in *ServingCellConfigCommon*). |
| ***ssb-TimeOffset***  The time offset between CD-SSB of the serving cell and this Non-Cell Defining SSB. Value sf5 means the first burst of Non-Cell Defining SSB is transmitted 5ms later than the first burst of CD-SSB transmitted after the first symbol of SFN=0 of the serving cell, value sf10 means the first burst of Non-Cell Defining SSB is transmitted 10ms later than the first burst of CD-SSB transmitted after the first symbol in SFN=0 of the serving cell, and so on. If the field is absent, RedCap UE considers that the time offset between the first burst of CD-SSB transmitted in the serving cell and the first burst of this Non-Cell Defining SSB transmitted is zero. |

#### – *NPN-Identity*

The IE *NPN-Identity* includes either a list of CAG-IDs or a list of NIDs per PLMN Identity. Further information regarding how to set the IE is specified in TS 23.003 [21].

*NPN-Identity* information element

-- ASN1START

-- TAG-NPN-IDENTITY-START

NPN-Identity-r16 ::= CHOICE {

pni-npn-r16 SEQUENCE {

plmn-Identity-r16 PLMN-Identity,

cag-IdentityList-r16 SEQUENCE (SIZE (1..maxNPN-r16)) OF CAG-IdentityInfo-r16

},

snpn-r16 SEQUENCE {

plmn-Identity-r16 PLMN-Identity,

nid-List-r16 SEQUENCE (SIZE (1..maxNPN-r16)) OF NID-r16

}

}

CAG-IdentityInfo-r16 ::= SEQUENCE {

cag-Identity-r16 BIT STRING (SIZE (32)),

manualCAGselectionAllowed-r16 ENUMERATED {true} OPTIONAL -- Need R

}

NID-r16 ::= BIT STRING (SIZE (44))

-- TAG-NPN-IDENTITY-STOP

-- ASN1STOP

|  |
| --- |
| *NPN-Identity* field descriptions |
| ***cag-Identity***  A CAG-ID as specified in TS 23.003 [21]. The PLMN ID and a CAG ID in the *NPN-Identity* identifies a PNI-NPN. |
| ***cag-IdentityList***  The *cag-IdentityList* contains one or more CAG IDs. All CAG IDs associated to the same PLMN ID are listed in the same *cag-IdentityList* entry*.* |
| ***manualCAGselectionAllowed***  The *manualCAGselectionAllowed* indicates that the CAG ID can be selected manually even if it is outside the UE's allowed CAG list. |
| ***NID***  A NID as specified in TS 23.003 [21]. The PLMN ID and a NID in the *NPN-Identity* identifies a SNPN. |
| ***nid-List***  The *nid-List* contains one or more *NID*. |

#### – *NPN-IdentityInfoList*

The IE *NPN-IdentityInfoList* includes a list of NPN identity information.

*NPN-IdentityInfoList* information element

-- ASN1START

-- TAG-NPN-IDENTITYINFOLIST-START

NPN-IdentityInfoList-r16 ::= SEQUENCE (SIZE (1..maxNPN-r16)) OF NPN-IdentityInfo-r16

NPN-IdentityInfo-r16 ::= SEQUENCE {

npn-IdentityList-r16 SEQUENCE (SIZE (1..maxNPN-r16)) OF NPN-Identity-r16,

trackingAreaCode-r16 TrackingAreaCode,

ranac-r16 RAN-AreaCode OPTIONAL, -- Need R

cellIdentity-r16 CellIdentity,

cellReservedForOperatorUse-r16 ENUMERATED {reserved, notReserved},

iab-Support-r16 ENUMERATED {true} OPTIONAL, -- Need S

...,

[[

gNB-ID-Length-r17 INTEGER (22..32) OPTIONAL -- Need R

]]

}

-- TAG-NPN-IDENTITYINFOLIST-STOP

-- ASN1STOP

|  |
| --- |
| *NPN-IdentityInfoList* field descriptions |
| ***iab-Support***  This field combines both the support of IAB and the cell status for IAB. If the field is present, the cell supports IAB and the cell is also considered as a candidate for cell (re)selection for IAB-nodes; if the field is absent, the cell does not support IAB and/or the cell is barred for IAB-node. |
| ***gNB-ID-Length***  Indicates the length of the gNB ID out of the 36-bit long *cellIdentity*. |
| ***NPN-IdentityInfo***  The *NPN-IdentityInfo* contains one or more NPN identities and additional information associated with those NPNs. Only the same type of NPNs (either SNPNs or PNI-NPNs) can be listed in a *NPN-IdentityInfo* element. |
| ***npn-IdentityList***  The *npn-IdentityList* contains one or more NPN Identity elements. |
| ***trackingAreaCode***  Indicates the Tracking Area Code to which the cell indicated by cellIdentity field belongs. |
| ***ranac***  Indicates the RAN Area Code to which the cell indicated by cellIdentity field belongs. |
| ***cellReservedForOperatorUse***  Indicates whether the cell is reserved for operator use (for the NPN(s) identified in the *npn-IdentityList*) as defined in TS 38.304 [20]. This field is ignored by NPN capable IAB-MT. |

#### – *NR-DL-PRS-PDC-Info*

The IE *NR-DL-PRS-PDC-Info* defines downlink PRS configuration for PDC.

*NR-DL-PRS-PDC-Info* information element

-- ASN1START

-- TAG-NR-DL-PRS-PDC-INFO-START

NR-DL-PRS-PDC-Info-r17 ::= SEQUENCE {

nr-DL-PRS-PDC-ResourceSet-r17 NR-DL-PRS-PDC-ResourceSet-r17 OPTIONAL, -- Need R

...

}

NR-DL-PRS-PDC-ResourceSet-r17 ::= SEQUENCE {

periodicityAndOffset-r17 NR-DL-PRS-Periodicity-and-ResourceSetSlotOffset-r17,

numSymbols-r17 ENUMERATED {n2, n4, n6, n12, spare4, spare3, spare2, spare1},

dl-PRS-ResourceBandwidth-r17 INTEGER (1..63),

dl-PRS-StartPRB-r17 INTEGER (0..2176),

resourceList-r17 SEQUENCE (SIZE (1..maxNrofPRS-ResourcesPerSet-r17)) OF NR-DL-PRS-Resource-r17,

repFactorAndTimeGap-r17 RepFactorAndTimeGap-r17 OPTIONAL, -- Need S

...

}

NR-DL-PRS-Periodicity-and-ResourceSetSlotOffset-r17 ::= CHOICE {

scs15-r17 CHOICE {

n4-r17 INTEGER (0..3),

n5-r17 INTEGER (0..4),

n8-r17 INTEGER (0..7),

n10-r17 INTEGER (0..9),

n16-r17 INTEGER (0..15),

n20-r17 INTEGER (0..19),

n32-r17 INTEGER (0..31),

n40-r17 INTEGER (0..39),

n64-r17 INTEGER (0..63),

n80-r17 INTEGER (0..79),

n160-r17 INTEGER (0..159),

n320-r17 INTEGER (0..319),

n640-r17 INTEGER (0..639),

n1280-r17 INTEGER (0..1279),

n2560-r17 INTEGER (0..2559),

n5120-r17 INTEGER (0..5119),

n10240-r17 INTEGER (0..10239),

...

},

scs30-r17 CHOICE {

n8-r17 INTEGER (0..7),

n10-r17 INTEGER (0..9),

n16-r17 INTEGER (0..15),

n20-r17 INTEGER (0..19),

n32-r17 INTEGER (0..31),

n40-r17 INTEGER (0..39),

n64-r17 INTEGER (0..63),

n80-r17 INTEGER (0..79),

n128-r17 INTEGER (0..127),

n160-r17 INTEGER (0..159),

n320-r17 INTEGER (0..319),

n640-r17 INTEGER (0..639),

n1280-r17 INTEGER (0..1279),

n2560-r17 INTEGER (0..2559),

n5120-r17 INTEGER (0..5119),

n10240-r17 INTEGER (0..10239),

n20480-r17 INTEGER (0..20479),

...

},

scs60-r17 CHOICE {

n16-r17 INTEGER (0..15),

n20-r17 INTEGER (0..19),

n32-r17 INTEGER (0..31),

n40-r17 INTEGER (0..39),

n64-r17 INTEGER (0..63),

n80-r17 INTEGER (0..79),

n128-r17 INTEGER (0..127),

n160-r17 INTEGER (0..159),

n256-r17 INTEGER (0..255),

n320-r17 INTEGER (0..319),

n640-r17 INTEGER (0..639),

n1280-r17 INTEGER (0..1279),

n2560-r17 INTEGER (0..2559),

n5120-r17 INTEGER (0..5119),

n10240-r17 INTEGER (0..10239),

n20480-r17 INTEGER (0..20479),

n40960-r17 INTEGER (0..40959),

...

},

scs120-r17 CHOICE {

n32-r17 INTEGER (0..31),

n40-r17 INTEGER (0..39),

n64-r17 INTEGER (0..63),

n80-r17 INTEGER (0..79),

n128-r17 INTEGER (0..127),

n160-r17 INTEGER (0..159),

n256-r17 INTEGER (0..255),

n320-r17 INTEGER (0..319),

n512-r17 INTEGER (0..511),

n640-r17 INTEGER (0..639),

n1280-r17 INTEGER (0..1279),

n2560-r17 INTEGER (0..2559),

n5120-r17 INTEGER (0..5119),

n10240-r17 INTEGER (0..10239),

n20480-r17 INTEGER (0..20479),

n40960-r17 INTEGER (0..40959),

n81920-r17 INTEGER (0..81919),

...

},

...

}

NR-DL-PRS-Resource-r17 ::= SEQUENCE {

nr-DL-PRS-ResourceID-r17 NR-DL-PRS-ResourceID-r17,

dl-PRS-SequenceID-r17 INTEGER (0..4095),

dl-PRS-CombSizeN-AndReOffset-r17 CHOICE {

n2-r17 INTEGER (0..1),

n4-r17 INTEGER (0..3),

n6-r17 INTEGER (0..5),

n12-r17 INTEGER (0..11),

...

},

dl-PRS-ResourceSlotOffset-r17 INTEGER (0..maxNrofPRS-ResourceOffsetValue-1-r17),

dl-PRS-ResourceSymbolOffset-r17 INTEGER (0..12),

dl-PRS-QCL-Info-r17 DL-PRS-QCL-Info-r17 OPTIONAL, -- Need N

...

}

DL-PRS-QCL-Info-r17 ::= CHOICE {

ssb-r17 SEQUENCE {

ssb-Index-r17 INTEGER (0..63),

rs-Type-r17 ENUMERATED {typeC, typeD, typeC-plus-typeD},

...

},

dl-PRS-r17 SEQUENCE {

qcl-DL-PRS-ResourceID-r17 NR-DL-PRS-ResourceID-r17,

...

},

...

}

NR-DL-PRS-ResourceID-r17 ::= INTEGER (0..maxNrofPRS-ResourcesPerSet-1-r17)

RepFactorAndTimeGap-r17 ::= SEQUENCE {

repetitionFactor-r17 ENUMERATED {n2, n4, n6, n8, n16, n32, spare2, spare1},

timeGap-r17 ENUMERATED {s1, s2, s4, s8, s16, s32, spare2, spare1}

}

-- TAG-NR-DL-PRS-PDC-INFO-STOP

-- ASN1STOP

|  |
| --- |
| *NR-DL-PRS-PDC-ResourceSet* field descriptions |
| ***dl-PRS-ResourceBandwidth***  This field specifies the number of PRBs allocated for all the DL-PRS Resource (allocated DL-PRS bandwidth) in multiples of 4 PRBs in this resource set. All DL-PRS Resources of the DL-PRS-PDC Resource Set have the same bandwidth. Integer value 1 corresponds to 24 PRBs, value 2 corresponds to 28 PRBs, value 3 corresponds to 32 PRBs and so on. |
| ***dl-PRS-StartPRB***  This field specifies the start PRB index defined as offset with respect to subcarrier 0 in common resource block 0 for the DL-PRS Resource. All DL-PRS Resources of the DL-PRS-PDC Resource Set have the same value of dl-PRS-StartPRB. |
| ***numSymbols***  This field specifies the number of symbols per DL-PRS Resource within a slot. |
| ***periodicityAndOffset***  This field specifies the periodicity of DL-PRS allocation in slots and the slot offset with respect to SFN #0 slot #0 in the PCell where the DL-PRS-PDC Resource Set is configured (i.e., slot where the first DL-PRS Resource of DL-PRS-PDC Resource Set occurs). |
| ***repFactorAndTimeGap***  If this field is absent, the value for r*epetitionFactor* is 1 (i.e., no resource repetition). |

|  |
| --- |
| *RepFactorAndTimeGap* field descriptions |
| ***repetitionFactor***  This field specifies how many times each DL-PRS Resource is repeated for a single instance of the DL-PRS Resource Set. It is applied to all resources of the DL-PRS Resource Set. Enumerated values n2, n4, n6, n8, n16, n32 correspond to 2, 4, 6, 8, 16, 32 resource repetitions, respectively. |
| ***timeGap***  This field specifies the offset in units of slots between two repeated instances of a DL-PRS Resource corresponding to the same DL-PRS Resource ID within a single instance of the DL-PRS Resource Set. The time duration spanned by one DL-PRS Resource Set containing repeated DL-PRS Resources should not exceed the periodicity configured by *periodicityAndOffset*. |

#### – *NR-NS-PmaxList*

The IE *NR-NS-PmaxList* is used to configure a list of *additionalPmax* and *additionalSpectrumEmission*, as defined in TS 38.101-1 [15], table 6.2.3.1-1A, and TS 38.101-2 [39], table 6.2.3.1-2, for a given frequency band.

*NR-NS-PmaxList* information element

-- ASN1START

-- TAG-NR-NS-PMAXLIST-START

NR-NS-PmaxList ::= SEQUENCE (SIZE (1..maxNR-NS-Pmax)) OF NR-NS-PmaxValue

NR-NS-PmaxValue ::= SEQUENCE {

additionalPmax P-Max OPTIONAL, -- Need N

additionalSpectrumEmission AdditionalSpectrumEmission

}

-- TAG-NR-NS-PMAXLIST-STOP

-- ASN1STOP

#### – *NSAG-IdentityInfo*

The IE *NSAG-IdentityInfo* is used to identify an NSAG (TS 23.501 [32]) for slice based cell reselection or slice specific RACH purposes.

*NSAG-IdentityInfo* information element

-- ASN1START

-- TAG-NSAG-IDENTITYINFO-START

NSAG-IdentityInfo-r17 ::= SEQUENCE {

nsag-ID-r17 NSAG-ID-r17,

trackingAreaCode-r17 TrackingAreaCode OPTIONAL -- Need R

}

NSAG-ID-r17 ::= BIT STRING (SIZE (8))

-- TAG-NSAG-IDENTITYINFO-STOP

-- ASN1STOP

| *NSAG-IdentityInfo* field descriptions |
| --- |
| ***trackingAreaCode***  If absent, UE assumes the *trackingAreaCode*of the serving cell. |

#### – *NTN-Config*

The IE *NTN-Config* provides parameters needed for the UE to access NR via NTN access.

*NTN-Config* information element

-- ASN1START

-- TAG-NTN-CONFIG-START

NTN-Config-r17 ::= SEQUENCE {

epochTime-r17 EpochTime-r17 OPTIONAL, -- Need R

ntn-UlSyncValidityDuration-r17 ENUMERATED{ s5, s10, s15, s20, s25, s30, s35,

s40, s45, s50, s55, s60, s120, s180, s240, s900} OPTIONAL, -- Need R

cellSpecificKoffset-r17 INTEGER(1..1023) OPTIONAL, -- Need R

kmac-r17 INTEGER(1..512) OPTIONAL, -- Need R

ta-Info-r17 TA-Info-r17 OPTIONAL, -- Need R

ntn-PolarizationDL-r17 ENUMERATED {rhcp,lhcp,linear} OPTIONAL, -- Need R

ntn-PolarizationUL-r17 ENUMERATED {rhcp,lhcp,linear} OPTIONAL, -- Need R

ephemerisInfo-r17 EphemerisInfo-r17 OPTIONAL, -- Need R

ta-Report-r17 ENUMERATED {enabled} OPTIONAL, -- Need R

...

}

EpochTime-r17 ::= SEQUENCE {

sfn-r17 INTEGER(0..1023),

subFrameNR-r17 INTEGER(0..9)

}

TA-Info-r17 ::= SEQUENCE {

ta-Common-r17 INTEGER(0..66485757),

ta-CommonDrift-r17 INTEGER(-257303..257303) OPTIONAL, -- Need R

ta-CommonDriftVariant-r17 INTEGER(0..28949) OPTIONAL -- Need R

}

-- TAG-NTN-CONFIG-STOP

-- ASN1STOP

|  |
| --- |
| *NTN-Config* field descriptions |
| ***EphemerisInfo***  This field provides satellite ephemeris either in format of position and velocity state vector or in format of orbital parameters. This field is excluded when determining changes in system information, i.e. changes of XXX should neither result in system information change notifications nor in a modification of valueTag in SIB1. |
| ***epochTime***  Indicate the epoch time for assistance information (i.e. Serving satellite ephemeris in IE ephemerisInfo and Common TA parameters). When explicitly provided through SIB, or through dedicated signaling, EpochTime is the starting time of a DL sub-frame, indicated by a SFN and a sub-frame number signaled together with the assistance information.The reference point for epoch time of the serving satellite ephemeris and Common TA parameters is the uplink time synchronization reference point. If this field is absent, the epoch time is the end of SI window where this SIB19 is scheduled. This field is mandatory present when provided in dedicated configuration. If this field is absent in *ntn-Config* provided via *NTN-NeighCellConfig* the UE uses epoch time from the serving satellite ephemeris. In case of handover, this field is based on the timing of the target cell, i.e. the SFN and sub-frame number indicated in this field refers to the SFN and sub-frame of the target cell. This field is excluded when determining changes in system information, i.e. changes of *epochTime* should neither result in system information change notifications nor in a modification of *valueTag* in SIB1. |
| ***cellSpecificKoffset***  The CellSpecific\_K\_offset is a scheduling offset used for the timing relationships that need to be modified for NTN [see TS 38.2xy]. The unit of K\_offset is number of slots for a given subcarrier spacing of 15 kHz. If the field is absent UE assumes value 0. |
| ***kmac***  K\_mac is a scheduling offset provided by network if downlink and uplink frame timing are not aligned at gNB. It is needed for UE action and assumption on downlink configuration indicated by a MAC-CE command in PDSCH [see TS 38.2xy]. If the field is absent UE assumes value 0.  For the reference subcarrier spacing value for the unit of K\_mac in FR1, a value of 15 kHz is used. The unit of K\_mac is number of slots for a given subcarrier spacing. |
| ***ntn-PolarizationDL***  If present, this parameter indicates polarization information for Downlink transmission on service link: including Right hand, Left hand circular polarizations (RHCP, LHCP) and Linear polarization. |
| ***ntn-PolarizationUL***  If present, this parameter indicates Polarization information for Uplink service link.  If not present and ntnPolarizationDL is present, UE assumes a same polarization for UL and DL. |
| ***ntn-UlSyncValidityDuration***  A validity duration configured by the network for uplink synchronization assistance information (i.e. Serving satellite ephemeris and Common TA parameters) which indicates the maximum time during which the UE can apply assistance information without having acquired new assistance information.  The unit of *ntn-UlSyncValidityDuration* is second. This parameter applies to both connected and idle mode UEs. This field is excluded when determining changes in system information, i.e. changes of *ntn-UlSyncValidityDuration* should neither result in system information change notifications nor in a modification of *valueTag* in SIB1. *ntn-UlSyncValidityDuration* is only updated when at least one of *epochTime*, *ta-Info*, *ephemerisInfo* is updated. |
| ***ta-Common***  *ta-Common* is a network-controlled common timing advanced value and it may include any timing offset considered necessary by the network. *ta-Common* with value of 0 is supported. The granularity of *ta-Common* is 4.072 × 10^(-3) μs. Values are given in unit of corresponding granularity. This field is excluded when determining changes in system information, i.e. changes of *ta-Common* should neither result in system information change notifications nor in a modification of *valueTag* in SIB1. |
| ***ta-CommonDrift***  Indicate drift rate of the common TA. The granularity of TACommonDrift is 0.2 × 10^(-3) μs⁄s Values are given in unit of corresponding granularity.This field is excluded when determining changes in system information, i.e. changes of *ta-CommonDrift* should neither result in system information change notifications nor in a modification of *valueTag* in SIB1. |
| ***ta-CommonDriftVariant***  Indicate drift rate variation of the common TA. The granularity of TACommonDriftVariation is 0.2×10^(-4) μs⁄s^2. Values are given in unit of corresponding granularity. This field is excluded when determining changes in system information, i.e. changes of *ta-CommonDriftVariant* should neither result in system information change notifications nor in a modification of *valueTag* in SIB1. |
| ***ta-Report***  When this field is included in SIB19, it indicates TA reporting is enabled during Random Access due to RRC connection establishment, RRC connection reestablishment and RRC connection resume. When this field is included in *ServingCellConfigCommon* within dedicated signalling, it indicates TA reporting is enabled during Random Access due to reconfiguration with sync (see TS 38.321 [3], clause x.x.x). |

#### – *NZP-CSI-RS-Resource*

The IE *NZP-CSI-RS-Resource* is used to configure Non-Zero-Power (NZP) CSI-RS transmitted in the cell where the IE is included, which the UE may be configured to measure on (see TS 38.214 [19], clause 5.2.2.3.1). A change of configuration between periodic, semi-persistent or aperiodic for an *NZP-CSI-RS-Resource* is not supported without a release and add.

*NZP-CSI-RS-Resource* information element

-- ASN1START

-- TAG-NZP-CSI-RS-RESOURCE-START

NZP-CSI-RS-Resource ::= SEQUENCE {

nzp-CSI-RS-ResourceId NZP-CSI-RS-ResourceId,

resourceMapping CSI-RS-ResourceMapping,

powerControlOffset INTEGER (-8..15),

powerControlOffsetSS ENUMERATED{db-3, db0, db3, db6} OPTIONAL, -- Need R

scramblingID ScramblingId,

periodicityAndOffset CSI-ResourcePeriodicityAndOffset OPTIONAL, -- Cond PeriodicOrSemiPersistent

qcl-InfoPeriodicCSI-RS TCI-StateId OPTIONAL, -- Cond Periodic

...

}

-- TAG-NZP-CSI-RS-RESOURCE-STOP

-- ASN1STOP

|  |
| --- |
| *NZP-CSI-RS-Resource* field descriptions |
| ***periodicityAndOffset***  Periodicity and slot offset *sl1* corresponds to a periodicity of 1 slot, *sl2* to a periodicity of two slots, and so on. The corresponding offset is also given in number of slots (see TS 38.214 [19], clause 5.2.2.3.1). Network always configures the UE with a value for this field for periodic and semi-persistent NZP-CSI-RS-Resource (as indicated in *CSI-ResourceConfig*). |
| ***powerControlOffset***  Power offset of PDSCH RE to NZP CSI-RS RE. Value in dB (see TS 38.214 [19], clauses 5.2.2.3.1 and 4.1). |
| ***powerControlOffsetSS***  Power offset of NZP CSI-RS RE to SSS RE. Value in dB (see TS 38.214 [19], clause 5.2.2.3.1). |
| ***qcl-InfoPeriodicCSI-RS***  For a target periodic CSI-RS, contains a reference to one *TCI-State* in TCI-States for providing the QCL source and QCL type. For periodic CSI-RS, the source can be SSB or another periodic-CSI-RS. Refers to the *TCI-State* or *DLorJoint-TCIState* which has this value for *tci-StateId* and is defined in *tci-StatesToAddModList* or in *dl-orJoint-TCI-State-ToAddModList* in the *PDSCH-Config* included in the *BWP-Downlink* corresponding to the serving cell and to the DL BWP to which the resource belongs to (see TS 38.214 [19], clause 5.2.2.3.1). |
| ***resourceMapping***  OFDM symbol location(s) in a slot and subcarrier occupancy in a PRB of the CSI-RS resource. |
| ***scramblingID***  Scrambling ID (see TS 38.214 [19], clause 5.2.2.3.1). |

|  |  |
| --- | --- |
| Conditional Presence | Explanation |
| *Periodic* | The field is optionally present, Need M, for periodic *NZP-CSI-RS-Resources* (as indicated in *CSI-ResourceConfig*). The field is absent otherwise. |
| *PeriodicOrSemiPersistent* | The field is optionally present, Need M, for periodic and semi-persistent *NZP-CSI-RS-Resources* (as indicated in *CSI-ResourceConfig*). The field is absent otherwise. |

#### – *NZP-CSI-RS-ResourceId*

The IE *NZP-CSI-RS-ResourceId* is used to identify one NZP-CSI-RS-Resource.

*NZP-CSI-RS-ResourceId* information element

-- ASN1START

-- TAG-NZP-CSI-RS-RESOURCEID-START

NZP-CSI-RS-ResourceId ::= INTEGER (0..maxNrofNZP-CSI-RS-Resources-1)

-- TAG-NZP-CSI-RS-RESOURCEID-STOP

-- ASN1STOP

#### – *NZP-CSI-RS-ResourceSet*

The IE *NZP-CSI-RS-ResourceSet* is a set of Non-Zero-Power (NZP) CSI-RS resources (their IDs) and set-specific parameters.

*NZP-CSI-RS-ResourceSet* information element

-- ASN1START

-- TAG-NZP-CSI-RS-RESOURCESET-START

NZP-CSI-RS-ResourceSet ::= SEQUENCE {

nzp-CSI-ResourceSetId NZP-CSI-RS-ResourceSetId,

nzp-CSI-RS-Resources SEQUENCE (SIZE (1..maxNrofNZP-CSI-RS-ResourcesPerSet)) OF NZP-CSI-RS-ResourceId,

repetition ENUMERATED { on, off } OPTIONAL, -- Need S

aperiodicTriggeringOffset INTEGER(0..6) OPTIONAL, -- Need S

trs-Info ENUMERATED {true} OPTIONAL, -- Need R

...,

[[

aperiodicTriggeringOffset-r16 INTEGER(0..31) OPTIONAL -- Need S

]],

[[

pdc-Info-r17 ENUMERATED {true} OPTIONAL, -- Need R

cmrGroupingAndPairing-r17 CMRGroupingAndPairing-r17 OPTIONAL, -- Need R

aperiodicTriggeringOffset-r17 INTEGER (0..124) OPTIONAL, -- Need S

aperiodicTriggeringOffsetL2-r17 INTEGER(0..31) OPTIONAL -- Need R

]]

}

CMRGroupingAndPairing-r17 ::= SEQUENCE {

nrofResourcesGroup1-r17 INTEGER (1..7),

pair1OfNZP-CSI-RS-r17 NZP-CSI-RS-Pairing-r17 OPTIONAL, -- Need R

pair2OfNZP-CSI-RS-r17 NZP-CSI-RS-Pairing-r17 OPTIONAL -- Need R

}

NZP-CSI-RS-Pairing-r17 ::= SEQUENCE {

nzp-CSI-RS-ResourceId1-r17 INTEGER (1..7),

nzp-CSI-RS-ResourceId2-r17 INTEGER (1..7)

}

-- TAG-NZP-CSI-RS-RESOURCESET-STOP

-- ASN1STOP

|  |
| --- |
| *NZP-CSI-RS-ResourceSet* field descriptions |
| ***aperiodicTriggeringOffset, aperiodicTriggeringOffset-r16, aperiodicTriggeringOffset-r17***  Offset X between the slot containing the DCI that triggers a set of aperiodic NZP CSI-RS resources and the slot in which the CSI-RS resource set is transmitted. For *aperiodicTriggeringOffset*, the value 0 corresponds to 0 slots, value 1 corresponds to 1 slot, value 2 corresponds to 2 slots, value 3 corresponds to 3 slots, value 4 corresponds to 4 slots, value 5 corresponds to 16 slots, value 6 corresponds to 24 slots. For *aperiodicTriggeringOffset-r16* and *aperiodicTriggeringOffset-r17*, the value indicates the number of slots. *aperiodicTriggeringOffset-r17* is applicable to SCS 480 kHz and 960 kHz, and only the values of integer multiples of 4 are valid, i.e. 0, 4, 8, and so on. The network configures only one of the fields. When neither field is included, the UE applies the value 0. |
| ***aperiodicTriggeringOffsetL2***  Indicates triggering offset of aperiodic NZP CSI-RS resources used for fast activation of the SCell (see clause 5.2.1.5.3 of TS 38.214 [19]), when the NZP CSI-RS resources are activated by the MAC CE (see clause 5.9 of TS 38.321 [3]). The value indicates the number of slots. |
| ***cmrGroupingAndPairing***  Configures CMR groups and pairs. The first *nrofResourcesGroup1* resources in the NZP-CSI-RS resource set belong to Group 1 and the remaining resources in the NZP-CSI-RS resource set belong to Group 2. *nrofResourcesGroup1* is and the number of remaining resources in the NZP-CSI-RS resource set belonging to Group 2 is as specified in TS 38.214 clause 5.2.1.4.1. Maximum total number in Group 1 and Group 2 is 8 (see TS 38.214 [19], clauses 5.2.1.4.1 and 5.2.1.4.2). |
| ***pair1OfNZP-CSI-RS, pair2OfNZP-CSI-RS***  A pair of NZP CSI-RS resources. In one pair, one resource shall belong to group 1 and the other resource shall belong to group 2 as configured by nrofResourcesGroup1 and nrofResourcesGroup2. (see TS 38.214 [19], clause xx). |
| ***nzp-CSI-RS-Resources***  NZP-CSI-RS-Resources associated with this NZP-CSI-RS resource set (see TS 38.214 [19], clause 5.2). For CSI, there are at most 8 NZP CSI RS resources per resource set. |
| ***nzp-CSI-RS-ResourceId1, nzp-CSI-RS-ResourceId2***  The *nzp-CSI-RS-ResourceId1-r17* represents the index of the NZP CSI-RS resource in Resource Group 1, and *nzp-CSI-RS-ResourceId2-r17* represents the index of the NZP CSI-RS resource in Resource Group 2. |
| ***pdc-Info***  Indicates that this NZP-CSI-RS-ResourceSet, if configured also with *trs-Info,* is used for propagation delay compensation. The field can be present only if *trs-info* is present. The field can be present in only one *NZP-CSI-RS-ResourceSet*. If network configures this field for an *NZP-CSI-RS-ResourceSet*, the UE measures the UE Rx-Tx time difference based on resources configured in this resource set. |
| ***repetition***  Indicates whether repetition is on/off. If the field is set to *off* or if the field is absent, the UE may not assume that the NZP-CSI-RS resources within the resource set are transmitted with the same downlink spatial domain transmission filter (see TS 38.214 [19], clauses 5.2.2.3.1 and 5.1.6.1.2). It can only be configured for CSI-RS resource sets which are associated with *CSI-ReportConfig* with report of L1 RSRP, L1 SINR or "no report". |
| ***trs-Info***  Indicates that the antenna port for all NZP-CSI-RS resources in the CSI-RS resource set is same. If the field is absent or released the UE applies the value *false* (see TS 38.214 [19], clause 5.2.2.3.1). |

#### – *NZP-CSI-RS-ResourceSetId*

The IE *NZP-CSI-RS-ResourceSetId* is used to identify one *NZP-CSI-RS-ResourceSet*.

*NZP-CSI-RS-ResourceSetId* information element

-- ASN1START

-- TAG-NZP-CSI-RS-RESOURCESETID-START

NZP-CSI-RS-ResourceSetId ::= INTEGER (0..maxNrofNZP-CSI-RS-ResourceSets-1)

-- TAG-NZP-CSI-RS-RESOURCESETID-STOP

-- ASN1STOP

#### – *P-Max*

The IE *P-Max* is used to limit the UE's uplink transmission power on a carrier frequency, in TS 38.101-1 [15] and is used to calculate the parameter *Pcompensation* defined in TS 38.304 [20].

*P-Max* information element

-- ASN1START

-- TAG-P-MAX-START

P-Max ::= INTEGER (-30..33)

-- TAG-P-MAX-STOP

-- ASN1STOP

#### – *PCI-ARFCN-EUTRA*

The IE *PCI-ARFCN-EUTRA* is used to encode EUTRA PCI and ARFCN.

*PCI-ARFCN-EUTRA* information element

-- ASN1START

-- TAG-PCIARFCNEUTRA-START

PCI-ARFCN-EUTRA-r16 ::= SEQUENCE {

physCellId-r16 EUTRA-PhysCellId,

carrierFreq-r16 ARFCN-ValueEUTRA

}

-- TAG-PCIARFCNEUTRA-STOP

-- ASN1STOP

#### – *PCI-ARFCN-NR*

The IE *PCI-ARFCN-NR* is used to encode NR PCI and ARFCN.

*PCI-ARFCN-NR* information element

-- ASN1START

-- TAG-PCIARFCNNR-START

PCI-ARFCN-NR-r16 ::= SEQUENCE {

physCellId-r16 PhysCellId,

carrierFreq-r16 ARFCN-ValueNR

}

-- TAG-PCIARFCNNR-STOP

-- ASN1STOP

#### – *PCI-List*

The IE *PCI-List* concerns a list of physical cell identities, which may be used for different purposes.

*PCI-List* information element

-- ASN1START

-- TAG-PCI-LIST-START

PCI-List ::= SEQUENCE (SIZE (1..maxNrofCellMeas)) OF PhysCellId

-- TAG-PCI-LIST-STOP

-- ASN1STOP

#### – *PCI-Range*

The IE *PCI-Range* is used to encode either a single or a range of physical cell identities. The range is encoded by using a *start* value and by indicating the number of consecutive physical cell identities (including *start*) in the range. For fields comprising multiple occurrences of *PCI-Range*, the Network may configure overlapping ranges of physical cell identities.

*PCI-Range* information element

-- ASN1START

-- TAG-PCI-RANGE-START

PCI-Range ::= SEQUENCE {

start PhysCellId,

range ENUMERATED {n4, n8, n12, n16, n24, n32, n48, n64, n84,

n96, n128, n168, n252, n504, n1008,spare1} OPTIONAL -- Need S

}

-- TAG-PCI-RANGE-STOP

-- ASN1STOP

| *PCI-Range* field descriptions |
| --- |
| ***range***  Indicates the number of physical cell identities in the range (including *start*). Value *n4* corresponds with 4, value *n8* corresponds with 8 and so on. The UE shall apply value 1 in case the field is absent, in which case only the physical cell identity value indicated by *start* applies. |
| ***start***  Indicates the lowest physical cell identity in the range. |

#### – *PCI-RangeElement*

The IE *PCI-RangeElement* is used to define a PCI-Range as part of a list (e.g. AddMod list).

*PCI-RangeElement* information element

-- ASN1START

-- TAG-PCI-RANGEELEMENT-START

PCI-RangeElement ::= SEQUENCE {

pci-RangeIndex PCI-RangeIndex,

pci-Range PCI-Range

}

-- TAG-PCI-RANGEELEMENT-STOP

-- ASN1STOP

|  |
| --- |
| *PCI-RangeElement* field descriptions |
| ***pci-Range***  Physical cell identity or a range of physical cell identities. |

#### – *PCI-RangeIndex*

The IE PCI-RangeIndex identifies a physical cell id range, which may be used for different purposes.

*PCI-RangeIndex* information element

-- ASN1START

-- TAG-PCI-RANGEINDEX-START

PCI-RangeIndex ::= INTEGER (1..maxNrofPCI-Ranges)

-- TAG-PCI-RANGEINDEX-STOP

-- ASN1STOP

#### – *PCI-RangeIndexList*

The IE *PCI-RangeIndexList* concerns a list of indexes of physical cell id ranges, which may be used for different purposes.

*PCI-RangeIndexList* information element

-- ASN1START

-- TAG-PCI-RANGEINDEXLIST-START

PCI-RangeIndexList ::= SEQUENCE (SIZE (1..maxNrofPCI-Ranges)) OF PCI-RangeIndex

-- TAG-PCI-RANGEINDEXLIST-STOP

-- ASN1STOP

#### – *PDCCH-Config*

The IE *PDCCH-Config* is used to configure UE specific PDCCH parameters or MBS multicast PDCCH parameters such as control resource sets (CORESET), search spaces and additional parameters for acquiring the PDCCH. If this IE is used for the scheduled SCell in case of cross carrier scheduling, the fields other than *searchSpacesToAddModList* and *searchSpacesToReleaseList* are absent. If the IE is used for a dormant BWP, the fields other than *controlResourceSetToAddModList* and *controlResourceSetToReleaseList* are absent. If this IE is used for MBS CFR, the field *downlinkPreemptiom,tpc-PUSCH, tpc-SRS, uplinkCancellation, monitoringCapabilityConfig,* and *searchSpaceSwitchConfig* are absent.

*PDCCH-Config* information element

-- ASN1START

-- TAG-PDCCH-CONFIG-START

PDCCH-Config ::= SEQUENCE {

controlResourceSetToAddModList SEQUENCE(SIZE (1..3)) OF ControlResourceSet OPTIONAL, -- Need N

controlResourceSetToReleaseList SEQUENCE(SIZE (1..3)) OF ControlResourceSetId OPTIONAL, -- Need N

searchSpacesToAddModList SEQUENCE(SIZE (1..10)) OF SearchSpace OPTIONAL, -- Need N

searchSpacesToReleaseList SEQUENCE(SIZE (1..10)) OF SearchSpaceId OPTIONAL, -- Need N

downlinkPreemption SetupRelease { DownlinkPreemption } OPTIONAL, -- Need M

tpc-PUSCH SetupRelease { PUSCH-TPC-CommandConfig } OPTIONAL, -- Need M

tpc-PUCCH SetupRelease { PUCCH-TPC-CommandConfig } OPTIONAL, -- Need M

tpc-SRS SetupRelease { SRS-TPC-CommandConfig} OPTIONAL, -- Need M

...,

[[

controlResourceSetToAddModListSizeExt-v1610 SEQUENCE (SIZE (1..2)) OF ControlResourceSet OPTIONAL, -- Need N

controlResourceSetToReleaseListSizeExt-r16 SEQUENCE (SIZE (1..5)) OF ControlResourceSetId-r16 OPTIONAL, -- Need N

searchSpacesToAddModListExt-r16 SEQUENCE(SIZE (1..10)) OF SearchSpaceExt-r16 OPTIONAL, -- Need N

uplinkCancellation-r16 SetupRelease { UplinkCancellation-r16 } OPTIONAL, -- Need M

monitoringCapabilityConfig-r16 ENUMERATED { r15monitoringcapability,r16monitoringcapability } OPTIONAL, -- Need M

searchSpaceSwitchConfig-r16 SearchSpaceSwitchConfig-r16 OPTIONAL -- Need R

]],

[[

searchSpacesToAddModListExt-v1700 SEQUENCE(SIZE (1..10)) OF SearchSpaceExt-v1700 OPTIONAL, -- Need N

monitoringCapabilityConfig-v1710 ENUMERATED { r17monitoringcapability } OPTIONAL, -- Need M

searchSpaceSwitchConfig-r17 SearchSpaceSwitchConfig-r17 OPTIONAL, -- Need R

pdcch-SkippingDurationList-r17 SEQUENCE(SIZE (1..3)) OF SCS-SpecificDuration-r17 OPTIONAL -- Need R

]]

}

SearchSpaceSwitchConfig-r16 ::= SEQUENCE {

cellGroupsForSwitchList-r16 SEQUENCE(SIZE (1..4)) OF CellGroupForSwitch-r16 OPTIONAL, -- Need R

searchSpaceSwitchDelay-r16 INTEGER (10..52) OPTIONAL -- Need R

}

SearchSpaceSwitchConfig-r17 ::= SEQUENCE {

searchSpaceSwitchTimer-r17 SCS-SpecificDuration-r17 OPTIONAL, -- Need R

searchSpaceSwitchDelay-r17 INTEGER (10..52) OPTIONAL -- Need R

}

CellGroupForSwitch-r16 ::= SEQUENCE(SIZE (1..16)) OF ServCellIndex

SCS-SpecificDuration-r17 ::= INTEGER (1..166)

-- TAG-PDCCH-CONFIG-STOP

-- ASN1STOP

|  |
| --- |
| *PDCCH-Config* field descriptions |
| ***controlResourceSetToAddModList, controlResourceSetToAddModListSizeExt***  List of UE specifically configured Control Resource Sets (CORESETs) to be used by the UE. The network restrictions on configuration of CORESETs per DL BWP are specified in TS 38.213 [13], clause 10.1 and TS 38.306 [26]. The UE shall consider entries in *controlResourceSetToAddModList* and in *controlResourceSetToAddModListSizeExt* as a single list, i.e. an entry created using *controlResourceSetToAddModList* can be modified using *controlResourceSetToAddModListSizeExt* (or deleted using *controlResourceSetToReleaseListSizeExt*) and vice-versa. In case network reconfigures control resource set with the same *ControlResourceSetId* as used for *commonControlResourceSet* or *commonControlResourceSetExt* configured via *PDCCH-ConfigCommon* or via *SIB20*, the configuration from *PDCCH-Config* always takes precedence and should not be updated by the UE based on *servingCellConfigCommon* or based on *SIB20*. |
| ***controlResourceSetToReleaseList, controlResourceSetToReleaseListSizeExt***  List of UE specifically configured Control Resource Sets (CORESETs) to be released by the UE. This field only applies to CORESETs configured by *controlResourceSetToAddModList* or *controlResourceSetToAddModListSizeExt* and does not release the field *commonControlResourceSet* configured by *PDCCH-ConfigCommon* and *commonControlResourceSetExt* configured by *SIB20*. |
| ***downlinkPreemption***  Configuration of downlink preemption indications to be monitored in this cell (see TS 38.213 [13], clause 11.2). |
| ***monitoringCapabilityConfig***  Configures either Rel-15 PDCCH monitoring capability, Rel-16 PDCCH monitoring capability or Rel-17 PDCCH monitoring capability for PDCCH monitoring on a serving cell (see TS 38.213 [13], clause 10.1). Value *r15monitoringcapablity* enables the Rel-15 monitoring capability, and value *r16monitoringcapablity* enables the Rel-16 PDCCH monitoring capability. *r17monitoringcapability* enables the Rel-17 PDCCH multi-slot monitoring capability. For 480 and 960 kHz SCS, only value *r17monitoringcapability* is applicable. |
| ***pdcch-SkippingDurationList***  Provides one or more values to derive the skipping duration in unit of slots, as specified in TS 38.213 [13], clause 10.4. The DCI which schedules data indicates which of the values is to be applied (see TS 38.213 [13], clause 10.4). For the 15kHz SCS, for each entry, only the first 26 values are valid and correspond to {1, 2, 3, …, 20, 30, 40, 50, 60, 80, 100}. For the 30kHz SCS, for each entry, only the first 46 values are valid and correspond to {1, 2, 3, …, 40, 60, 80, 100, 120, 160, 200}. For the 60kHz SCS, for each entry, only the first 86 values are valid and correspond to {1, 2, 3, …, 80, 120, 160, 200, 240, 320, 400}. For the 120kHz SCS, for each entry, the 166 values correspond to {1, 2, 3, …, 160, 240, 320, 400, 480, 640, 800}. For the 480kHz SCS, for each entry, the 166 values correspond to {4, 8, 12, …, 640, 960, 1280, 1600, 1920, 2560, 3200}. For the 960kHz SCS, for each entry, the 166 values correspond to {8, 16, 24, …, 1280, 1920, 2560, 3200, 3840, 5120, 6400}. |
| ***searchSpacesToAddModList, searchSpacesToAddModListExt***  List of UE specifically configured Search Spaces or MBS multicast Search Spaces. The network configures at most 10 Search Spaces per BWP per cell (including UE-specific and common Search Spaces). If the network includes searchSpaceToAddModListExt, it includes the same number of entries, and listed in the same order, as in searchSpacesToAddModList in each of them. |
| ***searchSpaceSwitchConfig***  Configuration to control the UE behavior to switch from search space group X back to search space group 0, as specified in clause 10 of TS 38.213 [13]. The network only configures either *searchSpaceSwitchConfig-r16* or *searchSpaceSwitchConfig-r17* for a UE. |
| ***tpc-PUCCH***  Enable and configure reception of group TPC commands for PUCCH. |
| ***tpc-PUSCH***  Enable and configure reception of group TPC commands for PUSCH. |
| ***tpc-SRS***  Enable and configure reception of group TPC commands for SRS. |
| ***uplinkCancellation***  Configuration of uplink cancellation indications to be monitored in this cell (see TS 38.213 [13], clause 11.2A). |

|  |
| --- |
| *SearchSpaceSwitchConfig* field descriptions |
| ***cellGroupsForSwitchList***  The list of serving cells which are bundled for the search space group switching purpose (see TS 38.213 [13], clause 10.4). A serving cell can belong to only one *CellGroupForSwitch*. The network configures the same list for all BWPs of serving cells in the same *CellGroupForSwitch.* |
| ***searchSpaceSwitchDelay***  Indicates the value to be applied by a UE for Search Space Set Group switching; corresponds to the P value in TS 38.213 [13], clause 10.4. The network configures the same value for all BWPs of serving cells in the same *CellGroupForSwitch.* For 120/480/960 kHz SCS, only values 40,41, ... 52 are valid and the actual value = field value \* SCS/120 kHz i.e. field value 40 corresponds to 40 with 120 kHz SCS, 160 with 480 kHz SCS and 320 with 960 kHz SCS, and so on. |
| ***searchSpaceSwitchTimer***  Timer (in unit of slots) to control the UE behavior to switch from search space group X back to search space group 0, as specified in clause 10 of TS 38.213 [13]. For the 15kHz SCS, only the first 26 values are valid and correspond to {1, 2, 3, …, 20, 30, 40, 50, 60, 80, 100}. For the 30kHz SCS, only the first 46 values are valid and correspond to {1, 2, 3, …, 40, 60, 80, 100, 120, 160, 200}. For the 60kHz SCS, only the first 86 values are valid and correspond to {1, 2, 3, …, 80, 120, 160, 200, 240, 320, 400}. For the 120kHz SCS, the 166 values correspond to {1, 2, 3, …, 160, 240, 320, 400, 480, 640, 800}. For the 480kHz SCS, the 166 values correspond to {4, 8, 12, …, 640, 960, 1280, 1600, 1920, 2560, 3200}. For the 960kHz SCS, the 166 values correspond to {8, 16, 24, …, 1280, 1920, 2560, 3200, 3840, 5120, 6400}. |

#### – *PDCCH-ConfigCommon*

The IE *PDCCH-ConfigCommon* is used to configure cell specific PDCCH parameters provided in SIB as well as in dedicated signalling.

*PDCCH-ConfigCommon* information element

-- ASN1START

-- TAG-PDCCH-CONFIGCOMMON-START

PDCCH-ConfigCommon ::= SEQUENCE {

controlResourceSetZero ControlResourceSetZero OPTIONAL, -- Cond InitialBWP-Only

commonControlResourceSet ControlResourceSet OPTIONAL, -- Need R

searchSpaceZero SearchSpaceZero OPTIONAL, -- Cond InitialBWP-Only

commonSearchSpaceList SEQUENCE (SIZE(1..4)) OF SearchSpace OPTIONAL, -- Need R

searchSpaceSIB1 SearchSpaceId OPTIONAL, -- Need S

searchSpaceOtherSystemInformation SearchSpaceId OPTIONAL, -- Need S

pagingSearchSpace SearchSpaceId OPTIONAL, -- Need S

ra-SearchSpace SearchSpaceId OPTIONAL, -- Need S

...,

[[

firstPDCCH-MonitoringOccasionOfPO CHOICE {

sCS15KHZoneT SEQUENCE (SIZE (1..maxPO-perPF)) OF INTEGER (0..139),

sCS30KHZoneT-SCS15KHZhalfT SEQUENCE (SIZE (1..maxPO-perPF)) OF INTEGER (0..279),

sCS60KHZoneT-SCS30KHZhalfT-SCS15KHZquarterT SEQUENCE (SIZE (1..maxPO-perPF)) OF INTEGER (0..559),

sCS120KHZoneT-SCS60KHZhalfT-SCS30KHZquarterT-SCS15KHZoneEighthT SEQUENCE (SIZE (1..maxPO-perPF)) OF INTEGER (0..1119),

sCS120KHZhalfT-SCS60KHZquarterT-SCS30KHZoneEighthT-SCS15KHZoneSixteenthT SEQUENCE (SIZE (1..maxPO-perPF)) OF INTEGER (0..2239),

sCS120KHZquarterT-SCS60KHZoneEighthT-SCS30KHZoneSixteenthT SEQUENCE (SIZE (1..maxPO-perPF)) OF INTEGER (0..4479),

sCS120KHZoneEighthT-SCS60KHZoneSixteenthT SEQUENCE (SIZE (1..maxPO-perPF)) OF INTEGER (0..8959),

sCS120KHZoneSixteenthT SEQUENCE (SIZE (1..maxPO-perPF)) OF INTEGER (0..17919)

} OPTIONAL -- Cond OtherBWP

]],

[[

commonSearchSpaceListExt-r16 SEQUENCE (SIZE(1..4)) OF SearchSpaceExt-r16 OPTIONAL -- Need R

]],

[[

sdt-SearchSpace-r17 CHOICE {

newSearchSpace SearchSpace,

existingSearchSpace SearchSpaceId

} OPTIONAL, -- Need R

searchSpaceMCCH-r17 SearchSpaceId OPTIONAL, -- Need R

searchSpaceMTCH-r17 SearchSpaceId OPTIONAL, -- Need S

commonSearchSpaceListExt2-r17 SEQUENCE (SIZE(1..4)) OF SearchSpaceExt-v1700 OPTIONAL, -- Need R

firstPDCCH-MonitoringOccasionOfPO-v1710 CHOICE {

sCS480KHZoneEighthT SEQUENCE (SIZE (1..maxPO-perPF)) OF INTEGER (0..35839),

sCS480KHZoneSixteenthT SEQUENCE (SIZE (1..maxPO-perPF)) OF INTEGER (0..71679)

} OPTIONAL, -- Need R

pei-ConfigBWP-r17 SEQUENCE {

pei-SearchSpace-r17 SearchSpaceId,

firstPDCCH-MonitoringOccasionOfPEI-O-r17 CHOICE {

sCS15KHZoneT SEQUENCE (SIZE (1..maxPEI-perPF-r17)) OF INTEGER (0..139),

sCS30KHZoneT-SCS15KHZhalfT SEQUENCE (SIZE (1..maxPEI-perPF-r17)) OF INTEGER (0..279),

sCS60KHZoneT-SCS30KHZhalfT-SCS15KHZquarterT SEQUENCE (SIZE (1..maxPEI-perPF-r17)) OF INTEGER (0..559),

sCS120KHZoneT-SCS60KHZhalfT-SCS30KHZquarterT-SCS15KHZoneEighthT SEQUENCE (SIZE (1..maxPEI-perPF-r17)) OF INTEGER (0..1119),

sCS120KHZhalfT-SCS60KHZquarterT-SCS30KHZoneEighthT-SCS15KHZoneSixteenthT SEQUENCE (SIZE (1..maxPEI-perPF-r17)) OF INTEGER (0..2239),

sCS480KHZoneT-SCS120KHZquarterT-SCS60KHZoneEighthT-SCS30KHZoneSixteenthT SEQUENCE (SIZE (1..maxPEI-perPF-r17)) OF INTEGER (0..4479),

sCS480KHZhalfT-SCS120KHZoneEighthT-SCS60KHZoneSixteenthT SEQUENCE (SIZE (1..maxPEI-perPF-r17)) OF INTEGER (0..8959),

sCS480KHZquarterT-SCS120KHZoneSixteenthT SEQUENCE (SIZE (1..maxPEI-perPF-r17)) OF INTEGER (0..17919),

sCS480KHZoneEighthT SEQUENCE (SIZE (1..maxPEI-perPF-r17)) OF INTEGER (0..35839),

sCS480KHZoneSixteenthT SEQUENCE (SIZE (1..maxPEI-perPF-r17)) OF INTEGER (0..71679)

}

} OPTIONAL -- Cond InitialBWP-Paging

]]

}

-- TAG-PDCCH-CONFIGCOMMON-STOP

-- ASN1STOP

|  |
| --- |
| *PDCCH-ConfigCommon* field descriptions |
| ***commonControlResourceSet***  An additional common control resource set which may be configured and used for any common or UE-specific search space. If the network configures this field, it uses a *ControlResourceSetId* other than 0 for this *ControlResourceSet*. The network configures the *commonControlResourceSet* in *SIB1* so that it is contained in the bandwidth of CORESET#0. |
| ***commonSearchSpaceList, commonSearchSpaceListExt***  A list of additional common search spaces. If the network configures this field, it uses the *SearchSpaceId*s other than 0. If the field is included, it replaces any previous list, i.e. all the entries of the list are replaced and each of the *SearchSpace* entries is considered to be newly created and the conditions and Need codes for setup of the entry apply. If the network includes *commonSearchSpaceListExt*, it includes the same number of entries, and listed in the same order, as in *commonSearchSpaceList*. |
| ***controlResourceSetZero***  Parameters of the common CORESET#0 which can be used in any common or UE-specific search spaces. The values are interpreted like the corresponding bits in *MIB* *pdcch-ConfigSIB1*. Even though this field is only configured in the initial BWP (BWP#0) *controlResourceSetZero* can be used in search spaces configured in other DL BWP(s) than the initial DL BWP if the conditions defined in TS 38.213 [13], clause 10 are satisfied. |
| ***firstPDCCH-MonitoringOccasionOfPEI-O***  Offset, in number of symbols, from the start of the reference frame for PEI-O to the start of the first PDCCH monitoring occasion of PEI-O on this BWP, see TS 38.213 [13], clause 10.4A. For the case *po-NumPerPEI* is smaller than Ns, UE applies the (floor(i\_s/poNumPerPEI)+1)-th value out of (N\_s/po-NumPerPEI) configured values in *firstPDCCH-MonitoringOccasionOfPEI-O* for the symbol-level offset. When *po-NumPerPEI* is one or multiple of Ns, UE applies the first configured value in *firstPDCCH-MonitoringOccasionOfPEI-O* for the symbol-level offset. |
| ***firstPDCCH-MonitoringOccasionOfPO***  Indicates the first PDCCH monitoring occasion of each PO of the PF on this BWP, see TS 38.304 [20]. |
| ***pagingSearchSpace***  ID of the Search space for paging (see TS 38.213 [13], clause 10.1). If the field is absent, the UE does not receive paging in this BWP (see TS 38.213 [13], clause 10). This field is absent for the RedCap specific initial DL BWP, if it does not include CD-SSB and the entire CORESET#0.. |
| ***pei-ConfigBWP***  Provides the configuration for PEI reception in this BWP. If the field is absent, the UE does not receive PEI in this BWP. |
| ***pei-SearchSpace***  ID of dedicated search space for PEI. It can be configured to one of up to 4 common SS sets configured by *commonSearchSpaceList* with *SearchSpaceId* > 0. The CCE aggregation levels and maximum number of PDCCH candidates per CCE aggregation level follows Table 10.1-1 of TS38.213 [13]. *SearchSpaceId* = 0 can be configured for the case of SS/PBCH block and CORESET multiplexing pattern 2 or 3. |
| ***ra-SearchSpace***  ID of the Search space for random access procedure (see TS 38.213 [13], clause 10.1). If the field is absent, the UE does not receive RAR in this BWP. This field is mandatory present in the DL BWP(s) if the conditions described in TS 38.321 [3], clause 5.15 are met. |
| ***sdt-SearchSpace***  Common search space for CG-SDT and RA-SDT (see TS 38.213 [13]). |
| ***searchSpaceMCCH***  ID of the search space for MCCH. If the field is absent, the UE does not receive MCCH in this BWP (see TS 38.213 [13], clause 10). |
| ***searchSpaceMTCH***  ID of the search space for MTCH of MBS broadcast. If the field is absent, the UE applies *searchSpaceMCCH* also for MTCH, (see TS 38.213 [13], clause 10). |
| ***searchSpaceOtherSystemInformation***  ID of the Search space for other system information, i.e., *SIB2* and beyond (see TS 38.213 [13], clause 10.1) If the field is absent, the UE does not receive other system information in this BWP. This field is absent for the RedCap specific initial DL BWP, if it does not include CD-SSB and the entire CORESET#0. |
| ***searchSpaceSIB1***  ID of the search space for *SIB1* message. In the initial DL BWP of the UE′s PCell, the network sets this field to 0. If the field is absent, the UE does not receive *SIB1* in this BWP. (see TS 38.213 [13], clause 10). This field is absent for the RedCap specific initial DL BWP, if it does not include CD-SSB and the entire CORESET#0. |
| ***searchSpaceZero***  Parameters of the common SearchSpace#0. The values are interpreted like the corresponding bits in *MIB* *pdcch-ConfigSIB1*. Even though this field is only configured in the initial BWP (BWP#0), *searchSpaceZero* can be used in search spaces configured in other DL BWP(s) than the initial DL BWP if the conditions described in TS 38.213 [13], clause 10, are satisfied. |

|  |  |
| --- | --- |
| Conditional Presence | Explanation |
| *InitialBWP-Only* | If *SIB1* is broadcast the field is mandatory present in the *PDCCH-ConfigCommon* of the initial BWP (BWP#0) in *ServingCellConfigCommon*; it is absent in other BWPs and when sent in system information. If SIB1 is not broadcast and there is an SSB associated to the cell, the field is optionally present, Need M, in the *PDCCH-ConfigCommon* of the initial BWP (BWP#0) in *ServingCellConfigCommon* (still with the same setting for all UEs). In other cases, the field is absent. |
| *OtherBWP* | This field is optionally present, Need R, if this BWP is not the *initialDownlinkBWP* and *pagingSearchSpace* is configured in this BWP. Otherwise this field is absent. |
| *InitialBWP-Paging* | This field is optionally present, Need R, if this BWP is the *initialDownlinkBWP* or *initialDownlinkBWP-RedCap*, and *pei-Config* is configured in *DownlinkConfigCommonSIB*. Otherwise this field is absent. |

#### – *PDCCH-ConfigSIB1*

The IE *PDCCH-ConfigSIB1* is used to configure CORESET#0 and search space#0.

*PDCCH-ConfigSIB1* information element

-- ASN1START

-- TAG-PDCCH-CONFIGSIB1-START

PDCCH-ConfigSIB1 ::= SEQUENCE {

controlResourceSetZero ControlResourceSetZero,

searchSpaceZero SearchSpaceZero

}

-- TAG-PDCCH-CONFIGSIB1-STOP

-- ASN1STOP

|  |
| --- |
| *PDCCH-ConfigSIB1* field descriptions |
| ***controlResourceSetZero***  Determines a common ControlResourceSet (CORESET) with ID #0, see TS 38.213 [13], clause 13. |
| ***searchSpaceZero***  Determines a common search space with ID #0, see TS 38.213 [13], clause 13. |

#### – *PDCCH-ServingCellConfig*

The IE *PDCCH-ServingCellConfig* is used to configure UE specific PDCCH parameters applicable across all bandwidth parts of a serving cell.

*PDCCH-ServingCellConfig* information element

-- ASN1START

-- TAG-PDCCH-SERVINGCELLCONFIG-START

PDCCH-ServingCellConfig ::= SEQUENCE {

slotFormatIndicator SetupRelease { SlotFormatIndicator } OPTIONAL, -- Need M

...,

[[

availabilityIndicator-r16 SetupRelease {AvailabilityIndicator-r16} OPTIONAL, -- Need M

searchSpaceSwitchTimer-r16 INTEGER (1..80) OPTIONAL -- Need R

]],

[[

searchSpaceSwitchTimer-v1710 INTEGER (81..1280) OPTIONAL -- Need R

]]

}

-- TAG-PDCCH-SERVINGCELLCONFIG-STOP

-- ASN1STOP

|  |
| --- |
| *PDCCH-ServingCellConfig* field descriptions |
| ***availabilityIndicator***  Use to configure monitoring a PDCCH for Availability Indicators (AI). |
| ***searchSpaceSwitchTimer***  The value of the timer in slots for monitoring PDCCH in the active DL BWP of the serving cell before moving to the default search space group (see TS 38.213 [13], clause 10.4).  For 15 kHz SCS, {1..20} are valid.  For 30 kHz SCS, {1..40} are valid.  For 60kHz SCS, {1..80} are valid.  For 120 kHz SCS, {1..160} are valid.  For 480 kHz SCS, {1..640} are valid.  For 960 kHz SCS, {1..1280} are valid.  The network configures the same value for all serving cells in the same *CellGroupForSwitch*. |
| ***slotFormatIndicator***  Configuration of Slot-Format-Indicators to be monitored in the correspondingly configured PDCCHs of this serving cell. |

#### – *PDCP-Config*

The IE *PDCP-Config* is used to set the configurable PDCP parameters for signalling, MBS multicast and data radio bearers.

*PDCP-Config* information element

-- ASN1START

-- TAG-PDCP-CONFIG-START

PDCP-Config ::= SEQUENCE {

drb SEQUENCE {

discardTimer ENUMERATED {ms10, ms20, ms30, ms40, ms50, ms60, ms75, ms100, ms150, ms200,

ms250, ms300, ms500, ms750, ms1500, infinity} OPTIONAL, -- Cond Setup

pdcp-SN-SizeUL ENUMERATED {len12bits, len18bits} OPTIONAL, -- Cond Setup1

pdcp-SN-SizeDL ENUMERATED {len12bits, len18bits} OPTIONAL, -- Cond Setup2

headerCompression CHOICE {

notUsed NULL,

rohc SEQUENCE {

maxCID INTEGER (1..16383) DEFAULT 15,

profiles SEQUENCE {

profile0x0001 BOOLEAN,

profile0x0002 BOOLEAN,

profile0x0003 BOOLEAN,

profile0x0004 BOOLEAN,

profile0x0006 BOOLEAN,

profile0x0101 BOOLEAN,

profile0x0102 BOOLEAN,

profile0x0103 BOOLEAN,

profile0x0104 BOOLEAN

},

drb-ContinueROHC ENUMERATED { true } OPTIONAL -- Need N

},

uplinkOnlyROHC SEQUENCE {

maxCID INTEGER (1..16383) DEFAULT 15,

profiles SEQUENCE {

profile0x0006 BOOLEAN

},

drb-ContinueROHC ENUMERATED { true } OPTIONAL -- Need N

},

...

},

integrityProtection ENUMERATED { enabled } OPTIONAL, -- Cond ConnectedTo5GC1

statusReportRequired ENUMERATED { true } OPTIONAL, -- Cond Rlc-AM-UM

outOfOrderDelivery ENUMERATED { true } OPTIONAL -- Need R

} OPTIONAL, -- Cond DRB

moreThanOneRLC SEQUENCE {

primaryPath SEQUENCE {

cellGroup CellGroupId OPTIONAL, -- Need R

logicalChannel LogicalChannelIdentity OPTIONAL -- Need R

},

ul-DataSplitThreshold UL-DataSplitThreshold OPTIONAL, -- Cond SplitBearer

pdcp-Duplication BOOLEAN OPTIONAL -- Need R

} OPTIONAL, -- Cond MoreThanOneRLC

t-Reordering ENUMERATED {

ms0, ms1, ms2, ms4, ms5, ms8, ms10, ms15, ms20, ms30, ms40,

ms50, ms60, ms80, ms100, ms120, ms140, ms160, ms180, ms200, ms220,

ms240, ms260, ms280, ms300, ms500, ms750, ms1000, ms1250,

ms1500, ms1750, ms2000, ms2250, ms2500, ms2750,

ms3000, spare28, spare27, spare26, spare25, spare24,

spare23, spare22, spare21, spare20,

spare19, spare18, spare17, spare16, spare15, spare14,

spare13, spare12, spare11, spare10, spare09,

spare08, spare07, spare06, spare05, spare04, spare03,

spare02, spare01 } OPTIONAL, -- Need S

...,

[[

cipheringDisabled ENUMERATED {true} OPTIONAL -- Cond ConnectedTo5GC

]],

[[

discardTimerExt-r16 SetupRelease { DiscardTimerExt-r16 } OPTIONAL, -- Cond DRB2

moreThanTwoRLC-DRB-r16 SEQUENCE {

splitSecondaryPath-r16 LogicalChannelIdentity OPTIONAL, -- Cond SplitBearer2

duplicationState-r16 SEQUENCE (SIZE (3)) OF BOOLEAN OPTIONAL -- Need S

} OPTIONAL, -- Cond MoreThanTwoRLC-DRB

ethernetHeaderCompression-r16 SetupRelease { EthernetHeaderCompression-r16 } OPTIONAL -- Need M

]],

[[

survivalTimeStateSupport-r17 ENUMERATED {true} OPTIONAL, -- Cond Drb-Duplication

uplinkDataCompression-r17 SetupRelease { UplinkDataCompression-r17 } OPTIONAL, -- Cond Rlc-AM

discardTimerExt2-r17 SetupRelease { DiscardTimerExt2-r17 } OPTIONAL, -- Need M

multicastHFN-AndRefSN-r17 BIT STRING (SIZE (32)) OPTIONAL -- Cond SetupOnlyMRB

]]

}

EthernetHeaderCompression-r16 ::= SEQUENCE {

ehc-Common-r16 SEQUENCE {

ehc-CID-Length-r16 ENUMERATED { bits7, bits15 },

...

},

ehc-Downlink-r16 SEQUENCE {

drb-ContinueEHC-DL-r16 ENUMERATED { true } OPTIONAL, -- Need N

...

} OPTIONAL, -- Need M

ehc-Uplink-r16 SEQUENCE {

maxCID-EHC-UL-r16 INTEGER (1..32767),

drb-ContinueEHC-UL-r16 ENUMERATED { true } OPTIONAL, -- Need N

...

} OPTIONAL -- Need M

}

UL-DataSplitThreshold ::= ENUMERATED {

b0, b100, b200, b400, b800, b1600, b3200, b6400, b12800, b25600, b51200, b102400, b204800,

b409600, b819200, b1228800, b1638400, b2457600, b3276800, b4096000, b4915200, b5734400,

b6553600, infinity, spare8, spare7, spare6, spare5, spare4, spare3, spare2, spare1}

DiscardTimerExt-r16 ::= ENUMERATED {ms0dot5, ms1, ms2, ms4, ms6, ms8, spare2, spare1}

DiscardTimerExt2-r17 ::= ENUMERATED {ms2000, spare3, spare2, spare1}

UplinkDataCompression-r17 ::= CHOICE {

newSetup SEQUENCE {

bufferSize-r17 ENUMERATED {kbyte2, kbyte4, kbyte8, spare1},

dictionary-r17 ENUMERATED {sip-SDP, operator} OPTIONAL -- Need N

},

drb-ContinueUDC NULL

}

-- TAG-PDCP-CONFIG-STOP

-- ASN1STOP

| *PDCP-Config* field descriptions |
| --- |
| ***cipheringDisabled***  If included, ciphering is disabled for this DRB regardless of which ciphering algorithm is configured for the SRB/DRBs. The field may only be included if the UE is connected to 5GC. Otherwise the field is absent. The network configures all DRBs with the same PDU-session ID with same value for this field. The value for this field cannot be changed after the DRB is set up. |
| ***discardTimer***  Value in ms of *discardTimer* specified in TS 38.323 [5]. Value *ms10* corresponds to 10 ms, value *ms20* corresponds to 20 ms and so on. The value for this field cannot be changed in case of reconfiguration with sync, if the bearer is configured as DAPS bearer. |
| ***discardTimerExt***  Value in ms of *discardTimer* specified in TS 38.323 [5]. Value *ms0dot5* corresponds to 0.5 ms, value *ms1* corresponds to 1ms and so on. If this field is present, the field *discardTimer* is ignored and *discardTimerExt* is used instead. |
| ***discardTimerExt2***  Value in ms of *discardTimerExt* specified in TS 38.323 [5]. Value *ms2000* corresponds to 2000 ms. If this field is present, the field *discardTimer* and *discardTimerExt* are ignored and *discardTimerExt2* is used instead. |
| ***drb-ContinueROHC***  Indicates whether the PDCP entity continues or resets the ROHC header compression protocol during PDCP re-establishment, as specified in TS 38.323 [5]. This field is configured only in case of resuming an RRC connection or reconfiguration with sync, where the PDCP termination point is not changed and the *fullConfig* is not indicated. The network does not include the field if the bearer is configured as DAPS bearer. This field can be configured for both DRB and multicast MRB. |
| ***duplicationState***  This field indicates the uplink PDCP duplication state for the associated RLC entities at the time of receiving this IE. If set to *true,* the PDCP duplication state is activated for the associated RLC entity. The index for the indication is determined by ascending order of logical channel ID of all RLC entities other than the primary RLC entityindicated by *primaryPath* in the order of MCG and SCG, as in clause 6.1.3.32 of TS 38.321 [3]. If the number of associated RLC entities other than the primary RLC entity is two, UE ignores the value in the largest index of this field. If the field is absent, the PDCP duplication states are deactivated for all associated RLC entities. |
| ***ethernetHeaderCompression***  This fields configures Ethernet Header Compression. This field can only be configured for a bi-directional DRB or a bi-directional multicast MRB. The network reconfigures *ethernetHeaderCompression* only upon reconfiguration involving PDCP re-establishment and with neither *drb-ContinueEHC-DL* nor *drb-ContinueEHC-UL* configured. Network only configures this field when *uplinkDataCompression* is not configured. |
| ***headerCompression***  If rohc is configured, the UE shall apply the configured ROHC profile(s) in both uplink and downlink. If *uplinkOnlyROHC* is configured, the UE shall apply the configured ROHC profile(s) in uplink (there is no header compression in downlink). ROHC can be configured for any bearer type. ROHC and EHC can be both configured simultaneously for a DRB or a multicast MRB. The network reconfigures *headerCompression* only upon reconfiguration involving PDCP re-establishment, and without any *drb-ContinueROHC*. Network configures *headerCompression* to *notUsed* when *outOfOrderDelivery* is configured. Network only configures this field when *uplinkDataCompression* is not configured. |
| ***integrityProtection***  Indicates whether or not integrity protection is configured for this radio bearer. The network configures all DRBs with the same PDU-session ID with same value for this field. The value for this field cannot be changed after the DRB is set up. |
| ***maxCID***  Indicates the value of the MAX\_CID parameter as specified in TS 38.323 [5].  The total value of MAX\_CIDs across all bearers for the UE should be less than or equal to the value of *maxNumberROHC-ContextSessions* parameter as indicated by the UE. |
| ***moreThanOneRLC***  This field configures UL data transmission when more than one RLC entity is associated with the PDCP entity. This field is not present if the bearer is configured as DAPS bearer. |
| ***moreThanTwoRLC-DRB***  This field configures UL data transmission when more than two RLC entities are associated with the PDCP entity for DRBs. |
| ***multicastHFN-AndRefSN***  Indicates an HFN and a reference PDCP SN associated to this HFN for multicast MRB PDCP window initialization as specified in TS 38.323 [5]. The value is composed of an HFN(MSBs) and a PDCP SN(LSBs). The size of the HFN part in bits is equal to 32 minus the length of the PDCP SN configured in *pdcp-SN-SizeDL*. |
| ***outOfOrderDelivery***  Indicates whether or not *outOfOrderDelivery* specified in TS 38.323 [5] is configured. This field should be either always present or always absent, after the radio bearer is established. |
| ***pdcp-Duplication***  Indicates whether or not uplink duplication status at the time of receiving this IE is configured and activated as specified in TS 38.323 [5]. The presence of this field indicates that duplication is configured. PDCP duplication is not configured for CA packet duplication of LTE RLC bearer. The value of this field, when the field is present, indicates the state of the duplication at the time of receiving this IE. If set to *true*, duplication is activated. The value of this field is always *true*, when configured for a SRB. For PDCP entity with more than two associated RLC entities for UL transmission, this field is always present. If the field *moreThanTwoRLC-DRB* is present, the value of this field is ignored and the state of the duplication is indicated by *duplicationState*. For PDCP entity with more than two associated RLC entities, only NR RLC bearer is supported. |
| ***pdcp-SN-SizeDL***  PDCP sequence number size for downlink, 12 or 18 bits, as specified in TS 38.323 [5]. For SRBs only the value *len12bits* is applicable. The value for this field cannot be changed in case of reconfiguration with sync, if the bearer is configured as DAPS bearer. |
| ***pdcp-SN-SizeUL***  PDCP sequence number size for uplink, 12 or 18 bits, as specified in TS 38.323 [5]. For SRBs only the value *len12bits* is applicable. The value for this field cannot be changed in case of reconfiguration with sync, if the bearer is configured as DAPS bearer. |
| ***primaryPath***  Indicates the cell group ID and LCID of the primary RLC entity as specified in TS 38.323 [5], clause 5.2.1 for UL data transmission when more than one RLC entity is associated with the PDCP entity. In this version of the specification, only cell group ID corresponding to MCG is supported for SRBs, except for the split SRB2 of the IAB-MT, and, when the SCG is deactivated, for DRBs. The NW indicates *cellGroup* for split bearers using logical channels in different cell groups. The NW always indicates *logicalChannel* if CA based PDCP duplication is configured in the cell group indicated by *cellGroup* of this field. |
| ***splitSecondaryPath***  Indicates the LCID of the split secondary RLC entity as specified in TS 38.323 [5] for fallback to split bearer operation when UL data transmission with more than two RLC entities is associated with the PDCP entity. This RLC entity belongs to a cell group that is different from the cell group indicated by *cellGroup* in the field *primaryPath.* |
| ***statusReportRequired***  For AM DRBs, AM MRBs and DAPS UM DRBs, indicates whether the DRB or the multicast MRB is configured to send a PDCP status report in the uplink, as specified in TS 38.323 [5]. For DAPS AM DRBs, it also indicates whether the DRB is configured to send a second PDCP status report in the uplink, as specified in TS 38.323 [5]. |
| ***survivalTimeStateSupport***  Indicates whether the DRB associated with this PDCP entity has survival time state support. If this field is configured to be true, all associated RLC entities are activated for PDCP duplication upon reception of a retransmission grant addressed to CS-RNTI, as specified in TS 38.321 [3]. |
| ***t-Reordering***  Value in ms of t-Reordering specified in TS 38.323 [5]. Value *ms0* corresponds to 0 ms, value *ms20* corresponds to 20 ms, value *ms40* corresponds to 40 ms, and so on. When the field is absent the UE applies the value *infinity*. The value for this field cannot be changed in case of reconfiguration with sync, if the bearer is configured as DAPS bearer. |
| ***ul-DataSplitThreshold***  Parameter specified in TS 38.323 [5]. Value *b0* corresponds to 0 bytes, value *b100* corresponds to 100 bytes, value *b200* corresponds to 200 bytes, and so on. The network sets this field to *infinity* for UEs not supporting *splitDRB-withUL-Both-MCG-SCG* and when the SCG is deactivated. If the field is absent when the split bearer is configured for the radio bearer first time, then the default value *infinity* is applied. |
| ***uplinkDataCompression***  Indicates the UDC configuration that the UE shall apply. Network does not configure *uplinkDataCompression* for a DRB, if *headerCompression* or *ethernetHeaderCompression* is already configured or *outOfOrderDelivery* or DAPS is configured for the DRB. The maximum number of DRBs where *uplinkDataCompression* can be applied is two. The network reconfigures *uplinkDataCompression* only upon reconfiguration involving PDCP re-establishment. If the field is set to *drb-ContinueUDC*, the PDCP entity continues the uplink data compression protocol during PDCP re-establishment, as specified in TS 38.323 [5]. The field is set to *drb-ContinueUDC* only in case of resuming an RRC connection or reconfiguration with sync, where the PDCP termination point is not changed and the *fullConfig* is not indicated. |

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| *EthernetHeaderCompression field descriptions* |
| ***drb-ContinueEHC-DL***  Indicates whether the PDCP entity continues or resets the downlink EHC header compression protocol during PDCP re-establishment, as specified in TS 38.323 [5]. The field is configured only in case of resuming an RRC connection or reconfiguration with sync, where the PDCP termination point is not changed and the *fullConfig* is not indicated. |
| ***drb-ContinueEHC-UL***  Indicates whether the PDCP entity continues or resets the uplink EHC header compression protocol during PDCP re-establishment, as specified in TS 38.323 [5]. The field is configured only in case of resuming an RRC connection or reconfiguration with sync, where the PDCP termination point is not changed and the *fullConfig* is not indicated. |
| ***ehc-CID-Length***  Indicates the length of the CID field for EHC packet. The value *bits7* indicates the length is 7 bits, and the value *bits15* indicates the length is 15 bits. Once the field *ethernetHeaderCompression-r16* is configured for a DRB or a multicast MRB, the value of the field *ehc-CID-Length* for this DRB or multicast MRB is not reconfigured to a different value. |
| ***ehc-Common***  Indicates the configurations that apply for both downlink and uplink. |
| ***ehc-Downlink***  Indicates the configurations that apply for only downlink. If the field is configured, then Ethernet header compression is configured for downlink. Otherwise, it is not configured for downlink. |
| ***ehc-Uplink***  Indicates the configurations that apply for only uplink. If the field is configured, then Ethernet header compression is configured for uplnik. Otherwise, it is not configured for uplink. |
| ***maxCID-EHC-UL***  Indicates the value of the MAX\_CID\_EHC\_UL parameter as specified in TS 38.323 [5]. The total value of MAX\_CID\_EHC\_UL across all bearers for the UE should be less than or equal to the value of *maxNumberEHC-Contexts* parameter as indicated by the UE. |

|  |
| --- |
| *UplinkDataCompression field descriptions* |
| ***bufferSize***  This field indicates the buffer size applied for UDC as specified in TS 38.323 [5]. Value *kbyte2* means 2048 bytes, *kbyte4* means 4096 bytes and so on. |
| ***dictionary***  This field indicates which pre-defined dictionary is used for UDC as specified in TS 38.323 [5]. The value *sip-SDP* means that UE shall prefill the buffer with standard dictionary for SIP and SDP defined in TS 38.323 [5], and the value *operator* means that UE shall prefill the buffer with operator-defined dictionary. |

| Conditional presence | Explanation |
| --- | --- |
| *DRB* | This field is mandatory present when the corresponding DRB/multicast MRB is being set up, absent for SRBs. Otherwise this field is optionally present, need M. |
| *DRB2* | This field is optionally present in case of DRB, need M. Otherwise, it is absent for SRBs and MRBs. |
| *Drb-Duplication* | For SRBs, this field is absent. For DRBs, this field is absent if duplication is not configured. Otherwise, this field is optional, need R. |
| *MoreThanOneRLC* | This field is mandatory present upon RRC reconfiguration with setup of a PDCP entity for a radio bearer with more than one associated logical channel and upon RRC reconfiguration with the association of additional logical channels to the PDCP entity.  The field is also mandatory present in case the field *moreThanTwoRLC-DRB* is included in *PDCP-Config*.  Upon RRC reconfiguration when a PDCP entity is associated with multiple logical channels, this field is optionally present need M. Otherwise, this field is absent. Need R. |
| *MoreThanTwoRLC-DRB* | For SRBs, this field is absent.  For DRBs, this field is mandatory present upon RRC reconfiguration with setup of a PDCP entity for a radio bearer with more than two associated logical channels and upon RRC reconfiguration with the association of one or more additional logical channel(s) to the PDCP entity so that the PDCP entity has more than two associated logical channels.  Upon RRC reconfiguration when a PDCP entity is associated with more than two logical channels, this field is optionally present, Need M. Otherwise, the field is absent, Need R. |
| *Rlc-AM* | For RLC AM, the field is optionally present, need M. Otherwise, the field is absent. |
| *Rlc-AM-UM* | In case of DRB, for RLC UM (if the UE supports DAPS handover) or RLC AM, the field is optionally present, need R. In case of multicast MRB, if multicast MRB is associated with at least one RLC AM entity, the field is optionally present, need R. Otherwise, the field is absent. |
| *Setup* | The field is mandatory present in case of SRB or DRB setup. Otherwise the field is optionally present, need M. |
| *SplitBearer* | The field is absent for SRBs. Otherwise, the field is optional present, need M, in case of radio bearer with more than one associated RLC mapped to different cell groups. |
| *SplitBearer2* | The field is mandatory present, in case of a split bearer. Otherwise the field is absent. |
| *ConnectedTo5GC* | The field is optionally present, need R, if the UE is connected to 5GC. Otherwise the field is absent. |
| *ConnectedTo5GC1* | The field is optionally present, need R, if the UE is connected to NR/5GC or if the UE supports user plane integrity protection when connected to E-UTRA/EPC (as specified in TS 33.401 [30]). Otherwise the field is absent. |
| *Setup1* | This field is mandatory present in case of SRB and DRB setup for RLC-AM and RLC-UM. Otherwise, this field is absent, Need M. |
| *Setup2* | This field is mandatory present in case for radio bearer setup for RLC-AM and RLC-UM. Otherwise, this field is absent, Need M. |
| *SetupOnlyMRB* | This field is mandatory present in case of multicast MRB setup. Otherwise, this field is absent, Need N. |

#### – *PDSCH-Config*

The *PDSCH-Config* IE is used to configure the UE specific PDSCH parameters. If this IE is used for MBS CFR, the following fields shall be absent: tci-StatesToAddModList, tci-StatesToReleaseList, zp-CSI-RS-ResourceToAddModList, minimumSchedulingOffsetK0, antennaPortsFieldPresenceDCI-1-2, aperiodicZP-CSI-RS-ResourceSetsToAddModListDCI-1-2, aperiodicZP-CSI-RS-ResourceSetsToReleaseListDCI-1-2, dmrs-DownlinkForPDSCH-MappingTypeA-DCI-1-2, dmrs-DownlinkForPDSCH-MappingTypeB-DCI-1-2, dmrs-SequenceInitializationDCI-1-2, harq-ProcessNumberSizeDCI-1-2, mcs-TableDCI-1-2, numberOfBitsForRV-DCI-1-2, pdsch-AggregationFactor, pdsch-TimeDomainAllocationListDCI-1-2, prb-BundlingTypeDCI-1-2, priorityIndicatorDCI-1-2, rateMatchPatternGroup1DCI-1-2, rateMatchPatternGroup2DCI-1-2, resourceAllocationType1GranularityDCI-1-2, vrb-ToPRB-InterleaverDCI-1-2, referenceOfSLIVDCI-1-2, resourceAllocationDCI-1-2, dataScramblingIdentityPDSCH2-r16, repetitionSchemeConfig.

*PDSCH-Config* information element

-- ASN1START

-- TAG-PDSCH-CONFIG-START

PDSCH-Config ::= SEQUENCE {

dataScramblingIdentityPDSCH INTEGER (0..1023) OPTIONAL, -- Need S

dmrs-DownlinkForPDSCH-MappingTypeA SetupRelease { DMRS-DownlinkConfig } OPTIONAL, -- Need M

dmrs-DownlinkForPDSCH-MappingTypeB SetupRelease { DMRS-DownlinkConfig } OPTIONAL, -- Need M

tci-StatesToAddModList SEQUENCE (SIZE(1..maxNrofTCI-States)) OF TCI-State OPTIONAL, -- Need N

tci-StatesToReleaseList SEQUENCE (SIZE(1..maxNrofTCI-States)) OF TCI-StateId OPTIONAL, -- Need N

vrb-ToPRB-Interleaver ENUMERATED {n2, n4} OPTIONAL, -- Need S

resourceAllocation ENUMERATED { resourceAllocationType0, resourceAllocationType1, dynamicSwitch},

pdsch-TimeDomainAllocationList SetupRelease { PDSCH-TimeDomainResourceAllocationList } OPTIONAL, -- Need M

pdsch-AggregationFactor ENUMERATED { n2, n4, n8 } OPTIONAL, -- Need S

rateMatchPatternToAddModList SEQUENCE (SIZE (1..maxNrofRateMatchPatterns)) OF RateMatchPattern OPTIONAL, -- Need N

rateMatchPatternToReleaseList SEQUENCE (SIZE (1..maxNrofRateMatchPatterns)) OF RateMatchPatternId OPTIONAL, -- Need N

rateMatchPatternGroup1 RateMatchPatternGroup OPTIONAL, -- Need R

rateMatchPatternGroup2 RateMatchPatternGroup OPTIONAL, -- Need R

rbg-Size ENUMERATED {config1, config2},

mcs-Table ENUMERATED {qam256, qam64LowSE} OPTIONAL, -- Need S

maxNrofCodeWordsScheduledByDCI ENUMERATED {n1, n2} OPTIONAL, -- Need R

prb-BundlingType CHOICE {

staticBundling SEQUENCE {

bundleSize ENUMERATED { n4, wideband } OPTIONAL -- Need S

},

dynamicBundling SEQUENCE {

bundleSizeSet1 ENUMERATED { n4, wideband, n2-wideband, n4-wideband } OPTIONAL, -- Need S

bundleSizeSet2 ENUMERATED { n4, wideband } OPTIONAL -- Need S

}

},

zp-CSI-RS-ResourceToAddModList SEQUENCE (SIZE (1..maxNrofZP-CSI-RS-Resources)) OF ZP-CSI-RS-Resource

OPTIONAL, -- Need N

zp-CSI-RS-ResourceToReleaseList SEQUENCE (SIZE (1..maxNrofZP-CSI-RS-Resources)) OF ZP-CSI-RS-ResourceId

OPTIONAL, -- Need N

aperiodic-ZP-CSI-RS-ResourceSetsToAddModList SEQUENCE (SIZE (1..maxNrofZP-CSI-RS-ResourceSets)) OF ZP-CSI-RS-ResourceSet

OPTIONAL, -- Need N

aperiodic-ZP-CSI-RS-ResourceSetsToReleaseList SEQUENCE (SIZE (1..maxNrofZP-CSI-RS-ResourceSets)) OF ZP-CSI-RS-ResourceSetId

OPTIONAL, -- Need N

sp-ZP-CSI-RS-ResourceSetsToAddModList SEQUENCE (SIZE (1..maxNrofZP-CSI-RS-ResourceSets)) OF ZP-CSI-RS-ResourceSet

OPTIONAL, -- Need N

sp-ZP-CSI-RS-ResourceSetsToReleaseList SEQUENCE (SIZE (1..maxNrofZP-CSI-RS-ResourceSets)) OF ZP-CSI-RS-ResourceSetId

OPTIONAL, -- Need N

p-ZP-CSI-RS-ResourceSet SetupRelease { ZP-CSI-RS-ResourceSet }

OPTIONAL, -- Need M

...,

[[

maxMIMO-Layers-r16 SetupRelease { MaxMIMO-LayersDL-r16 } OPTIONAL, -- Need M

minimumSchedulingOffsetK0-r16 SetupRelease { MinSchedulingOffsetK0-Values-r16 } OPTIONAL, -- Need M

-- Start of the parameters for DCI format 1\_2 introduced in V16.1.0

antennaPortsFieldPresenceDCI-1-2-r16 ENUMERATED {enabled} OPTIONAL, -- Need S

aperiodicZP-CSI-RS-ResourceSetsToAddModListDCI-1-2-r16 SEQUENCE (SIZE (1..maxNrofZP-CSI-RS-ResourceSets)) OF ZP-CSI-RS-ResourceSet

OPTIONAL, -- Need N

aperiodicZP-CSI-RS-ResourceSetsToReleaseListDCI-1-2-r16 SEQUENCE (SIZE (1..maxNrofZP-CSI-RS-ResourceSets)) OF ZP-CSI-RS-ResourceSetId

OPTIONAL, -- Need N

dmrs-DownlinkForPDSCH-MappingTypeA-DCI-1-2-r16 SetupRelease { DMRS-DownlinkConfig } OPTIONAL, -- Need M

dmrs-DownlinkForPDSCH-MappingTypeB-DCI-1-2-r16 SetupRelease { DMRS-DownlinkConfig } OPTIONAL, -- Need M

dmrs-SequenceInitializationDCI-1-2-r16 ENUMERATED {enabled} OPTIONAL, -- Need S

harq-ProcessNumberSizeDCI-1-2-r16 INTEGER (0..4) OPTIONAL, -- Need R

mcs-TableDCI-1-2-r16 ENUMERATED {qam256, qam64LowSE} OPTIONAL, -- Need S

numberOfBitsForRV-DCI-1-2-r16 INTEGER (0..2) OPTIONAL, -- Need R

pdsch-TimeDomainAllocationListDCI-1-2-r16 SetupRelease { PDSCH-TimeDomainResourceAllocationList-r16 }

OPTIONAL, -- Need M

prb-BundlingTypeDCI-1-2-r16 CHOICE {

staticBundling-r16 SEQUENCE {

bundleSize-r16 ENUMERATED { n4, wideband } OPTIONAL -- Need S

},

dynamicBundling-r16 SEQUENCE {

bundleSizeSet1-r16 ENUMERATED { n4, wideband, n2-wideband, n4-wideband } OPTIONAL, -- Need S

bundleSizeSet2-r16 ENUMERATED { n4, wideband } OPTIONAL -- Need S

}

} OPTIONAL, -- Need R

priorityIndicatorDCI-1-2-r16 ENUMERATED {enabled} OPTIONAL, -- Need S

rateMatchPatternGroup1DCI-1-2-r16 RateMatchPatternGroup OPTIONAL, -- Need R

rateMatchPatternGroup2DCI-1-2-r16 RateMatchPatternGroup OPTIONAL, -- Need R

resourceAllocationType1GranularityDCI-1-2-r16 ENUMERATED {n2,n4,n8,n16} OPTIONAL, -- Need S

vrb-ToPRB-InterleaverDCI-1-2-r16 ENUMERATED {n2, n4} OPTIONAL, -- Need S

referenceOfSLIVDCI-1-2-r16 ENUMERATED {enabled} OPTIONAL, -- Need S

resourceAllocationDCI-1-2-r16 ENUMERATED { resourceAllocationType0, resourceAllocationType1, dynamicSwitch}

OPTIONAL, -- Need M

-- End of the parameters for DCI format 1\_2 introduced in V16.1.0

priorityIndicatorDCI-1-1-r16 ENUMERATED {enabled} OPTIONAL, -- Need S

dataScramblingIdentityPDSCH2-r16 INTEGER (0..1023) OPTIONAL, -- Need R

pdsch-TimeDomainAllocationList-r16 SetupRelease { PDSCH-TimeDomainResourceAllocationList-r16 } OPTIONAL, -- Need M

repetitionSchemeConfig-r16 SetupRelease { RepetitionSchemeConfig-r16} OPTIONAL -- Need M

]],

[[

repetitionSchemeConfig-v1630 SetupRelease { RepetitionSchemeConfig-v1630} OPTIONAL -- Need M

]],

[[

pdsch-HARQ-ACK-OneShotFeedbackDCI-1-2-r17 ENUMERATED {enabled} OPTIONAL, -- Need R

pdsch-HARQ-ACK-EnhType3DCI-1-2-r17 ENUMERATED {enabled} OPTIONAL, -- Need R

pdsch-HARQ-ACK-EnhType3DCI-Field-1-2-r17 ENUMERATED {enabled} OPTIONAL, -- Need R

pdsch-HARQ-ACK-RetxDCI-1-2-r17 ENUMERATED {enabled} OPTIONAL, -- Need R

pucch-sSCellDynDCI-1-2-r17 ENUMERATED {enabled} OPTIONAL, -- Need R

dl-OrJoint-TCIStateList-r17 CHOICE {

explicitlist SEQUENCE {

dl-orJoint-TCI-State-ToAddModList-r17 SEQUENCE (SIZE (1..maxNrofTCI-States)) OF TCI-State

OPTIONAL, -- Need N

dl-orJoint-TCI-State-ToReleaseList-r17 SEQUENCE (SIZE (1..maxNrofTCI-States)) OF TCI-StateId

OPTIONAL -- Need N

},

unifiedTCI-StateRef-r17 ServingCellAndBWP-Id-r17

} OPTIONAL, -- Need R

beamAppTime-r17 ENUMERATED {n1, n2, n4, n7, n14, n28, n42, n56, n70, n84, n98, n112, n224, n336, spare2,

spare1} OPTIONAL, -- Need R

pdsch-TimeDomainAllocationListForMultiPDSCH-r17 SetupRelease { MultiPDSCH-TDRA-List-r17 } OPTIONAL, -- Need M

dmrs-FD-OCC-DisabledForRank1-PDSCH-r17 ENUMERATED {true} OPTIONAL, -- Need R

minimumSchedulingOffsetK0-r17 SetupRelease { MinSchedulingOffsetK0-Values-r17 } OPTIONAL, -- Need M

harq-ProcessNumberSizeDCI-1-2-v1700 INTEGER (0..5) OPTIONAL, -- Need R

harq-ProcessNumberSizeDCI-1-1-r17 INTEGER (5) OPTIONAL, -- Need R

mcs-Table-r17 ENUMERATED {qam1024} OPTIONAL, -- Need R

mcs-TableDCI-1-2-r17 ENUMERATED {qam1024} OPTIONAL, -- Need R

xOverheadMulticast-r17 ENUMERATED {xOh6, xOh12, xOh18} OPTIONAL, -- Need S

priorityIndicatorDCI-4-2-r17 ENUMERATED {enabled} OPTIONAL, -- Need S

sizeDCI-4-2-r17 INTEGER (20..maxDCI-4-2-Size-r17) OPTIONAL -- Need R

]]

}

RateMatchPatternGroup ::= SEQUENCE (SIZE (1..maxNrofRateMatchPatternsPerGroup)) OF CHOICE {

cellLevel RateMatchPatternId,

bwpLevel RateMatchPatternId

}

MinSchedulingOffsetK0-Values-r16 ::= SEQUENCE (SIZE (1..maxNrOfMinSchedulingOffsetValues-r16)) OF INTEGER (0..maxK0-SchedulingOffset-r16)

MinSchedulingOffsetK0-Values-r17 ::= SEQUENCE (SIZE (1..maxNrOfMinSchedulingOffsetValues-r16)) OF INTEGER (0..maxK0-SchedulingOffset-r17)

MaxMIMO-LayersDL-r16 ::= INTEGER (1..8)

-- TAG-PDSCH-CONFIG-STOP

-- ASN1STOP

|  |
| --- |
| *PDSCH-Config* field descriptions |
| ***antennaPortsFieldPresenceDCI-1-2***  Configure the presence of "Antenna ports" field in DCI format 1\_2. When the field is configured, then the "Antenna ports" field is present in DCI format 1\_2. Otherwise, the field size is set to 0 for DCI format 1\_2 (See TS 38.212 [17], clause 7.3.1.1.3). If neither *dmrs-DownlinkForPDSCH-MappingTypeA-DCI-1-2* nor *dmrs-DownlinkForPDSCH-MappingTypeB-DCI-1-2* is configured, this field is absent. |
| ***aperiodic-ZP-CSI-RS-ResourceSetsToAddModList, aperiodic-ZP-CSI-RS-ResourceSetsToAddModListDCI-1-2***  AddMod/Release lists for configuring aperiodically triggered zero-power CSI-RS resource sets. Each set contains a *ZP-CSI-RS-ResourceSetId* and the IDs of one or more *ZP-CSI-RS-Resources* (the actual resources are defined in the *zp-CSI-RS-ResourceToAddModList*). The network configures the UE with at most 3 aperiodic *ZP-CSI-RS-ResourceSets* and it uses only the *ZP-CSI-RS-ResourceSetId* 1 to 3. The network triggers a set by indicating its *ZP-CSI-RS-ResourceSetId* in the DCI payload. The DCI codepoint '01' triggers the resource set with *ZP-CSI-RS-ResourceSetId* 1, the DCI codepoint '10' triggers the resource set with *ZP-CSI-RS-ResourceSetId 2*, and the DCI codepoint '11' triggers the resource set with *ZP-CSI-RS-ResourceSetId* 3 (see TS 38.214 [19], clause 5.1.4.2). The field *aperiodic-ZP-CSI-RS-ResourceSetsToAddModList* applies to DCI format 1\_1 and the field *aperiodic-ZP-CSI-RS-ResourceSetsToAddModListDCI-1-2* applies to DCI format 1\_2 (see TS 38.214 [19], clause 5.1.4.2 and TS 38.212 [17] clause 7.3.1). |
| ***beamAppTime***  Indicates the first slot to apply the unified TCI indicated by DCI as specified in TS 38.214 Clause 5.1.5. The value n1 means 1 symbol, n2 two symbols and so on. The first slot is at least Y symbols indicated by beamAppTime parameter after the last symbol of the acknowledgment of the joint or separate DL/UL beam indication. The same value shall be configured for all serving cells in any one of the *simultaneousU-TCI-UpdateListN* configured in IE *CellGroupConfig* based on the smallest SCS of the active BWP. |
| ***dataScramblingIdentityPDSCH, dataScramblingIdentityPDSCH2***  Identifier(s) used to initialize data scrambling (c\_init) for PDSCH as specified in TS 38.211 [16], clause 7.3.1.1. The *dataScramblingIdentityPDSCH2* is configured if *coresetPoolIndex* is configured with 1 for at least one CORESET in the same BWP. |
| ***dl-OrJoint-TCI-State-ToAddModList***  A list of Transmission Configuration Indicator (TCI) states indicating a transmission configuration which includes QCL-relationships between the DL RSs in one RS set and the PDSCH DMRS ports (see TS 38.214 [19], clause 5.1.5). |
| ***dmrs-DownlinkForPDSCH-MappingTypeA, dmrs-DownlinkForPDSCH-MappingTypeA-DCI-1-2***  DMRS configuration for PDSCH transmissions using PDSCH mapping type A (chosen dynamically via *PDSCH-TimeDomainResourceAllocation*). Only the fields *dmrs-Type*, *dmrs-AdditionalPosition* and *maxLength* may be set differently for mapping type A and B. The field *dmrs-DownlinkForPDSCH-MappingTypeA* applies to DCI format 1\_1 and the field *dmrs-DownlinkForPDSCH-MappingTypeA-DCI-1-2* applies to DCI format 1\_2 (see TS 38.212 [17], clause 7.3.1). |
| ***dmrs-DownlinkForPDSCH-MappingTypeB, dmrs-DownlinkForPDSCH-MappingTypeB-DCI-1-2***  DMRS configuration for PDSCH transmissions using PDSCH mapping type B (chosen dynamically via *PDSCH-TimeDomainResourceAllocation*). Only the fields *dmrs-Type*, *dmrs-AdditionalPosition* and *maxLength* may be set differently for mapping type A and B. The field *dmrs-DownlinkForPDSCH-MappingTypeB* applies to DCI format 1\_1 and the field *dmrs-DownlinkForPDSCH-MappingTypeB-DCI-1-2* applies to DCI format 1\_2 (see TS 38.212 [17], clause 7.3.1). |
| ***dmrs-FD-OCC-DisabledForRank1-PDSCH***  If configured, the UE may assume that the set of remaining orthogonal antenna ports, which are within the same code division multiplexing (CDM) group and have different frequency domain orthogonal cover codes (FD-OCC), are not associated with the PDSCH of another UE (see TS 38.214 [19], clause 5.1.6.2). It is applicable for PDSCH SCS of 480 and 960 kHz when rank 1 PDSCH with type-1 or type-2 DMRS is scheduled. |
| ***dmrs-SequenceInitializationDCI-1\_2***  Configure whether the field "DMRS Sequence Initialization" is present or not in DCI format 1\_2 If the field is absent, then the UE applies the value of 0 bit for the field "DMRS Sequence Initialization" in DCI format 1\_2. If the field is present, then the UE applies the value of 1 bit as in DCI format 1\_2 (see TS 38.212 [17], clause 7.3.1). |
| ***harq-ProcessNumberSizeDCI-1-2***  Configure the number of bits for the field "HARQ process number" in DCI format 1\_2 (see TS 38.212 [17], clause 7.3.1). |
| ***maxMIMO-Layers***  Indicates the maximum number of MIMO layers to be used for PDSCH in this DL BWP. If not configured, the UE uses the *maxMIMO-Layers* configuration in IE *PDSCH-ServingCellConfig* of the serving cell to which this BWP belongs, when the UE operates in this BWP. The value of *maxMIMO-Layers* for a DL BWP shall be smaller than or equal to the value of *maxMIMO-Layers* configured in IE *PDSCH-ServingCellConfig* of the serving cell to which this BWP belongs.  For MBS multicast, indicates the maximum number of MIMO layers to be used for group-common PDSCH of MBS multicast in this CFR. If not configured for CFR, the UE applies value 1. The value of *maxMIMO-Layers* for a CFR shall be smaller than or equal to the value of *maxMIMO-Layers* configured in *PDSCH-ServingCellConfig* IE of the serving cell to which this CFR belongs. |
| ***maxNrofCodeWordsScheduledByDCI***  Maximum number of code words that a single DCI may schedule. This changes the number of MCS/RV/NDI bits in the DCI message from 1 to 2. |
| ***mcs-Table***  Indicates which MCS table the UE shall use for PDSCH for DCI formats 1\_0 and 1\_1 (see TS 38.214 [19], clause 5.1.3.1). If all fields are absent the UE applies the value 64QAM. If the field *mcs-Table-r17* is present for DCI format 1\_1, the network does not configure the field *mcs-Table* (without suffix). For a RedCap UE, the 256QAM MCS table for PDSCH is only supported if the UE indicates support of 256QAM for PDSCH. |
| ***mcs-TableDCI-1-2***  Indicates which MCS table the UE shall use for PDSCH for DCI format 1\_2 (see TS 38.214 [19], clause 5.1.3.1). If all fields are absent the UE applies the value 64QAM. If the field *mcs-TableDCI-1-2-r17* is present, the network does not configure the field *mcs-TableDCI-1-2-r16*. For a RedCap UE, the 256QAM MCS table for PDSCH is only supported if the UE indicates support of 256QAM for PDSCH. |
| ***minimumSchedulingOffsetK0***  List of minimum K0 values. Minimum K0 parameter denotes minimum applicable value(s) for the TDRA table for PDSCH and for A-CSI RS triggering Offset(s) (see TS 38.214 [19], clause 5.3.1). |
| ***numberOfBitsForRV-DCI-1-2***  Configures the number of bits for "Redundancy version" in the DCI format 1\_2 (see TS 38.212 [17], clause 7.3.1 and TS 38.214 [19], clause 5.1.2.1). |
| ***pdsch-AggregationFactor***  Number of repetitions for data (see TS 38.214 [19], clause 5.1.2.1). When the field is absent in *PDSCH-Config* which is not used for MBS CFR, the UE applies the value 1. |
| ***pdsch-HARQ-ACK-EnhType3DCI-1-2***  When configured, enhanced Type 3 HARQ-ACK codebook triggering by DCI format 1\_2 is enabled. |
| ***pdsch-HARQ-ACK-EnhType3DCI-Field-1-2***  Enables the enhanced Type 3 codebook through a new DCI field to indicate the enhanced Type 3 HARQ-ACK codebook in DCI format 1\_2 if the more than one enhanced Type 3 HARQ-ACK codebook is configured for the primary PUCCH cell group. |
| ***pdsch-HARQ-ACK-OneShotFeedbackDCI-1-2***  When configured, DCI format 1\_2 can request the UE to report A/N for all HARQ processes and all component carriers configured in the PUCCH group (see TS 38.212 [17], clause 7.3.1). |
| ***pdsch-HARQ-ACK-RetxDCI-1-2***  When configured, DCI format 1\_2 can request the UE to perform a HARQ-ACK re-transmission on a PUCCH resource (see TS 38.213 [13], clause 9.1.5). |
| ***pdsch-TimeDomainAllocationList, pdsch-TimeDomainAllocationListDCI-1-2, pdsch-TimeDomainAllocationListForMultiPDSCH***  List of time-domain configurations for timing of DL assignment to DL data.  The field *pdsch-TimeDomainAllocationList* (with or without suffix) applies to DCI format 1\_0 and DCI format 1\_1 (see table 5.1.2.1.1-1 in TS 38.214 [19]), and if the field *pdsch-TimeDomainAllocationListDCI-1-2* is not configured, to DCI format 1\_2. If the field *pdsch-TimeDomainAllocationListDCI-1-2* is configured, it applies to DCI format 1\_2 (see table 5.1.2.1.1-1A in TS 38.214 [19]). The field *pdsch-TimeDomainAllocationListForMultiPDSCH* applies to DCI format 1\_1.  The network does not configure the *pdsch-TimeDomainAllocationList-r16* simultaneously with the *pdsch-TimeDomainAllocationList* (without suffix) in the same *PDSCH-Config*. |
| ***prb-BundlingType,*** ***prb-BundlingTypeDCI-1-2***  Indicates the PRB bundle type and bundle size(s) (see TS 38.214 [19], clause 5.1.2.3). If *dynamic* is chosen, the actual *bundleSizeSet1 or bundleSizeSet2* to use is indicated via DCI. Constraints on *bundleSize(Set)* setting depending on *vrb-ToPRB-Interleaver* and *rbg-Size* settings are described in TS 38.214 [19], clause 5.1.2.3. If a *bundleSize(Set)* value is absent, the UE applies the value *n2*. The field *prb-BundlingType* applies to DCI format 1\_1, and the field *prb-BundlingTypeDCI-1-2* applies to DCI format 1\_2 (see TS 38.212 [17], clause 7.3.1 and TS 38.214 [19], clause 5.1.2.3). |
| ***priorityIndicatorDCI-1-1, priorityIndicatorDCI-1-2, priorityIndicatorDCI-4-2***  Configure the presence of "priority indicator" in DCI format 1\_1/1\_2/4\_2. When the field is absent in the IE, then 0 bit for "priority indicator" in DCI format 1\_1/1\_2/4\_2. The field *priorityIndicatorDCI-1-1* applies to DCI format 1\_1, the field *priorityIndicatorDCI-1-2* applies to DCI format 1\_2 and the field *priorityIndicatorDCI-4-2* applies to DCI format 4\_2, respectively (see TS 38.212 [17], clause 7.3.1 and TS 38.213 [13] clause 9). |
| ***pucch-sSCellDynDCI-1-2***  When configured, PUCCH cell switching based on dynamic indication in DCI format 1\_2 is enabled (see TS 38.213 [13], clause 9.A). |
| ***p-ZP-CSI-RS-ResourceSet***  A set of periodically occurring ZP-CSI-RS-Resources (the actual resources are defined in the zp-CSI-RS-ResourceToAddModList). The network uses the ZP-CSI-RS-ResourceSetId=0 for this set.  If *p-ZP-CSI-RS-ResourceSet* is configured in both *PDSCH-Config* for MBS CFR and *PDSCH-Config* for the assoicated BWP, it is subject to UE capability whether the *p-ZP-CSI-RS-ResourceSet* configured in *PDSCH-Config* for MBS CFR can be different from the *p-ZP-CSI-RS-ResourceSet* configured in *PDSCH-Config* for the assoicated BWP. |
| ***rateMatchPatternGroup1, rateMatchPatternGroup1DCI-1-2***  The IDs of a first group of *RateMatchPatterns* defined in *PDSCH-Config*->*rateMatchPatternToAddModList* (BWP level) or in *ServingCellConfig* ->*rateMatchPatternToAddModLis*t (cell level). These patterns can be activated dynamically by DCI (see TS 38.214 [19], clause 5.1.4.1). The field *rateMatchPatternGroup1* applies to DCI format 1\_1, and the field *rateMatchPatternGroup1DCI-1-2* applies to DCI format 1\_2 (see TS 38.214 [19], clause 5.1.4.1). |
| ***rateMatchPatternGroup2, rateMatchPatternGroup2DCI-1-2***  The IDs of a second group of *RateMatchPatterns* defined in *PDSCH-Config*->*rateMatchPatternToAddModList* (BWP level) or in *ServingCellConfig* ->*rateMatchPatternToAddModLis*t (cell level). These patterns can be activated dynamically by DCI (see TS 38.214 [19], clause 5.1.4.1). The field *rateMatchPatternGroup2* applies to DCI format 1\_1, and the field *rateMatchPatternGroup2DCI-1-2* applies to DCI format 1\_2 (see TS 38.214 [19], clause 5.1.4.1). |
| ***rateMatchPatternToAddModList***  Resources patterns which the UE should rate match PDSCH around. The UE rate matches around the union of all resources indicated in the rate match patterns (see TS 38.214 [19], clause 5.1.4.1). If a *RateMatchPattern* with the same *RateMatchPatternId* is configured in both MBS CFR and its associated BWP, the entire *RateMatchPattern* configuration shall be the same and they are counted as a single rate match pattern in the total configured rate match patterns as defined in TS 38.214 [19]. |
| ***rbg-Size***  Selection between config 1 and config 2 for RBG size for PDSCH. The UE ignores this field if *resourceAllocation* is set to *resourceAllocationType1* (see TS 38.214 [19], clause 5.1.2.2.1). |
| ***referenceOfSLIVDCI-1-2***  Enable using the starting symbol of the PDCCH monitoring occasion in which the DL assignment is detected as the reference of the SLIV for DCI format 1\_2. When the RRC parameter enables the utilization of the new reference, the new reference is applied for TDRA entries with K0=0. For other entries (if any) in the same TDRA table, the reference is slot boundary as in Rel-15. PDSCH mapping type A is not supported with the new reference. The new reference of SLIV is not configured for a serving cell configured to be scheduled by cross-carrier scheduling on a scheduling cell with different numerology (see TS 38.212 [17] clause 7.3.1 and TS 38.214 [19] clause 5.1.2.1). |
| ***repetitionSchemeConfig***  Configure the UE with repetition schemes. The network does not configure *repetitionSchemeConfig-r16* and *repetitionSchemeConfig-v1630* simultaneously to *setup* in the same *PDSCH-Config*. |
| ***resourceAllocation, resourceAllocationDCI-1-2***  Configuration of resource allocation type 0 and resource allocation type 1 for non-fallback DCI (see TS 38.214 [19], clause 5.1.2.2). The field *resourceAllocation* applies to DCI format 1\_1, and the field *resourceAllocationDCI-1-2* applies to DCI format 1\_2 (see TS 38.214 [19], clause 5.1.2.2). |
| ***resourceAllocationType1GranularityDCI-1-2***  Configure the scheduling granularity applicable for both the starting point and length indication for resource allocation type 1 in DCI format 1\_2. If this field is absent, the granularity is 1 PRB (see TS 38.214 [19], clause 5.1.2.2.2). |
| ***sizeDCI-4-2***  Indicates the size of DCI format 4-2 (see TS 38.213 [13], clause 10.1). |
| ***sp-ZP-CSI-RS-ResourceSetsToAddModList***  AddMod/Release lists for configuring semi-persistent zero-power CSI-RS resource sets. Each set contains a *ZP-CSI-RS-ResourceSetId* and the IDs of one or more *ZP-CSI-RS-Resources* (the actual resources are defined in the *zp-CSI-RS-ResourceToAddModList*) (see TS 38.214 [19], clause 5.1.4.2). |
| ***tci-StatesToAddModList***  A list of Transmission Configuration Indicator (TCI) states indicating a transmission configuration which includes QCL-relationships between the DL RSs in one RS set and the PDSCH DMRS ports (see TS 38.214 [19], clause 5.1.5). |
| ***unifiedTCI-StateRef***  Provides the serving cell and BWP where the configuration for *dl-orJoint-TCI-State-ToAddModList-r17* in this IE for this serving cell and BWP. When this field is present, *dl-OrJoint-TCI-State-ToAddModList* and or *dl-Joint-TCI-State-ToReleaseList* are not present. |
| ***vrb-ToPRB-Interleaver, vrb-ToPRB-InterleaverDCI-1-2***  Interleaving unit configurable between 2 and 4 PRBs (see TS 38.211 [16], clause 7.3.1.6). When the field is absent, the UE performs non-interleaved VRB-to-PRB mapping. |
| ***xOverheadMulticast***  Accounts for an overhead from CSI-RS, CORESET etc. If the field is absent, the UE applies value xOh0 (see TS 38.214 [19]). |
| ***zp-CSI-RS-ResourceToAddModList***  A list of Zero-Power (ZP) CSI-RS resources used for PDSCH rate-matching. Each resource in this list may be referred to from only one type of resource set, i.e., aperiodic, semi-persistent or periodic (see TS 38.214 [19]). |

#### – *PDSCH-ConfigCommon*

The IE *PDSCH-ConfigCommon* is used to configure cell specific PDSCH parameters.

*PDSCH-ConfigCommon* information element

-- ASN1START

-- TAG-PDSCH-CONFIGCOMMON-START

PDSCH-ConfigCommon ::= SEQUENCE {

pdsch-TimeDomainAllocationList PDSCH-TimeDomainResourceAllocationList OPTIONAL, -- Need R

...

}

-- TAG-PDSCH-CONFIGCOMMON-STOP

-- ASN1STOP

|  |
| --- |
| *PDSCH-ConfigCommon* field descriptions |
| ***pdsch-TimeDomainAllocationList***  List of time-domain configurations for timing of DL assignment to DL data (see table 5.1.2.1.1-1 in TS 38.214 [19]). |

#### – *PDSCH-ServingCellConfig*

The IE *PDSCH-ServingCellConfig* is used to configure UE specific PDSCH parameters that are common across the UE's BWPs of one serving cell.

*PDSCH-ServingCellConfig* information element

-- ASN1START

-- TAG-PDSCH-SERVINGCELLCONFIG-START

PDSCH-ServingCellConfig ::= SEQUENCE {

codeBlockGroupTransmission SetupRelease { PDSCH-CodeBlockGroupTransmission } OPTIONAL, -- Need M

xOverhead ENUMERATED { xOh6, xOh12, xOh18 } OPTIONAL, -- Need S

nrofHARQ-ProcessesForPDSCH ENUMERATED {n2, n4, n6, n10, n12, n16} OPTIONAL, -- Need S

pucch-Cell ServCellIndex OPTIONAL, -- Cond SCellAddOnly

...,

[[

maxMIMO-Layers INTEGER (1..8) OPTIONAL, -- Need M

processingType2Enabled BOOLEAN OPTIONAL -- Need M

]],

[[

pdsch-CodeBlockGroupTransmissionList-r16 SetupRelease { PDSCH-CodeBlockGroupTransmissionList-r16 } OPTIONAL -- Need M

]],

[[

downlinkHARQ-FeedbackDisabled-r17 SetupRelease { DownlinkHARQ-FeedbackDisabled-r17 } OPTIONAL, -- Need M

nrofHARQ-ProcessesForPDSCH-v1700 ENUMERATED {n32} OPTIONAL -- Need R

]]

}

PDSCH-CodeBlockGroupTransmission ::= SEQUENCE {

maxCodeBlockGroupsPerTransportBlock ENUMERATED {n2, n4, n6, n8},

codeBlockGroupFlushIndicator BOOLEAN,

...

}

PDSCH-CodeBlockGroupTransmissionList-r16 ::= SEQUENCE (SIZE (1..2)) OF PDSCH-CodeBlockGroupTransmission

DownlinkHARQ-FeedbackDisabled-r17 ::= BIT STRING (SIZE (32))

-- TAG-PDSCH-SERVINGCELLCONFIG-STOP

-- ASN1STOP

|  |
| --- |
| *PDSCH-CodeBlockGroupTransmission* field descriptions |
| ***codeBlockGroupFlushIndicator***  Indicates whether CBGFI for CBG based (re)transmission in DL is enabled (true). (see TS 38.212 [17], clause 7.3.1.2.2). |
| ***maxCodeBlockGroupsPerTransportBlock***  Maximum number of code-block-groups (CBGs) per TB. In case of multiple CW, the maximum CBG is 4 (see TS 38.213 [13], clause 9.1.1). |

|  |
| --- |
| *PDSCH-ServingCellConfig* field descriptions |
| ***codeBlockGroupTransmission***  Enables and configures code-block-group (CBG) based transmission (see TS 38.213 [13], clause 9.1.1). Network does not configure for a UE both spatial bundling of HARQ ACKs and *codeBlockGroupTransmission* within the same cell group.  The network does not configure this field if  - the SCS is 480 or 960 kHz  - Type-1 HARQ-ACK codebook is configured and *pdsch-TimeDomainAllocationListForMultiPDSCH-r17* for this serving cell contains pdsch-AllocationList with multiple entries (multiple PDSCH)  - Type-2 HARQ-ACK codebook is configured and *pdsch-TimeDomainAllocationListForMultiPDSCH-r17* for any cell in the same PUCCH cell group associated with this serving cell contains pdsch-AllocationList with multiple entries (multiple PDSCH) |
| ***downlinkHARQ-FeedbackDisabled***  Used to disable the DL HARQ feedback, sent in the uplink, per HARQ process ID. The first/leftmost bit corresponds to HARQ process ID 0, the next bit to HARQ process ID 1 and so on. Bits corresponding to HARQ process IDs that are not configured shall be ignored. The bit(s) set to one identify HARQ processes with disabled DL HARQ feedback and the bit(s) set to zero identify HARQ processes with enabled DL HARQ feedback. |
| ***maxMIMO-Layers***  Indicates the maximum number of MIMO layers to be used for PDSCH in all BWPs of this serving cell. (see TS 38.212 [17], clause 5.4.2.1). |
| ***nrofHARQ-ProcessesForPDSCH***  The number of HARQ processes to be used on the PDSCH of a serving cell. Value *n2* corresponds to 2 HARQ processes, value *n4* to 4 HARQ processes, and so on. If both *nrofHARQ-ProcessesForPDSCH* and *nrofHARQ-ProcessesForPDSCH-v1700* are absent, the UE uses 8 HARQ processes (see TS 38.214 [19], clause 5.1). |
| ***pdsch-CodeBlockGroupTransmissionList***  A list of configurations for up to two simultaneously constructed HARQ-ACK codebooks (see TS 38.213 [13], clause 9.3). |
| ***processingType2Enabled***  Enables configuration of advanced processing time capability 2 for PDSCH (see 38.214 [19], clause 5.3). |
| ***pucch-Cell***  The ID of the serving cell (of the same cell group) to use for PUCCH. If the field is absent, the UE sends the HARQ feedback on the PUCCH of the SpCell of this cell group, or on this serving cell if it is a PUCCH SCell. |
| ***xOverhead***  Accounts for overhead from CSI-RS, CORESET, etc. If the field is absent, the UE applies value xOh0 (see TS 38.214 [19], clause 5.1.3.2). |

|  |  |
| --- | --- |
| Conditional Presence | Explanation |
| *SCellAddOnly* | It is optionally present, Need S, for (non-PUCCH) SCells when adding a new SCell. The field is absent, Need M, when reconfiguring SCells. The field is also absent for the SpCells as well as for a PUCCH SCell. |

#### – *PDSCH-TimeDomainResourceAllocationList*

The IE *PDSCH-TimeDomainResourceAllocation* is used to configure a time domain relation between PDCCH and PDSCH. The *PDSCH-TimeDomainResourceAllocationList* contains one or more of such *PDSCH-TimeDomainResourceAllocations*. The network indicates in the DL assignment which of the configured time domain allocations the UE shall apply for that DL assignment. The UE determines the bit width of the DCI field based on the number of entries in the *PDSCH-TimeDomainResourceAllocationList*. Value 0 in the DCI field refers to the first element in this list, value 1 in the DCI field refers to the second element in this list, and so on.

*PDSCH-TimeDomainResourceAllocationList* information element

-- ASN1START

-- TAG-PDSCH-TIMEDOMAINRESOURCEALLOCATIONLIST-START

PDSCH-TimeDomainResourceAllocationList ::= SEQUENCE (SIZE(1..maxNrofDL-Allocations)) OF PDSCH-TimeDomainResourceAllocation

PDSCH-TimeDomainResourceAllocation ::= SEQUENCE {

k0 INTEGER(0..32) OPTIONAL, -- Need S

mappingType ENUMERATED {typeA, typeB},

startSymbolAndLength INTEGER (0..127)

}

PDSCH-TimeDomainResourceAllocationList-r16 ::= SEQUENCE (SIZE(1..maxNrofDL-Allocations)) OF PDSCH-TimeDomainResourceAllocation-r16

PDSCH-TimeDomainResourceAllocation-r16 ::= SEQUENCE {

k0-r16 INTEGER(0..32) OPTIONAL, -- Need S

mappingType-r16 ENUMERATED {typeA, typeB},

startSymbolAndLength-r16 INTEGER (0..127),

repetitionNumber-r16 ENUMERATED {n2, n3, n4, n5, n6, n7, n8, n16} OPTIONAL, -- Cond Formats1-0and1-1

...,

[[

k0-v1710 INTEGER(33..128) OPTIONAL -- Need S

]]

}

MultiPDSCH-TDRA-List-r17 ::= SEQUENCE (SIZE(1.. maxNrofDL-Allocations)) OF MultiPDSCH-TDRA-r17

MultiPDSCH-TDRA-r17 ::= SEQUENCE {

pdsch-TDRA-List-r17 SEQUENCE (SIZE(1..maxNrofMultiplePDSCHs-r17)) OF PDSCH-TimeDomainResourceAllocation-r16,

...

}

-- TAG-PDSCH-TIMEDOMAINRESOURCEALLOCATIONLIST-STOP

-- ASN1STOP

|  |
| --- |
| *PDSCH-TimeDomainResourceAllocation* field descriptions |
| ***k0***  Slot offset between DCI and its scheduled PDSCH (see TS 38.214 [19], clause 5.1.2.1). *k0-v1710* is only applicable for PDSCH SCS of 480 kHz and 960 kHz. When the field is absent the UE applies the value 0. |
| ***mappingType***  PDSCH mapping type (see TS 38.214 [19], clause 5.3). |
| ***repetitionNumber***  Indicates the number of PDSCH transmission occasions for slot-based repetition scheme in IE *RepetitionSchemeConfig.* The parameter is used as specified in 38.214 [19]. |
| ***startSymbolAndLength***  An index giving valid combinations of start symbol and length (jointly encoded) as start and length indicator (SLIV). The network configures the field so that the allocation does not cross the slot boundary (see TS 38.214 [19], clause 5.1.2.1). |

|  |
| --- |
| *MultiPDSCH-TimeDomainResourceAllocation* field descriptions |
| ***pdsch-TDRA-List***  One or multiple PDSCHs which can be in consecutive or non-consecutive slots (see TS 38.214 [19], clause 5.1.2.1). |

|  |  |
| --- | --- |
| Conditional Presence | Explanation |
| *Formats1-0and1-1* | In *pdsch-TimeDomainAllocationListDCI-1-2*, *pdsch-TimeDomainAllocationListForMultiPDSCH*, and *SIB20*, this field is absent.  Otherwise, in *pdsch-TimeDomainResourceAllocationList-r16* and *pdsch-TimeDomainResourceAllocationList-r17*, this field is optionally present, Need R. |

#### – *PHR-Config*

The IE *PHR-Config* is used to configure parameters for power headroom reporting.

*PHR-Config* information element

-- ASN1START

-- TAG-PHR-CONFIG-START

PHR-Config ::= SEQUENCE {

phr-PeriodicTimer ENUMERATED {sf10, sf20, sf50, sf100, sf200,sf500, sf1000, infinity},

phr-ProhibitTimer ENUMERATED {sf0, sf10, sf20, sf50, sf100,sf200, sf500, sf1000},

phr-Tx-PowerFactorChange ENUMERATED {dB1, dB3, dB6, infinity},

multiplePHR BOOLEAN,

dummy BOOLEAN,

phr-Type2OtherCell BOOLEAN,

phr-ModeOtherCG ENUMERATED {real, virtual},

...,

[[

mpe-Reporting-FR2-r16 SetupRelease { MPE-Config-FR2-r16 } OPTIONAL -- Need M

]],

[[

mpe-Reporting-FR2-r17 SetupRelease { MPE-Config-FR2-r17 } OPTIONAL, -- Need M

twoPHRMode-r17 ENUMERATED {enabled} OPTIONAL -- Need R

]]

}

MPE-Config-FR2-r16 ::= SEQUENCE {

mpe-ProhibitTimer-r16 ENUMERATED {sf0, sf10, sf20, sf50, sf100, sf200, sf500, sf1000},

mpe-Threshold-r16 ENUMERATED {dB3, dB6, dB9, dB12}

}

MPE-Config-FR2-r17 ::= SEQUENCE {

mpe-ProhibitTimer-r17 ENUMERATED {sf0, sf10, sf20, sf50, sf100, sf200, sf500, sf1000},

mpe-Threshold-r17 ENUMERATED {dB3, dB6, dB9, dB12},

numberOfN-r17 INTEGER(1..4),

...

}

-- TAG-PHR-CONFIG-STOP

-- ASN1STOP

|  |
| --- |
| *PHR-Config* field descriptions |
| ***dummy***  This field is not used in this version of the specification and the UE ignores the received value. |
| ***mpe-ProhibitTimer***  Value in number of subframes for MPE reporting, as specified in TS 38.321 [3]. Value sf10 corresponds to 10 subframes, and so on. |
| ***mpe-Reporting-FR2***  Indicates whether the UE shall report MPE P-MPR in the PHR MAC control element, as specified in TS 38.321 [3]. |
| ***mpe-Threshold***  Value of the P-MPR threshold in dB for reporting MPE P-MPR when FR2 is configured, as specified in TS 38.321 [3]. The same value applies for each serving cell (although the associated functionality is performed independently for each cell). |
| ***multiplePHR***  Indicates if power headroom shall be reported using the Single Entry PHR MAC control element or Multiple Entry PHR MAC control element defined in TS 38.321 [3]. True means to use Multiple Entry PHR MAC control element and False means to use the Single Entry PHR MAC control element defined in TS 38.321 [3]. The network configures this field to *true* for MR-DC and UL CA for NR, and to *false* in all other cases. |
| ***numberOfN***  Number of reported P-MPR values in a PHR MAC CE. |
| ***phr-ModeOtherCG***  Indicates the mode (i.e. real or virtual) used for the PHR of the activated cells that are part of the other Cell Group (i.e. MCG or SCG), when DC is configured. If the UE is configured with only one cell group (no DC), it ignores the field. |
| ***phr-PeriodicTimer***  Value in number of subframes for PHR reporting as specified in TS 38.321 [3]. Value *sf10* corresponds to 10 subframes, value *sf20* corresponds to 20 subframes, and so on. |
| ***phr-ProhibitTimer***  Value in number of subframes for PHR reporting as specified in TS 38.321 [3]. Value *sf0* corresponds to 0 subframe, value *sf10* corresponds to 10 subframes, value *sf20* corresponds to 20 subframes, and so on. |
| ***phr-Tx-PowerFactorChange***  Value in dB for PHR reporting as specified in TS 38.321 [3]. Value *dB1* corresponds to 1 dB, *dB3* corresponds to 3 dB and so on. The same value applies for each serving cell (although the associated functionality is performed independently for each cell). |
| ***phr-Type2OtherCell***  If set to true, the UE shall report a PHR type 2 for the SpCell of the other MAC entity. See TS 38.321 [3], clause 5.4.6. Network sets this field to *false* if the UE is not configured with an E-UTRA MAC entity. |
| ***twoPHRMode***  Indicates if the power headroom shall be reported as two PHRs (each PHR associated with a SRS resource set) is enabled or not. |

#### – *PhysCellId*

The *PhysCellId* identifies the physical cell identity (PCI).

*PhysCellId* information element

-- ASN1START

-- TAG-PHYSCELLID-START

PhysCellId ::= INTEGER (0..1007)

-- TAG-PHYSCELLID-STOP

-- ASN1STOP

#### – *PhysicalCellGroupConfig*

The IE *PhysicalCellGroupConfig* is used to configure cell-group specific L1 parameters.

*PhysicalCellGroupConfig* information element

-- ASN1START

-- TAG-PHYSICALCELLGROUPCONFIG-START

PhysicalCellGroupConfig ::= SEQUENCE {

harq-ACK-SpatialBundlingPUCCH ENUMERATED {true} OPTIONAL, -- Need S

harq-ACK-SpatialBundlingPUSCH ENUMERATED {true} OPTIONAL, -- Need S

p-NR-FR1 P-Max OPTIONAL, -- Need R

pdsch-HARQ-ACK-Codebook ENUMERATED {semiStatic, dynamic},

tpc-SRS-RNTI RNTI-Value OPTIONAL, -- Need R

tpc-PUCCH-RNTI RNTI-Value OPTIONAL, -- Need R

tpc-PUSCH-RNTI RNTI-Value OPTIONAL, -- Need R

sp-CSI-RNTI RNTI-Value OPTIONAL, -- Need R

cs-RNTI SetupRelease { RNTI-Value } OPTIONAL, -- Need M

...,

[[

mcs-C-RNTI RNTI-Value OPTIONAL, -- Need R

p-UE-FR1 P-Max OPTIONAL -- Cond MCG-Only

]],

[[

xScale ENUMERATED {dB0, dB6, spare2, spare1} OPTIONAL -- Cond SCG-Only

]],

[[

pdcch-BlindDetection SetupRelease { PDCCH-BlindDetection } OPTIONAL -- Need M

]],

[[

dcp-Config-r16 SetupRelease { DCP-Config-r16 } OPTIONAL, -- Need M

harq-ACK-SpatialBundlingPUCCH-secondaryPUCCHgroup-r16 ENUMERATED {enabled, disabled} OPTIONAL, -- Cond twoPUCCHgroup

harq-ACK-SpatialBundlingPUSCH-secondaryPUCCHgroup-r16 ENUMERATED {enabled, disabled} OPTIONAL, -- Cond twoPUCCHgroup

pdsch-HARQ-ACK-Codebook-secondaryPUCCHgroup-r16 ENUMERATED {semiStatic, dynamic} OPTIONAL, -- Cond twoPUCCHgroup

p-NR-FR2-r16 P-Max OPTIONAL, -- Need R

p-UE-FR2-r16 P-Max OPTIONAL, -- Cond MCG-Only

nrdc-PCmode-FR1-r16 ENUMERATED {semi-static-mode1, semi-static-mode2, dynamic} OPTIONAL, -- Cond MCG-Only

nrdc-PCmode-FR2-r16 ENUMERATED {semi-static-mode1, semi-static-mode2, dynamic} OPTIONAL, -- Cond MCG-Only

pdsch-HARQ-ACK-Codebook-r16 ENUMERATED {enhancedDynamic} OPTIONAL, -- Need R

nfi-TotalDAI-Included-r16 ENUMERATED {true} OPTIONAL, -- Need R

ul-TotalDAI-Included-r16 ENUMERATED {true} OPTIONAL, -- Need R

pdsch-HARQ-ACK-OneShotFeedback-r16 ENUMERATED {true} OPTIONAL, -- Need R

pdsch-HARQ-ACK-OneShotFeedbackNDI-r16 ENUMERATED {true} OPTIONAL, -- Need R

pdsch-HARQ-ACK-OneShotFeedbackCBG-r16 ENUMERATED {true} OPTIONAL, -- Need R

downlinkAssignmentIndexDCI-0-2-r16 ENUMERATED { enabled } OPTIONAL, -- Need S

downlinkAssignmentIndexDCI-1-2-r16 ENUMERATED {n1, n2, n4} OPTIONAL, -- Need S

pdsch-HARQ-ACK-CodebookList-r16 SetupRelease {PDSCH-HARQ-ACK-CodebookList-r16} OPTIONAL, -- Need M

ackNackFeedbackMode-r16 ENUMERATED {joint, separate} OPTIONAL, -- Need R

pdcch-BlindDetectionCA-CombIndicator-r16 SetupRelease { PDCCH-BlindDetectionCA-CombIndicator-r16 } OPTIONAL, -- Need M

pdcch-BlindDetection2-r16 SetupRelease { PDCCH-BlindDetection2-r16 } OPTIONAL, -- Need M

pdcch-BlindDetection3-r16 SetupRelease { PDCCH-BlindDetection3-r16 } OPTIONAL, -- Need M

bdFactorR-r16 ENUMERATED {n1} OPTIONAL -- Need R

]],

[[

-- start of enhanced Type3 feedback

pdsch-HARQ-ACK-EnhType3ToAddModList-r17 SEQUENCE (SIZE(1..maxNrofEnhType3HARQ-ACK-r17)) OF PDSCH-HARQ-ACK-EnhType3-r17

OPTIONAL, -- Need N

pdsch-HARQ-ACK-EnhType3ToReleaseList-r17 SEQUENCE (SIZE(1..maxNrofEnhType3HARQ-ACK-r17)) OF PDSCH-HARQ-ACK-EnhType3Index-r17

OPTIONAL, -- Need N

pdsch-HARQ-ACK-EnhType3SecondaryToAddModList-r17 SEQUENCE (SIZE(1..maxNrofEnhType3HARQ-ACK-r17)) OF PDSCH-HARQ-ACK-EnhType3-r17

OPTIONAL, -- Need N

pdsch-HARQ-ACK-EnhType3SecondaryToReleaseList-r17 SEQUENCE (SIZE(1..maxNrofEnhType3HARQ-ACK-r17)) OF PDSCH-HARQ-ACK-EnhType3Index-r17

OPTIONAL, -- Need N

pdsch-HARQ-ACK-EnhType3DCI-FieldSecondaryPUCCHgroup-r17 ENUMERATED {enabled} OPTIONAL, -- Cond twoPUCCHgroup

pdsch-HARQ-ACK-EnhType3DCI-Field-r17 ENUMERATED {enabled} OPTIONAL, -- Need R

-- end of enhanced Type3 feedback

-- start of triggering of HARQ-ACK re-transmission on a PUCCH resource

pdsch-HARQ-ACK-Retx-r17 ENUMERATED {enabled} OPTIONAL, -- Need R

pdsch-HARQ-ACK-RetxSecondaryPUCCHgroup-r17 ENUMERATED {enabled} OPTIONAL, -- Cond twoPUCCHgroup

-- end of triggering of HARQ-ACK re-transmission on a PUCCH resource

-- start of PUCCH Cell switching

pucch-sSCell-r17 SCellIndex OPTIONAL, -- Need R

pucch-sSCellSecondaryPUCCHgroup-r17 SCellIndex OPTIONAL, -- Cond twoPUCCHgroup

pucch-sSCellDyn-r17 ENUMERATED {enabled} OPTIONAL, -- Need R

pucch-sSCellDynSecondaryPUCCHgroup-r17 ENUMERATED {enabled} OPTIONAL, -- Cond twoPUCCHgroup

pucch-sSCellPattern-r17 SEQUENCE (SIZE(1..maxNrofSlots)) OF INTEGER (0..1) OPTIONAL, -- Need R

pucch-sSCellPatternSecondaryPUCCHgroup-r17 SEQUENCE (SIZE(1..maxNrofSlots)) OF INTEGER (0..1) OPTIONAL, -- Cond twoPUCCHgroup

-- end of PUCCH Cell switching

uci-MuxWithDiffPrio-r17 ENUMERATED {enabled} OPTIONAL, -- Need R

uci-MuxWithDiffPrioSecondaryPUCCHgroup-r17 ENUMERATED {enabled} OPTIONAL, -- Cond twoPUCCHgroup

simultaneousPUCCH-PUSCH-r17 ENUMERATED {enabled} OPTIONAL, -- Need R

simultaneousPUCCH-PUSCH-SecondaryPUCCHgroup-r17 ENUMERATED {enabled} OPTIONAL, -- Cond twoPUCCHgroup

prioLowDG-HighCG-r17 ENUMERATED {enabled} OPTIONAL, -- Need R

prioHighDG-LowCG-r17 ENUMERATED {enabled} OPTIONAL, -- Need R

twoQCLTypeDforPDCCHRepetition-r17 ENUMERATED {enabled} OPTIONAL, -- Need R

multicastConfig-r17 SetupRelease { MulticastConfig-r17 } OPTIONAL, -- Need M

pdcch-BlindDetectionCA-CombIndicator-r17 SetupRelease { PDCCH-BlindDetectionCA-CombIndicator-r17 } OPTIONAL -- Need M

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}

PDSCH-HARQ-ACK-EnhType3-r17 ::= SEQUENCE {

pdsch-HARQ-ACK-EnhType3Index-r17 PDSCH-HARQ-ACK-EnhType3Index-r17,

applicable-r17 CHOICE {

perCC SEQUENCE (SIZE (1..maxNrofServingCells)) OF INTEGER (0..1),

perHARQ SEQUENCE (SIZE (1..maxNrofServingCells)) OF BIT STRING (SIZE (16))

},

pdsch-HARQ-ACK-EnhType3NDI-r17 ENUMERATED {true} OPTIONAL, -- Need R

pdsch-HARQ-ACK-EnhType3CBG-r17 ENUMERATED {true} OPTIONAL, -- Need S

...

}

PDSCH-HARQ-ACK-EnhType3Index-r17 ::= INTEGER (0..maxNrofEnhType3HARQ-ACK-1-r17)

PDCCH-BlindDetection ::= INTEGER (1..15)

DCP-Config-r16 ::= SEQUENCE {

ps-RNTI-r16 RNTI-Value,

ps-Offset-r16 INTEGER (1..120),

sizeDCI-2-6-r16 INTEGER (1..maxDCI-2-6-Size-r16),

ps-PositionDCI-2-6-r16 INTEGER (0..maxDCI-2-6-Size-1-r16),

ps-WakeUp-r16 ENUMERATED {true} OPTIONAL, -- Need S

ps-TransmitPeriodicL1-RSRP-r16 ENUMERATED {true} OPTIONAL, -- Need S

ps-TransmitOtherPeriodicCSI-r16 ENUMERATED {true} OPTIONAL -- Need S

}

PDSCH-HARQ-ACK-CodebookList-r16 ::= SEQUENCE (SIZE (1..2)) OF ENUMERATED {semiStatic, dynamic}

PDCCH-BlindDetectionCA-CombIndicator-r16 ::= SEQUENCE {

pdcch-BlindDetectionCA1-r16 INTEGER (1..15),

pdcch-BlindDetectionCA2-r16 INTEGER (1..15)

}

PDCCH-BlindDetection2-r16 ::= INTEGER (1..15)

PDCCH-BlindDetection3-r16 ::= INTEGER (1..15)

MulticastConfig-r17 ::= SEQUENCE {

pdsch-HARQ-ACK-CodebookListMulticast-r17 SetupRelease { PDSCH-HARQ-ACK-CodebookList-r16} OPTIONAL, -- Need M

type1-Codebook-GenerationMode-r17 ENUMERATED { mode1, mode2} OPTIONAL -- Need M

}

PDCCH-BlindDetectionCA-CombIndicator-r17 ::= SEQUENCE {

pdcch-BlindDetectionCA1-r17 INTEGER (1..15) OPTIONAL,

pdcch-BlindDetectionCA2-r17 INTEGER (1..15) OPTIONAL,

pdcch-BlindDetectionCA3-r17 INTEGER (1..15)

}

-- TAG-PHYSICALCELLGROUPCONFIG-STOP

-- ASN1STOP

|  |
| --- |
| *PhysicalCellGroupConfig* field descriptions |
| ***ackNackFeedbackMode***  Indicates which among the joint and separate ACK/NACK feedback modes to use within a slot as specified in TS 38.213 [13] (clause 9). |
| ***bdFactorR***  Parameter for determining and distributing the maximum numbers of BD/CCE for mPDCCH based mPDSCH transmission as specified in TS 38.213 [13] Clause 10.1. |
| ***cs-RNTI***  RNTI value for downlink SPS (see *SPS-Config*) and uplink configured grant (see *ConfiguredGrantConfig*). |
| ***downlinkAssignmentIndexDCI-0-2***  Indicates if "Downlink assignment index" is present or absent in DCI format 0\_2. If the field "*downlinkAssignmentIndexDCI-0-2*" is absent, then 0 bit for "Downlink assignment index" in DCI format 0\_2. If the field "*downlinkAssignmentIndexDCI-0-2*" is present, then the bitwidth of "Downlink assignment index" in DCI format 0\_2 is defined in the same was as that in DCI format 0\_1 (see TS 38.212 [17], clause 7.3.1 and TS 38.213 [13], clause 9.1). |
| ***downlinkAssignmentIndexDCI-1-2***  Configures the number of bits for "Downlink assignment index" in DCI format 1\_2. If the field is absent, then 0 bit for "Downlink assignment index" in DCI format 1\_2. Note that 1 bit and 2 bits are applied if only one serving cell is configured in the DL and the higher layer parameter pdsch-HARQ-ACK-Codebook=dynamic. 4 bits is applied if more than one serving cell are configured in the DL and the higher layer parameter *pdsch-HARQ-ACK-Codebook* is set to *dynamic* (see TS 38.212 [17], clause 7.3.1 and TS 38.213 [13], clause 9.1). |
| ***harq-ACK-SpatialBundlingPUCCH***  Enables spatial bundling of HARQ ACKs. It is configured per cell group (i.e. for all the cells within the cell group) for PUCCH reporting of HARQ-ACK. It is only applicable when more than 4 layers are possible to schedule. When the field is absent, the spatial bundling of PUCCH HARQ ACKs for the primary PUCCH group is disabled (see TS 38.213 [13], clause 9.1.2.1). If the field *harq-ACK SpatialBundlingPUCCH-secondaryPUCCHgroup* is present, *harq-ACK-SpatialBundlingPUCCH* is only applied to primary PUCCH group. Network does not configure for a UE both spatial bundling of HARQ ACKs and *codeBlockGroupTransmission* within the same cell group. |
| ***harq-ACK-SpatialBundlingPUCCH-secondaryPUCCHgroup***  Indicates whether spatial bundling of PUCCH HARQ ACKs for the secondary PUCCH group is enabled or disabled. The field is only applicable when more than 4 layers are possible to schedule (see TS 38.213 [13], clause 9.1.2.1). When the field is absent, the use of spatial bundling of PUCCH HARQ ACKs for the secondary PUCCH group is indicated by *harq-ACK-SpatialBundlingPUCCH*. See TS 38.213 [13], clause 9.1.2.1. Network does not configure for a UE both spatial bundling of HARQ ACKs and *codeBlockGroupTransmission* within the same cell group. |
| ***harq-ACK-SpatialBundlingPUSCH***  Enables spatial bundling of HARQ ACKs. It is configured per cell group (i.e. for all the cells within the cell group) for PUSCH reporting of HARQ-ACK. It is only applicable when more than 4 layers are possible to schedule. When the field is absent, the spatial bundling of PUSCH HARQ ACKs for the primary PUCCH group is disabled (see TS 38.213 [13], clauses 9.1.2.2 and 9.1.3.2). If the field *harq-ACK SpatialBundlingPUSCH-secondaryPUCCHgroup* is present, *harq-ACK-SpatialBundlingPUSCH* is only applied to primary PUCCH group. Network does not configure for a UE both spatial bundling of HARQ ACKs and *codeBlockGroupTransmission* within the same cell group. |
| ***harq-ACK-SpatialBundlingPUSCH-secondaryPUCCHgroup***  Indicates whether spatial bundling of PUSCH HARQ ACKs for the secondary PUCCH group is enabled or disabled. The field is only applicable when more than 4 layers are possible to schedule (see TS 38.213 [13], clauses 9.1.2.2 and 9.1.3.2). When the field is absent, the use of spatial bundling of PUSCH HARQ ACKs for the secondary PUCCH group is indicated by *harq-ACK-SpatialBundlingPUSCH*. See TS 38.213 [13], clauses 9.1.2.2 and 9.1.3.2. Network does not configure for a UE both spatial bundling of HARQ ACKs and *codeBlockGroupTransmission* within the same cell group. |
| ***mcs-C-RNTI***  RNTI to indicate use of *qam64LowSE* for grant-based transmissions. When the *mcs*-*C-RNT*I is configured, RNTI scrambling of DCI CRC is used to choose the corresponding MCS table. |
| ***nfi-TotalDAI-Included***  Indicates whether the NFI and total DAI fields of the non-scheduled PDSCH group is included in the non-fallback DL grant DCI (see TS 38.212 [17], clause 7.3.1). The network configures this only when enhanced dynamic codebook is configured (*pdsch-HARQ-ACK-Codebook* is set to *enhancedDynamic*). |
| ***nrdc-PCmode-FR1***  Indicates the uplink power sharing mode that the UE uses in NR-DC in frequency range 1 (FR1) (see TS 38.213 [13], clause 7.6). |
| ***nrdc-PCmode-FR2***  Indicates the uplink power sharing mode that the UE uses in NR-DC in frequency range 2 (FR2) (see TS 38.213 [13], clause 7.6). |
| ***pdcch-BlindDetection, pdcch-BlindDetection2, pdcch-BlindDetection3***  Indicates the reference number of cells for PDCCH blind detection for the CG. Network configures the field for each CG when the UE is in NR DC and sets the value in accordance with the constraints specified in TS 38.213 [13]. The network configures *pdcch-BlindDetection* only if the UE is in NR-DC. The network configures *pdcch-BlindDetection2* only if the UE is in NR-DC with at least one downlink cell using Rel-16 PDCCH monitoring capability. The network configures *pdcch-BlindDetection3* only if the UE is in NR-DC with at least one downlink cell using Rel-15 PDCCH monitoring capability. |
| ***pdcch-BlindDetectionCA-CombIndicator***  Configure one combination of pdcch-BlindDetectionCA1 (for R15) and pdcch-BlindDetectionCA2 (for R16) for UE to use for scaling PDCCH monitoring capability if the number of serving cells configured to a UE is larger than the reported capability, and if UE reports more than one combination of pdcch-BlindDetectionCA1 and pdcch-BlindDetectionCA2 as UE capability. The combination of pdcch-BlindDetectionCA1 and pdcch-BlindDetectionCA2) configured by pdcch-BlindDetectionCACombIndicator is from the more than one combination of pdcch-BlindDetectionCA1 and pdcch-BlindDetectionCA2 reported by UE (see TS 38.213 [13], clause 10).  *pdcch-BlindDetectionCA-CombIndicator-r17* is used to configure one combination of *pdcch-BlindDetectionCA1* (for R15), *pdcch-BlindDetectionCA2* (for R16) and *pdcch-BlindDetectionCA3* (for R17) for UE to use for scaling PDCCH monitoring capability if the number of serving cells configured to a UE is larger than the reported capability, and if UE reports more than one combination of *pdcch-BlindDetectionCA1*, *pdcch-BlindDetectionCA2* and *pdcch-BlindDetectionCA3* as UE capability. The combination of *pdcch-BlindDetectionCA1*, *pdcch-BlindDetectionCA2* and *pdcch-BlindDetectionCA3* configured by *pdcch-BlindDetectionCACombIndicator-r17* is from the more than one combination of *pdcch-BlindDetectionCA1*, *pdcch-BlindDetectionCA2* and *pdcch-BlindDetectionCA3* reported by UE (see TS 38.213 [13], clause 10).  *pdcch-BlindDetectionCA-CombIndicator-r16* and *pdcch-BlindDetectionCA-CombIndicator-r17* are not configured simultaneously. |
| ***p-NR-FR1***  The maximum total transmit power to be used by the UE in this NR cell group across all serving cells in frequency range 1 (FR1). The maximum transmit power that the UE may use may be additionally limited by *p-Max* (configured in *FrequencyInfoUL*) and by *p-UE-FR1* (configured total for all serving cells operating on FR1). |
| ***p-NR-FR2***  The maximum total transmit power to be used by the UE in this NR cell group across all serving cells in frequency range 2 (FR2). The maximum transmit power that the UE may use may be additionally limited by *p-Max* (configured in *FrequencyInfoUL*) and by *p-UE-FR2* (configured total for all serving cells operating on FR2). This field is only used in NR-DC. |
| ***prioLowDG-HighCG***  Enable PHY prioritization for the case where low-priority dynamic grant-PUSCH collides with high-priority configured grant-PUSCH on a BWP of a serving cell (see TS 38.213 [13], clause 9), when the UE has generated transport blocks for both DG-PUSCH and CG-PUSCH as described in TS 38.321 [3]. |
| ***prioHighDG-LowCG***  Enable PHY prioritization for the case where high-priority dynamic grant PUSCH collides with low-priority configured grant PUSCH on a BWP of a serving cell (see TS 38.213 [13], clause 9), when the UE has generated transport blocks for both DG-PUSCH and CG-PUSCH as described in TS 38.321 [3]. |
| ***ps-RNTI***  RNTI value for scrambling CRC of DCI format 2-6 used for power saving (see TS 38.213 [13], clause 10.1). |
| ***ps-Offset***  The start of the search-time of DCI format 2-6 with CRC scrambled by PS-RNTI relative to the start of the *drx-onDurationTimer* of Long DRX (see TS 38.213 [13], clause 10.3). Value in multiples of 0.125ms (milliseconds). 1 corresponds to 0.125 ms, 2corresponds to 0.25 ms, 3 corresponds to 0.375 ms and so on. |
| ***ps-WakeUp***  Indicates the UE to wake-up if DCI format 2-6 is not detected outside active time (see TS 38.321 [3], clause 5.7). If the field is absent, the UE does not wake-up if DCI format 2-6 is not detected outside active time. |
| ***ps-PositionDCI-2-6***  Starting position of UE wakeup and SCell dormancy indication in DCI format 2-6 (see TS 38.213 [13], clause 10.3). |
| ***ps-TransmitPeriodicL1-RSRP***  Indicates the UE to transmit periodic L1-RSRP report(s) when the *drx-onDurationTimer* does not start (see TS 38.321 [3], clause 5.7). If the field is absent, the UE does not transmit periodic L1-RSRP report(s) when the *drx-onDurationTimer* does not start. |
| ***ps-TransmitOtherPeriodicCSI***  Indicates the UE to transmit periodic CSI report(s) other than L1-RSRP reports when the *drx-onDurationTimer* does not start (see TS 38.321 [3], clause 5.7). If the field is absent, the UE does not transmit periodic CSI report(s) other than L1-RSRP reports when the *drx-onDurationTimer* does not start. |
| ***p-UE-FR1***  The maximum total transmit power to be used by the UE across all serving cells in frequency range 1 (FR1) across all cell groups. The maximum transmit power that the UE may use may be additionally limited by *p-Max* (configured in *FrequencyInfoUL*) and by *p-NR-FR1* (configured for the cell group). |
| ***p-UE-FR2***  The maximum total transmit power to be used by the UE across all serving cells in frequency range 2 (FR2) across all cell groups. The maximum transmit power that the UE may use may be additionally limited by p-Max (configured in FrequencyInfoUL) and by p-NR-FR2 (configured for the cell group). |
| ***pdsch-HARQ-ACK-Codebook***  The PDSCH HARQ-ACK codebook is either semi-static or dynamic. This is applicable to both CA and none CA operation (see TS 38.213 [13], clauses 9.1.2 and 9.1.3). If *pdsch-HARQ-ACK-Codebook-r16* is signalled, UE shall ignore the *pdsch-HARQ-ACK-Codebook* (without suffix). For the HARQ-ACK for sidelink, if *pdsch-HARQ-ACK-Codebook-r16* is signalled, the UE uses *pdsch-HARQ-ACK-Codebook* (without suffix) and ignores *pdsch-HARQ-ACK-Codebook-r16*. If the field *pdsch-HARQ-ACK-Codebook-secondaryPUCCHgroup* is present, *pdsch-HARQ-ACK-Codebook* is applied to primary PUCCH group. Otherwise, this field is applied to the cell group (i.e. for all the cells within the cell group). For the HARQ-ACK for sidelink, if the field *pdsch-HARQ-ACK-Codebook-secondaryPUCCHgroup* is present, *pdsch-HARQ-ACK-Codebook* is applied to primary and secondary PUCCH group and the UE ignores *pdsch-HARQ-ACK-Codebook-secondaryPUCCHgroup*. |
| ***pdsch-HARQ-ACK-CodebookList***  A list of configurations for one or two HARQ-ACK codebooks. Each configuration in the list is defined in the same way as *pdsch-HARQ-ACK-Codebook* (see TS 38.212 [17], clause 7.3.1.2.2 and TS 38.213 [13], clauses 7.2.1, 9.1.2, 9.1.3 and 9.2.1). If this field is present, the field *pdsch-HARQ-ACK-Codebook* is ignored. If this field is present, the value of this field is applied for primary PUCCH group and for secondary PUCCH group (if configured). For the HARQ-ACK for sidelink, the UE uses *pdsch-HARQ-ACK-Codebook* and ignores *pdsch-HARQ-ACK-CodebookList* if this field is present. |
| ***pdsch-HARQ-ACK-Codebook-secondaryPUCCHgroup***  The PDSCH HARQ-ACK codebook is either semi-static or dynamic. This is applicable to CA operation (see TS 38.213 [13], clauses 9.1.2 and 9.1.3). It is configured for secondary PUCCH group*.* |
| ***pdsch-HARQ-ACK-EnhType3DCI-Field, pdsch-HARQ-ACK-EnhType3DCI-FieldSecondaryPUCCHgroup***  Indicates the enhanced Type 3 codebook through a new DCI field to indicate the enhanced Type 3 HARQ-ACK codebook in the primary PUCCH group if the more than one enhanced Type 3 HARQ-ACK codebook is configured for the primary PUCCH group, or in the secondary PUCCH group if the more than one enhanced Type 3 HARQ-ACK code is configured for the secondary PUCCH group, respectively. |
| ***pdsch-HARQ-ACK-EnhType3ToAddModList, pdsch-HARQ-ACK-EnhType3SecondaryToAddModList***  Configure the list of enhanced Type 3 HARQ-ACK codebooks for the primary PUCCH group and the secondary PUCCH group, respectively. When configured, DCI\_format 1\_1 can request the UE to report A/N for one of the configured enhanced Type 3 HARQ-ACK codebooks in the corresponding PUCCH group (see TS 38.213 [13], clause 9.1.4). The network can configure *pdsch-HARQ-ACK-EnhType3SecondaryToAddModList* only if secondary PUCCH group is configured. |
| ***pdsch-HARQ-ACK-OneShotFeedback***  When configured, the DCI\_format 1\_1 can request the UE to report A/N for all HARQ processes and all CCs configured in the PUCCH group (see TS 38.212 [17], clause 7.3.1). |
| ***pdsch-HARQ-ACK-OneShotFeedbackCBG***  When configured, the DCI\_format 1\_1 can request the UE to include CBG level A/N for each CC with CBG level transmission configured. When not configured, the UE will report TB level A/N even if CBG level transmission is configured for a CC.The network configures this only when *pdsch-HARQ-ACK-OneShotFeedback* is configured. |
| ***pdsch-HARQ-ACK-OneShotFeedbackNDI***  When configured, the DCI\_format 1\_1 can request the UE to include NDI for each A/N reported.The network configures this only when *pdsch-HARQ-ACK-OneShotFeedback* is configured. |
| ***pdsch-HARQ-ACK-Retx, pdsch-HARQ-ACK-RetxSecondaryPUCCHgroup***  When configured, the DCI format 1\_1 can request the UE to perform a HARQ-ACK re-transmission on a PUCCH resource in the primary PUCCH group and the secondary PUCCH group, respectively (see TS 38.213 [13], clause 9.1.5). |
| ***pucch-sSCell, pucch-sSCellSecondaryPUCCHgroup***  indictates the alternative PUCCH cells for PUCCH cell switching in the primary and the secondary PUCCH group, respectively. For the primary PUCCH group, it is configured for cells on top of SpCell. For the secondary PUCCH group, it is configured for cell on top of the PUCCH SCell. |
| ***pucch-sSCellDyn, pucch-sSCellDynsecondaryPUCCHgroup***  When configured, PUCCH cell switching based on dynamic indication in DCI format 1\_1 is enabled (see TS 38.213 [13], clause 9.A, clause 9.1.5), respectively for the primary PUCCH group and the secondary PUCCH group. |
| ***pucch-sSCellPattern, pucch-sSCellPatternSecondaryPUCCHgroup***  When configured, the UE applies the semi-static PUCCH cell switching (see TS 38.213 [13], clause 9.A) using the time domain pattern of applicable PUCCH cells indicated by this field, respectively for the primary PUCCH group and the secondary PUCCH group. |
| ***simultaneousPUCCH-PUSCH, simultaneousPUCCH-PUSCH-SecondaryPUCCHgroup***  Enables simultaneous PUCCH and PUSCH transmissions with different priorities for the primary PUCCH group and the secondary PUCCH group, respectively. |
| ***sizeDCI-2-6***  Size of DCI format 2-6 (see TS 38.213 [13], clause 10.3). |
| ***sp-CSI-RNTI***  RNTI for Semi-Persistent CSI reporting on PUSCH (see *CSI-ReportConfig*) (see TS 38.214 [19], clause 5.2.1.5.2). Network always configures the UE with a value for this field when at least one *CSI-ReportConfig* with *reportConfigType* set to *semiPersistentOnPUSCH* is configured. |
| ***tpc-PUCCH-RNTI***  RNTI used for PUCCH TPC commands on DCI (see TS 38.213 [13], clause 10.1). |
| ***tpc-PUSCH-RNTI***  RNTI used for PUSCH TPC commands on DCI (see TS 38.213 [13], clause 10.1). |
| ***tpc-SRS-RNTI***  RNTI used for SRS TPC commands on DCI (see TS 38.213 [13], clause 10.1). |
| ***twoQCLTypeDforPDCCHRepetition***  Indicates whether a UE is expected UE to identify and monitor two QCL-TypeD properties for multiple overlapping CORESETs in the case of PDCCH repetition. |
| ***uci-MuxWithDiffPrio, uci-MuxWithDiffPrio-secondaryPUCCHgroup***  When configured, enables multiplexing a high-priority (HP) HARQ-ACK UCI and a low-priority (LP) HARQ-ACK UCI into a PUCCH or PUSCH for the primary PUCCH group and the secondary PUCCH group, respectively. |
| ***ul-TotalDAI-Included***  Indicates whether the total DAI fields of the additional PDSCH group is included in the non-fallback UL grant DCI (see TS 38.212 [17], clause 7.3.1). The network configures this only when enhanced dynamic codebook is configured (*pdsch-HARQ-ACK-Codebook* is set to *enhancedDynamic*). |
| ***xScale***  The UE is allowed to drop NR only if the power scaling applied to NR results in a difference between scaled and unscaled NR UL of more than *xScale* dB (see TS 38.213 [13]). If the value is not configured for dynamic power sharing, the UE assumes default value of 6 dB. |

|  |
| --- |
| *MulticastConfig* field descriptions |
| ***pdsch-HARQ-ACK-CodebookListMulticast***  A list of configurations for one or two HARQ-ACK codebooks for MBS multicast. Each configuration in the list is defined in the same way as pdsch-HARQ-ACK-Codebook (see TS 38.212 [17], clause 7.3.1.2.2 and TS 38.213 [13], clauses 7.2.1, 9.1.2, 9.1.3 and 9.2.1). If this field is present, the field pdsch-HARQ-ACK-Codebook is ignored. If this field is present, the value of this field is applied for primary PUCCH group and for secondary PUCCH group (if configured). |
| ***type1-Codebook-Generation-Mode***  Indicates the mode of Type-1 HARQ-ACK codebook generation. Mode 1 is based on the k1 values that are in the intersection of K1 set for unicast and K1 set for multicast. Mode 2 is based on the k1 values that in the union of K1 set for unicast and K1 set for multicast. |

|  |
| --- |
| *PDSCH-HARQ-ACK-EnhType3* field descriptions |
| ***pdsch-HARQ-ACK-EnhType3CBG***  When configured, the DCI\_format 1\_1 or DCI format 1\_2 can request the UE to include CBG level A/N for each CC with CBG level transmission configured of the enhanced Type 3 HARQ-ACK codebook. When not configured, the UE will report TB level A/N even if CBG level transmission is configured for a CC. |
| ***pdsch-HARQ-ACK-EnhType3NDI***  When configured, the DCI\_format 1\_1 or DCI format 1\_2 can request the UE to include NDI for each A/N reported of the enhanced Type 3 HARQ-ACK codebook. |
| ***perCC***  Configures enhanced Type 3 HARQ-ACK codebook using per CC configuration. |
| ***perHARQ***  Configures enhanced Type 3 HARQ-ACK codebook using per HARQ process and CC configuration. |

|  |  |
| --- | --- |
| Conditional Presence | Explanation |
| *MCG-Only* | This field is optionally present, Need R, in the *PhysicalCellGroupConfig* of the MCG. It is absent otherwise. |
| *SCG-Only* | This field is optionally present, Need S, in the *PhysicalCellGroupConfig* of the SCG in (NG)EN-DC as defined in TS 38.213 [13]. It is absent otherwise. |
| *twoPUCCHgroup* | This field is optionally present, Need R, if secondary PUCCH group is configured. It is absent otherwise, Need R. |

#### – *PLMN-Identity*

The IE *PLMN-Identity* identifies a Public Land Mobile Network. Further information regarding how to set the IE is specified in TS 23.003 [21].

*PLMN-Identity* information element

-- ASN1START

-- TAG-PLMN-IDENTITY-START

PLMN-Identity ::= SEQUENCE {

mcc MCC OPTIONAL, -- Cond MCC

mnc MNC

}

MCC ::= SEQUENCE (SIZE (3)) OF MCC-MNC-Digit

MNC ::= SEQUENCE (SIZE (2..3)) OF MCC-MNC-Digit

MCC-MNC-Digit ::= INTEGER (0..9)

-- TAG-PLMN-IDENTITY-STOP

-- ASN1STOP

|  |
| --- |
| *PLMN-Identity* field descriptions |
| ***mcc***  The first element contains the first MCC digit, the second element the second MCC digit and so on. If the field is absent, it takes the same value as the *mcc* of the immediately preceding IE PLMN-Identity. See TS 23.003 [21]. |
| ***mnc***  The first element contains the first MNC digit, the second element the second MNC digit and so on. See TS 23.003 [21]. |

|  |  |
| --- | --- |
| Conditional Presence | Explanation |
| *MCC* | This field is mandatory present when PLMN-Identity is not used in a list or if it is the first entry of PLMN-Identity in a list. Otherwise it is optionally present, Need S. |

#### – *PLMN-IdentityInfoList*

The IE *PLMN-IdentityInfoList* includes a list of PLMN identity information.

*PLMN-IdentityInfoList* information element

-- ASN1START

-- TAG-PLMN-IDENTITYINFOLIST-START

PLMN-IdentityInfoList ::= SEQUENCE (SIZE (1..maxPLMN)) OF PLMN-IdentityInfo

PLMN-IdentityInfo ::= SEQUENCE {

plmn-IdentityList SEQUENCE (SIZE (1..maxPLMN)) OF PLMN-Identity,

trackingAreaCode TrackingAreaCode OPTIONAL, -- Need R

ranac RAN-AreaCode OPTIONAL, -- Need R

cellIdentity CellIdentity,

cellReservedForOperatorUse ENUMERATED {reserved, notReserved},

...,

[[

iab-Support-r16 ENUMERATED {true} OPTIONAL -- Need S

]],

[[

trackingAreaList-r17 SEQUENCE (SIZE (1..maxTAC-r17)) OF TrackingAreaCode OPTIONAL, -- Need R

gNB-ID-Length-r17 INTEGER (22..32) OPTIONAL -- Need R

]]

}

-- TAG-PLMN-IDENTITYINFOLIST-STOP

-- ASN1STOP

|  |
| --- |
| *PLMN-IdentityInfo* field descriptions |
| ***cellReservedForOperatorUse***  Indicates whether the cell is reserved for operator use (per PLMN), as defined in TS 38.304 [20]. This field is ignored by IAB-MT. |
| ***gNB-ID-Length***  Indicates the length of the gNB ID out of the 36-bit long *cellIdentity*. |
| ***iab-Support***  This field combines both the support of IAB and the cell status for IAB. If the field is present, the cell supports IAB and the cell is also considered as a candidate for cell (re)selection for IAB-node; if the field is absent, the cell does not support IAB and/or the cell is barred for IAB-node. |
| ***trackingAreaCode***  Indicates Tracking Area Code to which the cell indicated by *cellIdentity* field belongs. The absence of the field indicates that the cell only supports PSCell/SCell functionality (per PLMN) or is an NTN cell. |
| ***trackingAreaList***  List of Tracking Areas to which the cell indicated by *cellIdentity* field belongs. If this field is present, network does not configure *trackingAreaCode.* Total number of different TACs across different *PLMN-IdentityInfo*s shall not exceed *maxTAC*. |

#### – *PLMN-IdentityList2*

Includes a list of PLMN identities.

*PLMN-IdentityList2* information element

-- ASN1START

-- TAG-PLMNIDENTITYLIST2-START

PLMN-IdentityList2-r16 ::= SEQUENCE (SIZE (1..16)) OF PLMN-Identity

-- TAG-PLMNIDENTITYLIST2-STOP

-- ASN1STOP

#### – *PRB-Id*

The IE *PRB-Id* identifies a Physical Resource Block (PRB) position within a carrier.

*PRB-Id* information element

-- ASN1START

-- TAG-PRB-ID-START

PRB-Id ::= INTEGER (0..maxNrofPhysicalResourceBlocks-1)

-- TAG-PRB-ID-STOP

-- ASN1STOP

#### – *PTRS-DownlinkConfig*

The IE *PTRS-DownlinkConfig* is used to configure downlink phase tracking reference signals (PTRS) (see TS 38.214 [19] clause 5.1.6.3)

*PTRS-DownlinkConfig* information element

-- ASN1START

-- TAG-PTRS-DOWNLINKCONFIG-START

PTRS-DownlinkConfig ::= SEQUENCE {

frequencyDensity SEQUENCE (SIZE (2)) OF INTEGER (1..276) OPTIONAL, -- Need S

timeDensity SEQUENCE (SIZE (3)) OF INTEGER (0..29) OPTIONAL, -- Need S

epre-Ratio INTEGER (0..3) OPTIONAL, -- Need S

resourceElementOffset ENUMERATED { offset01, offset10, offset11 } OPTIONAL, -- Need S

...,

[[

maxNrofPorts-r16 ENUMERATED {n1, n2} OPTIONAL -- Need R

]]

}

-- TAG-PTRS-DOWNLINKCONFIG-STOP

-- ASN1STOP

|  |
| --- |
| *PTRS-DownlinkConfig* field descriptions |
| ***epre-Ratio***  EPRE ratio between PTRS and PDSCH. Value 0 corresponds to the codepoint "00" in table 4.1-2. Value 1 corresponds to codepoint "01", and so on. If the field is not provided, the UE applies value 0 (see TS 38.214 [19], clause 4.1). |
| ***frequencyDensity***  Presence and frequency density of DL PT-RS as a function of Scheduled BW. If the field is absent, the UE uses K\_PT-RS = 2 (see TS 38.214 [19], clause 5.1.6.3, table 5.1.6.3-2). |
| ***maxNrofPorts***  The maximum number of DL PTRS ports specified in TS 38.214 [19] (clause 5.1.6.3). 2 PT-RS ports can only be configured for a DL BWP that is configured, as specified in TS 38.214 [19] clause 5.1, with a mode where a single PDSCH has association between the DM-RS ports and the TCI states as defined in TS 38.214 [19] clause 5.1.6.2. |
| ***resourceElementOffset***  Indicates the subcarrier offset for DL PTRS. If the field is absent, the UE applies the value offset00 (see TS 38.211 [16], clause 7.4.1.2.2). |
| ***timeDensity***  Presence and time density of DL PT-RS as a function of MCS. The value 29 is only applicable for MCS Table 5.1.3.1-1 (TS 38.214 [19]). If the field is absent, the UE uses L\_PT-RS = 1 (see TS 38.214 [19], clause 5.1.6.3, table 5.1.6.3-1). |

#### – *PTRS-UplinkConfig*

The IE *PTRS-UplinkConfig* is used to configure uplink Phase-Tracking-Reference-Signals (PTRS).

*PTRS-UplinkConfig* information element

-- ASN1START

-- TAG-PTRS-UPLINKCONFIG-START

PTRS-UplinkConfig ::= SEQUENCE {

transformPrecoderDisabled SEQUENCE {

frequencyDensity SEQUENCE (SIZE (2)) OF INTEGER (1..276) OPTIONAL, -- Need S

timeDensity SEQUENCE (SIZE (3)) OF INTEGER (0..29) OPTIONAL, -- Need S

maxNrofPorts ENUMERATED {n1, n2},

resourceElementOffset ENUMERATED {offset01, offset10, offset11 } OPTIONAL, -- Need S

ptrs-Power ENUMERATED {p00, p01, p10, p11}

} OPTIONAL, -- Need R

transformPrecoderEnabled SEQUENCE {

sampleDensity SEQUENCE (SIZE (5)) OF INTEGER (1..276),

timeDensityTransformPrecoding ENUMERATED {d2} OPTIONAL -- Need S

} OPTIONAL, -- Need R

...

}

-- TAG-PTRS-UPLINKCONFIG-STOP

-- ASN1STOP

|  |
| --- |
| *PTRS-UplinkConfig* field descriptions |
| ***frequencyDensity***  Presence and frequency density of UL PT-RS for CP-OFDM waveform as a function of scheduled BW If the field is absent, the UE uses K\_PT-RS = 2 (see TS 38.214 [19], clause 6.1). |
| ***maxNrofPorts***  The maximum number of UL PTRS ports for CP-OFDM (see TS 38.214 [19], clause 6.2.3.1). |
| ***ptrs-Power***  UL PTRS power boosting factor per PTRS port (see TS 38.214 [19], clause 6.1, table 6.2.3.1.3). |
| ***resourceElementOffset***  Indicates the subcarrier offset for UL PTRS for CP-OFDM. If the field is absent, the UE applies the value offset00 (see TS 38.211 [16], clause 6.4.1.2.2). |
| ***sampleDensity***  Sample density of PT-RS for DFT-s-OFDM, pre-DFT, indicating a set of thresholds T={NRBn, n=0,1,2,3,4}, that indicates dependency between presence of PT-RS and scheduled BW and the values of X and K the UE should use depending on the scheduled BW, see TS 38.214 [19], clause 6.1, table 6.2.3.2-1. |
| ***timeDensity***  Presence and time density of UL PT-RS for CP-OFDM waveform as a function of MCS If the field is absent, the UE uses L\_PT-RS = 1 (see TS 38.214 [19], clause 6.1). |
| ***timeDensityTransformPrecoding***  Time density (OFDM symbol level) of PT-RS for DFT-s-OFDM. If the field is absent, the UE applies value d1 (see TS 38.214 [19], clause 6.1). |
| ***transformPrecoderDisabled***  Configuration of UL PTRS without transform precoder (with CP-OFDM). |
| ***transformPrecoderEnabled***  Configuration of UL PTRS with transform precoder (DFT-S-OFDM). |

#### – *PUCCH-Config*

The IE *PUCCH-Config* is used to configure UE specific PUCCH parameters (per BWP).

*PUCCH-Config* information element

-- ASN1START

-- TAG-PUCCH-CONFIG-START

PUCCH-Config ::= SEQUENCE {

resourceSetToAddModList SEQUENCE (SIZE (1..maxNrofPUCCH-ResourceSets)) OF PUCCH-ResourceSet OPTIONAL, -- Need N

resourceSetToReleaseList SEQUENCE (SIZE (1..maxNrofPUCCH-ResourceSets)) OF PUCCH-ResourceSetId OPTIONAL, -- Need N

resourceToAddModList SEQUENCE (SIZE (1..maxNrofPUCCH-Resources)) OF PUCCH-Resource OPTIONAL, -- Need N

resourceToReleaseList SEQUENCE (SIZE (1..maxNrofPUCCH-Resources)) OF PUCCH-ResourceId OPTIONAL, -- Need N

format1 SetupRelease { PUCCH-FormatConfig } OPTIONAL, -- Need M

format2 SetupRelease { PUCCH-FormatConfig } OPTIONAL, -- Need M

format3 SetupRelease { PUCCH-FormatConfig } OPTIONAL, -- Need M

format4 SetupRelease { PUCCH-FormatConfig } OPTIONAL, -- Need M

schedulingRequestResourceToAddModList SEQUENCE (SIZE (1..maxNrofSR-Resources)) OF SchedulingRequestResourceConfig

OPTIONAL, -- Need N

schedulingRequestResourceToReleaseList SEQUENCE (SIZE (1..maxNrofSR-Resources)) OF SchedulingRequestResourceId

OPTIONAL, -- Need N

multi-CSI-PUCCH-ResourceList SEQUENCE (SIZE (1..2)) OF PUCCH-ResourceId OPTIONAL, -- Need M

dl-DataToUL-ACK SEQUENCE (SIZE (1..8)) OF INTEGER (0..15) OPTIONAL, -- Need M

spatialRelationInfoToAddModList SEQUENCE (SIZE (1..maxNrofSpatialRelationInfos)) OF PUCCH-SpatialRelationInfo

OPTIONAL, -- Need N

spatialRelationInfoToReleaseList SEQUENCE (SIZE (1..maxNrofSpatialRelationInfos)) OF PUCCH-SpatialRelationInfoId

OPTIONAL, -- Need N

pucch-PowerControl PUCCH-PowerControl OPTIONAL, -- Need M

...,

[[

resourceToAddModListExt-v1610 SEQUENCE (SIZE (1..maxNrofPUCCH-Resources)) OF PUCCH-ResourceExt-v1610 OPTIONAL, -- Need N

dl-DataToUL-ACK-r16 SetupRelease { DL-DataToUL-ACK-r16 } OPTIONAL, -- Need M

ul-AccessConfigListDCI-1-1-r16 SetupRelease { UL-AccessConfigListDCI-1-1-r16 } OPTIONAL, -- Need M

subslotLengthForPUCCH-r16 CHOICE {

normalCP-r16 ENUMERATED {n2,n7},

extendedCP-r16 ENUMERATED {n2,n6}

} OPTIONAL, -- Need R

dl-DataToUL-ACK-DCI-1-2-r16 SetupRelease { DL-DataToUL-ACK-DCI-1-2-r16} OPTIONAL, -- Need M

numberOfBitsForPUCCH-ResourceIndicatorDCI-1-2-r16 INTEGER (0..3) OPTIONAL, -- Need R

dmrs-UplinkTransformPrecodingPUCCH-r16 ENUMERATED {enabled} OPTIONAL, -- Cond PI2-BPSK

spatialRelationInfoToAddModListSizeExt-v1610 SEQUENCE (SIZE (1..maxNrofSpatialRelationInfosDiff-r16)) OF PUCCH-SpatialRelationInfo

OPTIONAL, -- Need N

spatialRelationInfoToReleaseListSizeExt-v1610 SEQUENCE (SIZE (1..maxNrofSpatialRelationInfosDiff-r16)) OF PUCCH-SpatialRelationInfoId

OPTIONAL, -- Need N

spatialRelationInfoToAddModListExt-v1610 SEQUENCE (SIZE (1..maxNrofSpatialRelationInfos-r16)) OF PUCCH-SpatialRelationInfoExt-r16

OPTIONAL, -- Need N

spatialRelationInfoToReleaseListExt-v1610 SEQUENCE (SIZE (1..maxNrofSpatialRelationInfos-r16)) OF

PUCCH-SpatialRelationInfoId-r16 OPTIONAL, -- Need N

resourceGroupToAddModList-r16 SEQUENCE (SIZE (1..maxNrofPUCCH-ResourceGroups-r16)) OF PUCCH-ResourceGroup-r16

OPTIONAL, -- Need N

resourceGroupToReleaseList-r16 SEQUENCE (SIZE (1..maxNrofPUCCH-ResourceGroups-r16)) OF PUCCH-ResourceGroupId-r16

OPTIONAL, -- Need N

sps-PUCCH-AN-List-r16 SetupRelease { SPS-PUCCH-AN-List-r16 } OPTIONAL, -- Need M

schedulingRequestResourceToAddModListExt-v1610 SEQUENCE (SIZE (1..maxNrofSR-Resources)) OF SchedulingRequestResourceConfigExt-v1610

OPTIONAL -- Need N

]],

[[

format0-r17 SetupRelease { PUCCH-FormatConfig } OPTIONAL, -- Need M

format2Ext-r17 SetupRelease { PUCCH-FormatConfigExt-r17 } OPTIONAL, -- Need M

format3Ext-r17 SetupRelease { PUCCH-FormatConfigExt-r17 } OPTIONAL, -- Need M

format4Ext-r17 SetupRelease { PUCCH-FormatConfigExt-r17 } OPTIONAL, -- Need M

ul-AccessConfigListDCI-1-2-r17 SetupRelease { UL-AccessConfigListDCI-1-2-r17 } OPTIONAL, -- Need M

mappingPattern-r17 ENUMERATED {cyclicMapping, sequentialMapping} OPTIONAL, -- Need R

powerControlSetInfoToAddModList-r17 SEQUENCE (SIZE (1..maxNrofPowerControlSetInfos-r17)) OF PUCCH-PowerControlSetInfo-r17

OPTIONAL, -- Need N

powerControlSetInfoToReleaseList-r17 SEQUENCE (SIZE (1..maxNrofPowerControlSetInfos-r17)) OF PUCCH-PowerControlSetInfoId-r17

OPTIONAL, -- Need N

secondTPCFieldDCI-1-1-r17 ENUMERATED {enabled} OPTIONAL, -- Need R

secondTPCFieldDCI-1-2-r17 ENUMERATED {enabled} OPTIONAL, -- Need R

dl-DataToUL-ACK-r17 SetupRelease { DL-DataToUL-ACK-r17 } OPTIONAL, -- Need M

dl-DataToUL-ACK-DCI-1-2-r17 SetupRelease { DL-DataToUL-ACK-DCI-1-2-r17} OPTIONAL, -- Need M

ul-AccessConfigListDCI-1-1-r17 SetupRelease { UL-AccessConfigListDCI-1-1-r17 } OPTIONAL, -- Need M

schedulingRequestResourceToAddModListExt-v1700 SEQUENCE (SIZE (1..maxNrofSR-Resources)) OF SchedulingRequestResourceConfigExt-v1700

OPTIONAL, -- Need N

dmrs-BundlingPUCCH-Config-r17 SetupRelease { DMRS-BundlingPUCCH-Config-r17 } OPTIONAL, -- Need M

dl-DataToUL-ACK-v1700 SetupRelease { DL-DataToUL-ACK-v1700 } OPTIONAL, -- Need M

dl-DataToUL-ACK-MulticastDCI-Format4-1-r17 SetupRelease { DL-DataToUL-ACK-MulticastDCI-Format4-1-r17 } OPTIONAL, -- Need M

sps-PUCCH-AN-ListMulticast-r17 SetupRelease { SPS-PUCCH-AN-List-r16 } OPTIONAL -- Need M

]]

}

PUCCH-FormatConfig ::= SEQUENCE {

interslotFrequencyHopping ENUMERATED {enabled} OPTIONAL, -- Need R

additionalDMRS ENUMERATED {true} OPTIONAL, -- Need R

maxCodeRate PUCCH-MaxCodeRate OPTIONAL, -- Need R

nrofSlots ENUMERATED {n2,n4,n8} OPTIONAL, -- Need S

pi2BPSK ENUMERATED {enabled} OPTIONAL, -- Need R

simultaneousHARQ-ACK-CSI ENUMERATED {true} OPTIONAL -- Need R

}

PUCCH-FormatConfigExt-r17 ::= SEQUENCE {

maxCodeRateLP-r17 PUCCH-MaxCodeRate OPTIONAL, -- Need R

...

}

PUCCH-MaxCodeRate ::= ENUMERATED {zeroDot08, zeroDot15, zeroDot25, zeroDot35, zeroDot45, zeroDot60, zeroDot80}

-- A set with one or more PUCCH resources

PUCCH-ResourceSet ::= SEQUENCE {

pucch-ResourceSetId PUCCH-ResourceSetId,

resourceList SEQUENCE (SIZE (1..maxNrofPUCCH-ResourcesPerSet)) OF PUCCH-ResourceId,

maxPayloadSize INTEGER (4..256) OPTIONAL -- Need R

}

PUCCH-ResourceSetId ::= INTEGER (0..maxNrofPUCCH-ResourceSets-1)

PUCCH-Resource ::= SEQUENCE {

pucch-ResourceId PUCCH-ResourceId,

startingPRB PRB-Id,

intraSlotFrequencyHopping ENUMERATED { enabled } OPTIONAL, -- Need R

secondHopPRB PRB-Id OPTIONAL, -- Need R

format CHOICE {

format0 PUCCH-format0,

format1 PUCCH-format1,

format2 PUCCH-format2,

format3 PUCCH-format3,

format4 PUCCH-format4

}

}

PUCCH-ResourceExt-v1610 ::= SEQUENCE {

interlaceAllocation-r16 SEQUENCE {

rb-SetIndex INTEGER (0..4),

interlace0 CHOICE {

scs15 INTEGER (0..9),

scs30 INTEGER (0..4)

}

} OPTIONAL, --Need R

format-v1610 CHOICE {

interlace1-v1610 INTEGER (0..9),

occ-v1610 SEQUENCE {

occ-Length-v1610 ENUMERATED {n2,n4} OPTIONAL, -- Need M

occ-Index-v1610 ENUMERATED {n0,n1,n2,n3} OPTIONAL -- Need M

}

} OPTIONAL, -- Need R

...,

[[

formatExt-v1700 SEQUENCE {

nrofPRBs-r17 INTEGER (1..16)

} OPTIONAL, -- Need R

pucch-RepetitionNrofSlots-r17 ENUMERATED { n1,n2,n4,n8 } OPTIONAL -- Need R

]]

}

PUCCH-ResourceId ::= INTEGER (0..maxNrofPUCCH-Resources-1)

PUCCH-format0 ::= SEQUENCE {

initialCyclicShift INTEGER(0..11),

nrofSymbols INTEGER (1..2),

startingSymbolIndex INTEGER(0..13)

}

PUCCH-format1 ::= SEQUENCE {

initialCyclicShift INTEGER(0..11),

nrofSymbols INTEGER (4..14),

startingSymbolIndex INTEGER(0..10),

timeDomainOCC INTEGER(0..6)

}

PUCCH-format2 ::= SEQUENCE {

nrofPRBs INTEGER (1..16),

nrofSymbols INTEGER (1..2),

startingSymbolIndex INTEGER(0..13)

}

PUCCH-format3 ::= SEQUENCE {

nrofPRBs INTEGER (1..16),

nrofSymbols INTEGER (4..14),

startingSymbolIndex INTEGER(0..10)

}

PUCCH-format4 ::= SEQUENCE {

nrofSymbols INTEGER (4..14),

occ-Length ENUMERATED {n2,n4},

occ-Index ENUMERATED {n0,n1,n2,n3},

startingSymbolIndex INTEGER(0..10)

}

PUCCH-ResourceGroup-r16 ::= SEQUENCE {

pucch-ResourceGroupId-r16 PUCCH-ResourceGroupId-r16,

resourcePerGroupList-r16 SEQUENCE (SIZE (1..maxNrofPUCCH-ResourcesPerGroup-r16)) OF PUCCH-ResourceId

}

PUCCH-ResourceGroupId-r16 ::= INTEGER (0..maxNrofPUCCH-ResourceGroups-1-r16)

DL-DataToUL-ACK-r16 ::= SEQUENCE (SIZE (1..8)) OF INTEGER (-1..15)

DL-DataToUL-ACK-r17 ::= SEQUENCE (SIZE (1..8)) OF INTEGER (-1..127)

DL-DataToUL-ACK-v1700 ::= SEQUENCE (SIZE (1..8)) OF INTEGER (16..31)

DL-DataToUL-ACK-DCI-1-2-r16 ::= SEQUENCE (SIZE (1..8)) OF INTEGER (0..15)

DL-DataToUL-ACK-DCI-1-2-r17 ::= SEQUENCE (SIZE (1..8)) OF INTEGER (0..127)

UL-AccessConfigListDCI-1-1-r16 ::= SEQUENCE (SIZE (1..16)) OF INTEGER (0..15)

UL-AccessConfigListDCI-1-2-r17 ::= SEQUENCE (SIZE (1..16)) OF INTEGER (0..15)

UL-AccessConfigListDCI-1-1-r17 ::= SEQUENCE (SIZE (1..3)) OF INTEGER (0..2)

DL-DataToUL-ACK-MulticastDCI-Format4-1-r17 ::= SEQUENCE (SIZE (1..8)) OF INTEGER (0..15)

-- TAG-PUCCH-CONFIG-STOP

-- ASN1STOP

|  |
| --- |
| *PUCCH-Config* field descriptions |
| ***dl-DataToUL-ACK, dl-DataToUL-ACK-DCI-1-2***  List of timing for given PDSCH to the DL ACK (see TS 38.213 [13], clause 9.1.2). The field *dl-DataToUL-ACK* applies to DCI format 1\_1 and the field *dl-DataToUL-ACK-DCI-1-2* applies to DCI format 1\_2 (see TS 38.212 [17], clause 7.3.1 and TS 38.213 [13], clause 9.2.3). The *dl-DataToUL-ACK-v1700* is applicable for NTN and *dl-DataToUL-ACK-r17* is applicable for up to 71 GHz. If *dl-DataToUL-ACK-r16* *or dl-DataToUL-ACK-r17* or *dl-DataToUL-ACK-v1700* is signalled, UE shall ignore the *dl-DataToUL-ACK* (without suffix). The value -1 corresponds to "inapplicable value" for the case where the A/N feedback timing is not explicitly included at the time of scheduling PDSCH.The fields *dl-DataToUL-ACK-r17* and *dl-DataToUL-ACK-DCI-1-2-r17* are only applicable for SCS of 480 kHz or 960 kHz. |
| ***dl-DataToUL-ACK-MulticastDCI-Format4-1***  List of timing for given group-common PDSCH to the DL ACK (see TS 38.213 [13], clause 9.1.2). The field *dl-DataToUL-ACK-MulticastDciFormat4-1* applies to DCI format 4\_1 for MBS multicast (see TS 38.212 [17], clause 7.3.1 and TS 38.213 [13], clause 9.2.3). |
| ***dmrs-BundlingPUCCH-Config***  Configuration of the parameters for DMRS bundling for PUCCH (see TS 38.214 [19], clause 6.1.7). DMRS bundling for PUCCH is not supported for PUCCH format 0/2. |
| ***dmrs-UplinkTransformPrecodingPUCCH***  This field is used for PUCCH formats 3 and 4 according to TS 38.211, Clause 6.4.1.3.3.1. |
| ***format0***  Parameters that are common for all PUCCH resources of format 0. |
| ***format1***  Parameters that are common for all PUCCH resources of format 1. |
| ***format2***  Parameters that are common for all PUCCH resources of format 2. |
| ***format3***  Parameters that are common for all PUCCH resources of format 3. |
| ***format4***  Parameters that are common for all PUCCH resources of format 4 |
| ***mappingPattern***  Indicates whether the UE should follow Cyclical mapping pattern or Sequential mapping pattern for when a PUCCH resource used for repetitions of a PUCCH transmission includes first and second spatial settings for FR2, or first and second sets of power control parameters for FR1 (see TS 38.213 [13], clause 9.2.6) |
| ***numberOfBitsForPUCCH- ResourceIndicatorDCI-1-2***  Configuration of the number of bits for "PUCCH resource indicator" in DCI format 1\_2 (see TS 38.212 [17], clause 7.3.1 and TS 38.213 [13], clause 9.2.3). |
| ***powerControlSetInfoToAddModList***  Configures power control sets for repetition of a PUCCH transmission in FR1. This field is not configured if *ul-powerControl* is configured in the *BWP-UplinkDedicated* in which the *PUCCH-Config* is included. |
| ***pucch-PowerControl***  Configures power control parameters PUCCH transmission. This field is not configured if *unifiedTCI-StateType* is configured for the serving cell. |
| ***resourceGroupToAddModList, resourceGroupToReleaseList***  Lists for adding and releasing groups of PUCCH resources that can be updated simultaneously for spatial relations with a MAC CE |
| ***resourceSetToAddModList, resourceSetToReleaseList***  Lists for adding and releasing PUCCH resource sets (see TS 38.213 [13], clause 9.2). |
| ***resourceToAddModList, resourceToAddModListExt, resourceToReleaseList***  Lists for adding and releasing PUCCH resources applicable for the UL BWP and serving cell in which the *PUCCH-Config* is defined. The resources defined herein are referred to from other parts of the configuration to determine which resource the UE shall use for which report. If the network includes of *resourceToAddModListExt*, it includes the same number of entries, and listed in the same order, as in *resourceToAddModList*. |
| ***secondTPCFieldDCI-1-1, secondTPCFieldDCI-1-2***  A second TPC field can be configured via RRC for DCI-1-1 and DCI-1-2. Each TPC field is for each closed-loop index value respectively (i.e., 1st /2nd TPC fields correspond to "closedLoopIndex" value = 0 and 1. |
| ***spatialRelationInfoToAddModList, spatialRelationInfoToAddModListSizeExt , spatialRelationInfoToAddModListExt***  Configuration of the spatial relation between a reference RS and PUCCH. Reference RS can be SSB/CSI-RS/SRS. If the list has more than one element, MAC-CE selects a single element (see TS 38.321 [3], clause 5.18.8 and TS 38.213 [13], clause 9.2.2). The UE shall consider entries in *spatialRelationInfoToAddModList* and in *spatialRelationInfoToAddModListSizeExt* as a single list, i.e. an entry created using *spatialRelationInfoToAddModList* can be modified using *spatialRelationInfoToAddModListSizeExt* (or deleted using *spatialRelationInfoToReleaseListSizeExt*) and vice-versa. If the network includes *spatialRelationInfoToAddModListExt*, it includes the same number of entries, and listed in the same order, as in the concatenation of *spatialRelationInfoToAddModList* and of *spatialRelationInfoToAddModListSizeExt*. |
| ***spatialRelationInfoToReleaseList, spatialRelationInfoToReleaseListSizeExt, spatialRelationInfoToReleaseListExt***  Lists of spatial relation configurations between a reference RS and PUCCH to be released by the UE. |
| ***sps-PUCCH-AN-List***  Indicates a list of PUCCH resources for DL SPS HARQ ACK. The field *maxPayloadSize* is absent for the first and the last *SPS-PUCCH-AN* in the list. If configured, this overrides *n1PUCCH-AN* in *SPS-config.* |
| ***sps-PUCCH-AN-ListMulticast***  The field is used to configure the list of PUCCH resources per HARQ ACK codebook for MBS multicast. |
| ***subslotLengthForPUCCH***  Indicate the sub-slot length for sub-slot based PUCCH feedback in number of symbols (see TS 38.213 [13], clause 9). Value *n2* corresponds to 2 symbols, value *n6* corresponding to 6 symbols, value *n7* corresponds to 7 symbols. For normal CP, the value is either *n2* or *n7*. For extended CP, the value is either *n2* or *n6*. |
| ***ul-AccessConfigListDCI-1-1, ul-AccessConfigListDCI-1-2***  List of the combinations of cyclic prefix extension and UL channel access type (see TS 38.212 [17], clause 7.3.1) applicable, respectively, to DCI format 1\_1 and DCI format 1\_2. The fields *ul-AccessConfigListDCI-1-1-r16* and *ul-AccessConfigListDCI-1-2-r17* are only applicable for FR1 (see TS 38.212 [17], Table 7.3.1.2.2-6). The field *ul-AccessConfigListDCI-1-1-r17* indicates a list which only contains UL channel access types and is only applicable for FR2-2 (see TS 38.212 [17], Table 7.3.1.2.2-6A). |

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| *PUCCH-format3* field descriptions |
| ***nrofPRBs***  The supported values are 1,2,3,4,5,6,8,9,10,12,15 and 16. The UE shall ignore this field when *formatExt* is configured. |

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| *PUCCH-FormatConfig, PUCCH-FormatConfigExt* field descriptions |
| ***additionalDMRS***  If the field is present, the UE enables 2 DMRS symbols per hop of a PUCCH Format 3 or 4 if both hops are more than X symbols when FH is enabled (X=4). And it enables 4 DMRS symbols for a PUCCH Format 3 or 4 with more than 2X+1 symbols when FH is disabled (X=4). The field is not applicable for format 0, 1 and 2. See TS 38.213 [13], clause 9.2.2. |
| ***interslotFrequencyHopping***  If the field is present, the UE enables inter-slot frequency hopping when PUCCH Format 0, 1, 3 or 4 is repeated over multiple slots. For long PUCCH over multiple slots, the intra and inter slot frequency hopping cannot be enabled at the same time for a UE. The field is not applicable for format 2. See TS 38.213 [13], clause 9.2.6. |
| ***maxCodeRate***  Max coding rate to determine how to feedback UCI on PUCCH for format 2, 3 or 4. The field is not applicable for format 0 and 1. See TS 38.213 [13], clause 9.2.5. |
| ***maxCodeRateLP***  Max coding rate to determine how to feedback UCI on PUCCH for format 2, 3 or 4. The field is not applicable for format 0 and 1. This field configures additional max code rate in the second entry of *PUCCH-ConfigurationList-r16* for multiplexing low-priority (LP) HARQ-ACK and high-priority (HP) UCI in a PUCCH as described Clause 9.2.5.3 of TS 38.213 [13]. The field is absent for the first entry of *PUCCH-ConfigurationList-r16*. |
| ***nrofSlots***  Number of slots with the same PUCCH. When the field is absent the UE applies the value *n1*. The field is not applicable for format 2. See TS 38.213 [13], clause 9.2.6. |
| ***pi2BPSK***  If the field is present, the UE uses pi/2 BPSK for UCI symbols instead of QPSK for PUCCH. The field is not applicable for format 0, 1 and 2. See TS 38.213 [13], clause 9.2.5. |
| ***rb-SetIndex***  Indicates the RB set where PUCCH resource is allocated. |
| ***simultaneousHARQ-ACK-CSI***  If the field is present, the UE uses simultaneous transmission of CSI and HARQ-ACK feedback with or without SR with PUCCH Format 2, 3 or 4. See TS 38.213 [13], clause 9.2.5. When the field is absent the UE applies the value *off.* The field is not applicable for format 0 and 1. |

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| *PUCCH-Resource, PUCCH-ResourceExt* field descriptions |
| ***format,*** ***formatExt***  Selection of the PUCCH format (format 0 – 4) and format-specific parameters, see TS 38.213 [13], clause 9.2. *format0* and *format1* are only allowed for a resource in a first PUCCH resource set. *format2*, *format3* and *format4* are only allowed for a resource in non-first PUCCH resource set. The network can only configure *formatExt-v1610* when format is set to *format2* or *format3*. The network only configures *formatExt-v17xx* when format is set to *format0*, *format1* or *format4*. |
| ***interlace0***  This is the only interlace of interlaced PUCCH Format 0 and 1 and the first interlace for interlaced PUCCH Format 2 and 3. |
| ***interlace1***  A second interlace, in addition to interlace 0, as specified in TS 38.213 [13], clause 9.2.1. For 15KHz SCS, values {0..9} are applicable; for 30Khz SCS, values {0..4} are applicable. For 15kHz SCS, the values of *interlace1* shall satisfy *interlace1*=mod(*interlace0*+X,10) where X=1, -1, or 5. |
| ***intraSlotFrequencyHopping***  Enabling intra-slot frequency hopping, applicable for all types of PUCCH formats. For long PUCCH over multiple slots, the intra and inter slot frequency hopping cannot be enabled at the same time for a UE. See TS 38.213 [13], clause 9.2.1. |
| ***nrofPRBs***  Indicates the number of PRBs used per PUCCH resource for the PUCCH format, see TS 38.213 [13], clause 9.2.1. This field is applicable for PUCCH *format0*, *format1*, and *format4* in FR2-2. The supported values for *format4* are 1,2,3,4,5,6,8,9,10,12,15 and 16. |
| ***occ-Index***  Indicates the orthogonal cover code index (see TS 38.213 [13], clause 9.2.1). This field is Applicable when *useInterlacePUCCH-Dedicated-r16* is configured. |
| ***occ-Length***  Indicates the orthogonal cover code length (see TS 38.213 [13], clause 9.2.1). Applicable when *useInterlacePUCCH-Dedicated-r16* is configured. |
| ***pucch-RepetitionNrofSlots***  Configuration of PUCCH repetition factor per PUCCH resource with associated scheduling DCI corresponding to Rel-17 dynamic PUCCH repetition. For a PUCCH resource, if both the field *pucch-RepetitionNrofSlots* and the field *nrofSlots* are present, the field *nrofSlots* is ignored and apply the value of *pucch-RepetitionNrofSlots* corresponding to Rel-17 dynamic PUCCH repetition. If this field is absent in a PUCCH resource with associated scheduling DCI, the UE applies the value of field *nrofSlots*. |
| ***pucch-ResourceId***  Identifier of the PUCCH resource. |
| ***secondHopPRB***  Index of first PRB after frequency hopping of PUCCH. This value is applicable for intra-slot frequency hopping (see TS 38.213 [13], clause 9.2.1) or inter-slot frequency hopping (see TS 38.213 [13], clause 9.2.6). |

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| --- |
| *PUCCH-ResourceSet* field descriptions |
| ***maxPayloadSize***  Maximum number of UCI information bits that the UE may transmit using this PUCCH resource set (see TS 38.213 [13], clause 9.2.1). In a PUCCH occurrence, the UE chooses the first of its *PUCCH-ResourceSet* which supports the number of bits that the UE wants to transmit. The field is absent in the first set (Set0) and in the last configured set since the UE derives the maximum number of UCI information bits as specified in TS 38.213 [13], clause 9.2.1. This field can take integer values that are multiples of 4. |
| ***resourceList***  PUCCH resources of *format0* and *format1* are only allowed in the first PUCCH resource set, i.e., in a PUCCH-ResourceSet with *pucch-ResourceSetId* = 0. This set may contain between 1 and 32 resources. PUCCH resources of *format2*, *format3* and *format4* are only allowed in a *PUCCH-ResourceSet* with *pucch-ResourceSetId* > 0. If present, these sets contain between 1 and 8 resources each. The UE chooses a *PUCCH-Resource* from this list as specified in TS 38.213 [13], clause 9.2.3. Note that this list contains only a list of resource IDs. The actual resources are configured in *PUCCH-Config*. |

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| --- | --- |
| Conditional Presence | Explanation |
| *PI2-BPSK* | The field is optionally present, Need R, if *format3* and/or *format4* are configured and *pi2BPSK* is configured in each of them. It is absent, Need R otherwise. |

#### – *PUCCH-ConfigCommon*

The IE *PUCCH-ConfigCommon* is used to configure the cell specific PUCCH parameters.

*PUCCH-ConfigCommon* information element

-- ASN1START

-- TAG-PUCCH-CONFIGCOMMON-START

PUCCH-ConfigCommon ::= SEQUENCE {

pucch-ResourceCommon INTEGER (0..15) OPTIONAL, -- Cond InitialBWP-Only

pucch-GroupHopping ENUMERATED { neither, enable, disable },

hoppingId INTEGER (0..1023) OPTIONAL, -- Need R

p0-nominal INTEGER (-202..24) OPTIONAL, -- Need R

...,

[[

nrofPRBs INTEGER (1..16) OPTIONAL, -- Need R

intra-SlotFH-r17 ENUMERATED {fromLowerEdge, fromUpperEdge} OPTIONAL, -- Need R

pucch-ResourceCommon-RedCap-r17 INTEGER (0..15) OPTIONAL, -- Need R

additionalPRBOffset-r17 ENUMERATED {n2, n3, n4, n6, n8, n9, n10, n12} OPTIONAL -- Need S

]]

}

-- TAG-PUCCH-CONFIGCOMMON-STOP

-- ASN1STOP

|  |
| --- |
| *PUCCH-ConfigCommon* field descriptions |
| ***additionalPRBOffset***  When intra-slot PUCCH frequency hopping within RedCap-specific initial UL BWP is disabled, each common PUCCH resource is mapped to a single PRB on one side of the UL BWP. This parameter determines an additional PRB offset in the PRB mapping for the PUCCH resource. If the field is not configured, the UE shall assume an additional PRB offset of zero. |
| ***hoppingId***  Cell-specific scrambling ID for group hopping and sequence hopping if enabled, see TS 38.211 [16], clause 6.3.2.2. |
| ***intra-SlotFH-r17***  In case a separate initial UL BWP is configured for RedCap UEs, the presence of this parameter indicates whether intra-slot PUCCH frequency hopping within the separate initial UL BWP in the common PUCCH resource is enabled for RedCap UEs. If this field is absent, intra-slot PUCCH frequency hopping within RedCap-specific initial UL BWP is enabled. If this field is present, intra-slot PUCCH frequency hopping within RedCap-specific initial UL BWP is disabled and each PUCCH resource is mapped to a single PRB on one side of the UL BWP and this parameter determines whether the PRB index in the PRB mapping is counted in increasing order from the lower edge or in decreasing order from the upper edge of the UL BWP. |
| ***nrofPRBs***  Indicates the number of PRBs used per PUCCH resource for PUCCH format 0 and format 1 in FR2-2, see TS 38.213 [13], clause 9.2.1. |
| ***p0-nominal***  Power control parameter P0 for PUCCH transmissions. Value in dBm. Only even values (step size 2) allowed (see TS 38.213 [13], clause 7.2). |
| ***pucch-GroupHopping***  Configuration of group- and sequence hopping for all the PUCCH formats 0, 1, 3 and 4. Value *neither* implies neither group or sequence hopping is enabled. Value *enable* enables group hopping and disables sequence hopping. Value *disable* disables group hopping and enables sequence hopping (see TS 38.211 [16], clause 6.3.2.2). |
| ***pucch-ResourceCommon***  An entry into a 16-row table where each row configures a set of cell-specific PUCCH resources/parameters. The UE uses those PUCCH resources until it is provided with a dedicated *PUCCH-Config* (e.g. during initial access) on the initial uplink BWP. Once the network provides a dedicated *PUCCH-Config* for that bandwidth part the UE applies that one instead of the one provided in this field (see TS 38.213 [13], clause 9.2). |
| ***pucch-ResourceCommon-RedCap***  An entry into a 16-row table where each row configures a set of cell-specific PUCCH resources/parameters for RedCap UEs. The UE uses those PUCCH resources until it is provided with a dedicated *PUCCH-Config* (e.g. during initial access) on the initial uplink BWP. Once the network provides a dedicated *PUCCH-Config* for that bandwidth part the UE applies that one instead of the one provided in this field (see TS 38.213 [13], clause 9.2). |

|  |  |
| --- | --- |
| Conditional Presence | Explanation |
| *InitialBWP-Only* | The field is mandatory present in the *PUCCH-ConfigCommon* of the initial BWP (BWP#0) in SIB1. It is absent in other BWPs. |

#### – *PUCCH-ConfigurationList*

The IE *PUCCH-ConfigurationList* is used to configure UE specific PUCCH parameters (per BWP) for two simultaneously constructed HARQ-ACK codebooks. See TS 38.213 [13], clause 9.1.

PUCCH-ConfigurationList information element

-- ASN1START

-- TAG-PUCCH-CONFIGURATIONLIST-START

PUCCH-ConfigurationList-r16 ::= SEQUENCE (SIZE (1..2)) OF PUCCH-Config

-- TAG-PUCCH-CONFIGURATIONLIST-STOP

-- ASN1STOP

#### – *PUCCH-PathlossReferenceRS-Id*

The IE *PUCCH-PathlossReferenceRS-Id* is an ID for a reference signal (RS) configured as PUCCH pathloss reference (see TS 38.213 [13], clause 7.2).

*PUCCH-PathlossReferenceRS-Id* information element

-- ASN1START

-- TAG-PUCCH-PATHLOSSREFERENCERS-ID-START

PUCCH-PathlossReferenceRS-Id ::= INTEGER (0..maxNrofPUCCH-PathlossReferenceRSs-1)

PUCCH-PathlossReferenceRS-Id-v1610 ::= INTEGER (maxNrofPUCCH-PathlossReferenceRSs..maxNrofPUCCH-PathlossReferenceRSs-1-r16)

PUCCH-PathlossReferenceRS-Id-r17 ::= INTEGER (0..maxNrofPUCCH-PathlossReferenceRSs-1-r17)

-- TAG-PUCCH-PATHLOSSREFERENCERS-ID-STOP

-- ASN1STOP

#### – *PUCCH-PowerControl*

The IE *PUCCH-PowerControl* is used to configure UE-specific parameters for the power control of PUCCH.

*PUCCH-PowerControl* information element

-- ASN1START

-- TAG-PUCCH-POWERCONTROL-START

PUCCH-PowerControl ::= SEQUENCE {

deltaF-PUCCH-f0 INTEGER (-16..15) OPTIONAL, -- Need R

deltaF-PUCCH-f1 INTEGER (-16..15) OPTIONAL, -- Need R

deltaF-PUCCH-f2 INTEGER (-16..15) OPTIONAL, -- Need R

deltaF-PUCCH-f3 INTEGER (-16..15) OPTIONAL, -- Need R

deltaF-PUCCH-f4 INTEGER (-16..15) OPTIONAL, -- Need R

p0-Set SEQUENCE (SIZE (1..maxNrofPUCCH-P0-PerSet)) OF P0-PUCCH OPTIONAL, -- Need M

pathlossReferenceRSs SEQUENCE (SIZE (1..maxNrofPUCCH-PathlossReferenceRSs)) OF PUCCH-PathlossReferenceRS

OPTIONAL, -- Need M

twoPUCCH-PC-AdjustmentStates ENUMERATED {twoStates} OPTIONAL, -- Need S

...,

[[

pathlossReferenceRSs-v1610 SetupRelease { PathlossReferenceRSs-v1610 } OPTIONAL -- Need M

]]

}

P0-PUCCH ::= SEQUENCE {

p0-PUCCH-Id P0-PUCCH-Id,

p0-PUCCH-Value INTEGER (-16..15)

}

P0-PUCCH-Id ::= INTEGER (1..8)

PathlossReferenceRSs-v1610 ::= SEQUENCE (SIZE (1..maxNrofPUCCH-PathlossReferenceRSsDiff-r16)) OF PUCCH-PathlossReferenceRS-r16

PUCCH-PathlossReferenceRS ::= SEQUENCE {

pucch-PathlossReferenceRS-Id PUCCH-PathlossReferenceRS-Id,

referenceSignal CHOICE {

ssb-Index SSB-Index,

csi-RS-Index NZP-CSI-RS-ResourceId

}

}

PUCCH-PathlossReferenceRS-r16 ::= SEQUENCE {

pucch-PathlossReferenceRS-Id-r16 PUCCH-PathlossReferenceRS-Id-v1610,

referenceSignal-r16 CHOICE {

ssb-Index-r16 SSB-Index,

csi-RS-Index-r16 NZP-CSI-RS-ResourceId

}

}

PUCCH-PowerControlSetInfo-r17 ::= SEQUENCE {

pucch-PowerControlSetInfoId-r17 PUCCH-PowerControlSetInfoId-r17,

p0-PUCCH-Id-r17 P0-PUCCH-Id,

pucch-ClosedLoopIndex-r17 ENUMERATED { i0, i1 },

pucch-PathlossReferenceRS-Id-r17 PUCCH-PathlossReferenceRS-Id-r17

}

PUCCH-PowerControlSetInfoId-r17 ::= INTEGER (1.. maxNrofPowerControlSetInfos-r17)

-- TAG-PUCCH-POWERCONTROL-STOP

-- ASN1STOP

|  |
| --- |
| *P0-PUCCH* field descriptions |
| ***p0-PUCCH-Value***  P0 value for PUCCH with 1dB step size. |

|  |
| --- |
| *PUCCH-PowerControl* field descriptions |
| ***deltaF-PUCCH-f0***  deltaF for PUCCH format 0 with 1dB step size (see TS 38.213 [13], clause 7.2). |
| ***deltaF-PUCCH-f1***  deltaF for PUCCH format 1 with 1dB step size (see TS 38.213 [13], clause 7.2). |
| ***deltaF-PUCCH-f2***  deltaF for PUCCH format 2 with 1dB step size (see TS 38.213 [13], clause 7.2). |
| ***deltaF-PUCCH-f3***  deltaF for PUCCH format 3 with 1dB step size (see TS 38.213 [13], clause 7.2). |
| ***deltaF-PUCCH-f4***  deltaF for PUCCH format 4 with 1dB step size (see TS 38.213 [13], clause 7.2). |
| ***p0-Set***  A set with dedicated P0 values for PUCCH, i.e., {P01, P02,... } (see TS 38.213 [13], clause 7.2). |
| ***pathlossReferenceRSs, pathlossReferenceRSs-v1610***  A set of Reference Signals (e.g. a CSI-RS config or a SS block) to be used for PUCCH pathloss estimation. Up to *maxNrofPUCCH-PathlossReference-RSs* may be configured. If the field is not configured, the UE uses the SSB as reference signal (see TS 38.213 [13], clause 7.2). The set includes Reference Signals indicated in pathlossReferenceRSs (without suffix) and in pathlossReferenceRSs-v1610. The UE maintains *pathlossReferenceRSs* and *pathlossReferenceRSs-v1610* separately: Receiving *pathlossReferenceRSs-v1610* set to *release* releases only the entries that were configured by *pathlossReferenceRSs-v1610*, and receiving *pathlossReferenceRSs-v1610* set to *setup* replaces only the entries that were configured by *pathlossReferenceRSs-v1610* with the newly signalled entries. |
| ***twoPUCCH-PC-AdjustmentStates***  Number of PUCCH power control adjustment states maintained by the UE (i.e., g(i)). If the field is present (n2) the UE maintains two power control states (i.e., g(i,0) and g(i,1)). If the field is absent, it maintains one power control state (i.e., g(i,0)) (see TS 38.213 [13], clause 7.2). |

#### – *PUCCH-SpatialRelationInfo*

The IE *PUCCH-SpatialRelationInfo* is used to configure the spatial setting for PUCCH transmission and the parameters for PUCCH power control, see TS 38.213, [13], clause 9.2.2.

*PUCCH-SpatialRelationInfo* information element

-- ASN1START

-- TAG-PUCCH-SPATIALRELATIONINFO-START

PUCCH-SpatialRelationInfo ::= SEQUENCE {

pucch-SpatialRelationInfoId PUCCH-SpatialRelationInfoId,

servingCellId ServCellIndex OPTIONAL, -- Need S

referenceSignal CHOICE {

ssb-Index SSB-Index,

csi-RS-Index NZP-CSI-RS-ResourceId,

srs PUCCH-SRS

},

pucch-PathlossReferenceRS-Id PUCCH-PathlossReferenceRS-Id,

p0-PUCCH-Id P0-PUCCH-Id,

closedLoopIndex ENUMERATED { i0, i1 }

}

PUCCH-SpatialRelationInfoExt-r16 ::= SEQUENCE {

pucch-SpatialRelationInfoId-v1610 PUCCH-SpatialRelationInfoId-v1610 OPTIONAL, -- Need S

pucch-PathlossReferenceRS-Id-v1610 PUCCH-PathlossReferenceRS-Id-v1610 OPTIONAL, --Need R

...

}

PUCCH-SRS ::= SEQUENCE {

resource SRS-ResourceId,

uplinkBWP BWP-Id

}

-- TAG-PUCCH-SPATIALRELATIONINFO-STOP

-- ASN1STOP

|  |
| --- |
| *PUCCH-SpatialRelationInfo* field descriptions |
| ***pucch-PathLossReferenceRS-Id***  When *pucch-PathLossReferenceRS-Id-v1610* is configured, the UE shall ignore *pucch-PathLossReferenceRS-Id* (without suffix). |
| ***pucch-SpatialRelationInfoId***  When *pucch-SpatialRelationInfoId-v1610* is configured, the UE shall ignore *pucch-SpatialRelationInfoId* (without suffix). If *pucch-SpatialRelationInfoId-v1610 is* absent, the UE shall use the *pucch-SpatialRelationInfoId* (without suffix). |
| ***servingCellId***  If the field is absent, the UE applies the *ServCellId* of the serving cell in which this *PUCCH-SpatialRelationInfo* is configured |

#### – *PUCCH-SpatialRelationInfo-Id*

The IE *PUCCH-SpatialRelationInfo-Id* is used to identify a *PUCCH-SpatialRelationInfo*

*PUCCH-SpatialRelationInfo-Id* information element

-- ASN1START

-- TAG-PUCCH-SPATIALRELATIONINFO-START

PUCCH-SpatialRelationInfoId ::= INTEGER (1..maxNrofSpatialRelationInfos)

PUCCH-SpatialRelationInfoId-r16 ::= INTEGER (1..maxNrofSpatialRelationInfos-r16)

PUCCH-SpatialRelationInfoId-v1610::= INTEGER (maxNrofSpatialRelationInfos-plus-1..maxNrofSpatialRelationInfos-r16)

-- TAG-PUCCH-SPATIALRELATIONINFO-STOP

-- ASN1STOP

#### – *PUCCH-TPC-CommandConfig*

The IE *PUCCH-TPC-CommandConfig* is used to configure the UE for extracting TPC commands for PUCCH from a group-TPC messages on DCI.

*PUCCH-TPC-CommandConfig* information element

-- ASN1START

-- TAG-PUCCH-TPC-COMMANDCONFIG-START

PUCCH-TPC-CommandConfig ::= SEQUENCE {

tpc-IndexPCell INTEGER (1..15) OPTIONAL, -- Cond PDCCH-OfSpcell

tpc-IndexPUCCH-SCell INTEGER (1..15) OPTIONAL, -- Cond PDCCH-ofSpCellOrPUCCH-SCell

...,

[[

tpc-IndexPUCCH-sSCell-r17 INTEGER (1..15) OPTIONAL, -- Need R

tpc-IndexPUCCH-sScellSecondaryPUCCHgroup-r17 INTEGER (1..15) OPTIONAL -- Cond twoPUCCHgroup

]]

}

-- TAG-PUCCH-TPC-COMMANDCONFIG-STOP

-- ASN1STOP

|  |
| --- |
| *PUCCH-TPC-CommandConfig* field descriptions |
| ***tpc-IndexPCell***  An index determining the position of the first bit of TPC command (applicable to the SpCell) inside the DCI format 2-2 payload. |
| ***tpc-IndexPUCCH-SCell***  An index determining the position of the first bit of TPC command (applicable to the PUCCH SCell) inside the DCI format 2-2 payload. |
| ***tpc-IndexPUCCH-sSCell, tpc-IndexPUCCH-sSCellSecondaryPUCCHgroup***  An index determining the position of the first bit of TPC command (applicable to the alternative PUCCH cell for PUCCH cell switching) inside the DCI format 2-2 payload, for the primary PUCCH group and the secondary PUCCH group respectively. |

|  |  |
| --- | --- |
| Conditional Presence | Explanation |
| *PDCCH-OfSpcell* | The field is mandatory present if the *PUCCH-TPC-CommandConfig* is provided in the *PDCCH-Config* for the SpCell. Otherwise, the field is absent, Need R. |
| *PDCCH-ofSpCellOrPUCCH-SCell* | The field is mandatory present if the *PUCCH-TPC-CommandConfig* is provided in the *PDCCH-Config* for the PUCCH-SCell.  The field is optionally present, need R, if the UE is configured with a PUCCH SCell in this cell group and if the *PUCCH-TPC-CommandConfig* is provided in the *PDCCH-Config* for the SpCell.  Otherwise, the field is absent, Need R. |
| *twoPUCCHgroup* | This field is optionally present, Need R, if secondary PUCCH group is configured. It is absent otherwise. |

#### – *PUSCH-Config*

The IE *PUSCH-Config* is used to configure the UE specific PUSCH parameters applicable to a particular BWP.

*PUSCH-Config* information element

-- ASN1START

-- TAG-PUSCH-CONFIG-START

PUSCH-Config ::= SEQUENCE {

dataScramblingIdentityPUSCH INTEGER (0..1023) OPTIONAL, -- Need S

txConfig ENUMERATED {codebook, nonCodebook} OPTIONAL, -- Need S

dmrs-UplinkForPUSCH-MappingTypeA SetupRelease { DMRS-UplinkConfig } OPTIONAL, -- Need M

dmrs-UplinkForPUSCH-MappingTypeB SetupRelease { DMRS-UplinkConfig } OPTIONAL, -- Need M

pusch-PowerControl PUSCH-PowerControl OPTIONAL, -- Need M

frequencyHopping ENUMERATED {intraSlot, interSlot} OPTIONAL, -- Need S

frequencyHoppingOffsetLists SEQUENCE (SIZE (1..4)) OF INTEGER (1.. maxNrofPhysicalResourceBlocks-1)

OPTIONAL, -- Need M

resourceAllocation ENUMERATED { resourceAllocationType0, resourceAllocationType1, dynamicSwitch},

pusch-TimeDomainAllocationList SetupRelease { PUSCH-TimeDomainResourceAllocationList } OPTIONAL, -- Need M

pusch-AggregationFactor ENUMERATED { n2, n4, n8 } OPTIONAL, -- Need S

mcs-Table ENUMERATED {qam256, qam64LowSE} OPTIONAL, -- Need S

mcs-TableTransformPrecoder ENUMERATED {qam256, qam64LowSE} OPTIONAL, -- Need S

transformPrecoder ENUMERATED {enabled, disabled} OPTIONAL, -- Need S

codebookSubset ENUMERATED {fullyAndPartialAndNonCoherent, partialAndNonCoherent,nonCoherent}

OPTIONAL, -- Cond codebookBased

maxRank INTEGER (1..4) OPTIONAL, -- Cond codebookBased

rbg-Size ENUMERATED { config2} OPTIONAL, -- Need S

uci-OnPUSCH SetupRelease { UCI-OnPUSCH} OPTIONAL, -- Need M

tp-pi2BPSK ENUMERATED {enabled} OPTIONAL, -- Need S

...,

[[

minimumSchedulingOffsetK2-r16 SetupRelease { MinSchedulingOffsetK2-Values-r16 } OPTIONAL, -- Need M

ul-AccessConfigListDCI-0-1-r16 SetupRelease { UL-AccessConfigListDCI-0-1-r16 } OPTIONAL, -- Need M

-- Start of the parameters for DCI format 0\_2 introduced in V16.1.0

harq-ProcessNumberSizeDCI-0-2-r16 INTEGER (0..4) OPTIONAL, -- Need R

dmrs-SequenceInitializationDCI-0-2-r16 ENUMERATED {enabled} OPTIONAL, -- Need S

numberOfBitsForRV-DCI-0-2-r16 INTEGER (0..2) OPTIONAL, -- Need R

antennaPortsFieldPresenceDCI-0-2-r16 ENUMERATED {enabled} OPTIONAL, -- Need S

dmrs-UplinkForPUSCH-MappingTypeA-DCI-0-2-r16 SetupRelease { DMRS-UplinkConfig } OPTIONAL, -- Need M

dmrs-UplinkForPUSCH-MappingTypeB-DCI-0-2-r16 SetupRelease { DMRS-UplinkConfig } OPTIONAL, -- Need M

frequencyHoppingDCI-0-2-r16 CHOICE {

pusch-RepTypeA ENUMERATED {intraSlot, interSlot},

pusch-RepTypeB ENUMERATED {interRepetition, interSlot}

} OPTIONAL, -- Need S

frequencyHoppingOffsetListsDCI-0-2-r16 SetupRelease { FrequencyHoppingOffsetListsDCI-0-2-r16} OPTIONAL, -- Need M

codebookSubsetDCI-0-2-r16 ENUMERATED {fullyAndPartialAndNonCoherent, partialAndNonCoherent,nonCoherent}

OPTIONAL, -- Cond codebookBased

invalidSymbolPatternIndicatorDCI-0-2-r16 ENUMERATED {enabled} OPTIONAL, -- Need S

maxRankDCI-0-2-r16 INTEGER (1..4) OPTIONAL, -- Cond codebookBased

mcs-TableDCI-0-2-r16 ENUMERATED {qam256, qam64LowSE} OPTIONAL, -- Need S

mcs-TableTransformPrecoderDCI-0-2-r16 ENUMERATED {qam256, qam64LowSE} OPTIONAL, -- Need S

priorityIndicatorDCI-0-2-r16 ENUMERATED {enabled} OPTIONAL, -- Need S

pusch-RepTypeIndicatorDCI-0-2-r16 ENUMERATED { pusch-RepTypeA, pusch-RepTypeB} OPTIONAL, -- Need R

resourceAllocationDCI-0-2-r16 ENUMERATED { resourceAllocationType0, resourceAllocationType1, dynamicSwitch}

OPTIONAL, -- Need M

resourceAllocationType1GranularityDCI-0-2-r16 ENUMERATED { n2,n4,n8,n16 } OPTIONAL, -- Need S

uci-OnPUSCH-ListDCI-0-2-r16 SetupRelease { UCI-OnPUSCH-ListDCI-0-2-r16} OPTIONAL, -- Need M

pusch-TimeDomainAllocationListDCI-0-2-r16 SetupRelease { PUSCH-TimeDomainResourceAllocationList-r16 }

OPTIONAL, -- Need M

-- End of the parameters for DCI format 0\_2 introduced in V16.1.0

-- Start of the parameters for DCI format 0\_1 introduced in V16.1.0

pusch-TimeDomainAllocationListDCI-0-1-r16 SetupRelease { PUSCH-TimeDomainResourceAllocationList-r16 }

OPTIONAL, -- Need M

invalidSymbolPatternIndicatorDCI-0-1-r16 ENUMERATED {enabled} OPTIONAL, -- Need S

priorityIndicatorDCI-0-1-r16 ENUMERATED {enabled} OPTIONAL, -- Need S

pusch-RepTypeIndicatorDCI-0-1-r16 ENUMERATED { pusch-RepTypeA, pusch-RepTypeB} OPTIONAL, -- Need R

frequencyHoppingDCI-0-1-r16 ENUMERATED {interRepetition, interSlot} OPTIONAL, -- Cond RepTypeB

uci-OnPUSCH-ListDCI-0-1-r16 SetupRelease { UCI-OnPUSCH-ListDCI-0-1-r16 } OPTIONAL, -- Need M

-- End of the parameters for DCI format 0\_1 introduced in V16.1.0

invalidSymbolPattern-r16 InvalidSymbolPattern-r16 OPTIONAL, -- Need S

pusch-PowerControl-v1610 SetupRelease {PUSCH-PowerControl-v1610} OPTIONAL, -- Need M

ul-FullPowerTransmission-r16 ENUMERATED {fullpower, fullpowerMode1, fullpowerMode2} OPTIONAL, -- Need R

pusch-TimeDomainAllocationListForMultiPUSCH-r16 SetupRelease { PUSCH-TimeDomainResourceAllocationList-r16 }

OPTIONAL, -- Need M

numberOfInvalidSymbolsForDL-UL-Switching-r16 INTEGER (1..4) OPTIONAL -- Cond RepTypeB2

]],

[[

ul-AccessConfigListDCI-0-2-r17 SetupRelease { UL-AccessConfigListDCI-0-2-r17 } OPTIONAL, -- Need M

betaOffsetsCrossPri0-r17 SetupRelease { BetaOffsetsCrossPriSel-r17 } OPTIONAL, -- Need M

betaOffsetsCrossPri1-r17 SetupRelease { BetaOffsetsCrossPriSel-r17 } OPTIONAL, -- Need M

betaOffsetsCrossPri0DCI-0-2-r17 SetupRelease { BetaOffsetsCrossPriSelDCI-0-2-r17 } OPTIONAL, -- Need M

betaOffsetsCrossPri1DCI-0-2-r17 SetupRelease { BetaOffsetsCrossPriSelDCI-0-2-r17 } OPTIONAL, -- Need M

mappingPattern-r17 ENUMERATED {cyclicMapping, sequentialMapping} OPTIONAL, -- Cond SRSsets

secondTPCFieldDCI-0-1-r17 ENUMERATED {enabled} OPTIONAL, -- Need R

secondTPCFieldDCI-0-2-r17 ENUMERATED {enabled} OPTIONAL, -- Need R

sequenceOffsetForRV-r17 INTEGER (0..3) OPTIONAL, -- Need R

ul-AccessConfigListDCI-0-1-r17 SetupRelease { UL-AccessConfigListDCI-0-1-r17 } OPTIONAL, -- Need M

minimumSchedulingOffsetK2-r17 SetupRelease { MinSchedulingOffsetK2-Values-r17 } OPTIONAL, -- Need M

availableSlotCounting-r17 ENUMERATED { enabled } OPTIONAL, -- Need S

dmrs-BundlingPUSCH-Config-r17 SetupRelease { DMRS-BundlingPUSCH-Config-r17 } OPTIONAL, -- Need M

harq-ProcessNumberSizeDCI-0-2-v1700 INTEGER (5) OPTIONAL, -- Need R

harq-ProcessNumberSizeDCI-0-1-r17 INTEGER (5) OPTIONAL, -- Need R

mpe-ResourcePoolToAddModList-r17 SEQUENCE (SIZE(1..maxMPE-Resources-r17)) OF MPE-Resource-r17 OPTIONAL, -- Need N

mpe-ResourcePoolToReleaseList-r17 SEQUENCE (SIZE(1..maxMPE-Resources-r17)) OF MPE-ResourceId-r17 OPTIONAL -- Need N

]]

}

UCI-OnPUSCH ::= SEQUENCE {

betaOffsets CHOICE {

dynamic SEQUENCE (SIZE (4)) OF BetaOffsets,

semiStatic BetaOffsets

} OPTIONAL, -- Need M

scaling ENUMERATED { f0p5, f0p65, f0p8, f1 }

}

MinSchedulingOffsetK2-Values-r16 ::= SEQUENCE (SIZE (1..maxNrOfMinSchedulingOffsetValues-r16)) OF INTEGER (0..maxK2-SchedulingOffset-r16)

MinSchedulingOffsetK2-Values-r17 ::= SEQUENCE (SIZE (1..maxNrOfMinSchedulingOffsetValues-r16)) OF INTEGER (0..maxK2-SchedulingOffset-r17)

UCI-OnPUSCH-DCI-0-2-r16 ::= SEQUENCE {

betaOffsetsDCI-0-2-r16 CHOICE {

dynamicDCI-0-2-r16 CHOICE {

oneBit-r16 SEQUENCE (SIZE (2)) OF BetaOffsets,

twoBits-r16 SEQUENCE (SIZE (4)) OF BetaOffsets

},

semiStaticDCI-0-2-r16 BetaOffsets

} OPTIONAL, -- Need M

scalingDCI-0-2-r16 ENUMERATED { f0p5, f0p65, f0p8, f1 }

}

FrequencyHoppingOffsetListsDCI-0-2-r16 ::= SEQUENCE (SIZE (1..4)) OF INTEGER (1.. maxNrofPhysicalResourceBlocks-1)

UCI-OnPUSCH-ListDCI-0-2-r16 ::= SEQUENCE (SIZE (1..2)) OF UCI-OnPUSCH-DCI-0-2-r16

UCI-OnPUSCH-ListDCI-0-1-r16 ::= SEQUENCE (SIZE (1..2)) OF UCI-OnPUSCH

UL-AccessConfigListDCI-0-1-r16 ::= SEQUENCE (SIZE (1..64)) OF INTEGER (0..63)

UL-AccessConfigListDCI-0-1-r17 ::= SEQUENCE (SIZE (1..3)) OF INTEGER (0..2)

UL-AccessConfigListDCI-0-2-r17 ::= SEQUENCE (SIZE (1..64)) OF INTEGER (0..63)

BetaOffsetsCrossPriSel-r17 ::= CHOICE {

dynamic-r17 SEQUENCE (SIZE (4)) OF BetaOffsetsCrossPri-r17,

semiStatic-r17 BetaOffsetsCrossPri-r17

}

BetaOffsetsCrossPriSelDCI-0-2-r17 ::= CHOICE {

dynamicDCI-0-2-r17 CHOICE {

oneBit-r17 SEQUENCE (SIZE (2)) OF BetaOffsetsCrossPri-r17,

twoBits-r17 SEQUENCE (SIZE (4)) OF BetaOffsetsCrossPri-r17

},

semiStaticDCI-0-2-r17 BetaOffsetsCrossPri-r17

}

MPE-Resource-r17 ::= SEQUENCE {

mpe-ResourceId-r17 MPE-ResourceId-r17,

cell ServCellIndex OPTIONAL, -- Need R

additionalPCI-r17 AdditionalPCIIndex-r17 OPTIONAL, -- Need R

mpe-ReferenceSignal-r17 CHOICE {

csi-RS-Resource-r17 NZP-CSI-RS-ResourceId,

ssb-Resource-r17 SSB-Index

}

}

MPE-ResourceId-r17 ::= INTEGER (1..maxMPE-Resources-r17)

-- TAG-PUSCH-CONFIG-STOP

-- ASN1STOP

|  |
| --- |
| *PUSCH-Config* field descriptions |
| ***antennaPortsFieldPresenceDCI-0-2***  Configure the presence of "Antenna ports" field in DCI format 0\_2. When the field is configured, then the "Antenna ports" field is present in DCI format 0\_2. Otherwise, the field size is set to 0 for DCI format 0\_2 (See TS 38.212 [17], clause 7.3.1.1.3). If neither *dmrs-UplinkForPUSCH-MappingTypeA-DCI-0-2* nor *dmrs-UplinkForPUSCH-MappingTypeB-DCI-0-2* is configured, this field is absent. |
| ***availableSlotCounting***  Indicate whether PUSCH repetitions counted on the basis of available slots is enabled. If the field is absent, PUSCH repetitions counted on the basis of available slots is disabled. |
| ***betaOffsetsCrossPri0, betaOffsetsCrossPri1,*** ***betaOffsetsCrossPri0DCI-0-2, betaOffsetsCrossPri1DCI-0-2***  Selection between and configuration of dynamic and semi-static beta-offset for multiplexing HARQ-ACK on dynamically scheduled PUSCH with different priorities, see TS 38.213 [13], clause 9.3.  The field *betaOffsetsCrossPrio0* indicates multiplexing low priority (LP) HARQ-ACK on dynamically scheduled high priority (HP) PUSCH.  The field *betaOffsetsCrossPrio1* indicates multiplexing HP HARQ-ACK on dynamically scheduled LP PUSCH.  The field *betaOffsetsCrossPrio0DCI-0-2* indicates multiplexing LP HARQ-ACK on dynamically scheduled HP PUSCH by DCI format 0\_2.  The field *betaOffsetsCrossPrio1DCI-0-2* indicates multiplexing HP HARQ-ACK on dynamically scheduled LP PUSCH by DCI format 0\_2. |
| ***codebookSubset, codebookSubsetDCI-0-2***  Subset of PMIs addressed by TPMI, where PMIs are those supported by UEs with maximum coherence capabilities (see TS 38.214 [19], clause 6.1.1.1). The field *codebookSubset* applies to DCI format 0\_1 and the field *codebookSubsetDCI-0-2* applies to DCI format 0\_2 (see TS 38.214 [19], clause 6.1.1.1). |
| ***dataScramblingIdentityPUSCH***  Identifier used to initialise data scrambling (c\_init) for PUSCH. If the field is absent, the UE applies the physical cell ID. (see TS 38.211 [16], clause 6.3.1.1). |
| ***dmrs-BundlingPUSCH-Config***  Configure the parameters for DMRS bundling for PUSCH (see TS 38.214 [19], clause 6.1.7). |
| ***dmrs-SequenceInitializationDCI-0-2***  Configure whether the field "DMRS Sequence Initialization" is present or not in DCI format 0\_2. If the field is absent, then 0 bit for the field "DMRS Sequence Initialization" in DCI format 0\_2. If the field is present, then the number of bits is determined in the same way as DCI format 0\_1 (see TS 38.212 [17], clause 7.3.1). |
| ***dmrs-UplinkForPUSCH-MappingTypeA, dmrs-UplinkForPUSCH-MappingTypeA-DCI-0-2***  DMRS configuration for PUSCH transmissions using PUSCH mapping type A (chosen dynamically via *PUSCH-TimeDomainResourceAllocation*). Only the fields *dmrs-Type*, *dmrs-AdditionalPosition* and *maxLength* may be set differently for mapping type A and B. The field *dmrs-UplinkForPUSCH-MappingTypeA* applies to DCI format 0\_1 and the field *dmrs-UplinkForPUSCH-MappingTypeA-DCI-0-2* applies to DCI format 0\_2 (see TS 38.212 [17], clause 7.3.1). |
| ***dmrs-UplinkForPUSCH-MappingTypeB, dmrs-UplinkForPUSCH-MappingTypeB-DCI-0-2***  DMRS configuration for PUSCH transmissions using PUSCH mapping type B (chosen dynamically via *PUSCH-TimeDomainResourceAllocation*). Only the fields *dmrs-Type*, *dmrs-AdditionalPosition* and *maxLength* may be set differently for mapping type A and B. The field *dmrs-UplinkForPUSCH-MappingTypeB* applies to DCI format 0\_1 and the field *dmrs-UplinkForPUSCH-MappingTypeB-DCI-0-2* applies to DCI format 0\_2 (see TS 38.212 [17], clause 7.3.1). |
| ***frequencyHopping***  The value *intraSlot* enables 'Intra-slot frequency hopping' and the value *interSlot* enables 'Inter-slot frequency hopping'. If the field is absent, frequency hopping is not configured for 'pusch-RepTypeA' (see TS 38.214 [19], clause 6.3). The field *frequencyHopping* applies to DCI format 0\_0 and 0\_1 for 'pusch-RepTypeA'. |
| ***frequencyHoppingDCI-0-1***  Indicates the frequency hopping scheme for DCI format 0\_1 when *pusch-RepTypeIndicatorDCI-0-1* is set to 'pusch-RepTypeB', The value *interRepetition* enables 'Inter-repetition frequency hopping', and the value *interSlot* enables 'Inter-slot frequency hopping'. If the field is absent, frequency hopping is not configured for DCI format 0\_1 (see TS 38.214 [19], clause 6.1). |
| ***frequencyHoppingDCI-0-2***  Indicate the frequency hopping scheme for DCI format 0\_2. The value *intraSlot* enables 'intra-slot frequency hopping', and the value *interRepetition* enables 'Inter-repetition frequency hopping', and the value *interSlot* enables 'Inter-slot frequency hopping'. When *pusch-RepTypeIndicatorDCI-0-2* is set to '*pusch-RepTypeA*', the frequency hopping scheme can be chosen between 'intra-slot frequency hopping and 'inter-slot frequency hopping' if enabled. When *pusch-RepTypeIndicatorDCI-0-2* is set to '*pusch-RepTypeB'*, the frequency hopping scheme can be chosen between 'inter-repetition frequency hopping' and 'inter-slot frequency hopping' if enabled. If the field is absent, frequency hopping is not configured for DCI format 0\_2 for 'pusch-RepTypeB' (see TS 38.214 [19], clause 6.3). |
| ***frequencyHoppingOffsetLists, frequencyHoppingOffsetListsDCI-0-2***  Set of frequency hopping offsets used when frequency hopping is enabled for granted transmission (not msg3) and type 2 configured grant activation (see TS 38.214 [19], clause 6.3). The field *frequencyHoppingOffsetLists* applies to DCI format 0\_0 and DCI format 0\_1 and the field *frequencyHoppingOffsetListsDCI-0-2* applies to DCI format 0\_2 (see TS 38.214 [19], clause 6.3). |
| ***harq-ProcessNumberSizeDCI-0-2***  Configure the number of bits for the field "HARQ process number" in DCI format 0\_2 (see TS 38.212 [17], clause 7.3.1). |
| ***invalidSymbolPattern***  Indicates one pattern for invalid symbols for PUSCH transmission repetition type B applicable to both DCI format 0\_1 and 0\_2. If *InvalidSymbolPattern* is not configured, semi-static flexible symbols are used for PUSCH. Segmentation occurs only around semi-static DL symbols (see TS 38.214 [19] clause 6.1). |
| ***invalidSymbolPatternIndicatorDCI-0-1, invalidSymbolPatternIndicatorDCI-0-2***  Indicates the presence of an additional bit in the DCI format 0\_1/0\_2. If *invalidSymbolPattern* is absent, then both *invalidSymbolPatternIndicatorDCI-0-1* and *invalidSymbolPatternIndicatorDCI-0-2* are absent. The field *invalidSymbolPatternIndicatorDCI-0-1* applies to the DCI format 0\_1 and the field *invalidSymbolPatternIndicatorDCI-0-2* applies to DCI format 0\_2 (see TS 38.214 [19] clause 6.1). If the field is absent, the UE behaviour is specified in TS 38.214 [19], clause 6.1.2.1. |
| ***mappingPattern***  Indicates whether the UE should follow Cyclical mapping pattern or Sequential mapping pattern for when two SRS resource sets are configured in *srs-ResourceSetToAddModList* or *srs-ResourceSetToAddModListDCI-0-2* with usage 'codebook' or 'noncodebook' for PUSCH transmission and the PUSCH transmission occasions are associated with both SRS resource sets. |
| ***maxRank, maxRankDCI-0-2***  Subset of PMIs addressed by TRIs from 1 to ULmaxRank (see TS 38.214 [19], clause 6.1.1.1). The field *maxRank* applies to DCI format 0\_1 and the field *maxRankDCI-0-2* applies to DCI format 0\_2 (see TS 38.214 [19], clause 6.1.1.1). |
| ***mcs-Table, mcs-TableFormat0-2***  Indicates which MCS table the UE shall use for PUSCH without transform precoder (see TS 38.214 [19], clause 6.1.4.1). If the field is absent the UE applies the value 64QAM. The field *mcs-Table* applies to DCI format 0\_0 and DCI format 0\_1 and the field *mcs-TableDCI-0-2* applies to DCI format 0\_2 (see TS 38.214 [19], clause 6.1.4.1). |
| ***mcs-TableTransformPrecoder, mcs-TableTransformPrecoderDCI-0-2***  Indicates which MCS table the UE shall use for PUSCH with transform precoding (see TS 38.214 [19], clause 6.1.4.1) If the field is absent the UE applies the value 64QAM. The field *mcs-TableTransformPrecoder* applies to DCI format 0\_0 and DCI format 0\_1 and the field *mcs-TableTransformPrecoderDCI-0-2* applies to DCI format 0\_2 (see TS 38.214 [19], clause 6.1.4.1). |
| ***minimumSchedulingOffsetK2***  List of minimum K2 values. Minimum K2 parameter denotes minimum applicable value(s) for the *Time domain resource assignment* table for PUSCH (see TS 38.214 [19], clause 6.1.2.1). |
| ***mpe-ResourcePoolToAddModList***  List of SSB/CSI-RS resources for P-MPR reporting. Each resource is configured with serving cell index where the resource is configured for the UE. The *additionalPCI* is configured only if the resource is SSB. For each resource, If neither *cell* nor *additionalPCI* is present, the SSB/CSI-RS resource is from the serving cell where the *PUSCH-Config* is. |
| ***numberOfBitsRV-DCI-0-2***  Configures the number of bits for "Redundancy version" in the DCI format 0\_2 (see TS 38.212 [17], clause 7.3.1 and TS 38.214 [19], clause 6.1.2.1). |
| ***numberOfInvalidSymbolsForDL-UL-Switching***  Indicates the number of symbols after the last semi-static DL symbol that are invalid symbols for PUSCH repetition Type B. If it is absent, no symbol is explicitly defined for DL-to-UL switching (see TS 38.214 [19], clause 6.1). |
| ***priorityIndicatorDCI-0-1, priorityIndicatorDCI-0-2***  Configures the presence of "priority indicator" in DCI format 0\_1/0\_2. When the field is absent in the IE, then the UE shall apply 0 bit for "Priority indicator" in DCI format 0\_1/0\_2. The field *priorityIndicatorDCI-0-1* applies to DCI format 0\_1 and the field *priorityIndicatorDCI-0-2* applies to DCI format 0\_2 (see TS 38.212 [17] clause 7.3.1 and TS 38.213 [13] clause 9). |
| ***pusch-AggregationFactor***  Number of repetitions for data (see TS 38.214 [19], clause 6.1.2.1). If the field is absent the UE applies the value 1. |
| ***pusch-PowerControl***  Configures power control parameters PUSCH transmission. This field is not configured if *unifiedTCI-StateType* is configured for the serving cell. |
| ***pusch-RepTypeIndicatorDCI-0-1, pusch-RepTypeIndicatorDCI-0-2***  Indicates whether UE follows the behavior for "PUSCH repetition type A" or the behavior for "PUSCH repetition type B" for the PUSCH scheduled by DCI format 0\_1/0\_2 and for Type 2 CG associated with the activating DCI format 0\_1/0\_2.The value *pusch-RepTypeA* enables the 'PUSCH repetition type A' and the value *pusch-RepTypeB* enables the 'PUSCH repetition type B'. The field *pusch-RepTypeIndicatorDCI-0-1* applies to DCI format 0\_1 and the field *pusch-RepTypeIndicatorDCI-0-2* applies to DCI format 0\_2 (see TS 38.214 [19], clause 6.1.2.1). |
| ***pusch-TimeDomainAllocationList***  List of time domain allocations for timing of UL assignment to UL data (see TS 38.214 [19], table 6.1.2.1.1-1). The field *pusch-TimeDomainAllocationList* applies to DCI formats 0\_0 or DCI format 0\_1 when the field *pusch-TimeDomainAllocationListDCI-0-1* is not configured (see TS 38.214 [19], table 6.1.2.1.1-1 and table 6.1.2.1.1-1A). The network does not configure the *pusch-TimeDomainAllocationList* (without suffix) simultaneously with the *pusch-TimeDomainAllocationListDCI-0-2-r16* or *pusch-TimeDomainAllocationListDCI-0-1-r16* or *pusch-TimeDomainAllocationListForMultiPUSCH-r16*. |
| ***pusch-TimeDomainAllocationListDCI-0-1***  Configuration of the time domain resource allocation (TDRA) table for DCI format 0\_1 (see TS 38.214 [19], clause 6.1, table 6.1.2.1.1-1A). |
| ***pusch-TimeDomainAllocationListDCI-0-2***  Configuration of the time domain resource allocation (TDRA) table for DCI format 0\_2 (see TS 38.214 [19], clause 6.1.2, table 6.1.2.1.1-1B). |
| ***pusch-TimeDomainAllocationListForMultiPUSCH***  Configuration of the time domain resource allocation (TDRA) table for multiple PUSCH (see TS 38.214 [19], clause 6.1.2). The network configures at most 16 rows in this TDRA table in *PUSCH-TimeDomainResourceAllocationList-r16* configured by this field. This field is not configured simultaneously with *pusch-AggregationFactor*. |
| ***rbg-Size***  Selection between configuration 1 and configuration 2 for RBG size for PUSCH. The UE does not apply this field if *resourceAllocation* is set to *resourceAllocationType1*. Otherwise, the UE applies the value *config1* when the field is absent (see TS 38.214 [19], clause 6.1.2.2.1). |
| ***resourceAllocation, resourceAllocationDCI-0-2***  Configuration of resource allocation type 0 and resource allocation type 1 for non-fallback DCI (see TS 38.214 [19], clause 6.1.2). The field *resourceAllocation* applies to DCI format 0\_1 and the field *resourceAllocationDCI-0-2* applies to DCI format 0\_2 (see TS 38.214 [19], clause 6.1.2). |
| ***resourceAllocationType1GranularityDCI-0-2***  Configures the scheduling granularity applicable for both the starting point and length indication for resource allocation type 1 in DCI format 0\_2. If this field is absent, the granularity is 1 PRB (see TS 38.214 [19], clause 6.1.2.2.2). |
| ***secondTPCFieldDCI-0-1, secondTPCFieldDCI-0-2***  A second TPC field can be configured via RRC for DCI-0-1 and DCI-0-2. Each TPC field is for each closed-loop index value respectively (i.e., 1st /2nd TPC fields correspond to "closedLoopIndex" value = 0 and 1, |
| ***sequenceOffsetForRV***  Configures the RV offset for the starting RV for the first repetition (first actual repetition in PUSCH repetition Type B) towards the second 'SRS resource set' for PUSCH configured in either *srs-ResourceSetToAddModList* or *srs-ResourceSetToAddModListDCI-0-2* with usage 'codebook' or 'noncodebook'. |
| ***tp-pi2BPSK***  Enables pi/2-BPSK modulation with transform precoding if the field is present and disables it otherwise. |
| ***transformPrecoder***  The UE specific selection of transformer precoder for PUSCH (see TS 38.214 [19], clause 6.1.3). When the field is absent the UE applies the value of the field *msg3-transformPrecoder*. |
| ***txConfig***  Whether UE uses codebook based or non-codebook based transmission (see TS 38.214 [19], clause 6.1.1). If the field is absent, the UE transmits PUSCH on one antenna port, see TS 38.214 [19], clause 6.1.1. |
| ***uci-OnPUSCH-ListDCI-0-1, uci-OnPUSCH-ListDCI-0-2***  Configuration for up to 2 HARQ-ACK codebooks specific to DCI format 0\_1/0\_2. The field uci-OnPUSCH-ListDCI-0-1 applies to DCI format 0\_1 and the field uci-OnPUSCH-ListDCI-0-2 applies to DCI format 0\_2 (see TS 38.212 [17], clause 7.3.1 and TS 38.213 [13] clause 9.3). |
| ***ul-AccessConfigListDCI-0-1, ul-AccessConfigListDCI-0-2***  List of the combinations of cyclic prefix extension, channel access priority class (CAPC), and UL channel access type (see TS 38.212 [17], clause 7.3.1) applicable for DCI format 0\_1 and DCI format 0\_2, respectively.The fields *ul-AccessConfigListDCI-0-1-r16* and *ul-AccessConfigListDCI-0-2-r17* are only applicable for FR1 (see TS 38.212 [17], Table 7.3.1.1.2-35). The field *ul-AccessConfigListDCI-0-1-r17* only contains a list of UL channel access types and is only applicable for FR2-2 (see TS 38.212 [17], Table 7.3.1.1.2-35A). |
| ***ul-FullPowerTransmission***  Configures the UE with UL full power transmission mode as specified in TS 38.213. This field is not configured if *ul-powerControl* is configured in the *BWP-UplinkDedicated* in which the *PUCCH-Config* is included. |

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| *UCI-OnPUSCH* field descriptions |
| ***betaOffsets***  Selection between and configuration of dynamic and semi-static beta-offset for DCI formats other than DCI format 0\_2. If the field is not configured, the UE applies the value 'semiStatic' (see TS 38.213 [13], clause 9.3). |
| ***scaling***  Indicates a scaling factor to limit the number of resource elements assigned to UCI on PUSCH for DCI formats other than DCI format 0\_2. Value *f0p5* corresponds to 0.5, value *f0p65* corresponds to 0.65, and so on. The value configured herein is applicable for PUSCH with configured grant (see TS 38.212 [17], clause 6.3). |

|  |
| --- |
| *UCI-OnPUSCH-DCI-0-2* field descriptions |
| ***betaOffsetsDCI-0-2***  Configuration of beta-offset for DCI format 0\_2. If semiStaticDCI-0-2 is chosen, the UE shall apply the value of 0 bit for the field of beta offset indicator in DCI format 0\_2. If dynamicDCI-0-2 is chosen, the UE shall apply the value of 1 bit or 2 bits for the field of beta offset indicator in DCI format 0\_2 (see TS 38.212 [17], clause 7.3.1 and TS 38.213 [13] clause 9.3). |
| ***dynamicDCI-0-2***  Indicates the UE applies the value 'dynamic' for DCI format 0\_2 (see TS 38.212 [17], clause 7.3.1 and TS 38.213 [13], clause 9.3). |
| ***semiStaticDCI-0-2***  Indicates the UE applies the value 'semiStatic' for DCI format 0\_2. (see TS 38.212 [17], clause 7.3.1 and see TS 38.213 [13], clause 9.3). |
| ***scalingDCI-0-2***  Indicates a scaling factor to limit the number of resource elements assigned to UCI on PUSCH for DCI format 0\_2. Value f0p5 corresponds to 0.5, value *f0p65* corresponds to 0.65, and so on (see TS 38.212 [17], clause 6.3). |

|  |  |
| --- | --- |
| Conditional Presence | Explanation |
| *codebookBased* | The field is mandatory present if *txConfig* is set to codebook and absent otherwise. |
| *RepTypeB* | The field is optionally present, Need S, if *pusch-RepTypeIndicatorDCI-0-1* is set to pusch-RepTypeB. It is absent otherwise. |
| *RepTypeB2* | The field is optionally present, Need S, if *pusch-RepTypeIndicatorDCI-0-1* or *pusch-RepTypeIndicatorDCI-0-2* is set to pusch-RepTypeB. It is absent otherwise. |
| *SRSsets* | This field is mandatory present when UE is configured with two SRS sets in either *srs-ResourceSetToAddModList* or *srs-ResourceSetToAddModListDCI-0-2* with usage codebook or non-codebook. |

#### – *PUSCH-ConfigCommon*

The IE *PUSCH-ConfigCommon* is used to configure the cell specific PUSCH parameters.

*PUSCH-ConfigCommon* information element

-- ASN1START

-- TAG-PUSCH-CONFIGCOMMON-START

PUSCH-ConfigCommon ::= SEQUENCE {

groupHoppingEnabledTransformPrecoding ENUMERATED {enabled} OPTIONAL, -- Need R

pusch-TimeDomainAllocationList PUSCH-TimeDomainResourceAllocationList OPTIONAL, -- Need R

msg3-DeltaPreamble INTEGER (-1..6) OPTIONAL, -- Need R

p0-NominalWithGrant INTEGER (-202..24) OPTIONAL, -- Need R

...

}

-- TAG-PUSCH-CONFIGCOMMON-STOP

-- ASN1STOP

|  |
| --- |
| *PUSCH-ConfigCommon* field descriptions |
| ***groupHoppingEnabledTransformPrecoding***  For DMRS transmission with transform precoder, the NW may configure group hopping by this cell-specific parameter, see TS 38.211 [16], clause 6.4.1.1.1.2. |
| ***msg3-DeltaPreamble***  Power offset between msg3 and RACH preamble transmission. Actual value = field value \* 2 [dB] (see TS 38.213 [13], clause 7.1) |
| ***p0-NominalWithGrant***  P0 value for PUSCH with grant (except msg3). Value in dBm. Only even values (step size 2) allowed (see TS 38.213 [13], clause 7.1) This field is cell specific |
| ***pusch-TimeDomainAllocationList***  List of time domain allocations for timing of UL assignment to UL data (see TS 38.214 [19], table 6.1.2.1.1-1). |

#### – *PUSCH-PowerControl*

The IE *PUSCH-PowerControl* is used to configure UE specific power control parameter for PUSCH.

*PUSCH-PowerControl* information element

-- ASN1START

-- TAG-PUSCH-POWERCONTROL-START

PUSCH-PowerControl ::= SEQUENCE {

tpc-Accumulation ENUMERATED { disabled } OPTIONAL, -- Need S

msg3-Alpha Alpha OPTIONAL, -- Need S

p0-NominalWithoutGrant INTEGER (-202..24) OPTIONAL, -- Need M

p0-AlphaSets SEQUENCE (SIZE (1..maxNrofP0-PUSCH-AlphaSets)) OF P0-PUSCH-AlphaSet OPTIONAL, -- Need M

pathlossReferenceRSToAddModList SEQUENCE (SIZE (1..maxNrofPUSCH-PathlossReferenceRSs)) OF PUSCH-PathlossReferenceRS

OPTIONAL, -- Need N

pathlossReferenceRSToReleaseList SEQUENCE (SIZE (1..maxNrofPUSCH-PathlossReferenceRSs)) OF PUSCH-PathlossReferenceRS-Id

OPTIONAL, -- Need N

twoPUSCH-PC-AdjustmentStates ENUMERATED {twoStates} OPTIONAL, -- Need S

deltaMCS ENUMERATED {enabled} OPTIONAL, -- Need S

sri-PUSCH-MappingToAddModList SEQUENCE (SIZE (1..maxNrofSRI-PUSCH-Mappings)) OF SRI-PUSCH-PowerControl

OPTIONAL, -- Need N

sri-PUSCH-MappingToReleaseList SEQUENCE (SIZE (1..maxNrofSRI-PUSCH-Mappings)) OF SRI-PUSCH-PowerControlId

OPTIONAL -- Need N

}

P0-PUSCH-AlphaSet ::= SEQUENCE {

p0-PUSCH-AlphaSetId P0-PUSCH-AlphaSetId,

p0 INTEGER (-16..15) OPTIONAL, -- Need S

alpha Alpha OPTIONAL -- Need S

}

P0-PUSCH-AlphaSetId ::= INTEGER (0..maxNrofP0-PUSCH-AlphaSets-1)

PUSCH-PathlossReferenceRS ::= SEQUENCE {

pusch-PathlossReferenceRS-Id PUSCH-PathlossReferenceRS-Id,

referenceSignal CHOICE {

ssb-Index SSB-Index,

csi-RS-Index NZP-CSI-RS-ResourceId

}

}

PUSCH-PathlossReferenceRS-r16 ::= SEQUENCE {

pusch-PathlossReferenceRS-Id-r16 PUSCH-PathlossReferenceRS-Id-v1610,

referenceSignal-r16 CHOICE {

ssb-Index-r16 SSB-Index,

csi-RS-Index-r16 NZP-CSI-RS-ResourceId

}

}

PUSCH-PathlossReferenceRS-v1710 ::= SEQUENCE {

pusch-PathlossReferenceRS-Id-r17 PUSCH-PathlossReferenceRS-Id-r17,

additionalPCI-r17 AdditionalPCIIndex-r17 OPTIONAL -- Need R

}

PUSCH-PathlossReferenceRS-Id ::= INTEGER (0..maxNrofPUSCH-PathlossReferenceRSs-1)

PUSCH-PathlossReferenceRS-Id-v1610 ::= INTEGER (maxNrofPUSCH-PathlossReferenceRSs..maxNrofPUSCH-PathlossReferenceRSs-1-r16)

PUSCH-PathlossReferenceRS-Id-r17 ::= INTEGER (0..maxNrofPUSCH-PathlossReferenceRSs-1-r16)

SRI-PUSCH-PowerControl ::= SEQUENCE {

sri-PUSCH-PowerControlId SRI-PUSCH-PowerControlId,

sri-PUSCH-PathlossReferenceRS-Id PUSCH-PathlossReferenceRS-Id,

sri-P0-PUSCH-AlphaSetId P0-PUSCH-AlphaSetId,

sri-PUSCH-ClosedLoopIndex ENUMERATED { i0, i1 }

}

SRI-PUSCH-PowerControlId ::= INTEGER (0..maxNrofSRI-PUSCH-Mappings-1)

PUSCH-PowerControl-v1610 ::= SEQUENCE {

pathlossReferenceRSToAddModListSizeExt-v1610 SEQUENCE (SIZE (1..maxNrofPUSCH-PathlossReferenceRSsDiff-r16)) OF PUSCH-PathlossReferenceRS-r16

OPTIONAL, -- Need N

pathlossReferenceRSToReleaseListSizeExt-v1610 SEQUENCE (SIZE (1..maxNrofPUSCH-PathlossReferenceRSsDiff-r16)) OF PUSCH-PathlossReferenceRS-Id-v1610

OPTIONAL, -- Need N

p0-PUSCH-SetList-r16 SEQUENCE (SIZE (1..maxNrofSRI-PUSCH-Mappings)) OF P0-PUSCH-Set-r16 OPTIONAL, -- Need R

olpc-ParameterSet SEQUENCE {

olpc-ParameterSetDCI-0-1-r16 INTEGER (1..2) OPTIONAL, -- Need R

olpc-ParameterSetDCI-0-2-r16 INTEGER (1..2) OPTIONAL -- Need R

} OPTIONAL, -- Need M

...,

[[

sri-PUSCH-MappingToAddModList2-r17 SEQUENCE (SIZE (1..maxNrofSRI-PUSCH-Mappings)) OF SRI-PUSCH-PowerControl

OPTIONAL, -- Need N

sri-PUSCH-MappingToReleaseList2-r17 SEQUENCE (SIZE (1..maxNrofSRI-PUSCH-Mappings)) OF SRI-PUSCH-PowerControlId OPTIONAL, -- Need N

p0-PUSCH-SetList2-r17 SEQUENCE (SIZE (1..maxNrofSRI-PUSCH-Mappings)) OF P0-PUSCH-Set-r16 OPTIONAL, -- Need R

pathlossReferenceRSToAddModListExt-v1710 SEQUENCE (SIZE (1..maxNrofPUSCH-PathlossReferenceRSs-r16)) OF PUSCH-PathlossReferenceRS-v1710 OPTIONAL -- Need N

]]

}

P0-PUSCH-Set-r16 ::= SEQUENCE {

p0-PUSCH-SetId-r16 P0-PUSCH-SetId-r16,

p0-List-r16 SEQUENCE (SIZE (1..maxNrofP0-PUSCH-Set-r16)) OF P0-PUSCH-r16 OPTIONAL, -- Need R

...

}

P0-PUSCH-SetId-r16 ::= INTEGER (0..maxNrofSRI-PUSCH-Mappings-1)

P0-PUSCH-r16 ::= INTEGER (-16..15)

-- TAG-PUSCH-POWERCONTROL-STOP

-- ASN1STOP

|  |
| --- |
| *P0-PUSCH-AlphaSet* field descriptions |
| ***alpha***  alpha value for PUSCH with grant (except msg3) (see TS 38.213 [13], clause 7.1). When the field is absent the UE applies the value 1. |
| ***p0***  P0 value for PUSCH with grant (except msg3) in steps of 1dB (see TS 38.213 [13], clause 7.1). When the field is absent the UE applies the value 0. |

|  |
| --- |
| *P0-PUSCH-Set* field descriptions |
| ***p0-List***  Configuration of {p0-PUSCH, p0-PUSCH} sets for PUSCH. If SRI is present in the DCI, then one p0-PUSCH can be configured in P0-PUSCH-Set. If SRI is not present in the DCI, and both *olpc-ParameterSetDCI-0-1* and *olpc-ParameterSetDCI-0-2* are configured to be 1 bit, then one p0-PUSCH can be configured in P0-PUSCH-Set. If SRI is not present in the DCI, and if any of *olpc-ParameterSetDCI-0-1* and *olpc-ParameterSetDCI-0-2* is configured to be 2 bits, then two p0-PUSCH values can be configured in P0-PUSCH-Set (see TS 38.213 [13] clause 7 and TS 38.212 [17] clause 7.3.1). |
| ***p0-PUSCH-SetId***  Configure the index of a p0-PUSCH-Set (see TS 38.213 [13] clause 7 and TS 38.212 [17] clause 7.3.1). |

|  |
| --- |
| *PUSCH-PowerControl* field descriptions |
| ***deltaMCS***  Indicates whether to apply delta MCS. When the field is absent, the UE applies Ks = 0 in delta\_TFC formula for PUSCH (see TS 38.213 [13], clause 7.1). |
| ***msg3-Alpha***  Dedicated alpha value for msg3 PUSCH (see TS 38.213 [13], clause 7.1). When the field is absent the UE applies the value 1. |
| ***olpc-ParameterSetDCI-0-1, olpc-ParameterSetDCI-0-2***  Configures the number of bits for Open-loop power control parameter set indication for DCI format 0\_1/0\_2 in case SRI is not configured in the DCI. 2 bits is applicable only if SRI is not present in the DCI format 0\_1. The field *olpc-ParameterSetDCI-0-1* applies to DCI format 0\_1 and the field *olpc-ParameterSetDCI-0-2* applies to DCI format 0\_2 (see TS 38.212 [17], clause 7.3.1 and TS 38.213 [13], clause 11). |
| ***p0-AlphaSets***  configuration {p0-pusch, alpha} sets for PUSCH (except msg3 and msgA PUSCH), i.e., { {p0,alpha,index1}, {p0,alpha,index2},...} (see TS 38.213 [13], clause 7.1). When no set is configured, the UE uses the P0-nominal for msg3 PUSCH, P0-UE is set to 0 and alpha is set according to msg3-Alpha configured for msg3 PUSCH. |
| ***p0-NominalWithoutGrant***  P0 value for UL grant-free/SPS based PUSCH. Value in dBm. Only even values (step size 2) allowed (see TS 38.213 [13], clause 7.1). |
| ***p0-PUSCH-SetList***  Configure one additional *P0-PUSCH-Set* per SRI. If present, the one bit or 2 bits in the DCI is used to dynamically indicate among the P0 value from the existing *P0-PUSCH-AlphaSet* and the P0 value(s) from the *P0-PUSCH-Set* (See TS 38.212 [17], clause 7.3.1 and TS 38.213 [13], clause 17). |
| ***p0-PUSCH-SetList2***  For indicating per-TRP OLPC set in DCI format 0\_1/0\_2 with the legacy field, a second p0-PUSCH-SetList-r16 is used. When this field is present the *p0-PUSCH-SetList2* corresponds to the first SRS resource set (see TS 38.213). |
| ***pathlossReferenceRSToAddModList, pathlossReferenceRSToAddModListSizeExt, pathlossReferenceRSToAddModListExt***  A set of Reference Signals (e.g. a CSI-RS config or a SS block) to be used for PUSCH path loss estimation. The set consists of Reference Signals configured using *pathLossReferenceRSToAddModList* and *Reference* Signals configured using *pathlossReferenceRSToAddModListSizeExt*. Up to *maxNrofPUSCH-PathlossReferenceRSs* may be configured (see TS 38.213 [13], clause 7.1). When *pathlossReferenceRSToAddModListExt* is included, its number of entries is the number of entries of *pathlossReferenceRSToAddModList* plus the number of entries of *pathlossReferenceRSToAddModListSizeExt-v1610* and its n-th entry corresponds to the n-th entry of the concatenated list made of *pathlossReferenceRSToAddModList* and *pathlossReferenceRSToAddModListSizeExt-v1610*. Network configures the *additionalPCI* only when reference signal is SSB. |
| ***pathlossReferenceRSToReleaseList, pathlossReferenceRSToReleaseListSizeExt***  Lists of reference signals for PUSCH path loss estimation to be released by the UE. |
| ***sri-PUSCH-MappingToAddModList***  A list of *SRI-PUSCH-PowerControl* elements among which one is selected by the second SRI field in DCI (see TS 38.213 [13], clause 7.1). |
| ***sri-PUSCH-MappingToAddModList2***  A list of *SRI-PUSCH-PowerControl* elements for second SRS-resource set, among which one is selected by the SRI field in DCI (see TS 38.213 [13], clause 7.1). When this field is present the *sri-PUSCH-MappingToAddModList* corresponds to the first SRS resource set for PUSCH. |
| ***tpc-Accumulation***  If enabled, UE applies TPC commands via accumulation. If not enabled, UE applies the TPC command without accumulation. If the field is absent, TPC accumulation is enabled (see TS 38.213 [13], clause 7.1). |
| ***twoPUSCH-PC-AdjustmentStates***  Number of PUSCH power control adjustment states maintained by the UE (i.e., fc(i)). If the field is present (*n2*) the UE maintains two power control states (i.e., fc(i,0) and fc(i,1)). If the field is absent, it maintains one power control state (i.e., fc(i,0)) (see TS 38.213 [13], clause 7.1). |

|  |
| --- |
| *SRI-PUSCH-PowerControl* field descriptions |
| ***sri-P0-PUSCH-AlphaSetId***  The ID of a *P0-PUSCH-AlphaSet* as configured in *p0-AlphaSets* *in PUSCH-PowerControl*. |
| ***sri-PUSCH-ClosedLoopIndex***  The index of the closed power control loop associated with this *SRI-PUSCH-PowerControl.* |
| ***sri-PUSCH-PathlossReferenceRS-Id***  The ID of *PUSCH-PathlossReferenceRS* as configured in the *pathlossReferenceRSToAddModList* in *PUSCH-PowerControl*. |
| ***sri-PUSCH-PowerControlId***  The ID of this *SRI-PUSCH-PowerControl* configuration. It is used as the codepoint (payload) in the SRI DCI field. |

#### – *PUSCH-ServingCellConfig*

The IE *PUSCH-ServingCellConfig* is used to configure UE specific PUSCH parameters that are common across the UE's BWPs of one serving cell.

*PUSCH-ServingCellConfig* information element

-- ASN1START

-- TAG-PUSCH-SERVINGCELLCONFIG-START

PUSCH-ServingCellConfig ::= SEQUENCE {

codeBlockGroupTransmission SetupRelease { PUSCH-CodeBlockGroupTransmission } OPTIONAL, -- Need M

rateMatching ENUMERATED {limitedBufferRM} OPTIONAL, -- Need S

xOverhead ENUMERATED {xoh6, xoh12, xoh18} OPTIONAL, -- Need S

...,

[[

maxMIMO-Layers INTEGER (1..4) OPTIONAL, -- Need M

processingType2Enabled BOOLEAN OPTIONAL -- Need M

]],

[[

maxMIMO-LayersDCI-0-2-r16 SetupRelease { MaxMIMO-LayersDCI-0-2-r16} OPTIONAL -- Need M

]],

[[

nrofHARQ-ProcessesForPUSCH-r17 ENUMERATED {n32} OPTIONAL, -- Need R

uplinkHARQ-mode-r17 SetupRelease { UplinkHARQ-mode-r17} OPTIONAL -- Need M

]]

}

PUSCH-CodeBlockGroupTransmission ::= SEQUENCE {

maxCodeBlockGroupsPerTransportBlock ENUMERATED {n2, n4, n6, n8},

...

}

MaxMIMO-LayersDCI-0-2-r16 ::= INTEGER (1..4)

UplinkHARQ-mode-r17 ::= BIT STRING (SIZE (32))

-- TAG-PUSCH-SERVINGCELLCONFIG-STOP

-- ASN1STOP

|  |
| --- |
| *PUSCH-CodeBlockGroupTransmission* field descriptions |
| ***maxCodeBlockGroupsPerTransportBlock***  Maximum number of code-block-groups (CBGs) per TB (see TS 38.213 [13], clause 9.1). |

|  |
| --- |
| *PUSCH-ServingCellConfig* field descriptions |
| ***codeBlockGroupTransmission***  Enables and configures code-block-group (CBG) based transmission (see TS 38.214 [19], clause 5.1.5).  The network does not configure this field if the SCS is 480 or 960 kHz. |
| ***maxMIMO-Layers***  Indicates the maximum MIMO layer to be used for PUSCH in all BWPs of the corresponding UL of this serving cell (see TS 38.212 [17], clause 5.4.2.1). If present, the network sets *maxRank* to the same value. The field *maxMIMO-Layers* refers to DCI format 0\_1. |
| ***nrofHARQ-ProcessesForPUSCH***  The number of HARQ processes to be used on the PUSCH of a serving cell. Value *n32* corresponds to 32 HARQ processes. If the field is absent, the UE uses 16 HARQ processes (see TS 38.214 [19], clause 6.1). |
| ***processingType2Enabled***  Enables configuration of advanced processing time capability 2 for PUSCH (see 38.214 [19], clause 6.4). |
| ***rateMatching***  Enables LBRM (Limited buffer rate-matching). When the field is absent the UE applies FBRM (Full buffer rate-matchingLBRM) (see TS 38.212 [17], clause 5.4.2). |
| ***xOverhead***  If the field is absent, the UE applies the value 'xoh0' (see TS 38.214 [19], clause 5.1.3.2). |
| ***maxMIMO-LayersDCI-0-2***  Indicates the maximum MIMO layer to be used for PUSCH for DCI format 0\_2 in all BWPs of the corresponding UL of this serving cell (see TS 38.212 [17], clause 5.4.2.1). If present, the network sets *maxRankDCI-0-2* to the same value. |
| ***uplinkHARQ-mode***  Used to set the HARQ mode per HARQ process ID, see TS 38.321 [3]. The first/leftmost bit corresponds to HARQ process ID 0, the next bit to HARQ process ID 1 and so on. Bits corresponding to HARQ process IDs that are not configured shall be ignored. A bit set to one identifies a HARQ process with *HARQmodeA* and a bit set to zero identifies a HARQ process with *HARQ modeB*. This field applies for SRBs and DRBs. |

#### – *PUSCH-TimeDomainResourceAllocationList*

The IE *PUSCH-TimeDomainResourceAllocation* is used to configure a time domain relation between PDCCH and PUSCH. *PUSCH-TimeDomainResourceAllocationList* contains one or more of such *PUSCH-TimeDomainResourceAllocations*. The network indicates in the UL grant which of the configured time domain allocations the UE shall apply for that UL grant. The UE determines the bit width of the DCI field based on the number of entries in the *PUSCH-TimeDomainResourceAllocationList*. Value 0 in the DCI field refers to the first element in this list, value 1 in the DCI field refers to the second element in this list, and so on.

*PUSCH-TimeDomainResourceAllocation* information element

-- ASN1START

-- TAG-PUSCH-TIMEDOMAINRESOURCEALLOCATIONLIST-START

PUSCH-TimeDomainResourceAllocationList ::= SEQUENCE (SIZE(1..maxNrofUL-Allocations)) OF PUSCH-TimeDomainResourceAllocation

PUSCH-TimeDomainResourceAllocation ::= SEQUENCE {

k2 INTEGER(0..32) OPTIONAL, -- Need S

mappingType ENUMERATED {typeA, typeB},

startSymbolAndLength INTEGER (0..127)

}

PUSCH-TimeDomainResourceAllocationList-r16 ::= SEQUENCE (SIZE(1..maxNrofUL-Allocations-r16)) OF PUSCH-TimeDomainResourceAllocation-r16

PUSCH-TimeDomainResourceAllocation-r16 ::= SEQUENCE {

k2-r16 INTEGER(0..32) OPTIONAL, -- Need S

puschAllocationList-r16 SEQUENCE (SIZE(1..maxNrofMultiplePUSCHs-r16)) OF PUSCH-Allocation-r16,

...

}

PUSCH-Allocation-r16 ::= SEQUENCE {

mappingType-r16 ENUMERATED {typeA, typeB} OPTIONAL, -- Cond NotFormat01-02-Or-TypeA

startSymbolAndLength-r16 INTEGER (0..127) OPTIONAL, -- Cond NotFormat01-02-Or-TypeA

startSymbol-r16 INTEGER (0..13) OPTIONAL, -- Cond RepTypeB

length-r16 INTEGER (1..14) OPTIONAL, -- Cond RepTypeB

numberOfRepetitions-r16 ENUMERATED {n1, n2, n3, n4, n7, n8, n12, n16} OPTIONAL, -- Cond Format01-02

...,

[[

numberOfRepetitionsExt-r17 ENUMERATED {n1, n2, n3, n4, n7, n8, n12, n16, n20, n24, n28, n32, spare4, spare3, spare2,

spare1} OPTIONAL, -- Cond Format01-02-For-TypeA

numberOfSlots-TBoMS-r17 ENUMERATED {n1, n2, n4, n8, spare4, spare3, spare2, spare1} OPTIONAL, -- Need R

extendedK2-r17 INTEGER (0..128) OPTIONAL -- Cond MultiPUSCH

]]

}

-- TAG-PUSCH-TIMEDOMAINRESOURCEALLOCATIONLIST-STOP

-- ASN1STOP

|  |
| --- |
| *PUSCH-TimeDomainResourceAllocationList* field descriptions |
| ***extendedK2***  Corresponds to L1 parameter 'K2' (see TS 38.214 [19], clause 6.1.2.1) configurable per PUSCH allocation. Only values {0..32} are applicable for PUSCH SCS of 120 kHz.  When the field is absent for the first PUSCH if multiple PUSCH are configured per PDCCH, or when the field is absent and only one PUSCH is configured per PDCCH, the UE applies the value 1 when PUSCH SCS is 15/30 kHz; the value 2 when PUSCH SCS is 60 kHz, the value 3 when PUSCH SCS is 120 kHz, the value 11 when PUSCH SCS is 480 kHz, and the value 21 when PUSCH SCS is 960 kHz. |
| ***k2***  Corresponds to L1 parameter 'K2' (see TS 38.214 [19], clause 6.1.2.1). When the field is absent the UE applies the value 1 when PUSCH SCS is 15/30 kHz; the value 2 when PUSCH SCS is 60 kHz, and the value 3 when PUSCH SCS is 120 kHz. k2 is absent/ignored if *extendedK2* is present. |
| ***length***  Indicates the length allocated for PUSCH for DCI format 0\_1/0\_2 (see TS 38.214 [19], clause 6.1.2.1). |
| ***mappingType***  Mapping type (see TS 38.214 [19], clause 6.1.2.1). |
| ***numberOfRepetitions***  Number of repetitions for DCI format 0\_1/0\_2 (see TS 38.214 [19], clause 6.1.2.1). When *numberOfSlotsTBoMS-r17* is set to 2, 4 or 8 (i.e. TB processing over multi-slot (TBoMS) PUSCH is enabled), it indicates the number of repetitions of a single TBoMS. |
| ***numberOfRepetitionsExt***  Number of repetitions for DCI format 0\_1/0\_2 if *pusch-RepTypeIndicatorDCI-0-1*/*pusch-RepTypeIndicatorDCI-0-2* is set to pusch-RepTypeA (see TS 38.214 [19], clause 6.1.2.1). If this field is present, the field *numberOfRepeitions-r16* is ignored for PUSCH repetition Type A. |
| ***numberOfSlots-TBoMS***  Number of slots allocated for TB processing over multi-slot PUSCH for DCI format 0\_1/0\_2. If a number of repetitions K is configured by *numberOfRepetitions* or *numberOfRepetitionsExt*, the network configures *numberOfSlots-TBoMS* (N) and K such that N\*K ≤ 32 (see TS 38.214 [19], clause 6.1.2.1). |
| ***puschAllocationList***  The field *puschAllocationList-r16* indicates one or multiple PUSCH continuous in time domain which share a common k2 (see TS 38.214 [19], clause 6.1.2.1). The field *pusch-AllocationList-r17* configures one or multiple PUSCH that may be in consecutive or non-consecutive slots (see TS 38.214 [19], clause 6.1.2.1). The *puschAllocationList-r16* only has one element in *pusch-TimeDomainAllocationListDCI-0-1-r16* and in *pusch-TimeDomainAllocationListDCI-0-2-r16*. |
| ***startSymbol***  Indicates the index of start symbol for PUSCH for DCI format 0\_1/0\_2 (see TS 38.214 [19], clause 6.1.2.1). |
| ***startSymbolAndLength***  An index giving valid combinations of start symbol and length (jointly encoded) as start and length indicator (SLIV). The network configures the field so that the allocation does not cross the slot boundary. (see TS 38.214 [19], clause 6.1.2.1). |

|  |  |
| --- | --- |
| Conditional Presence | Explanation |
| *Format01-02* | In *pusch-TimeDomainAllocationListForMultiPUSCH-r16* and *pusch-TimeDomainAllocationListForMultiPUSCH-r17*, the field is absent.  In *pusch-TimeDomainAllocationListDCI-0-1* and in *pusch-TimeDomainAllocationListDCI-0-2*, the field is mandatory present. |
| *Format01-02-For-TypeA* | In *pusch-TimeDomainAllocationListForMultiPUSCH-r16*, the field is absent.  In *pusch-TimeDomainAllocationListDCI-0-1*, the field is optionally present if *pusch-RepTypeIndicatorDCI-0-1* is set to pusch-RepTypeA, Need R. It is absent otherwise, Need R.  In *pusch-TimeDomainAllocationListDCI-0-2*, the field is optionally present if *pusch-RepTypeIndicatorDCI-0-2* is set to pusch-RepTypeA, Need R. It is absent otherwise, Need R. |
| *NotFormat01-02-Or-TypeA* | In *pusch-TimeDomainAllocationListForMultiPUSCH-r16 and pusch-TimeDomainAllocationListForMultiPUSCH-r17*, the field is mandatory present.  In *pusch-TimeDomainAllocationListDCI-0-1*, the field is optionally present if *pusch-RepTypeIndicatorDCI-0-1* is set to pusch-RepTypeA, Need R. It is absent otherwise, Need R.  In *pusch-TimeDomainAllocationListDCI-0-2*, the field is optionally present if *pusch-RepTypeIndicatorDCI-0-2* is set to pusch-RepTypeA, Need R. It is absent otherwise, Need R. |
| *RepTypeB* | In *pusch-TimeDomainAllocationListForMultiPUSCH-r16 and pusch-TimeDomainAllocationListForMultiPUSCH-r17*, the field is absent.  In *pusch-TimeDomainAllocationListDCI-0-1*, the field is optionally present if *pusch-RepTypeIndicatorDCI-0-1* is set to pusch-RepTypeB, Need R. It is absent otherwise, Need R.  In *pusch-TimeDomainAllocationListDCI-0-2*, the field is optionally present if *pusch-RepTypeIndicatorDCI-0-2* is set to pusch-RepTypeB, Need R. It is absent otherwise, Need R. |
| *MultiPUSCH* | In case size of *puschAllocationList* is higher than 1, the field *extendedK2(n)* corresponding to k2 of the n-th PUSCH, n>1, is mandatory present. Otherwise, it is optionally present, Need S. |

#### – *PUSCH-TPC-CommandConfig*

The IE *PUSCH-TPC-CommandConfig* is used to configure the UE for extracting TPC commands for PUSCH from a group-TPC messages on DCI.

*PUSCH-TPC-CommandConfig* information element

-- ASN1START

-- TAG-PUSCH-TPC-COMMANDCONFIG-START

PUSCH-TPC-CommandConfig ::= SEQUENCE {

tpc-Index INTEGER (1..15) OPTIONAL, -- Cond SUL

tpc-IndexSUL INTEGER (1..15) OPTIONAL, -- Cond SUL-Only

targetCell ServCellIndex OPTIONAL, -- Need S

...

}

-- TAG-PUSCH-TPC-COMMANDCONFIG-STOP

-- ASN1STOP

|  |
| --- |
| *PUSCH-TPC-CommandConfig* field descriptions |
| ***targetCell***  The serving cell to which the acquired power control commands are applicable. If the value is absent, the UE applies the TPC commands to the serving cell on which the command has been received. |
| ***tpc-Index***  An index determining the position of the first bit of TPC command inside the DCI format 2-2 payload. |
| ***tpc-IndexSUL***  An index determining the position of the first bit of TPC command inside the DCI format 2-2 payload. |

|  |  |
| --- | --- |
| Conditional Presence | Explanation |
| *SUL-Only* | The field is optionally present, Need R, if *supplementaryUplink* is configured within S*ervingCellConfig*. It is absent otherwise. |
| *SUL* | The field is optionally present, Need R, if *supplementaryUplink* is configured within S*ervingCellConfig*. It is mandatory present otherwise. |

#### *– Q-OffsetRange*

The IE *Q-OffsetRange* is used to indicate a cell, beam or measurement object specific offset to be applied when evaluating candidates for cell re-selection or when evaluating triggering conditions for measurement reporting. The value is in dB. Value *dB-24* corresponds to -24 dB, *dB-22* corresponds to -22 dB and so on.

*Q-OffsetRange* information element

-- ASN1START

-- TAG-Q-OFFSETRANGE-START

Q-OffsetRange ::= ENUMERATED {

dB-24, dB-22, dB-20, dB-18, dB-16, dB-14,

dB-12, dB-10, dB-8, dB-6, dB-5, dB-4, dB-3,

dB-2, dB-1, dB0, dB1, dB2, dB3, dB4, dB5,

dB6, dB8, dB10, dB12, dB14, dB16, dB18,

dB20, dB22, dB24}

-- TAG-Q-OFFSETRANGE-STOP

-- ASN1STOP

#### – *Q-QualMin*

The IE *Q-QualMin* is used to indicate for cell selection/ re-selection the required minimum received RSRQ level in the (NR) cell. Corresponds to parameter Qqualmin in TS 38.304 [20]. Actual value Qqualmin = field value [dB].

*Q-QualMin* information element

-- ASN1START

-- TAG-Q-QUALMIN-START

Q-QualMin ::= INTEGER (-43..-12)

-- TAG-Q-QUALMIN-STOP

-- ASN1STOP

#### – *Q-RxLevMin*

The IE *Q-RxLevMin* is used to indicate for cell selection/ re-selection the required minimum received RSRP level in the (NR) cell. Corresponds to parameter Qrxlevmin in TS 38.304 [20]. Actual value Qrxlevmin = field value \* 2 [dBm].

*Q-RxLevMin* information element

-- ASN1START

-- TAG-Q-RXLEVMIN-START

Q-RxLevMin ::= INTEGER (-70..-22)

-- TAG-Q-RXLEVMIN-STOP

-- ASN1STOP

#### – *QuantityConfig*

The IE *QuantityConfig* specifies the measurement quantities and layer 3 filtering coefficients for NR and inter-RAT measurements.

QuantityConfig information element

-- ASN1START

-- TAG-QUANTITYCONFIG-START

QuantityConfig ::= SEQUENCE {

quantityConfigNR-List SEQUENCE (SIZE (1..maxNrofQuantityConfig)) OF QuantityConfigNR OPTIONAL, -- Need M

...,

[[

quantityConfigEUTRA FilterConfig OPTIONAL -- Need M

]],

[[

quantityConfigUTRA-FDD-r16 QuantityConfigUTRA-FDD-r16 OPTIONAL, -- Need M

quantityConfigCLI-r16 FilterConfigCLI-r16 OPTIONAL -- Need M

]]

}

QuantityConfigNR::= SEQUENCE {

quantityConfigCell QuantityConfigRS,

quantityConfigRS-Index QuantityConfigRS OPTIONAL -- Need M

}

QuantityConfigRS ::= SEQUENCE {

ssb-FilterConfig FilterConfig,

csi-RS-FilterConfig FilterConfig

}

FilterConfig ::= SEQUENCE {

filterCoefficientRSRP FilterCoefficient DEFAULT fc4,

filterCoefficientRSRQ FilterCoefficient DEFAULT fc4,

filterCoefficientRS-SINR FilterCoefficient DEFAULT fc4

}

FilterConfigCLI-r16 ::= SEQUENCE {

filterCoefficientSRS-RSRP-r16 FilterCoefficient DEFAULT fc4,

filterCoefficientCLI-RSSI-r16 FilterCoefficient DEFAULT fc4

}

QuantityConfigUTRA-FDD-r16 ::= SEQUENCE {

filterCoefficientRSCP-r16 FilterCoefficient DEFAULT fc4,

filterCoefficientEcNO-r16 FilterCoefficient DEFAULT fc4

}

-- TAG-QUANTITYCONFIG-STOP

-- ASN1STOP

|  |
| --- |
| *QuantityConfigNR* field descriptions |
| ***quantityConfigCell***  Specifies L3 filter configurations for cell measurement results for the configurable RS Types (e.g. SS/PBCH block and CSI-RS) and the configurable measurement quantities (e.g. RSRP, RSRQ and SINR). |
| ***quantityConfigRS-Index***  Specifies L3 filter configurations for measurement results per RS index for the configurable RS Types (e.g. SS/PBCH block and CSI-RS) and the configurable measurement quantities (e.g. RSRP, RSRQ and SINR). |

|  |
| --- |
| *QuantityConfigRS* field descriptions |
| ***csi-RS-FilterConfig***  CSI-RS based L3 filter configurations:  Specifies L3 filter configurations for CSI-RSRP, CSI-RSRQ and CSI-SINR measurement results from the L1 filter(s), as defined in TS 38.215 [9]. |
| ***ssb-FilterConfig***  SS Block based L3 filter configurations:  Specifies L3 filter configurations for SS-RSRP, SS-RSRQ and SS-SINR measurement results from the L1 filter(s), as defined in TS 38.215 [9]. |

|  |
| --- |
| *QuantityConfigUTRA-FDD field descriptions* |
| ***filterCoefficientRSCP***  Specifies L3 filter coefficient for FDD UTRAN CPICH\_RSCP measuement results from L1 filter. |
| ***filterCoefficientEcN0***  Specifies L3 filter coefficient for FDD UTRAN CPICH\_EcN0 measuement results from L1 filter. |

#### – *RACH-ConfigCommon*

The IE *RACH-ConfigCommon* is used to specify the cell specific random-access parameters.

*RACH-ConfigCommon* information element

-- ASN1START

-- TAG-RACH-CONFIGCOMMON-START

RACH-ConfigCommon ::= SEQUENCE {

rach-ConfigGeneric RACH-ConfigGeneric,

totalNumberOfRA-Preambles INTEGER (1..63) OPTIONAL, -- Need S

ssb-perRACH-OccasionAndCB-PreamblesPerSSB CHOICE {

oneEighth ENUMERATED {n4,n8,n12,n16,n20,n24,n28,n32,n36,n40,n44,n48,n52,n56,n60,n64},

oneFourth ENUMERATED {n4,n8,n12,n16,n20,n24,n28,n32,n36,n40,n44,n48,n52,n56,n60,n64},

oneHalf ENUMERATED {n4,n8,n12,n16,n20,n24,n28,n32,n36,n40,n44,n48,n52,n56,n60,n64},

one ENUMERATED {n4,n8,n12,n16,n20,n24,n28,n32,n36,n40,n44,n48,n52,n56,n60,n64},

two ENUMERATED {n4,n8,n12,n16,n20,n24,n28,n32},

four INTEGER (1..16),

eight INTEGER (1..8),

sixteen INTEGER (1..4)

} OPTIONAL, -- Need M

groupBconfigured SEQUENCE {

ra-Msg3SizeGroupA ENUMERATED {b56, b144, b208, b256, b282, b480, b640,

b800, b1000, b72, spare6, spare5,spare4, spare3, spare2, spare1},

messagePowerOffsetGroupB ENUMERATED { minusinfinity, dB0, dB5, dB8, dB10, dB12, dB15, dB18},

numberOfRA-PreamblesGroupA INTEGER (1..64)

} OPTIONAL, -- Need R

ra-ContentionResolutionTimer ENUMERATED { sf8, sf16, sf24, sf32, sf40, sf48, sf56, sf64},

rsrp-ThresholdSSB RSRP-Range OPTIONAL, -- Need R

rsrp-ThresholdSSB-SUL RSRP-Range OPTIONAL, -- Cond SUL

prach-RootSequenceIndex CHOICE {

l839 INTEGER (0..837),

l139 INTEGER (0..137)

},

msg1-SubcarrierSpacing SubcarrierSpacing OPTIONAL, -- Cond L139

restrictedSetConfig ENUMERATED {unrestrictedSet, restrictedSetTypeA, restrictedSetTypeB},

msg3-transformPrecoder ENUMERATED {enabled} OPTIONAL, -- Need R

...,

[[

ra-PrioritizationForAccessIdentity-r16 SEQUENCE {

ra-Prioritization-r16 RA-Prioritization,

ra-PrioritizationForAI-r16 BIT STRING (SIZE (2))

} OPTIONAL, -- Cond InitialBWP-Only

prach-RootSequenceIndex-r16 CHOICE {

l571 INTEGER (0..569),

l1151 INTEGER (0..1149)

} OPTIONAL -- Need R

]],

[[

ra-PrioritizationForSlicing-r17 RA-PrioritizationForSlicing-r17 OPTIONAL, -- Cond InitialBWP-Only

featureCombinationPreamblesList-r17 SEQUENCE (SIZE(1..maxFeatureCombPreamblesPerRACHResource-r17)) OF FeatureCombinationPreambles-r17 OPTIONAL -- Need R

]]

}

-- TAG-RACH-CONFIGCOMMON-STOP

-- ASN1STOP

|  |
| --- |
| *RACH-ConfigCommon* field descriptions |
| ***featureCombinationPreamblesList***  Specifies a series of preamble partitions each associated to a combination of features and 4-step RA. |
| ***messagePowerOffsetGroupB***  Threshold for preamble selection. Value is in dB. Value *minusinfinity* corresponds to –infinity. Value *dB0* corresponds to 0 dB, *dB5* corresponds to 5 dB and so on. (see TS 38.321 [3], clause 5.1.2) |
| ***msg1-SubcarrierSpacing***  Subcarrier spacing of PRACH (see TS 38.211 [16], clause 5.3.2).  Only the following values are applicable depending on the used frequency:  FR1: 15 or 30 kHz  FR2-1: 60 or 120 kHz  FR2-2: 120, 480, or 960 kHz  If absent, the UE applies the SCS as derived from the *prach-ConfigurationIndex* in *RACH-ConfigGeneric* (see tables Table 6.3.3.1-1, Table 6.3.3.1-2, Table 6.3.3.2-2 and Table 6.3.3.2-3, TS 38.211 [16]). The value also applies to contention free random access (*RACH-ConfigDedicated*), to SI-request and to contention-based beam failure recovery (CB-BFR). But it does not apply for contention free beam failure recovery (CF-BFR) (see *BeamFailureRecoveryConfig*). |
| ***msg3-transformPrecoder***  Enables the transform precoder for Msg3 transmission according to clause 6.1.3 of TS 38.214 [19]. If the field is absent, the UE disables the transformer precoder (see TS 38.213 [13], clause 8.3). |
| ***numberOfRA-PreamblesGroupA***  The number of CB preambles per SSB in group A. This determines implicitly the number of CB preambles per SSB available in group B. (see TS 38.321 [3], clause 5.1.1). The setting should be consistent with the setting of *ssb-perRACH-OccasionAndCB-PreamblesPerSSB*. |
| ***prach-RootSequenceIndex***  PRACH root sequence index (see TS 38.211 [16], clause 6.3.3.1). The value range depends on whether L=839 or L=139 or L=571 or L=1151. The length of the root sequence corresponding with the index indicated in this IE should be consistent with the one indicated in *prach-ConfigurationIndex* in the *RACH-ConfigDedicated* (if configured). If *prach-RootSequenceIndex-r16* is signalled, UE shall ignore the *prach-RootSequenceIndex* (without suffix).  For FR2-2, only the following values are applicable depending on the used subcarrier spacing:  120 kHz: L=139, L=571, and L=1151  480 kHz: L=139, and L=571  960 kHz: L=139 |
| ***ra-ContentionResolutionTimer***  The initial value for the contention resolution timer (see TS 38.321 [3], clause 5.1.5). Value *sf8* corresponds to 8 subframes, value *sf16* corresponds to 16 subframes, and so on. |
| ***ra-Msg3SizeGroupA***  Transport Blocks size threshold in bits below which the UE shall use a contention-based RA preamble of group A. (see TS 38.321 [3], clause 5.1.2). |
| ***ra-Prioritization***  Parameters which apply for prioritized random access procedure on any UL BWP of SpCell for specific Access Identities (see TS 38.321 [3], clause 5.1.1a). |
| ***ra-PrioritizationForAI***  Indicates whether the field *ra-Prioritization-r16* applies for Access Identities. The first/leftmost bit corresponds to Access Identity 1, the next bit corresponds to Access Identity 2. Value 1 indicates that the field *ra-Prioritization-r16* applies otherwise the field does not apply (see TS 23.501 [32]). |
| ***ra-PrioritizationForSlicing***  Parameters which apply to configure prioritized CBRA 4-step random access type for slicing. |
| ***rach-ConfigGeneric***  RACH parameters for both regular random access and beam failure recovery. |
| ***restrictedSetConfig***  Configuration of an unrestricted set or one of two types of restricted sets, see TS 38.211 [16], clause 6.3.3.1. |
| ***rsrp-ThresholdSSB***  UE may select the SS block and corresponding PRACH resource for path-loss estimation and (re)transmission based on SS blocks that satisfy the threshold (see TS 38.213 [13]). |
| ***rsrp-ThresholdSSB-SUL***  The UE selects SUL carrier to perform random access based on this threshold (see TS 38.321 [3], clause 5.1.1). The value applies to all the BWPs and all RACH configurations. |
| ***ssb-perRACH-OccasionAndCB-PreamblesPerSSB***  The meaning of this field is twofold: the CHOICE conveys the information about the number of SSBs per RACH occasion. Value *oneEighth* corresponds to one SSB associated with 8 RACH occasions, value *oneFourth* corresponds to one SSB associated with 4 RACH occasions, and so on. The ENUMERATED part indicates the number of Contention Based preambles per SSB. Value *n4* corresponds to 4 Contention Based preambles per SSB, value *n8* corresponds to 8 Contention Based preambles per SSB, and so on. The total number of CB preambles in a RACH occasion is given by *CB-preambles-per-SSB* \* max(1, *SSB-per-rach-occasion*). See TS 38.213 [13]. |
| ***totalNumberOfRA-Preambles***  Total number of preambles used for contention based and contention free 4-step or 2-step random access in the RACH resources defined in *RACH-ConfigCommon*, excluding preambles used for other purposes (e.g. for SI request). If the field is absent, all 64 preambles are available for RA. The setting should be consistent with the setting of *ssb-perRACH-OccasionAndCB-PreamblesPerSSB*, i.e. it should be a multiple of the number of SSBs per RACH occasion. |

|  |  |
| --- | --- |
| Conditional Presence | Explanation |
| *L139* | The field is mandatory present if *prach-RootSequenceIndex* L=139, otherwise the field is absent, Need S. |
| *SUL* | The field is mandatory present in *rach-ConfigCommon* in *initialUplinkBWP* if *supplementaryUplink* is configured in *ServingCellConfigCommonSIB* or if *supplementaryUplinkConfig* is configured in *ServingCellConfigCommon*; otherwise, the field is absent. This field is not configured in *additionalRACH-Config*. |
| *InitialBWP-Only* | This field is optionally present, Need R, if this BWP is the initial BWP of SpCell. Otherwise the field is absent. |

#### – *RACH-ConfigCommonTwoStepRA*

The IE *RACH-ConfigCommonTwoStepRA* is used to specify cell specific 2-step random-access type parameters.

*RACH-ConfigCommonTwoStepRA* information element

-- ASN1START

-- TAG-RACH-CONFIGCOMMONTWOSTEPRA-START

RACH-ConfigCommonTwoStepRA-r16 ::= SEQUENCE {

rach-ConfigGenericTwoStepRA-r16 RACH-ConfigGenericTwoStepRA-r16,

msgA-TotalNumberOfRA-Preambles-r16 INTEGER (1..63) OPTIONAL, -- Need S

msgA-SSB-PerRACH-OccasionAndCB-PreamblesPerSSB-r16 CHOICE {

oneEighth ENUMERATED {n4,n8,n12,n16,n20,n24,n28,n32,n36,n40,n44,n48,n52,n56,n60,n64},

oneFourth ENUMERATED {n4,n8,n12,n16,n20,n24,n28,n32,n36,n40,n44,n48,n52,n56,n60,n64},

oneHalf ENUMERATED {n4,n8,n12,n16,n20,n24,n28,n32,n36,n40,n44,n48,n52,n56,n60,n64},

one ENUMERATED {n4,n8,n12,n16,n20,n24,n28,n32,n36,n40,n44,n48,n52,n56,n60,n64},

two ENUMERATED {n4,n8,n12,n16,n20,n24,n28,n32},

four INTEGER (1..16),

eight INTEGER (1..8),

sixteen INTEGER (1..4)

} OPTIONAL, -- Cond 2StepOnly

msgA-CB-PreamblesPerSSB-PerSharedRO-r16 INTEGER (1..60) OPTIONAL, -- Cond SharedRO

msgA-SSB-SharedRO-MaskIndex-r16 INTEGER (1..15) OPTIONAL, -- Need S

groupB-ConfiguredTwoStepRA-r16 GroupB-ConfiguredTwoStepRA-r16 OPTIONAL, -- Need S

msgA-PRACH-RootSequenceIndex-r16 CHOICE {

l839 INTEGER (0..837),

l139 INTEGER (0..137),

l571 INTEGER (0..569),

l1151 INTEGER (0..1149)

} OPTIONAL, -- Cond 2StepOnly

msgA-TransMax-r16 ENUMERATED {n1, n2, n4, n6, n8, n10, n20, n50, n100, n200} OPTIONAL, -- Need R

msgA-RSRP-Threshold-r16 RSRP-Range OPTIONAL, -- Cond 2Step4Step

msgA-RSRP-ThresholdSSB-r16 RSRP-Range OPTIONAL, -- Need R

msgA-SubcarrierSpacing-r16 SubcarrierSpacing OPTIONAL, -- Cond 2StepOnlyL139

msgA-RestrictedSetConfig-r16 ENUMERATED {unrestrictedSet, restrictedSetTypeA,

restrictedSetTypeB} OPTIONAL, -- Cond 2StepOnly

ra-PrioritizationForAccessIdentityTwoStep-r16 SEQUENCE {

ra-Prioritization-r16 RA-Prioritization,

ra-PrioritizationForAI-r16 BIT STRING (SIZE (2))

} OPTIONAL, -- Cond InitialBWP-Only

ra-ContentionResolutionTimer-r16 ENUMERATED {sf8, sf16, sf24, sf32, sf40, sf48, sf56, sf64} OPTIONAL, -- Cond 2StepOnly

...,

[[

ra-PrioritizationForSlicingTwoStep-r17 RA-PrioritizationForSlicing-r17 OPTIONAL, -- Cond InitialBWP-Only

featureCombinationPreamblesList-r17 SEQUENCE (SIZE(1..maxFeatureCombPreamblesPerRACHResource-r17)) OF FeatureCombinationPreambles-r17 OPTIONAL -- Need R

]]

}

GroupB-ConfiguredTwoStepRA-r16 ::= SEQUENCE {

ra-MsgA-SizeGroupA ENUMERATED {b56, b144, b208, b256, b282, b480, b640, b800,

b1000, b72, spare6, spare5, spare4, spare3, spare2, spare1},

messagePowerOffsetGroupB ENUMERATED {minusinfinity, dB0, dB5, dB8, dB10, dB12, dB15, dB18},

numberOfRA-PreamblesGroupA INTEGER (1..64)

}

-- TAG-RACH-CONFIGCOMMONTWOSTEPRA-STOP

-- ASN1STOP

|  |
| --- |
| *RACH-ConfigCommonTwoStepRA* field descriptions |
| ***featureCombinationPreamblesList***  Specifies a series of preamble partitions each associated to a combination of features and 2-step RA. |
| ***groupB-ConfiguredTwoStepRA***  Preamble grouping for 2-step random access type. If the field is absent then there is only one preamble group configured and only one msgA PUSCH configuration. |
| ***msgA-CB-PreamblesPerSSB-PerSharedRO***  Number of contention-based preambles used for 2-step RA type from the non-CBRA 4-step type preambles associated with each SSB for RO shared with 4-step type RA. The number of preambles for 2-step RA type shall not exceed the number of preambles per SSB minus the number of contention-based preambles per SSB for 4-step type RA. The possible value range for this parameter needs to be aligned with value range for the configured SSBs per RACH occasion in *ssb-perRACH-OccasionAndCB-PreamblesPerSSB* in *RACH-ConfigCommon*. The field is only applicable for the case of shared ROs with 4-step type random access. |
| ***msgA-PRACH-RootSequenceIndex***  PRACH root sequence index. If the field is not configured, the UE applies the value in field *prach-RootSequenceIndex* in *RACH-ConfigCommon* in the configured BWP. When both 2-step and 4-step type random access is configured, this field is only configured for the case of separate ROs between 2-step and 4-step type random access.  For FR2-2, only the following values are applicable depending on the used subcarrier spacing:  120 kHz: L=139, L=571, and L=1151  480 kHz: L=139, and L=571  960 kHz: L=139 |
| ***msgA-RestrictedSetConfig***  Configuration of an unrestricted set or one of two types of restricted sets for 2-step random access type preamble. If the field is not configured, the UE applies the value in field *restrictedSetConfig* in *RACH-ConfigCommon* in the configured BWP. When both 2-step and 4-step type random access is configured, this field is only configured for the case of separate ROs between 2-step and 4-step type random access. |
| ***msgA-RSRP-Threshold***  The UE selects 2-step random access type to perform random access based on this threshold (see TS 38.321 [3], clause 5.1.1). This field is only present if both 2-step and 4-step RA type are configured for the BWP. |
| ***msgA-RSRP-ThresholdSSB***  UE may select the SS block and corresponding PRACH resource for path-loss estimation and (re)transmission based on SS blocks that satisfy the threshold (see TS 38.213 [13]). |
| ***msgA-SSB-PerRACH-OccasionAndCB-PreamblesPerSSB***  The meaning of this field is twofold: the CHOICE conveys the information about the number of SSBs per RACH occasion. Value *oneEight* corresponds to one SSB associated with 8 RACH occasions, value *oneFourth* corresponds to one SSB associated with 4 RACH occasions, and so on. The ENUMERATED part indicates the number of Contention Based preambles per SSB. Value *n4* corresponds to 4 Contention Based preambles per SSB, value *n8* corresponds to 8 Contention Based preambles per SSB, and so on. The total number of CB preambles in a RACH occasion is given by *CB-preambles-per-SSB* \* max(1, *SSB-per-rach-occasion*). If the field is not configured and both 2-step and 4-step are configured for the BWP, the UE applies the value in the field *ssb-perRACH-OccasionAndCB-PreamblesPerSSB* in *RACH-ConfigCommon*. The field is not present when RACH occasions are shared between 2-step and 4-step type random access in the BWP. |
| ***msgA-SSB-SharedRO-MaskIndex***  Indicates the subset of 4-step type ROs shared with 2-step random access type for each SSB. This field is configured when there is more than one RO per SSB. If the field is absent, and 4-step and 2-step has shared ROs, then all ROs are shared. |
| ***msgA-SubcarrierSpacing***  Subcarrier spacing of PRACH (see TS 38.211 [16], clause 5.3.2).  Only the following values are applicable depending on the used frequency:  FR1: 15 or 30 kHz  FR2-1: 60 or 120 kHz  FR2-2: 120, 480, or 960 kHz.  If the field is absent, the UE applies the SCS as derived from the *msgA-PRACH-ConfigurationIndex* in *RACH-ConfigGenericTwoStepRA* (see tables Table 6.3.3.1-1, Table 6.3.3.1-2, Table 6.3.3.2-2 and Table 6.3.3.2-3, TS 38.211 [16]) in case of 2-step only BWP, otherwise the UE applies the same SCS as Msg1 derived from *RACH-ConfigCommon*. The value also applies to contention free 2-step random access type (*RACH-ConfigDedicated*). |
| ***msgA-TotalNumberOfRA-Preambles***  Indicates the total number of preambles used for contention-based and contention-free 2-step random access type when ROs for 2-step are not shared with 4-step. If the field is absent, and 2-step and 4-step does not have shared ROs, all 64 preambles are available for 2-step random access type. |
| ***msgA-TransMax***  Max number of MsgA preamble transmissions performed before switching to 4-step random access (see TS 38.321 [3], clauses 5.1.1). This field is only applicable when 2-step and 4-step RA type are configured and switching to 4-step type RA is supported. If the field is absent, switching from 2-step RA type to 4-step RA type is not allowed. |
| ***ra-ContentionResolutionTimer***  The initial value for the contention resolution timer for fallback RAR in case no 4-step random access type is configured (see TS 38.321 [3], clause 5.1.5). Value *sf8* corresponds to 8 subframes, value *sf16* corresponds to 16 subframes, and so on. If both 2-step and 4-step random access type resources are configured on the BWP, then this field is absent. |
| ***ra-Prioritization***  Parameters which apply for prioritized random access procedure on any UL BWP of SpCell for specific Access Identities (see TS 38.321 [3], clause 5.1.1a). |
| ***ra-PrioritizationForAI***  Indicates whether the field *ra-Prioritization-r16* applies for Access Identities. The first/leftmost bit corresponds to Access Identity 1, the next bit corresponds to Access Identity 2. Value *1* for an Access Identity indicates that the field *ra-Prioritization-r16* applies, otherwise the field does not apply. |
| ***ra-PrioritizationForSlicingTwoStep***  Parameters which apply to configure prioritized CBRA 2-step random access type for slicing. |
| ***rach-ConfigGenericTwoStepRA***  2-step random access type parameters for both regular random access and beam failure recovery. |

|  |
| --- |
| *GroupB-ConfiguredTwoStepRA* field descriptions |
| ***messagePowerOffsetGroupB***  Threshold for preamble selection. Value is in dB. Value *minusinfinity* corresponds to –infinity. Value *dB0* corresponds to 0 dB, *dB5* corresponds to 5 dB and so on. (see TS 38.321 [3], clause 5.1.1). |
| ***numberOfRA-PreamblesGroupA***  The number of CB preambles per SSB in group A for idle/inactive or connected mode. The setting of the number of preambles for each group should be consistent with *msgA-SSB-PerRACH-OccasionAndCB-PreamblesPerSSB* or *msgA-CB-PreamblesPerSSB-PerSharedRO* if configured. |
| ***ra-MsgA-SizeGroupA***  Transport block size threshold in bits below which the UE shall use a contention-based RA preamble of group A. (see TS 38.321 [3], clause 5.1.1). |

|  |  |
| --- | --- |
| Conditional Presence | Explanation |
| *2StepOnlyL139* | The field is mandatory present if *msgA-PRACH-RootSequenceIndex* L=139 and no 4-step random access type is configured, otherwise the field is absent, Need S. |
| *2StepOnly* | The field is mandatory present in *msgA-ConfigCommon* field in B*WP-UplinkCommon* if *rach-ConfigCommon* field is absent in this *BWP-UplinkCommon*, otherwise the field is optionally present in *msgA-ConfigCommon* field in *BWP-UplinkCommon*, Need S.  The field is mandatory present in *msgA-ConfigCommon* field in *AdditionalRACH-Config* if *rach-ConfigCommon* field is absent in this *AdditionalRACH-Config*, otherwise the field is optionally present in *msgA-ConfigCommon* field in *AdditionalRACH-Config*, Need S. |
| *SharedRO* | The field is mandatory present if the 2-step random access type occasions are shared with 4-step random access type, otherwise the field is not present. |
| *2Step4Step* | The field is mandatory present if both 2-step random access type and 4-step random access type are configured in the BWP, otherwise the field is not present.  The field is mandatory present in *msgA-ConfigCommon* field in *AdditionalRACH-Config* if both 2-step random access type and 4-step random access type are configured for the same feature combination in the BWP. |
| *InitialBWP-Only* | This field is optionally present, Need R, if this BWP is the initial BWP of SpCell. Otherwise the field is absent. |

#### – *RACH-ConfigDedicated*

The IE *RACH-ConfigDedicated* is used to specify the dedicated random access parameters.

*RACH-ConfigDedicated* information element

-- ASN1START

-- TAG-RACH-CONFIGDEDICATED-START

RACH-ConfigDedicated ::= SEQUENCE {

cfra CFRA OPTIONAL, -- Need S

ra-Prioritization RA-Prioritization OPTIONAL, -- Need N

...,

[[

ra-PrioritizationTwoStep-r16 RA-Prioritization OPTIONAL, -- Need N

cfra-TwoStep-r16 CFRA-TwoStep-r16 OPTIONAL -- Need S

]]

}

CFRA ::= SEQUENCE {

occasions SEQUENCE {

rach-ConfigGeneric RACH-ConfigGeneric,

ssb-perRACH-Occasion ENUMERATED {oneEighth, oneFourth, oneHalf, one, two, four, eight, sixteen}

OPTIONAL -- Cond Mandatory

} OPTIONAL, -- Need S

resources CHOICE {

ssb SEQUENCE {

ssb-ResourceList SEQUENCE (SIZE(1..maxRA-SSB-Resources)) OF CFRA-SSB-Resource,

ra-ssb-OccasionMaskIndex INTEGER (0..15)

},

csirs SEQUENCE {

csirs-ResourceList SEQUENCE (SIZE(1..maxRA-CSIRS-Resources)) OF CFRA-CSIRS-Resource,

rsrp-ThresholdCSI-RS RSRP-Range

}

},

...,

[[

totalNumberOfRA-Preambles INTEGER (1..63) OPTIONAL -- Cond Occasions

]]

}

CFRA-TwoStep-r16 ::= SEQUENCE {

occasionsTwoStepRA-r16 SEQUENCE {

rach-ConfigGenericTwoStepRA-r16 RACH-ConfigGenericTwoStepRA-r16,

ssb-PerRACH-OccasionTwoStepRA-r16 ENUMERATED {oneEighth, oneFourth, oneHalf, one,

two, four, eight, sixteen}

} OPTIONAL, -- Need S

msgA-CFRA-PUSCH-r16 MsgA-PUSCH-Resource-r16,

msgA-TransMax-r16 ENUMERATED {n1, n2, n4, n6, n8, n10, n20, n50, n100, n200} OPTIONAL, -- Need S

resourcesTwoStep-r16 SEQUENCE {

ssb-ResourceList SEQUENCE (SIZE(1..maxRA-SSB-Resources)) OF CFRA-SSB-Resource,

ra-ssb-OccasionMaskIndex INTEGER (0..15)

},

...

}

CFRA-SSB-Resource ::= SEQUENCE {

ssb SSB-Index,

ra-PreambleIndex INTEGER (0..63),

...,

[[

msgA-PUSCH-Resource-Index-r16 INTEGER (0..3071) OPTIONAL -- Cond 2StepCFRA

]]

}

CFRA-CSIRS-Resource ::= SEQUENCE {

csi-RS CSI-RS-Index,

ra-OccasionList SEQUENCE (SIZE(1..maxRA-OccasionsPerCSIRS)) OF INTEGER (0..maxRA-Occasions-1),

ra-PreambleIndex INTEGER (0..63),

...

}

-- TAG-RACH-CONFIGDEDICATED-STOP

-- ASN1STOP

|  |
| --- |
| *CFRA-CSIRS-Resource* field descriptions |
| ***csi-RS***  The ID of a CSI-RS resource defined in the measurement object associated with this serving cell. |
| ***ra-OccasionList***  RA occasions that the UE shall use when performing CF-RA upon selecting the candidate beam identified by this CSI-RS. The network ensures that the RA occasion indexes provided herein are also configured by prach-ConfigurationIndex and msg1-FDM. Each RACH occasion is sequentially numbered, first, in increasing order of frequency resource indexes for frequency multiplexed PRACH occasions; second, in increasing order of time resource indexes for time multiplexed PRACH occasions within a PRACH slot and Third, in increasing order of indexes for PRACH slots. |
| ***ra-PreambleIndex***  The RA preamble index to use in the RA occasions associated with this CSI-RS. |

|  |
| --- |
| *CFRA* field descriptions |
| ***occasions***  RA occasions for contention free random access. If the field is absent, the UE uses the RA occasions configured in *RACH-ConfigCommon* in the first active UL BWP. |
| ***ra-ssb-OccasionMaskIndex***  Explicitly signalled PRACH Mask Index for RA Resource selection in TS 38.321 [3]. The mask is valid for all SSB resources signalled in *ssb-ResourceList*. |
| ***rach-ConfigGeneric***  Configuration of contention free random access occasions for CFRA. The UE shall ignore *preambleReceivedTargetPower*, *preambleTransMax*, *powerRampingStep*, *ra-ResponseWindow* signaled within this field and use the corresponding values provided in *RACH-ConfigCommon*. |
| ***ssb-perRACH-Occasion***  Number of SSBs per RACH occasion. |
| ***totalNumberOfRA-Preambles***  Total number of preambles used for contention free random access in the RACH resources defined in CFRA, excluding preambles used for other purposes (e.g. for SI request). If the field is absent but the field *occasions* is present, the UE may assume all the 64 preambles are for RA. The setting should be consistent with the setting of *ssb-perRACH-Occasion*, if present, i.e. it should be a multiple of the number of SSBs per RACH occasion. |

|  |
| --- |
| *CFRA-SSB-Resource* field descriptions |
| ***msgA-PUSCH-Resource-Index***  Identifies the index of the PUSCH resource used for MSGA CFRA. The PUSCH resource index indicates a valid PUSCH occasion (as specified in TS 38.213 [13], clause 8.1A) and the associated DMRS resources corresponding to a PRACH slot. The PUSCH resource indexes are sequentially numbered and are mapped to valid PUSCH occasions corresponding to a PRACH slot which are ordered, first, in increasing order of frequency resource indexes for frequency multiplexed PUSCH occasions; second, in increasing order of DMRS resource indexes within a PUSCH occasion, where a DMRS resource index is determined first in an ascending order of a DMRS port index and then in an ascending order of a DMRS sequence index, third in increasing order of time resource indexes for time multiplexed PUSCH occasions within a PUSCH slot and fourth, in increasing order of indexes for PUSCH slots. For the case of contention free 2-step random access type, if this field is absent, the UE shall use the value 0. |
| ***ra-PreambleIndex***  The preamble index that the UE shall use when performing CF-RA upon selecting the candidate beams identified by this SSB. |
| ***ssb***  The ID of an SSB transmitted by this serving cell. |

|  |
| --- |
| *CFRA-TwoStep* field descriptions |
| ***msgA-CFRA-PUSCH***  PUSCH resource configuration(s) for msgA CFRA. |
| ***msgA-TransMax***  Max number of MsgA preamble transmissions performed before switching to 4-step type random access (see TS 38.321 [3], clauses 5.1.1). This field is only applicable when 2-step and 4-step RA type are configured and switching to 4-step type RA is supported. If the field is absent in *cfra-TwoStep*, switching from 2-step RA type to 4-step RA type is not allowed. |
| ***occasionsTwoStepRA***  RA occasions for contention free random access. If the field is absent, the UE uses the RA occasions configured in *RACH-ConfigCommonTwoStepRA* in the first active UL BWP. |
| ***ra-SSB-OccasionMaskIndex***  Explicitly signalled PRACH Mask Index for RA Resource selection in TS 38.321 [3]. The mask is valid for all SSB resources signalled in *ssb-ResourceList*. |
| ***rach-ConfigGenericTwoStepRA***  Configuration of contention free random access occasions for CFRA 2-step random access type. |
| ***ssb-PerRACH-OccasionTwoStep***  Number of SSBs per RACH occasion for 2-step random access type. |

|  |
| --- |
| *RACH-ConfigDedicated* field descriptions |
| ***cfra***  Parameters for contention free random access to a given target cell. If this field and *cfra-TwoStep* are absent, the UE performs contention based random access. |
| ***cfra-TwoStep***  Parameters for contention free 2-step random access type to a given target cell. Network ensures that *cfra* and *cfra-TwoStep* are not configured at the same time. If this field and *cfra* are absent, the UE performs contention based random access. This field may only be present if *msgA-ConfigCommon* is configured on the BWP. |
| ***ra-prioritization***  Parameters which apply for prioritized random access procedure to a given target cell (see TS 38.321 [3], clause 5.1.1). |
| ***ra-PrioritizationTwoStep***  Parameters which apply for prioritized 2-step random access type procedure to a given target cell (see TS 38.321 [3], clause 5.1.1). |

|  |  |
| --- | --- |
| Conditional Presence | Explanation |
| *Mandatory* | The field is mandatory present. |
| *Occasions* | The field is optionally present, Need S, if the field *occasions* is present, otherwise it is absent. |
| *2StepCFRA* | The field is optionally present for the case of 2-step RA type contention free random access, Need S, otherwise it is absent. |

#### – *RACH-ConfigGeneric*

The IE *RACH-ConfigGeneric* is used to specify the random-access parameters both for regular random access as well as for beam failure recovery.

*RACH-ConfigGeneric* information element

-- ASN1START

-- TAG-RACH-CONFIGGENERIC-START

RACH-ConfigGeneric ::= SEQUENCE {

prach-ConfigurationIndex INTEGER (0..255),

msg1-FDM ENUMERATED {one, two, four, eight},

msg1-FrequencyStart INTEGER (0..maxNrofPhysicalResourceBlocks-1),

zeroCorrelationZoneConfig INTEGER(0..15),

preambleReceivedTargetPower INTEGER (-202..-60),

preambleTransMax ENUMERATED {n3, n4, n5, n6, n7, n8, n10, n20, n50, n100, n200},

powerRampingStep ENUMERATED {dB0, dB2, dB4, dB6},

ra-ResponseWindow ENUMERATED {sl1, sl2, sl4, sl8, sl10, sl20, sl40, sl80},

...,

[[

prach-ConfigurationPeriodScaling-IAB-r16 ENUMERATED {scf1,scf2,scf4,scf8,scf16,scf32,scf64} OPTIONAL, -- Need R

prach-ConfigurationFrameOffset-IAB-r16 INTEGER (0..63) OPTIONAL, -- Need R

prach-ConfigurationSOffset-IAB-r16 INTEGER (0..39) OPTIONAL, -- Need R

ra-ResponseWindow-v1610 ENUMERATED { sl60, sl160} OPTIONAL, -- Need R

prach-ConfigurationIndex-v1610 INTEGER (256..262) OPTIONAL -- Need R

]],

[[

ra-ResponseWindow-v1700 ENUMERATED {sl240, sl320, sl640, sl960, sl1280, sl1920, sl2560} OPTIONAL -- Need R

]]

}

-- TAG-RACH-CONFIGGENERIC-STOP

-- ASN1STOP

|  |
| --- |
| *RACH-ConfigGeneric* field descriptions |
| ***msg1-FDM***  The number of PRACH transmission occasions FDMed in one time instance. (see TS 38.211 [16], clause 6.3.3.2). |
| ***msg1-FrequencyStart***  Offset of lowest PRACH transmission occasion in frequency domain with respective to PRB 0. The value is configured so that the corresponding RACH resource is entirely within the bandwidth of the UL BWP. (see TS 38.211 [16], clause 6.3.3.2). |
| ***powerRampingStep***  Power ramping steps for PRACH (see TS 38.321 [3],5.1.3). |
| ***prach-ConfigurationFrameOffset-IAB***  Frame offset for ROs defined in the baseline configuration indicated by *prach-ConfigurationIndex* and is used only by the IAB-MT. (see TS 38.211 [16], clause 6.3.3.2). |
| ***prach-ConfigurationIndex***  PRACH configuration index. For *prach-ConfigurationIndex* configured under *beamFailureRecovery-Config*, the *prach-ConfigurationIndex* can only correspond to the short preamble format, (see TS 38.211 [16], clause 6.3.3.2). If the field *prach-ConfigurationIndex-v1610* is present, the UE shall ignore the value provided in *prach-ConfigurationIndex* (without suffix). |
| ***prach-ConfigurationPeriodScaling-IAB***  Scaling factor to extend the periodicity of the baseline configuration indicated by *prach-ConfigurationIndex* and is used only by the IAB-MT*.* Value scf1 corresponds to scaling factor of 1 and so on. (see TS 38.211 [16], clause 6.3.3.2). |
| ***prach-ConfigurationSOffset-IAB***  Subframe/Slot offset for ROs defined in the baseline configuration indicated by *prach-ConfigurationIndex* and is used only by the IAB-MT*.* (see TS 38.211 [16], clause 6.3.3.2). |
| ***preambleReceivedTargetPower***  The target power level at the network receiver side (see TS 38.213 [13], clause 7.4, TS 38.321 [3], clauses 5.1.2, 5.1.3). Only multiples of 2 dBm may be chosen (e.g. -202, -200, -198, ...). |
| ***preambleTransMax***  Max number of RA preamble transmission performed before declaring a failure (see TS 38.321 [3], clauses 5.1.4, 5.1.5). |
| ***ra-ResponseWindow***  Msg2 (RAR) window length in number of slots. The network configures a value lower than or equal to 10 ms when Msg2 is transmitted in licensed spectrum and a value lower than or equal to 40 ms when Msg2 is transmitted with shared spectrum channel access (see TS 38.321 [3], clause 5.1.4). UE ignores the field if included in *SCellConfig*. If *ra-ResponseWindow-v1610* or *ra-ResponseWindow-v1700* is signalled, UE shall ignore the *ra-ResponseWindow* (without suffix). The field *ra-ResponseWindow-v1700* is applicable to SCS 480 kHz and SCS 960 kHz. |
| ***zeroCorrelationZoneConfig***  N-CS configuration, see Table 6.3.3.1-5 in TS 38.211 [16]. |

#### – *RACH-ConfigGenericTwoStepRA*

The IE *RACH-ConfigGenericTwoStepRA* is used to specify the 2-step random access type parameters.

*RACH-ConfigGenericTwoStepRA* information element

-- ASN1START

-- TAG-RACH-CONFIGGENERICTWOSTEPRA-START

RACH-ConfigGenericTwoStepRA-r16 ::= SEQUENCE {

msgA-PRACH-ConfigurationIndex-r16 INTEGER (0..262) OPTIONAL, -- Cond 2StepOnly

msgA-RO-FDM-r16 ENUMERATED {one, two, four, eight} OPTIONAL, -- Cond 2StepOnly

msgA-RO-FrequencyStart-r16 INTEGER (0..maxNrofPhysicalResourceBlocks-1) OPTIONAL, -- Cond 2StepOnly

msgA-ZeroCorrelationZoneConfig-r16 INTEGER (0..15) OPTIONAL, -- Cond 2StepOnly

msgA-PreamblePowerRampingStep-r16 ENUMERATED {dB0, dB2, dB4, dB6} OPTIONAL, -- Cond 2StepOnlyNoCFRA

msgA-PreambleReceivedTargetPower-r16 INTEGER (-202..-60) OPTIONAL, -- Cond 2StepOnlyNoCFRA

msgB-ResponseWindow-r16 ENUMERATED {sl1, sl2, sl4, sl8, sl10, sl20, sl40, sl80, sl160, sl320}

OPTIONAL, -- Cond NoCFRA

preambleTransMax-r16 ENUMERATED {n3, n4, n5, n6, n7, n8, n10, n20, n50, n100, n200} OPTIONAL, -- Cond 2StepOnlyNoCFRA

...,

[[

msgB-ResponseWindow-v1700 ENUMERATED {sl240, sl640, sl960, sl1280, sl1920, sl2560} OPTIONAL -- Cond NoCFRA2

]]

}

-- TAG-RACH-CONFIGGENERICTWOSTEPRA-STOP

-- ASN1STOP

|  |
| --- |
| *RACH-ConfigGenericTwoStepRA* field descriptions |
| ***msgA-PreamblePowerRampingStep***  Power ramping steps for msgA PRACH. If the field is absent, UE shall use the value of *powerRampingStep* in *RACH-ConfigGeneric* in the configured BWP (see TS 38.321 [3], 5.1.3). This field may only be present if no 4-step type RA is configured in the BWP or in the case of separate ROs with 4-step type RA. The field is absent if *RACH-ConfigGenericTwoStepRA* is included in *CFRA-TwoStep* in *RACH-ConfigDedicated* and thenthe UE uses the value of *msgA-PreamblePowerRampingStep* in *RACH-ConfigGenericTwoStepRA* configured forCBRA. |
| ***msgA-PreambleReceivedTargetPower***  The target power level at the network receiver side (see TS 38.213 [13], clause 7.1.1 and TS 38.321 [3], clause 5.1.1). Only multiples of 2 dBm may be chosen (e.g -202, -200, -198, …). If the field is absent, UE shall use the value of *preambleReceivedTargetPower* in *RACH-ConfigGeneric* in the configured BWP. This field may only be present if no 4-step type RA is configured in the BWP. The field is absent if *RACH-ConfigGenericTwoStepRA* is included in *CFRA-TwoStep* in *RACH-ConfigDedicated* and thenthe UE uses the value of *msgA-PreambleReceivedTargetPower*in *RACH-ConfigGenericTwoStepRA* configured forCBRA*.* |
| ***msgA-PRACH-ConfigurationIndex***  Cell-specific PRACH configuration index for 2-step RA type. If the field is absent the UE shall use the value of corresponding 4-step random access parameter in the configured BWP. If the value is in the range of 256 to 262, the field *prach-ConfigurationIndex-v1610* should be considered configured (see TS 38.211 [16], clause 6.3.3.2). This field may only be present if no 4-step type RA is configured in the BWP or in the case of separate ROs with 4-step type RA. |
| ***msgA-RO-FDM***  The number of msgA PRACH transmission occasions Frequency-Division Multiplexed in one time instance. If the field is absent, UE shall use value of *msg1-FDM* in *RACH-ConfigGeneric* in the configured BWP (see TS 38.211 [16], clause 6.3.3.2). This field may only be present if no 4-step type RA is configured in the BWP or in the case of separate ROs with 4-step type RA. |
| ***msgA-RO-FrequencyStart***  Offset of lowest PRACH transmissions occasion in frequency domain with respect to PRB 0. If the field is absent, UE shall use value of *msg1-FrequencyStart* in *RACH-ConfigGeneric* in the configured BWP (see TS 38.211 [16], clauses 5.3.2 and 6.3.3.2). This field may only be present if no 4-step type RA is configured in the BWP or in the case of separate ROs with 4-step type RA. |
| ***msgA-ZeroCorrelationZoneConfig***  N-CS configuration for msgA preamble, see Table 6.3.3.1-5 in TS 38.211 [16]. If the field is absent, UE shall use value *zeroCorrelationZoneConfig* in *RACH-ConfigGeneric* in the configured BWP. This field may only be present if no 4-step type RA is configured in the BWP or in the case of separate ROs with 4-step type RA. |
| ***msgB-ResponseWindow***  MsgB monitoring window length in number of slots. The network configures a value lower than or equal to 40ms (see TS 38.321 [3], clause 5.1.1). The network does not configure *msgB-ResponseWindow-r16* simultaneously with *msgB-ResponseWindow-v1700*, and if both fields are absent,the UE uses the value of *msgB-ResponseWindow* in *RACH-ConfigGenericTwoStepRA* configured for CBRA. |
| ***preambleTransMax***  Max number of RA preamble transmission performed before declaring a failure (see TS 38.321 [3], clauses 5.1.4, 5.1.5). If the field is absent, UE shall use the value of *preambleTransMax* in *RACH-ConfigGeneric* in the configured BWP. The field is absent if *RACH-ConfigGenericTwoStepRA* is included in *CFRA-TwoStep* in *RACH-ConfigDedicated* and thenthe UE uses the value of *preambleTransMax*in *RACH-ConfigGenericTwoStepRA* configured forCBRA*.* |

|  |  |
| --- | --- |
| Conditional Presence | Explanation |
| *2StepOnly* | The field is mandatory present in *msgA-ConfigCommon* fieldin *BWP-UplinkCommon* if *rach-ConfigCommon* field is absent in this *BWP-UplinkCommon*, otherwise the field is optionally present in *msgA-ConfigCommon* fieldin *BWP-UplinkCommon*, Need S.  The field is mandatory present in *msgA-ConfigCommon* in *AdditionalRACH-Config* if *rach-ConfigCommon* field is absent in this *AdditionalRACH-Config,* otherwise the field is optionally present in *msgA-ConfigCommon* fieldin *AdditionalRACH-Config*, Need S. |
| *2StepOnlyNoCFRA* | The field is mandatory present if *RACH-ConfigGenericTwoStepRA* is included in the *RACH-ConfigCommonTwoStepRA* and there are no 4-step random access configurations configured in the BWP (i.e only 2-step random access type configured in the BWP), otherwise (i.e. 4-step random access configuration also exists in the BWP) the field is optionally present, Need S. When *RACH-ConfigGenericTwoStepRA* is included in the *RACH-ConfigDedicated*, this field is absent. |
| *NoCFRA* | The field is mandatory present if *msgB-ResponseWindow-r17* is absent and *RACH-ConfigGenericTwoStepRA* is not included in *CFRA-TwoStep* in *RACH-ConfigDedicated,* otherwise the field is absent, Need S. |
| *NoCFRA2* | The field is mandatory present if *msgB-ResponseWindow-r16* is absent and *RACH-ConfigGenericTwoStepRA* is not included in *CFRA-TwoStep* in *RACH-ConfigDedicated*, otherwise the field is absent, Need S. |

#### – *RA-Prioritization*

The IE *RA-Prioritization* is used to configure prioritized random access.

*RA-Prioritization* information element

-- ASN1START

-- TAG-RA-PRIORITIZATION-START

RA-Prioritization ::= SEQUENCE {

powerRampingStepHighPriority ENUMERATED {dB0, dB2, dB4, dB6},

scalingFactorBI ENUMERATED {zero, dot25, dot5, dot75} OPTIONAL, -- Need R

...

}

-- TAG-RA-PRIORITIZATION-STOP

-- ASN1STOP

|  |
| --- |
| *RA-Prioritization* field descriptions |
| ***powerRampingStepHighPrioritiy***  Power ramping step applied for prioritized random access procedure. |
| ***scalingFactorBI***  Scaling factor for the backoff indicator (BI) for the prioritized random access procedure. (see TS 38.321 [3], clause 5.1.4). Value *zero* corresponds to 0, value *dot25* corresponds to 0.25 and so on. |

#### – *RA-PrioritizationForSlicing*

The IE *RA-PrioritizationForSlicing* is used to configure prioritized random access for slicing.

*RA-PrioritizationForSlicing* information element

-- ASN1START

-- TAG-RA-PRIORITIZATIONFORSLICING-START

RA-PrioritizationForSlicing-r17 ::= SEQUENCE {

ra-PrioritizationSliceInfoList-r17 RA-PrioritizationSliceInfoList-r17,

...

}

RA-PrioritizationSliceInfoList-r17 ::= SEQUENCE (SIZE (1..maxSliceInfo-r17)) OF RA-PrioritizationSliceInfo-r17

RA-PrioritizationSliceInfo-r17 ::= SEQUENCE {

nsag-ID-List-r17 SEQUENCE (SIZE (1..maxSliceInfo-r17)) OF NSAG-ID-r17,

ra-Prioritization-r17 RA-Prioritization,

...

}

-- TAG-RA-PRIORITIZATIONFORSLICING-STOP

-- ASN1STOP

#### – *RadioBearerConfig*

The IE *RadioBearerConfig* is used to add, modify and release signalling, multicast MRBs and/or data radio bearers. Specifically, this IE carries the parameters for PDCP and, if applicable, SDAP entities for the radio bearers.

*RadioBearerConfig* information element

-- ASN1START

-- TAG-RADIOBEARERCONFIG-START

RadioBearerConfig ::= SEQUENCE {

srb-ToAddModList SRB-ToAddModList OPTIONAL, -- Cond HO-Conn

srb3-ToRelease ENUMERATED{true} OPTIONAL, -- Need N

drb-ToAddModList DRB-ToAddModList OPTIONAL, -- Cond HO-toNR

drb-ToReleaseList DRB-ToReleaseList OPTIONAL, -- Need N

securityConfig SecurityConfig OPTIONAL, -- Need M

...,

[[

mrb-ToAddModList-r17 MRB-ToAddModList-r17 OPTIONAL, -- Need N

mrb-ToReleaseList-r17 MRB-ToReleaseList-r17 OPTIONAL, -- Need N

srb4-ToAddMod-r17 SRB-ToAddMod OPTIONAL, -- Need N

srb4-ToRelease-r17 ENUMERATED{true} OPTIONAL -- Need N

]]

}

SRB-ToAddModList ::= SEQUENCE (SIZE (1..2)) OF SRB-ToAddMod

SRB-ToAddMod ::= SEQUENCE {

srb-Identity SRB-Identity,

reestablishPDCP ENUMERATED{true} OPTIONAL, -- Need N

discardOnPDCP ENUMERATED{true} OPTIONAL, -- Need N

pdcp-Config PDCP-Config OPTIONAL, -- Cond PDCP

...,

[[

srb-Identity-v1700 SRB-Identity-v1700 OPTIONAL -- Need M

]]

}

DRB-ToAddModList ::= SEQUENCE (SIZE (1..maxDRB)) OF DRB-ToAddMod

DRB-ToAddMod ::= SEQUENCE {

cnAssociation CHOICE {

eps-BearerIdentity INTEGER (0..15),

sdap-Config SDAP-Config

} OPTIONAL, -- Cond DRBSetup

drb-Identity DRB-Identity,

reestablishPDCP ENUMERATED{true} OPTIONAL, -- Need N

recoverPDCP ENUMERATED{true} OPTIONAL, -- Need N

pdcp-Config PDCP-Config OPTIONAL, -- Cond PDCP

...,

[[

daps-Config-r16 ENUMERATED{true} OPTIONAL -- Cond DAPS

]]

}

DRB-ToReleaseList ::= SEQUENCE (SIZE (1..maxDRB)) OF DRB-Identity

SecurityConfig ::= SEQUENCE {

securityAlgorithmConfig SecurityAlgorithmConfig OPTIONAL, -- Cond RBTermChange1

keyToUse ENUMERATED{master, secondary} OPTIONAL, -- Cond RBTermChange

...

}

MRB-ToAddModList-r17 ::= SEQUENCE (SIZE (1..maxMRB-r17)) OF MRB-ToAddMod-r17

MRB-ToAddMod-r17 ::= SEQUENCE {

mbs-SessionId-r17 TMGI-r17 OPTIONAL, -- Cond MRBSetup

mrb-Identity-r17 MRB-Identity-r17,

mrb-IdentityNew-r17 MRB-Identity-r17 OPTIONAL, -- Need N

reestablishPDCP-r17 ENUMERATED{true} OPTIONAL, -- Need N

recoverPDCP-r17 ENUMERATED{true} OPTIONAL, -- Need N

pdcp-Config-r17 PDCP-Config OPTIONAL, -- Cond PDCP

...

}

MRB-ToReleaseList-r17 ::= SEQUENCE (SIZE (1..maxMRB-r17)) OF MRB-Identity-r17

-- TAG-RADIOBEARERCONFIG-STOP

-- ASN1STOP

|  |
| --- |
| *DRB-ToAddMod* and *MRB-ToAddMod* field descriptions |
| ***cnAssociation***  Indicates if the bearer is associated with the *eps-bearerIdentity* (when connected to EPC) or *sdap-Config* (when connected to 5GC). |
| ***daps-Config***  Indicates that the bearer is configured as DAPS bearer. |
| ***drb-Identity***  In case of DC, the DRB identity is unique within the scope of the UE, i.e. an MCG DRB cannot use the same value as a split DRB. For a split DRB the same identity is used for the MCG and SCG parts of the configuration. |
| ***eps-BearerIdentity***  The EPS bearer ID determines the EPS bearer. |
| ***mbs-SessionId***  Indicates which multicast MBS session the bearer is associated with. |
| ***mrb-Identity***  Identification of the multicast MRB. |
| ***mrb-IdentityNew***  New identity of the multicast MRB when *mrb-Identity* needs to be changed, e.g. as a result of a handover. |
| ***reestablishPDCP***  Indicates that PDCP should be re-established. Network sets this to *true* whenever the security key used for this radio bearer changes. Key change could for example be due to termination point change for the bearer, reconfiguration with sync, resuming an RRC connection, or the first reconfiguration after reestablishment. It is also applicable for LTE procedures when NR PDCP is configured. Network doesn't include this field for DRB if the bearer is configured as DAPS bearer. |
| ***recoverPDCP***  Indicates that PDCP should perform recovery according to TS 38.323 [5]. Network doesn't include this field if the bearer is configured as DAPS bearer. |
| ***sdap-Config***  The SDAP configuration determines how to map QoS flows to DRBs when NR or E-UTRA connects to the 5GC and presence/absence of UL/DL SDAP headers. |

|  |
| --- |
| *RadioBearerConfig* field descriptions |
| ***securityConfig***  Indicates the security algorithm and key to use for the signalling and data radio bearers configured with the list in this IE *RadioBearerConfig*. When the field is not included after AS security has been activated, the UE shall continue to use the currently configured *keyToUse* and security algorithm for the radio bearers reconfigured with the lists in this IE *RadioBearerConfig*. The field is not included when configuring SRB1 before AS security is activated. |
| ***srb3-ToRelease***  Release SRB3. SRB3 release can only be done over SRB1 and only at SCG release and reconfiguration with sync. |

|  |
| --- |
| *SecurityConfig* field descriptions |
| ***keyToUse***  Indicates if the bearers configured with the list in this IE *RadioBearerConfig* are using the master key or the secondary key for deriving ciphering and/or integrity protection keys. For MR-DC, network should not configure SRB1 and SRB2 with secondary key and SRB3 with the master key. When the field is not included, the UE shall continue to use the currently configured *keyToUse* for the radio bearers reconfigured with the lists in this IE *RadioBearerConfig*. |
| ***securityAlgorithmConfig***  Indicates the security algorithm for the signalling and data radio bearers configured with the list in this IE *RadioBearerConfig*. When the field is not included, the UE shall continue to use the currently configured security algorithm for the radio bearers reconfigured with the lists in this IE *RadioBearerConfig*. |

|  |
| --- |
| *SRB-ToAddMod* field descriptions |
| ***discardOnPDCP***  Indicates that PDCP should discard stored SDU and PDU according to TS 38.323 [5]. |
| ***reestablishPDCP***  Indicates that PDCP should be re-established. Network sets this to *true* whenever the security key used for this radio bearer changes. Key change could for example be due to reconfiguration with sync, for SRB2 when resuming an RRC connection, or at the first reconfiguration after RRC connection reestablishment in NR. For SRB1, when resuming an RRC connection, or at the first reconfiguration after RRC connection reestablishment in NR, the network does not set this field to *true*. For LTE SRBs using NR PDCP, it could be for handover, RRC connection reestablishment or resume. Network doesn't include this field if any DAPS bearer is configured. |
| ***srb-Identity, srb-Identity-v1700***  Value 1 is applicable for SRB1 only. Value 2 is applicable for SRB2 only. Value 3 is applicable for SRB3 only. Value 4 is applicable for SRB4 only. If *srb-Identity-v1700* is received for an SRB, the UE shall ignore *srb-Identity* (i.e. without suffix) for this SRB. |

|  |  |
| --- | --- |
| Conditional Presence | Explanation |
| *RBTermChange* | The field is mandatory present in case of:  - set up of signalling and data radio bearer,  - change of termination point for the radio bearer between MN and SN.  It is optionally present otherwise, Need S. |
| *RBTermChange1* | The field is mandatory present in case of:  - set up of signalling and data radio bearer,  - change of termination point for the radio bearer between MN and SN,  - handover from E-UTRA/EPC or E-UTRA/5GC to NR,  - handover from NR or E-UTRA/EPC to E-UTRA/5GC if the UE supports NGEN-DC.  It is optionally present otherwise, Need S. |
| *PDCP* | The field is mandatory present if the corresponding DRB/multicast MRB is being setup or corresponding DRB/multicast MRB is reconfigured with NR PDCP or corresponding SRB associated with two RLC entities is being setup or if the number of RLC bearers associated with the DRB/multicast MRB or SRB is changed. The field is optionally present, Need S, if the corresponding SRB associated with one RLC entity is being setup or corresponding SRB is reconfigured with NR PDCP; otherwise the field is optionally present, need M. |
| *DRBSetup* | The field is mandatory present if the corresponding DRB is being setup; otherwise the field is optionally present, need M. |
| *HO-Conn* | The field is mandatory present  - in case of inter-system handover from E-UTRA/EPC to E-UTRA/5GC or NR,  - or when the *fullConfig* is included in the *RRCReconfiguration* message and NE-DC/NR-DC is not configured,  - or in case of *RRCSetup*.  Otherwise the field is optionally present, need N.  Upon *RRCSetup*, only SRB1 can be present. |
| *HO-toNR* | If *mrb-ToAddModList* is not included, the field is mandatory present  - in case of inter-system handover from E-UTRA/EPC to E-UTRA/5GC or NR,  - or when the *fullConfig* is included in the *RRCReconfiguration* message and NE-DC/NR-DC is not configured.  In case of *RRCSetup*, the field is absent; otherwise the field is optionally present, need N. |
| *DAPS* | The field is optionally present, need N, in case masterCellGroup includes ReconfigurationWithSync, SCell(s) and SCG are not configured, multi-DCI/single-DCI based multi-TRP are not configured in any DL BWP, *supplementaryUplink* is not configured, ethernetHeaderCompression is not configured for the DRB, *conditionalReconfiguration* is not configured, and NR sidelink and V2X sidelink are not configured. Otherwise the field is absent. |
| *MRBSetup* | The field is mandatory present if the corresponding multicast MRB is being setup; otherwise the field is optionally present, need M. |

#### – *RadioLinkMonitoringConfig*

The IE *RadioLinkMonitoringConfig* is used to configure radio link monitoring for detection of beam- and/or cell radio link failure. See also TS 38.321 [3], clause 5.1.1.

*RadioLinkMonitoringConfig* information element

-- ASN1START

-- TAG-RADIOLINKMONITORINGCONFIG-START

RadioLinkMonitoringConfig ::= SEQUENCE {

failureDetectionResourcesToAddModList SEQUENCE (SIZE(1..maxNrofFailureDetectionResources)) OF RadioLinkMonitoringRS

OPTIONAL, -- Need N

failureDetectionResourcesToReleaseList SEQUENCE (SIZE(1..maxNrofFailureDetectionResources)) OF RadioLinkMonitoringRS-Id

OPTIONAL, -- Need N

beamFailureInstanceMaxCount ENUMERATED {n1, n2, n3, n4, n5, n6, n8, n10} OPTIONAL, -- Need R

beamFailureDetectionTimer ENUMERATED {pbfd1, pbfd2, pbfd3, pbfd4, pbfd5, pbfd6, pbfd8, pbfd10} OPTIONAL, -- Need R

...,

[[

beamfailure BeamFailureDetection OPTIONAL –- Need R

]]

}

BeamFailureDetection ::= SEQUENCE {

failureDetectionSet1-r17 BeamFailureDetectionSet-r17 OPTIONAL, -- Need R

failureDetectionSet2-r17 BeamFailureDetectionSet-r17 OPTIONAL, -- Need R

additionalPCI-r17 AdditionalPCIIndex-r17 OPTIONAL -- Need R

}

RadioLinkMonitoringRS ::= SEQUENCE {

radioLinkMonitoringRS-Id RadioLinkMonitoringRS-Id,

purpose ENUMERATED {beamFailure, rlf, both},

detectionResource CHOICE {

ssb-Index SSB-Index,

csi-RS-Index NZP-CSI-RS-ResourceId

},

...

}

BeamFailureDetectionSet-r17 ::= SEQUENCE {

bfdResourcesToAddModList-r17 SEQUENCE (SIZE(1..maxNrofBFDResourcePerSet-r17)) OF BeamLinkMonitoringRS-r17

OPTIONAL, -- Need N

bfdResourcesToReleaseList-r17 SEQUENCE (SIZE(1..maxNrofBFDResourcePerSet-r17)) OF BeamLinkMonitoringRS-Id-r17

OPTIONAL, -- Need N

beamFailureInstanceMaxCount-r17 ENUMERATED {n1, n2, n3, n4, n5, n6, n8, n10} OPTIONAL, -- Need R

beamFailureDetectionTimer-r17 ENUMERATED {pbfd1, pbfd2, pbfd3, pbfd4, pbfd5, pbfd6, pbfd8, pbfd10} OPTIONAL, -- Need R

...

}

BeamLinkMonitoringRS-r17 ::= SEQUENCE {

beamLinkMonitoringRS-Id-r17 BeamLinkMonitoringRS-Id-r17,

detectionResource-r17 CHOICE {

ssb-Index SSB-Index,

csi-RS-Index NZP-CSI-RS-ResourceId

},

...

}

BeamLinkMonitoringRS-Id-r17 ::= INTEGER (0..maxNrofFailureDetectionResources-1-r17)

-- TAG-RADIOLINKMONITORINGCONFIG-STOP

-- ASN1STOP

|  |
| --- |
| *RadioLinkMonitoringConfig* field descriptions |
| ***additionalPCI***  Indicates the physical cell IDs (PCI) of the SSBs in the *failureDetectionSet2*. If *candidateBeamRSList2* is configured in IE *BeamfailureRSConfig* the field indicated the physical cell IDs (PCI) of the SSBs in the *candidateBeamRSList2*. |
| ***beamFailureDetectionTimer***  Timer for beam failure detection (see TS 38.321 [3], clause 5.17). See also the *BeamFailureRecoveryConfig* IE. Value in number of "Qout,LR reporting periods of Beam Failure Detection" Reference Signal (see TS 38.213 [13], clause 6). Value *pbfd1* corresponds to 1 Qout,LR reporting period of Beam Failure Detection Reference Signal, value *pbfd2* corresponds to 2 Qout,LR reporting periods of Beam Failure Detection Reference Signal and so on. |
| ***beamFailureInstanceMaxCount***  This field determines after how many beam failure events the UE triggers beam failure recovery (see TS 38.321 [3], clause 5.17). Value n1 corresponds to 1 beam failure instance, value n2 corresponds to 2 beam failure instances and so on. |
| ***failureDetectionResourcesToAddModList***  A list of reference signals for detecting beam failure and/or cell level radio link failure (RLF). The limits of the reference signals that the network can configure are specified in TS 38.213 [13], table 5-1. The network configures at most two detectionResources per BWP for the purpose *beamFailure* or *both*. If no RSs are provided for the purpose of beam failure detection, the UE performs beam monitoring based on the activated *TCI-State* for PDCCH as described in TS 38.213 [13], clause 6. If no RSs are provided in this list for the purpose of RLF detection, the UE performs Cell-RLM based on the activated *TCI-State* of PDCCH as described in TS 38.213 [13], clause 5. The network ensures that the UE has a suitable set of reference signals for performing cell-RLM. If *failureDetectionSet1-r17* and *failureDetectionSet2-r17* are present, the *purpose* of *RadioLinkMonitoringRS* in *failureDetctionResourceToaddModlist* only can be set to *rlf*. |
| ***failureDetectionSet1, failureDetectionSet2***  Configures parameters for beamfailure detection towards beam failure detection resources configured in the set. If *additionalPCIList* is configured for the serving cell, each RS in one set can be associted only to one PCI. The failureDetectionSet1 and failureDetectionSet2 are always configured together, and not more than two reference signals are configured in one set for a UE that does not support the MAC CE based BFD-RS activation. |

|  |
| --- |
| *RadioLinkMonitoringRS* field descriptions |
| ***detectionResource***  A reference signal that the UE shall use for radio link monitoring or beam failure detection (depending on the indicated *purpose*). Only periodic 1-port CSI-RS can be configured on SCell for beam failure detection purpose. |
| ***purpose***  Determines whether the UE shall monitor the associated reference signal for the purpose of cell- and/or beam failure detection. For SCell, network only configures the value to beamFailure. |

#### – *RadioLinkMonitoringRS-Id*

The IE *RadioLinkMonitoringRS-Id* is used to identify one *RadioLinkMonitoringRS*.

*RadioLinkMonitoringRS-Id* information element

-- ASN1START

-- TAG-RADIOLINKMONITORINGRS-ID-START

RadioLinkMonitoringRS-Id ::= INTEGER (0..maxNrofFailureDetectionResources-1)

-- TAG-RADIOLINKMONITORINGRS-ID-STOP

-- ASN1STOP

#### – *RAN-AreaCode*

The IE *RAN-AreaCode* is used to identify a RAN area within the scope of a tracking area.

*RAN-AreaCode* information element

-- ASN1START

-- TAG-RAN-AREACODE-START

RAN-AreaCode ::= INTEGER (0..255)

-- TAG-RAN-AREACODE-STOP

-- ASN1STOP

#### – *RateMatchPattern*

The IE *RateMatchPattern* is used to configure one rate matching pattern for PDSCH, see TS 38.214 [19], clause 5.1.4.1.

*RateMatchPattern* information element

-- ASN1START

-- TAG-RATEMATCHPATTERN-START

RateMatchPattern ::= SEQUENCE {

rateMatchPatternId RateMatchPatternId,

patternType CHOICE {

bitmaps SEQUENCE {

resourceBlocks BIT STRING (SIZE (275)),

symbolsInResourceBlock CHOICE {

oneSlot BIT STRING (SIZE (14)),

twoSlots BIT STRING (SIZE (28))

},

periodicityAndPattern CHOICE {

n2 BIT STRING (SIZE (2)),

n4 BIT STRING (SIZE (4)),

n5 BIT STRING (SIZE (5)),

n8 BIT STRING (SIZE (8)),

n10 BIT STRING (SIZE (10)),

n20 BIT STRING (SIZE (20)),

n40 BIT STRING (SIZE (40))

} OPTIONAL, -- Need S

...

},

controlResourceSet ControlResourceSetId

},

subcarrierSpacing SubcarrierSpacing OPTIONAL, -- Cond CellLevel

dummy ENUMERATED { dynamic, semiStatic },

...,

[[

controlResourceSet-r16 ControlResourceSetId-r16 OPTIONAL -- Need R

]]

}

-- TAG-RATEMATCHPATTERN-STOP

-- ASN1STOP

|  |
| --- |
| *RateMatchPattern* field descriptions |
| ***bitmaps***  Indicates rate matching pattern by a pair of bitmaps *resourceBlocks* and *symbolsInResourceBlock* to define the rate match pattern within one or two slots, and a third bitmap *periodicityAndPattern* to define the repetition pattern with which the pattern defined by the above bitmap pair occurs. |
| ***controlResourceSet***  This ControlResourceSet is used as a PDSCH rate matching pattern, i.e., PDSCH reception rate matches around it. In frequency domain, the resource is determined by the frequency domain resource of the CORESET with the corresponding CORESET ID. Time domain resource is determined by the parameters of the associated search space of the CORESET.  If the field *controlResourceSetId-r16* is present, UE shall ignore the *controlResourceSetId* (without suffix). |
| ***periodicityAndPattern***  A time domain repetition pattern at which the pattern defined by *symbolsInResourceBlock* and *resourceBlocks* recurs. This slot pattern repeats itself continuously. Absence of this field indicates the value *n1* (see TS 38.214 [19], clause 5.1.4.1). |
| ***resourceBlocks***  A resource block level bitmap in the frequency domain. A bit in the bitmap set to 1 indicates that the UE shall apply rate matching in the corresponding resource block in accordance with the *symbolsInResourceBlock* bitmap. If used as cell-level rate matching pattern, the bitmap identifies "common resource blocks (CRB)". If used for MBS broadcast CFR, the bitmap identifies "physical resource blocks" inside the MBS broadcast CFR. If used as BWP-level rate matching pattern, the bitmap identifies "physical resource blocks" inside the BWP or MBS multicast CFR. The first/ leftmost bit corresponds to resource block 0, and so on (see TS 38.214 [19], clause 5.1.4.1). |
| ***subcarrierSpacing***  The SubcarrierSpacing for this resource pattern. If the field is absent, the UE applies the SCS of the associated BWP. The value *kHz15* corresponds to µ=0, the value *kHz30* corresponds to µ=1, and so on.  Only the following values are applicable depending on the used frequency (see TS 38.214 [19], clause 5.1.4.1):  FR1: 15, 30 or 60 kHz  FR2-1: 60 or 120 kHz  FR2-2: 120, 480, or 960 kHz |
| ***symbolsInResourceBlock***  A symbol level bitmap in time domain. It indicates with a bit set to true that the UE shall rate match around the corresponding symbol. This pattern recurs (in time domain) with the configured periodicityAndPattern (see TS 38.214 [19], clause 5.1.4.1).  For *oneSlot*, if ECP is configured, the first 12 bits represent the symbols within the slot and the last two bits within the bitstring are ignored by the UE; Otherwise, the 14 bits represent the symbols within the slot.  For *twoSlots*, if ECP is configured, the first 12 bits represent the symbols within the first slot and the next 12 bits represent the symbols in the second slot and the last four bits within the bit string are ignored by the UE; Otherwise, the first 14 bits represent the symbols within the first slot and the next 14 bits represent the symbols in the second slot.  For the bits representing symbols in a slot, the most significant bit of the bit string represents the first symbol in the slot and the second most significant bit represents the second symbol in the slot and so on. |

|  |  |
| --- | --- |
| Conditional Presence | Explanation |
| *CellLevel* | The field is mandatory present if the *RateMatchPattern* is defined on cell level. The field is absent when the *RateMatchPattern* is defined on BWP level or defined for MBS broadcast CFR. If the *RateMatchPattern* is defined on BWP level, the UE applies the SCS of the BWP and if *RateMatchPattern* is defined for MBS broadcast CFR, the UE applies the SCS of the initial BWP. |

#### – *RateMatchPatternId*

The IE *RateMatchPatternId* identifies one RateMatchMattern (see TS 38.214 [19], clause 5.1.4.2).

*RateMatchPatternId* information element

-- ASN1START

-- TAG-RATEMATCHPATTERNID-START

RateMatchPatternId ::= INTEGER (0..maxNrofRateMatchPatterns-1)

-- TAG-RATEMATCHPATTERNID-STOP

-- ASN1STOP

#### – *RateMatchPatternLTE-CRS*

The IE *RateMatchPatternLTE-CRS* is used to configure a pattern to rate match around LTE CRS. See TS 38.214 [19], clause 5.1.4.2.

*RateMatchPatternLTE-CRS* information element

-- ASN1START

-- TAG-RATEMATCHPATTERNLTE-CRS-START

RateMatchPatternLTE-CRS ::= SEQUENCE {

carrierFreqDL INTEGER (0..16383),

carrierBandwidthDL ENUMERATED {n6, n15, n25, n50, n75, n100, spare2, spare1},

mbsfn-SubframeConfigList EUTRA-MBSFN-SubframeConfigList OPTIONAL, -- Need M

nrofCRS-Ports ENUMERATED {n1, n2, n4},

v-Shift ENUMERATED {n0, n1, n2, n3, n4, n5}

}

LTE-CRS-PatternList-r16 ::= SEQUENCE (SIZE (1..maxLTE-CRS-Patterns-r16)) OF RateMatchPatternLTE-CRS

-- TAG-RATEMATCHPATTERNLTE-CRS-STOP

-- ASN1STOP

|  |
| --- |
| *RateMatchPatternLTE-CRS* field descriptions |
| ***carrierBandwidthDL***  BW of the LTE carrier in number of PRBs (see TS 38.214 [19], clause 5.1.4.2). |
| ***carrierFreqDL***  Center of the LTE carrier (see TS 38.214 [19], clause 5.1.4.2). |
| ***mbsfn-SubframeConfigList***  LTE MBSFN subframe configuration (see TS 38.214 [19], clause 5.1.4.2). |
| ***nrofCRS-Ports***  Number of LTE CRS antenna port to rate-match around (see TS 38.214 [19], clause 5.1.4.2). |
| ***v-Shift***  Shifting value v-shift in LTE to rate match around LTE CRS (see TS 38.214 [19], clause 5.1.4.2). |

#### – *ReferenceLocation*

The IE *ReferenceLocation* contains location information used as a reference location. The value of the field is same as *Ellipsoid-Point* defined in TS37.355 [49]. The first/leftmost bit of the first octet contains the most significant bit.

*ReferenceLocation* information element

-- ASN1START

-- TAG-REFERENCELOCATION-START

ReferenceLocation-r17 ::= OCTET STRING

-- TAG-REFERENCELOCATION-STOP

-- ASN1STOP

#### – *ReferenceTimeInfo*

The IE *ReferenceTimeInfo* contains timing information for 5G internal system clock used for, e.g., time stamping, see TS 23.501 [32], clause 5.27.1.2.

*ReferenceTimeInfo* information element

-- ASN1START

-- TAG-REFERENCETIMEINFO-START

ReferenceTimeInfo-r16 ::= SEQUENCE {

time-r16 ReferenceTime-r16,

uncertainty-r16 INTEGER (0..32767) OPTIONAL, -- Need S

timeInfoType-r16 ENUMERATED {localClock} OPTIONAL, -- Need S

referenceSFN-r16 INTEGER (0..1023) OPTIONAL -- Cond RefTime

}

ReferenceTime-r16 ::= SEQUENCE {

refDays-r16 INTEGER (0..72999),

refSeconds-r16 INTEGER (0..86399),

refMilliSeconds-r16 INTEGER (0..999),

refTenNanoSeconds-r16 INTEGER (0..99999)

}

-- TAG-REFERENCETIMEINFO-STOP

-- ASN1STOP

|  |
| --- |
| *ReferenceTimeInfo* field descriptions |
| ***referenceSFN***  This field indicates the reference SFN corresponding to the reference time information. If *referenceTimeInfo* field is received in *DLInformationTransfer* message, this field indicates the SFN of PCell. |
| ***time***  This field indicates time reference with 10ns granularity. If included in *DLInformationTransfer* and if UE-side TA PDC is de-activated, the indicated time may not be referenced at the network, i.e., gNB may pre-compensate for RF propagation delay. If included in *DLInformationTransfer* and if UE is requested to transmit UE Rx-Tx time difference measurement, the indicated time may not be referenced at the network, i.e., gNB may pre-compensate for RF propagation delay. Otherwise, the indicated time is referenced at the network, i.e., without compensating for RF propagation delay.  The indicated time in 10ns unit from the origin is *refDays*\*86400\*1000\*100000 + *refSeconds*\*1000\*100000 + *refMilliSeconds*\*100000 + *refTenNanoSeconds*. The *refDays* field specifies the sequential number of days (with day count starting at 0) from the origin of the *time* field.  If the *referenceTimeInfo* field is received in *DLInformationTransfer* message, the time field indicates the *time* at the ending boundary of the system frame indicated by *referenceSFN*. The UE considers this frame (indicated by *referenceSFN*) to be the frame which is nearest to the frame where the message is received (which can be either in the past or in the future).  If the *referenceTimeInfo* field is received in *SIB9*, the *time* field indicates the time at the SFN boundary at or immediately after the ending boundary of the SI-window in which *SIB9* is transmitted.  If *referenceTimeInfo* field is received in *SIB9*, this field is excluded when determining changes in system information, i.e. changes of time should neither result in system information change notifications nor in a modification of *valueTag* in *SIB1*. |
| ***timeInfoType***  If *timeInfoType* is not included, the *time* indicates the GPS time and the origin of the *time* field is 00:00:00 on Gregorian calendar date 6 January, 1980 (start of GPS time). If *timeInfoType* is set to *localClock*, the origin of the *time* is unspecified. |
| ***uncertainty***  This field indicates the uncertainty of the reference time information provided by the time field. The uncertainty is 25ns multiplied by this field*.* If this field is absent, the uncertainty is unspecified. |

|  |  |
| --- | --- |
| Conditional Presence | Explanation |
| *RefTime* | The field is mandatory present if *referenceTimeInfo* is included in *DLInformationTransfer* message; otherwise the field is absent. |

#### – *RejectWaitTime*

The IE *RejectWaitTime* is used to provide the value in seconds for timer T302.

*RejectWaitTime* information element

-- ASN1START

-- TAG-REJECTWAITTIME-START

RejectWaitTime ::= INTEGER (1..16)

-- TAG-REJECTWAITTIME-STOP

-- ASN1STOP

#### – *RepetitionSchemeConfig*

The IE *RepetitionSchemeConfig* is used to configure the UE with repetition schemes as specified in TS 38.214 [19] clause 5.1.

*RepetitionSchemeConfig* information element

-- ASN1START

-- TAG-REPETITIONSCHEMECONFIG-START

RepetitionSchemeConfig-r16 ::= CHOICE {

fdm-TDM-r16 SetupRelease { FDM-TDM-r16 },

slotBased-r16 SetupRelease { SlotBased-r16 }

}

RepetitionSchemeConfig-v1630 ::= SEQUENCE {

slotBased-v1630 SetupRelease { SlotBased-v1630 }

}

FDM-TDM-r16 ::= SEQUENCE {

repetitionScheme-r16 ENUMERATED {fdmSchemeA, fdmSchemeB,tdmSchemeA },

startingSymbolOffsetK-r16 INTEGER (0..7) OPTIONAL -- Need R

}

SlotBased-r16 ::= SEQUENCE {

tciMapping-r16 ENUMERATED {cyclicMapping, sequentialMapping},

sequenceOffsetForRV-r16 INTEGER (1..3)

}

SlotBased-v1630 ::= SEQUENCE {

tciMapping-r16 ENUMERATED {cyclicMapping, sequentialMapping},

sequenceOffsetForRV-r16 INTEGER (0)

}

-- TAG-REPETITIONSCHEMECONFIG-STOP

-- ASN1STOP

|  |
| --- |
| *RepetitionSchemeConfig* field descriptions |
| ***fdm-TDM***  Configures UE with a repetition scheme among fdmSchemeA, fdmSchemeB and tdmSchemeA as specified in clause 5.1 of TS 38.214 [19]. The network does not set this field to *release*. Upon reception of this field in *RepetitionSchemeConfig-r16*, the UE shall release *slotBased* if previously configured in the same instance of *RepetitionSchemeConfig-r16*. |
| ***sequenceOffsetForRV***  For slot-based repetition scheme, selected RV sequence is applied to transmission occasions associated to the first TCI state. The RV sequence associated to the second TCI state is determined by a RV offset from that selected RV sequence. |
| ***slotBased***  Configures UE with slot-based repetition scheme. Network always configures this field when the parameter *repetitionNumber* is present in IE *PDSCH-TimeDomainResourceAllocationList.* The network does not set this field to *release*. Upon reception of this field in *RepetitionSchemeConfig-r16*, the UE shall release *fdm-TDM* if previously configured in the same instance of *RepetitionSchemeConfig-r16*. |
| ***startingSymbolOffsetK***  The starting symbol of the second transmission occasion has K symbol offset relative to the last symbol of the first transmission occasion. When UE is configured with *tdmSchemeA,* the parameter *startingSymbolOffsetK* is present, otherwise absent. |
| ***tciMapping***  Enables TCI state mapping method to PDSCH transmission occasions. |

#### – *ReportConfigId*

The IE *ReportConfigId* is used to identify a measurement reporting configuration.

*ReportConfigId* information element

-- ASN1START

-- TAG-REPORTCONFIGID-START

ReportConfigId ::= INTEGER (1..maxReportConfigId)

-- TAG-REPORTCONFIGID-STOP

-- ASN1STOP

#### *– ReportConfigInterRAT*

The IE *ReportConfigInterRAT* specifies criteria for triggering of an inter-RAT measurement reporting event, or an L2 U2N relay measurement reporting event. The inter-RAT measurement reporting events for E-UTRA and UTRA-FDD are labelled B*N* with *N* equal to 1, 2 and so on. The measurement reporting events for L2 U2N relay UE are labelled Y*N* with *N* equal to 1, 2 and so on.

Event B1: Neighbour becomes better than absolute threshold;

Event B2: PCell becomes worse than absolute threshold1 AND Neighbour becomes better than another absolute threshold2;

Event Y1: PCell becomes worse than absolute threshold1 AND candidate L2 U2N Relay UE becomes better than another absolute threshold2;

Event Y2: Candidate L2 U2N Relay UE becomes better than absolute threshold;

*ReportConfigInterRAT* information element

-- ASN1START

-- TAG-REPORTCONFIGINTERRAT-START

ReportConfigInterRAT ::= SEQUENCE {

reportType CHOICE {

periodical PeriodicalReportConfigInterRAT,

eventTriggered EventTriggerConfigInterRAT,

reportCGI ReportCGI-EUTRA,

...,

reportSFTD ReportSFTD-EUTRA

}

}

ReportCGI-EUTRA ::= SEQUENCE {

cellForWhichToReportCGI EUTRA-PhysCellId,

...,

[[

useAutonomousGaps-r16 ENUMERATED {setup} OPTIONAL -- Need R

]]

}

ReportSFTD-EUTRA ::= SEQUENCE {

reportSFTD-Meas BOOLEAN,

reportRSRP BOOLEAN,

...

}

EventTriggerConfigInterRAT ::= SEQUENCE {

eventId CHOICE {

eventB1 SEQUENCE {

b1-ThresholdEUTRA MeasTriggerQuantityEUTRA,

reportOnLeave BOOLEAN,

hysteresis Hysteresis,

timeToTrigger TimeToTrigger,

...

},

eventB2 SEQUENCE {

b2-Threshold1 MeasTriggerQuantity,

b2-Threshold2EUTRA MeasTriggerQuantityEUTRA,

reportOnLeave BOOLEAN,

hysteresis Hysteresis,

timeToTrigger TimeToTrigger,

...

},

...,

[[

eventB1-UTRA-FDD-r16 SEQUENCE {

b1-ThresholdUTRA-FDD-r16 MeasTriggerQuantityUTRA-FDD-r16,

reportOnLeave-r16 BOOLEAN,

hysteresis-r16 Hysteresis,

timeToTrigger-r16 TimeToTrigger,

...

},

eventB2-UTRA-FDD-r16 SEQUENCE {

b2-Threshold1-r16 MeasTriggerQuantity,

b2-Threshold2UTRA-FDD-r16 MeasTriggerQuantityUTRA-FDD-r16,

reportOnLeave-r16 BOOLEAN,

hysteresis-r16 Hysteresis,

timeToTrigger-r16 TimeToTrigger,

...

}

]],

[[

eventY1-Relay-r17 SEQUENCE {

y1-Threshold1-r17 MeasTriggerQuantity,

y1-Threshold2-Relay-r17 SL-MeasTriggerQuantity-r16,

reportOnLeave-r17 BOOLEAN,

hysteresis-r17 Hysteresis,

timeToTrigger-r17 TimeToTrigger,

...

},

eventY2-Relay-r17 SEQUENCE {

y2-Threshold-Relay-r17 SL-MeasTriggerQuantity-r16,

reportOnLeave-r17 BOOLEAN,

hysteresis-r17 Hysteresis,

timeToTrigger-r17 TimeToTrigger,

...

}

]]

},

rsType NR-RS-Type,

reportInterval ReportInterval,

reportAmount ENUMERATED {r1, r2, r4, r8, r16, r32, r64, infinity},

reportQuantity MeasReportQuantity,

maxReportCells INTEGER (1..maxCellReport),

...,

[[

reportQuantityUTRA-FDD-r16 MeasReportQuantityUTRA-FDD-r16 OPTIONAL -- Need R

]],

[[

includeCommonLocationInfo-r16 ENUMERATED {true} OPTIONAL, -- Need R

includeBT-Meas-r16 SetupRelease {BT-NameList-r16} OPTIONAL, -- Need M

includeWLAN-Meas-r16 SetupRelease {WLAN-NameList-r16} OPTIONAL, -- Need M

includeSensor-Meas-r16 SetupRelease {Sensor-NameList-r16} OPTIONAL -- Need M

]],

[[

reportQuantityRelay-r17 SL-MeasReportQuantity-r16 OPTIONAL -- Need R

]]}

PeriodicalReportConfigInterRAT ::= SEQUENCE {

reportInterval ReportInterval,

reportAmount ENUMERATED {r1, r2, r4, r8, r16, r32, r64, infinity},

reportQuantity MeasReportQuantity,

maxReportCells INTEGER (1..maxCellReport),

...,

[[

reportQuantityUTRA-FDD-r16 MeasReportQuantityUTRA-FDD-r16 OPTIONAL -- Need R

]],

[[

includeCommonLocationInfo-r16 ENUMERATED {true} OPTIONAL, -- Need R

includeBT-Meas-r16 SetupRelease {BT-NameList-r16} OPTIONAL, -- Need M

includeWLAN-Meas-r16 SetupRelease {WLAN-NameList-r16} OPTIONAL, -- Need M

includeSensor-Meas-r16 SetupRelease {Sensor-NameList-r16} OPTIONAL -- Need M

]],

[[

reportQuantityRelay-r17 SL-MeasReportQuantity-r16 OPTIONAL -- Need R

]]

}

MeasTriggerQuantityUTRA-FDD-r16 ::= CHOICE{

utra-FDD-RSCP-r16 INTEGER (-5..91),

utra-FDD-EcN0-r16 INTEGER (0..49)

}

MeasReportQuantityUTRA-FDD-r16 ::= SEQUENCE {

cpich-RSCP BOOLEAN,

cpich-EcN0 BOOLEAN

}

-- TAG-REPORTCONFIGINTERRAT-STOP

-- ASN1STOP

|  |
| --- |
| *ReportConfigInterRAT field descriptions* |
| ***reportType***  Type of the configured measurement report. In (NG)EN-DC, and NR-DC, network does not configure report of type *ReportCGI-EUTRA* for SCG. |

|  |
| --- |
| *ReportCGI-EUTRA field descriptions* |
| ***useAutonomousGaps***  Indicates whether or not the UE is allowed to use autonomous gaps in acquiring system information from the E-UTRAN neighbour cell. When the field is included, the UE applies the corresponding value for T321. |

|  |
| --- |
| *EventTriggerConfigInterRAT* field descriptions |
| ***b2-Threshold1***  NR threshold to be used in inter RAT measurement report triggering condition for event B2. |
| ***bN-ThresholdEUTRA***  E-UTRA threshold value associated with the selected trigger quantity (RSRP, RSRQ, SINR) to be used in inter RAT measurement report triggering condition for event number bN. In the same *eventB2*, the network configures the same CHOICE name (*rsrp*, *rsrq* or *sinr*) for the *MeasTriggerQuantity* of the *b2-Threshold1* and for the *MeasTriggerQuantityEUTRA* of the *b2-Threshold2EUTRA*. |
| ***eventId***  Choice of inter RAT event triggered reporting criteria. |
| ***maxReportCells***  Max number of non-serving cells/candidate L2 U2N Relay UEs to include in the measurement report. |
| ***reportAmount***  *Number* of measurement reports applicable for *eventTriggered* as well as for *periodical* report types |
| ***reportOnLeave***  Indicates whether or not the UE shall initiate the measurement reporting procedure when the leaving condition is met for a cell in *cellsTriggeredList*, as specified in 5.5.4.1. |
| ***reportQuantity, reportQuantityUTRA-FDD***  The cell measurement quantities to be included in the measurement report. If the field *eventB1-UTRA-FDD* or *eventB2-UTRA-FDD* is present, the UE shall ignore the value(s) provided in *reportQuantity*. |
| ***reportQuantityRelay***  The L2 U2N Relay UE measurement quantity to be included in measuremet report. |
| ***timeToTrigger***  Time during which specific criteria for the event needs to be met in order to trigger a measurement report. |
| ***bN-ThresholdUTRA-FDD***  UTRA-FDD threshold value associated with the selected trigger quantity (RSCP, EcN0) to be used in inter RAT measurement report triggering condition for event number bN.  *utra-FDD-RSCP* corresponds to CPICH\_RSCP in TS 25.133 [46] for FDD. *utra-FDD-EcN0* corresponds to CPICH\_Ec/No in TS 25.133 [46] for FDD.  For *utra-FDD-RSCP*: The actual value is field value – 115 dBm.  For *utra-FDD-EcN0*: The actual value is (field value – 49)/2 dB. |
| ***y1-Threshold1***  NR threshold to be used in measurement report triggering condition for event Y1. |
| ***yN-Threshold2-Relay***  L2 U2N Relay threshold value associated with the selected trigger quantity (i.e. RSRP) to be used in measurement report triggering condition for event number YN. |

|  |
| --- |
| *PeriodicalReportConfigInterRAT* field descriptions |
| ***maxReportCells***  Max number of non-serving cells/candidate L2 U2N Relay UEs to include in the measurement report. |
| ***reportAmount***  Number of measurement reports applicable for *eventTriggered* as well as for *periodical* report types |
| ***reportQuantity, reportQuantityUTRA-FDD***  The cell measurement quantities to be included in the measurement report. If the field *reportQuantityUTRA-FDD* is present, the UE shall ignore the value(s) provided in *reportQuantity*. |

#### – *ReportConfigNR*

The IE *ReportConfigNR* specifies criteria for triggering of an NR measurement reporting event or of a CHO, CPA or CPC event or of an L2 U2N relay measurement reporting event. For events labelled AN with N equal to 1, 2 and so on, measurement reporting events and CHO, CPA or CPC events are based on cell measurement results, which can either be derived based on SS/PBCH block or CSI-RS.

Event A1: Serving becomes better than absolute threshold;

Event A2: Serving becomes worse than absolute threshold;

Event A3: Neighbour becomes amount of offset better than PCell/PSCell;

Event A4: Neighbour becomes better than absolute threshold;

Event A5: PCell/PSCell becomes worse than absolute threshold1 AND Neighbour/SCell becomes better than another absolute threshold2;

Event A6: Neighbour becomes amount of offset better than SCell;

Event D1: Distance between UE and a reference location *referenceLocation1* becomes larger than configured threshold *distanceThreshFromReference1* and distance between UE and a reference location *referenceLocation2* becomes shorter than configured threshold *distanceThreshFromReference2*;

CondEvent A3: Conditional reconfiguration candidate becomes amount of offset better than PCell/PSCell;

CondEvent A4: Conditional reconfiguration candidate becomes better than absolute threshold;

CondEvent A5: PCell/PSCell becomes worse than absolute threshold1 AND Conditional reconfiguration candidate becomes better than another absolute threshold2;

CondEvent D1: Distance between UE and a reference location *referenceLocation1* becomes larger than configured threshold *distanceThreshFromReference1* and distance between UE and a reference location *referenceLocation2* of conditional reconfiguration candidate becomes shorter than configured threshold *distanceThreshFromReference2*;

CondEvent T1: Time measured at UE becomes more than configured threshold *t1-Threshold* but is less than *t1-Threshold + duration*;

Event X1: Serving L2 U2N Relay UE becomes worse than absolute threshold1 AND NR Cell becomes better than another absolute threshold2;

Event X2: Serving L2 U2N Relay UE becomes worse than absolute threshold;

For event I1, measurement reporting event is based on CLI measurement results, which can either be derived based on SRS-RSRP or CLI-RSSI.

Event I1: Interference becomes higher than absolute threshold.

*ReportConfigNR* information element

-- ASN1START

-- TAG-REPORTCONFIGNR-START

ReportConfigNR ::= SEQUENCE {

reportType CHOICE {

periodical PeriodicalReportConfig,

eventTriggered EventTriggerConfig,

...,

reportCGI ReportCGI,

reportSFTD ReportSFTD-NR,

condTriggerConfig-r16 CondTriggerConfig-r16,

cli-Periodical-r16 CLI-PeriodicalReportConfig-r16,

cli-EventTriggered-r16 CLI-EventTriggerConfig-r16,

rxTxPeriodical-r17 RxTxPeriodical-r17

}

}

ReportCGI ::= SEQUENCE {

cellForWhichToReportCGI PhysCellId,

...,

[[

useAutonomousGaps-r16 ENUMERATED {setup} OPTIONAL -- Need R

]]

}

ReportSFTD-NR ::= SEQUENCE {

reportSFTD-Meas BOOLEAN,

reportRSRP BOOLEAN,

...,

[[

reportSFTD-NeighMeas ENUMERATED {true} OPTIONAL, -- Need R

drx-SFTD-NeighMeas ENUMERATED {true} OPTIONAL, -- Need R

cellsForWhichToReportSFTD SEQUENCE (SIZE (1..maxCellSFTD)) OF PhysCellId OPTIONAL -- Need R

]]

}

CondTriggerConfig-r16 ::= SEQUENCE {

condEventId CHOICE {

condEventA3 SEQUENCE {

a3-Offset MeasTriggerQuantityOffset,

hysteresis Hysteresis,

timeToTrigger TimeToTrigger

},

condEventA5 SEQUENCE {

a5-Threshold1 MeasTriggerQuantity,

a5-Threshold2 MeasTriggerQuantity,

hysteresis Hysteresis,

timeToTrigger TimeToTrigger

},

...,

condEventA4-r17 SEQUENCE {

a4-Threshold-r17 MeasTriggerQuantity,

hysteresis-r17 Hysteresis,

timeToTrigger-r17 TimeToTrigger

},

condEventD1-r17 SEQUENCE {

distanceThreshFromReference1-r17 INTEGER(0.. 65525),

distanceThreshFromReference2-r17 INTEGER(0.. 65525),

referenceLocation1-r17 ReferenceLocation-r17,

referenceLocation2-r17 ReferenceLocation-r17,

hysteresis-r17 HysteresisLocation-r17,

timeToTrigger-r17 TimeToTrigger

},

condEventT1-r17 SEQUENCE {

t1-Threshold-r17 INTEGER (0..549755813887),

duration-r17 INTEGER (1..6000)

}

},

rsType-r16 NR-RS-Type,

...

}

EventTriggerConfig::= SEQUENCE {

eventId CHOICE {

eventA1 SEQUENCE {

a1-Threshold MeasTriggerQuantity,

reportOnLeave BOOLEAN,

hysteresis Hysteresis,

timeToTrigger TimeToTrigger

},

eventA2 SEQUENCE {

a2-Threshold MeasTriggerQuantity,

reportOnLeave BOOLEAN,

hysteresis Hysteresis,

timeToTrigger TimeToTrigger

},

eventA3 SEQUENCE {

a3-Offset MeasTriggerQuantityOffset,

reportOnLeave BOOLEAN,

hysteresis Hysteresis,

timeToTrigger TimeToTrigger,

useAllowedCellList BOOLEAN

},

eventA4 SEQUENCE {

a4-Threshold MeasTriggerQuantity,

reportOnLeave BOOLEAN,

hysteresis Hysteresis,

timeToTrigger TimeToTrigger,

useAllowedCellList BOOLEAN

},

eventA5 SEQUENCE {

a5-Threshold1 MeasTriggerQuantity,

a5-Threshold2 MeasTriggerQuantity,

reportOnLeave BOOLEAN,

hysteresis Hysteresis,

timeToTrigger TimeToTrigger,

useAllowedCellList BOOLEAN

},

eventA6 SEQUENCE {

a6-Offset MeasTriggerQuantityOffset,

reportOnLeave BOOLEAN,

hysteresis Hysteresis,

timeToTrigger TimeToTrigger,

useAllowedCellList BOOLEAN

},

...,

[[

eventX1-r17 SEQUENCE {

x1-Threshold1-Relay-r17 SL-MeasTriggerQuantity-r16,

x1-Threshold2-r17 MeasTriggerQuantity,

reportOnLeave-r17 BOOLEAN,

hysteresis-r17 Hysteresis,

timeToTrigger-r17 TimeToTrigger,

useAllowedCellList-r17 BOOLEAN

},

eventX2-r17 SEQUENCE {

x2-Threshold-Relay-r17 SL-MeasTriggerQuantity-r16,

reportOnLeave-r17 BOOLEAN,

hysteresis-r17 Hysteresis,

timeToTrigger-r17 TimeToTrigger

},

eventD1-r17 SEQUENCE {

distanceThreshFromReference1-r17 INTEGER(1.. 65525),

distanceThreshFromReference2-r17 INTEGER(1.. 65525),

referenceLocation1-r17 ReferenceLocation-r17,

referenceLocation2-r17 ReferenceLocation-r17,

reportOnLeave-r17 BOOLEAN,

hysteresisLocation-r17 HysteresisLocation-r17,

timeToTrigger-r17 TimeToTrigger

}

]]

},

rsType NR-RS-Type,

reportInterval ReportInterval,

reportAmount ENUMERATED {r1, r2, r4, r8, r16, r32, r64, infinity},

reportQuantityCell MeasReportQuantity,

maxReportCells INTEGER (1..maxCellReport),

reportQuantityRS-Indexes MeasReportQuantity OPTIONAL, -- Need R

maxNrofRS-IndexesToReport INTEGER (1..maxNrofIndexesToReport) OPTIONAL, -- Need R

includeBeamMeasurements BOOLEAN,

reportAddNeighMeas ENUMERATED {setup} OPTIONAL, -- Need R

...,

[[

measRSSI-ReportConfig-r16 MeasRSSI-ReportConfig-r16 OPTIONAL, -- Need R

useT312-r16 BOOLEAN OPTIONAL, -- Need M

includeCommonLocationInfo-r16 ENUMERATED {true} OPTIONAL, -- Need R

includeBT-Meas-r16 SetupRelease {BT-NameList-r16} OPTIONAL, -- Need M

includeWLAN-Meas-r16 SetupRelease {WLAN-NameList-r16} OPTIONAL, -- Need M

includeSensor-Meas-r16 SetupRelease {Sensor-NameList-r16} OPTIONAL -- Need M

]],

[[

coarseLocationRequest-r17 ENUMERATED {true} OPTIONAL, -- Need R

reportQuantityRelay-r17 SL-MeasReportQuantity-r16 OPTIONAL -- Need R

]]

}

PeriodicalReportConfig ::= SEQUENCE {

rsType NR-RS-Type,

reportInterval ReportInterval,

reportAmount ENUMERATED {r1, r2, r4, r8, r16, r32, r64, infinity},

reportQuantityCell MeasReportQuantity,

maxReportCells INTEGER (1..maxCellReport),

reportQuantityRS-Indexes MeasReportQuantity OPTIONAL, -- Need R

maxNrofRS-IndexesToReport INTEGER (1..maxNrofIndexesToReport) OPTIONAL, -- Need R

includeBeamMeasurements BOOLEAN,

useAllowedCellList BOOLEAN,

...,

[[

measRSSI-ReportConfig-r16 MeasRSSI-ReportConfig-r16 OPTIONAL, -- Need R

includeCommonLocationInfo-r16 ENUMERATED {true} OPTIONAL, -- Need R

includeBT-Meas-r16 SetupRelease {BT-NameList-r16} OPTIONAL, -- Need M

includeWLAN-Meas-r16 SetupRelease {WLAN-NameList-r16} OPTIONAL, -- Need M

includeSensor-Meas-r16 SetupRelease {Sensor-NameList-r16} OPTIONAL, -- Need M

ul-DelayValueConfig-r16 SetupRelease { UL-DelayValueConfig-r16 } OPTIONAL, -- Need M

reportAddNeighMeas-r16 ENUMERATED {setup} OPTIONAL -- Need R

]],

[[

ul-ExcessDelayConfig-r17 SetupRelease { UL-ExcessDelayConfig-r17 } OPTIONAL, -- Need M

coarseLocationRequest-r17 ENUMERATED {true} OPTIONAL, -- Need R

reportQuantityRelay-r17 SL-MeasReportQuantity-r16 OPTIONAL -- Need R

]]

}

NR-RS-Type ::= ENUMERATED {ssb, csi-rs}

MeasTriggerQuantity ::= CHOICE {

rsrp RSRP-Range,

rsrq RSRQ-Range,

sinr SINR-Range

}

MeasTriggerQuantityOffset ::= CHOICE {

rsrp INTEGER (-30..30),

rsrq INTEGER (-30..30),

sinr INTEGER (-30..30)

}

MeasReportQuantity ::= SEQUENCE {

rsrp BOOLEAN,

rsrq BOOLEAN,

sinr BOOLEAN

}

MeasRSSI-ReportConfig-r16 ::= SEQUENCE {

channelOccupancyThreshold-r16 RSSI-Range-r16 OPTIONAL -- Need R

}

CLI-EventTriggerConfig-r16 ::= SEQUENCE {

eventId-r16 CHOICE {

eventI1-r16 SEQUENCE {

i1-Threshold-r16 MeasTriggerQuantityCLI-r16,

reportOnLeave-r16 BOOLEAN,

hysteresis-r16 Hysteresis,

timeToTrigger-r16 TimeToTrigger

},

...

},

reportInterval-r16 ReportInterval,

reportAmount-r16 ENUMERATED {r1, r2, r4, r8, r16, r32, r64, infinity},

maxReportCLI-r16 INTEGER (1..maxCLI-Report-r16),

...

}

CLI-PeriodicalReportConfig-r16 ::= SEQUENCE {

reportInterval-r16 ReportInterval,

reportAmount-r16 ENUMERATED {r1, r2, r4, r8, r16, r32, r64, infinity},

reportQuantityCLI-r16 MeasReportQuantityCLI-r16,

maxReportCLI-r16 INTEGER (1..maxCLI-Report-r16),

...

}

RxTxPeriodical-r17 ::= SEQUENCE {

rxTxReportInterval-r17 RxTxReportInterval-r17 OPTIONAL, -- Need R

reportAmount-r17 ENUMERATED {r1, infinity, spare6, spare5, spare4, spare3, spare2, spare1},

...

}

RxTxReportInterval-r17 ::= ENUMERATED {ms80,ms120,ms160,ms240,ms320,ms480,ms640,ms1024,ms1280,ms2048,ms2560,ms5120,spare4,spare3,spare2,spare1}

MeasTriggerQuantityCLI-r16 ::= CHOICE {

srs-RSRP-r16 SRS-RSRP-Range-r16,

cli-RSSI-r16 CLI-RSSI-Range-r16

}

MeasReportQuantityCLI-r16 ::= ENUMERATED {srs-rsrp, cli-rssi}

-- TAG-REPORTCONFIGNR-STOP

-- ASN1STOP

|  |
| --- |
| *CondTriggerConfig* field descriptions |
| ***a3-Offset***  Offset value(s) to be used in NR conditional reconfiguration triggering condition for cond event a3. The actual value is field value \* 0.5 dB. |
| ***a4-Threshold***  Threshold value associated to the selected trigger quantity (e.g. RSRP, RSRQ, SINR) per RS Type (e.g. SS/PBCH block, CSI-RS) to be used in NR conditional reconfiguration triggering condition for cond event a4. |
| ***a5-Threshold1/ a5-Threshold2***  Threshold value associated to the selected trigger quantity (e.g. RSRP, RSRQ, SINR) per RS Type (e.g. SS/PBCH block, CSI-RS) to be used in NR conditional reconfiguration triggering condition for cond event a5. In the same *condeventA5*, the network configures the same quantity for the *MeasTriggerQuantity* of the *a5-Threshold1* and for the *MeasTriggerQuantity* of the *a5-Threshold2*. |
| ***condEventId***  Choice of NR conditional reconfiguration event triggered criteria. |
| ***duration***  This field is used for defining the leaving condition T1-2 for conditional HO event *condEventT1*. Each step represents 100ms. |
| ***t1-Threshold***  The field counts the number of UTC seconds in 10 ms units since 00:00:00 on Gregorian calendar date 1 January, 1900 (midnight between Sunday, December 31, 1899 and Monday, January 1, 1900). |
| ***timeToTrigger***  Time during which specific criteria for the event needs to be met in order to execute the conditional reconfiguration evaluation. |

|  |
| --- |
| *ReportConfigNR* field descriptions |
| ***reportType***  Type of the configured measurement report. In MR-DC, network does not configure report of type *reportCGI* using SRB3. The *condTriggerConfig is* used for CHO, CPA or CPC configuration. |

|  |
| --- |
| *ReportCGI* field descriptions |
| ***useAutonomousGaps***  Indicates whether or not the UE is allowed to use autonomous gaps in acquiring system information from the NR neighbour cell. When the field is included, the UE applies the corresponding value for T321. |

|  |
| --- |
| *EventTriggerConfig* field descriptions |
| ***a3-Offset/a6-Offset***  Offset value(s) to be used in NR measurement report triggering condition for event a3/a6. The actual value is field value \* 0.5 dB. |
| ***aN-ThresholdM***  Threshold value associated to the selected trigger quantity (e.g. RSRP, RSRQ, SINR) per RS Type (e.g. SS/PBCH block, CSI-RS) to be used in NR measurement report triggering condition for event number aN. If multiple thresholds are defined for event number aN, the thresholds are differentiated by M. The network configures aN-Threshold1 only for events A1, A2, A4, A5 and a5-Threshold2 only for event A5. In the same *eventA5*, the network configures the same quantity for the *MeasTriggerQuantity* of the *a5-Threshold1* and for the *MeasTriggerQuantity* of the *a5-Threshold2*. |
| ***channelOccupancyThreshold***  RSSI threshold which is used for channel occupancy evaluation. |
| ***coarseLocationRequest***  This field is used to request UE to report coarse location information. |
| ***distanceThreshFromReference1, distanceThreshFromReference2***  Distance from a reference location configured with *referenceLocation1* or *referenceLocation2.* Each step represents 50m. |
| ***eventId***  Choice of NR event triggered reporting criteria. |
| ***maxNrofRS-IndexesToReport***  Max number of RS indexes to include in the measurement report for A1-A6 events. |
| ***maxReportCells***  Max number of non-serving cells to include in the measurement report. |
| ***referenceLocation1, referenceLocation2***  Reference locations used for location based event. The *referenceLocation1* is associated to serving cell and *referenceLocation2* is associated to candidate target cell. |
| ***reportAddNeighMeas***  Indicates that the UE shall include the best neighbour cells per serving frequency. |
| ***reportAmount***  *Number* of measurement reports applicable for *eventTriggered* as well as for *periodical* report types. |
| ***reportOnLeave***  Indicates whether or not the UE shall initiate the measurement reporting procedure when the leaving condition is met for a cell in *cellsTriggeredList*, as specified in 5.5.4.1.  Indicates whether or not the UE shall initiate the measurement reporting procedure when the leaving condition is met if configured in *eventD1*, as specified in 5.5.4.1. |
| ***reportQuantityCell***  The cell measurement quantities to be included in the measurement report. |
| ***reportQuantityRS-Indexes***  Indicates which measurement information per RS index the UE shall include in the measurement report. |
| ***timeToTrigger***  Time during which specific criteria for the event needs to be met in order to trigger a measurement report. |
| ***useAllowedCellList***  Indicates whether only the cells included in the allow-list of the associated measObject are applicable as specified in 5.5.4.1. |
| ***useT312***  If value *TRUE* is configured, the UE shall use the timer T312 with the value *t312* as specified in the corresponding *measObjectNR*. If value FALSE is configured, the timer T312 is considered as disabled. Network configures value *TRUE* only if *reportType* is set to *eventTriggered*. |
| ***xN-ThresholdM***  Threshold value associated to the selected trigger quantity (e.g. RSRP, RSRQ, SINR) per RS Type (e.g. SS/PBCH block, CSI-RS) to be used in NR measurement report triggering condition for event xN. If multiple thresholds are defined for event number xN, the thresholds are differentiated by M. x1-Threshold1 and x2-Threshold indicates the threshold value for the serving L2 U2N Relay UE, x1-Threshold2 indicates the threshold value for the NR Cells. |

|  |
| --- |
| *CLI-EventTriggerConfig* field descriptions |
| ***i1-Threshold***  Threshold value associated to the selected trigger quantity (e.g. SRS-RSRP, CLI-RSSI) to be used in CLI measurement report triggering condition for event i1. |
| ***eventId***  Choice of CLI event triggered reporting criteria. |
| ***maxReportCLI***  Max number of CLI measurement resource to include in the measurement report. |
| ***reportAmount***  *Number* of measurement reports. |
| ***reportOnLeave***  Indicates whether or not the UE shall initiate the measurement reporting procedure when the leaving condition is met for a CLI measurement resource in *srsTriggeredList* or *rssiTriggeredList*, as specified in 5.5.4.1. |
| ***timeToTrigger***  Time during which specific criteria for the event needs to be met in order to trigger a measurement report. |

|  |
| --- |
| *CLI-PeriodicalReportConfig* field descriptions |
| ***maxReportCLI***  Max number of CLI measurement resource to include in the measurement report. |
| ***reportAmount***  *Number* of measurement reports. |
| ***reportQuantityCLI***  The CLI measurement quantities to be included in the measurement report. |

|  |
| --- |
| *PeriodicalReportConfig* field descriptions |
| ***coarseLocationRequest***  This field is used to request UE to report coarse location information. |
| ***maxNrofRS-IndexesToReport***  Max number of RS indexes to include in the measurement report. |
| ***maxReportCells***  Max number of non-serving cells to include in the measurement report. |
| ***reportAddNeighMeas***  Indicates that the UE shall include the best neighbour cells per serving frequency. |
| ***reportAmount***  *Number* of measurement reports applicable for *eventTriggered* as well as for *periodical* report types |
| ***reportQuantityCell***  The cell measurement quantities to be included in the measurement report. |
| ***reportQuantityRS-Indexes***  Indicates which measurement information per RS index the UE shall include in the measurement report. |
| ***ul-DelayValueConfig***  If the field is present, the UE shall perform the actual UL PDCP Packet Average Delay measurement per DRB as specified in TS 38.314 [53] and the UE shall ignore the fields *reportQuantityCell* and *maxReportCells*. The applicable values for the corresponding *reportInterval* are (one of the) {ms120, ms240, ms480, ms640, ms1024, ms2048, ms5120, ms10240, ms20480, ms40960, min1,min6, min12, min30}. The *reportInterval* indicates the periodicity for performing and reporting of UL PDCP Packet Average Delay per DRB measurement as specified in TS 38.314 [53]. |
| ***ul-ExcessDelayConfig***  If the field is present, the UE shall perform the actual UL PDCP Excess Packet Delay per DRB measurement as specified in TS 38.314 [53] and the UE shall ignore the fields *reportQuantityCell* and *maxReportCells*. The applicable values for the corresponding *reportInterval* are (one of the) {ms120, ms240, ms480, ms640, ms1024, ms2048, ms5120, ms10240, ms20480, ms40960, min1,min6, min12, min30}. The *reportInterval* indicates the periodicity for performing and reporting of UL PDCP Excess Packet Delay per DRB measurement as specified in TS 38.314 [53]. |
| ***useAllowedCellList***  Indicates whether only the cells included in the allow-list of the associated measObject are applicable as specified in 5.5.4.1. |

|  |
| --- |
| *ReportSFTD-NR* field descriptions |
| ***cellForWhichToReportSFTD***  Indicates the target NR neighbour cells for SFTD measurement between PCell and NR neighbour cells. |
| ***drx-SFTD-NeighMeas***  Indicates that the UE shall use available idle periods (i.e. DRX off periods) for the SFTD measurement in NR standalone. The network only includes *drx-SFTD-NeighMeas* field when *reprtSFTD-NeighMeas* is set to true. |
| ***reportSFTD-Meas***  Indicates whether UE is required to perform SFTD measurement between PCell and NR PSCell in NR-DC. |
| ***reportSFTD-NeighMeas***  Indicates whether UE is required to perform SFTD measurement between PCell and NR neighbour cells in NR standalone. The network does not include this field if *reportSFTD-Meas* is set to *true*. |
| ***reportRSRP***  Indicates whether UE is required to include RSRP result of NR PSCell or NR neighbour cells in SFTD measurement result, derived based on SSB. If it is set to true, the network should ensure that *ssb-ConfigMobility* is included in the measurement object for NR PSCell or NR neighbour cells. |

|  |
| --- |
| *RxTxPeriodical field descriptions* |
| ***reportAmount***  This field indicates the number of UE Rx-Tx time difference measurement reports. If configured to *r1,* the network does not configure *rxTxReportInterval* and only one measurement is reported. If configured to *infinity*, UE periodically reports measurements according to the periodicity configured by *rxTxReportInterval*. |
| ***rxTxReportInterval***  This field indicates the measurement reporting periodicity of UE Rx-Tx time difference. |

|  |
| --- |
| otherfield descriptions |
| ***MeasTriggerQuantity***  SINR is applicable only for CONNECTED mode events. |

#### – *ReportConfigNR-SL*

The IE *ReportConfigNR-SL* specifies criteria for triggering of a CBR measurement reporting event for NR sidelink communication. Measurement reporting events are based on CBR measurement results on the corresponding transmission resource pools. These events are labelled CN with N equal to 1 and 2.

Event C1: CBR of NR sidelink communication becomes better than absolute threshold;

Event C2: CBR of NR sidelink communication becomes worse than absolute threshold;

*ReportConfigNR-SL* information element

-- ASN1START

-- TAG-REPORTCONFIGNR-SL-START

ReportConfigNR-SL-r16 ::= SEQUENCE {

reportType-r16 CHOICE {

periodical-r16 PeriodicalReportConfigNR-SL-r16,

eventTriggered-r16 EventTriggerConfigNR-SL-r16

}

}

EventTriggerConfigNR-SL-r16::= SEQUENCE {

eventId-r16 CHOICE {

eventC1 SEQUENCE {

c1-Threshold-r16 SL-CBR-r16,

hysteresis-r16 Hysteresis,

timeToTrigger-r16 TimeToTrigger

},

eventC2-r16 SEQUENCE {

c2-Threshold-r16 SL-CBR-r16,

hysteresis-r16 Hysteresis,

timeToTrigger-r16 TimeToTrigger

},

...

},

reportInterval-r16 ReportInterval,

reportAmount-r16 ENUMERATED {r1, r2, r4, r8, r16, r32, r64, infinity},

reportQuantity-r16 MeasReportQuantity-r16,

...

}

PeriodicalReportConfigNR-SL-r16 ::= SEQUENCE {

reportInterval-r16 ReportInterval,

reportAmount-r16 ENUMERATED {r1, r2, r4, r8, r16, r32, r64, infinity},

reportQuantity-r16 MeasReportQuantity-r16,

...

}

MeasReportQuantity-r16 ::= SEQUENCE {

cbr-r16 BOOLEAN,

...

}

-- TAG-REPORTCONFIGNR-SL-STOP

-- ASN1STOP

|  |
| --- |
| *ReportConfigNR-SL* field descriptions |
| ***reportType***  Type of the configured CBR measurement report for NR sidelink communication. |

|  |
| --- |
| *EventTriggerConfigNR-SL* field descriptions |
| ***cN-Threshold***  Threshold used for events C1 and C2 specified in clauses 5.5.4.11 and 5.5.4.12, respectively. |
| ***eventId***  Choice of NR event triggered reporting criteria. |
| ***reportAmoun***  Number of measurement reports applicable for *eventTriggered* as well as for *periodical* report types. |
| ***reportQuantity***  The sidelink measurement quantities to be included in the measurement report. In this release, this is set as the CBR measurement result. |
| ***timeToTrigger***  Time during which specific criteria for the event needs to be met in order to trigger a measurement report. |

|  |
| --- |
| *PeriodicalReportConfigNR-SL* field descriptions |
| ***reportAmount***  Number of measurement reports applicable for *eventTriggered* as well as for *periodical* report types. |
| ***reportQuantity***  The sidelink measurement quantities to be included in the measurement report. In this release, this is set as the CBR measurement result. |

#### – *ReportConfigToAddModList*

The IE *ReportConfigToAddModList* concerns a list of reporting configurations to add or modify.

ReportConfigToAddModList information element

-- ASN1START

-- TAG-REPORTCONFIGTOADDMODLIST-START

ReportConfigToAddModList ::= SEQUENCE (SIZE (1..maxReportConfigId)) OF ReportConfigToAddMod

ReportConfigToAddMod ::= SEQUENCE {

reportConfigId ReportConfigId,

reportConfig CHOICE {

reportConfigNR ReportConfigNR,

...,

reportConfigInterRAT ReportConfigInterRAT,

reportConfigNR-SL-r16 ReportConfigNR-SL-r16

}

}

-- TAG-REPORTCONFIGTOADDMODLIST-STOP

-- ASN1STOP

#### – *ReportInterval*

The IE *ReportInterval* indicates the interval between periodical reports. The *ReportInterval* is applicable if the UE performs periodical reporting (i.e. when *reportAmount* exceeds 1), for *triggerTypeevent* as well as for *triggerTypeperiodical*. Value *ms120* corresponds to 120 ms, value *ms240* corresponds to 240 ms and so on, while value *min1* corresponds to 1 min, *min6* corresponds to 6 min and so on.

*ReportInterval* information element

-- ASN1START

-- TAG-REPORTINTERVAL-START

ReportInterval ::= ENUMERATED {ms120, ms240, ms480, ms640, ms1024, ms2048, ms5120, ms10240, ms20480, ms40960,

min1,min6, min12, min30 }

-- TAG-REPORTINTERVAL-STOP

-- ASN1STOP

#### – *ReselectionThreshold*

The IE *ReselectionThreshold* is used to indicate an Rx level threshold for cell reselection. Actual value of threshold = field value \* 2 [dB].

*ReselectionThreshold* information element

-- ASN1START

-- TAG-RESELECTIONTHRESHOLD-START

ReselectionThreshold ::= INTEGER (0..31)

-- TAG-RESELECTIONTHRESHOLD-STOP

-- ASN1STOP

#### – *ReselectionThresholdQ*

The IE *ReselectionThresholdQ* is used to indicate a quality level threshold for cell reselection. Actual value of threshold = field value [dB].

*ReselectionThresholdQ* information element

-- ASN1START

-- TAG-RESELECTIONTHRESHOLDQ-START

ReselectionThresholdQ ::= INTEGER (0..31)

-- TAG-RESELECTIONTHRESHOLDQ-STOP

-- ASN1STOP

#### – *ResumeCause*

The IE *ResumeCause* is used to indicate the resume cause in *RRCResumeRequest* and *RRCResumeRequest1*.

*ResumeCause* information element

-- ASN1START

-- TAG-RESUMECAUSE-START

ResumeCause ::= ENUMERATED {emergency, highPriorityAccess, mt-Access, mo-Signalling,

mo-Data, mo-VoiceCall, mo-VideoCall, mo-SMS, rna-Update, mps-PriorityAccess,

mcs-PriorityAccess, spare1, spare2, spare3, spare4, spare5 }

-- TAG-RESUMECAUSE-STOP

-- ASN1STOP

#### – *RLC-BearerConfig*

The IE *RLC-BearerConfig* is used to configure an RLC entity, a corresponding logical channel in MAC and the linking to a PDCP entity (served radio bearer).

*RLC-BearerConfig* information element

-- ASN1START

-- TAG-RLC-BEARERCONFIG-START

RLC-BearerConfig ::= SEQUENCE {

logicalChannelIdentity LogicalChannelIdentity,

servedRadioBearer CHOICE {

srb-Identity SRB-Identity,

drb-Identity DRB-Identity

} OPTIONAL, -- Cond LCH-SetupOnly

reestablishRLC ENUMERATED {true} OPTIONAL, -- Need N

rlc-Config RLC-Config OPTIONAL, -- Cond LCH-Setup

mac-LogicalChannelConfig LogicalChannelConfig OPTIONAL, -- Cond LCH-Setup

...,

[[

rlc-Config-v1610 RLC-Config-v1610 OPTIONAL -- Need R

]],

[[

rlc-Config-v1700 RLC-Config-v1700 OPTIONAL, -- Need R

logicalChannelIdentityExt-r17 LogicalChannelIdentityExt-r17 OPTIONAL, -- Cond LCH-SetupModMRB

multicastRLC-BearerConfig-r17 MulticastRLC-BearerConfig-r17 OPTIONAL, -- Cond LCH-SetupOnlyMRB

servedRadioBearerSRB4-r17 SRB-Identity-v1700 OPTIONAL -- Need N

]]

}

MulticastRLC-BearerConfig-r17 ::= SEQUENCE {

servedMBS-RadioBearer-r17 MRB-Identity-r17,

isPTM-Entity-r17 ENUMERATED {true} OPTIONAL -- NEED S

}

LogicalChannelIdentityExt-r17 ::= INTEGER (320..65855)

-- TAG-RLC-BEARERCONFIG-STOP

-- ASN1STOP

|  |
| --- |
| *RLC-BearerConfig* field descriptions |
| ***isPTM-Entity***  If configured, indicates that the RLC entity is used for PTM reception. When the field is absent the RLC entity is used for PTP transmission/reception. |
| ***logicalChannelIdentity***  ID used commonly for the MAC logical channel and for the RLC bearer. Value 4 is not configured for DRBs if SRB4 is configured. |
| ***logicalChannelIdentityExt***  Extended logical channel ID used commonly for the MAC logical channel and for the RLC bearer for PTM reception. If this field is configured, the UE shall ignore *logicalChannelIdentity*. |
| ***reestablishRLC***  Indicates that RLC should be re-established. Network sets this to *true* at least whenever the security key used for the radio bearer associated with this RLC entity changes. For SRB2, multicast MRBs and DRBs, unless full configuration is used, it is also set to *true* during the resumption of the RRC connection or the first reconfiguration after reestablishment. For SRB1, when resuming an RRC connection, or at the first reconfiguration after RRC connection reestablishment, the network does not set this field to *true.* |
| ***rlc-Config***  Determines the RLC mode (UM, AM) and provides corresponding parameters. RLC mode reconfiguration can only be performed by DRB/multicast MRB release/addition or full configuration. The network may configure *rlc-Config-v1610* only when *rlc-Config* (without suffix) is set to *am*. |
| ***servedMBS-RadioBearer***  Associates the RLC Bearer with a multicast MRB. The UE shall deliver DL RLC SDUs received via the RLC entity of this RLC bearer to the PDCP entity of the *servedMBS-RadioBearer*. |
| ***servedRadioBearer, servedRadioBearerSRB4***  Associates the RLC Bearer with an SRB or a DRB. The UE shall deliver DL RLC SDUs received via the RLC entity of this RLC bearer to the PDCP entity of the *servedRadioBearer*. Furthermore, the UE shall advertise and deliver uplink PDCP PDUs of the uplink PDCP entity of the *servedRadioBearer* to the uplink RLC entity of this RLC bearer unless the uplink scheduling restrictions (*moreThanOneRLC* in *PDCP-Config* and the restrictions in *LogicalChannelConfig*) forbid it to do so. |

|  |  |
| --- | --- |
| Conditional Presence | Explanation |
| *LCH-Setup* | This field is mandatory present upon creation of a new logical channel for a DRB or a multicast MRB. This field is optionally present, Need S, upon creation of a new logical channel for an SRB. It is optionally present, Need M, otherwise. |
| *LCH-SetupModMRB* | This field is optionally present upon creation of a new logical channel for PTM reception for a multicast MRB. If this field is included upon creation of a new logical channel for PTM reception for a multicast MRB, it shall be present when modifying this logical channel. The field is absent for logical channels configured for an SRB and a DRB. |
| *LCH-SetupOnly* | This field is mandatory present upon creation of a new logical channel for a DRB or an SRB (*servedRadioBearer*). It is absent, Need M otherwise. |
| LCH-SetupOnlyMRB | This field is mandatory present upon creation of a new logical channel for a multicast MRB and upon modification of *MRB-Identity* of the served MRB. It is absent, Need M otherwise. |

#### – *RLC-Config*

The IE *RLC-Config* is used to specify the RLC configuration of SRBs, multicast MRBs and DRBs.

*RLC-Config* information element

-- ASN1START

-- TAG-RLC-CONFIG-START

RLC-Config ::= CHOICE {

am SEQUENCE {

ul-AM-RLC UL-AM-RLC,

dl-AM-RLC DL-AM-RLC

},

um-Bi-Directional SEQUENCE {

ul-UM-RLC UL-UM-RLC,

dl-UM-RLC DL-UM-RLC

},

um-Uni-Directional-UL SEQUENCE {

ul-UM-RLC UL-UM-RLC

},

um-Uni-Directional-DL SEQUENCE {

dl-UM-RLC DL-UM-RLC

},

...

}

UL-AM-RLC ::= SEQUENCE {

sn-FieldLength SN-FieldLengthAM OPTIONAL, -- Cond Reestab

t-PollRetransmit T-PollRetransmit,

pollPDU PollPDU,

pollByte PollByte,

maxRetxThreshold ENUMERATED { t1, t2, t3, t4, t6, t8, t16, t32 }

}

DL-AM-RLC ::= SEQUENCE {

sn-FieldLength SN-FieldLengthAM OPTIONAL, -- Cond Reestab

t-Reassembly T-Reassembly,

t-StatusProhibit T-StatusProhibit

}

UL-UM-RLC ::= SEQUENCE {

sn-FieldLength SN-FieldLengthUM OPTIONAL -- Cond Reestab

}

DL-UM-RLC ::= SEQUENCE {

sn-FieldLength SN-FieldLengthUM OPTIONAL, -- Cond Reestab

t-Reassembly T-Reassembly

}

T-PollRetransmit ::= ENUMERATED {

ms5, ms10, ms15, ms20, ms25, ms30, ms35,

ms40, ms45, ms50, ms55, ms60, ms65, ms70,

ms75, ms80, ms85, ms90, ms95, ms100, ms105,

ms110, ms115, ms120, ms125, ms130, ms135,

ms140, ms145, ms150, ms155, ms160, ms165,

ms170, ms175, ms180, ms185, ms190, ms195,

ms200, ms205, ms210, ms215, ms220, ms225,

ms230, ms235, ms240, ms245, ms250, ms300,

ms350, ms400, ms450, ms500, ms800, ms1000,

ms2000, ms4000, ms1-v1610, ms2-v1610, ms3-v1610,

ms4-v1610, spare1}

PollPDU ::= ENUMERATED {

p4, p8, p16, p32, p64, p128, p256, p512, p1024, p2048, p4096, p6144, p8192, p12288, p16384,p20480,

p24576, p28672, p32768, p40960, p49152, p57344, p65536, infinity, spare8, spare7, spare6, spare5, spare4,

spare3, spare2, spare1}

PollByte ::= ENUMERATED {

kB1, kB2, kB5, kB8, kB10, kB15, kB25, kB50, kB75,

kB100, kB125, kB250, kB375, kB500, kB750, kB1000,

kB1250, kB1500, kB2000, kB3000, kB4000, kB4500,

kB5000, kB5500, kB6000, kB6500, kB7000, kB7500,

mB8, mB9, mB10, mB11, mB12, mB13, mB14, mB15,

mB16, mB17, mB18, mB20, mB25, mB30, mB40, infinity,

spare20, spare19, spare18, spare17, spare16,

spare15, spare14, spare13, spare12, spare11,

spare10, spare9, spare8, spare7, spare6, spare5,

spare4, spare3, spare2, spare1}

T-Reassembly ::= ENUMERATED {

ms0, ms5, ms10, ms15, ms20, ms25, ms30, ms35,

ms40, ms45, ms50, ms55, ms60, ms65, ms70,

ms75, ms80, ms85, ms90, ms95, ms100, ms110,

ms120, ms130, ms140, ms150, ms160, ms170,

ms180, ms190, ms200, spare1}

T-StatusProhibit ::= ENUMERATED {

ms0, ms5, ms10, ms15, ms20, ms25, ms30, ms35,

ms40, ms45, ms50, ms55, ms60, ms65, ms70,

ms75, ms80, ms85, ms90, ms95, ms100, ms105,

ms110, ms115, ms120, ms125, ms130, ms135,

ms140, ms145, ms150, ms155, ms160, ms165,

ms170, ms175, ms180, ms185, ms190, ms195,

ms200, ms205, ms210, ms215, ms220, ms225,

ms230, ms235, ms240, ms245, ms250, ms300,

ms350, ms400, ms450, ms500, ms800, ms1000,

ms1200, ms1600, ms2000, ms2400, spare2, spare1}

SN-FieldLengthUM ::= ENUMERATED {size6, size12}

SN-FieldLengthAM ::= ENUMERATED {size12, size18}

RLC-Config-v1610 ::= SEQUENCE {

dl-AM-RLC-v1610 DL-AM-RLC-v1610

}

RLC-Config-v1700 ::= SEQUENCE {

dl-AM-RLC-v1700 DL-AM-RLC-v1700,

dl-UM-RLC-v1700 DL-UM-RLC-v1700

}

DL-AM-RLC-v1610 ::= SEQUENCE {

t-StatusProhibit-v1610 T-StatusProhibit-v1610 OPTIONAL, -- Need N

...

}

DL-AM-RLC-v1700 ::= SEQUENCE {

t-ReassemblyExt-r17 T-ReassemblyExt-r17 OPTIONAL -- Need N

}

DL-UM-RLC-v1700 ::= SEQUENCE {

t-ReassemblyExt-r17 T-ReassemblyExt-r17 OPTIONAL -- Need N

}

T-StatusProhibit-v1610 ::= ENUMERATED { ms1, ms2, ms3, ms4, spare4, spare3, spare2, spare1}

T-ReassemblyExt-r17 ::= ENUMERATED {ms210, ms220, ms340, ms350, ms550, ms1100, ms1650, ms2200}

-- TAG-RLC-CONFIG-STOP

-- ASN1STOP

| *RLC-Config* field descriptions |
| --- |
| ***maxRetxThreshold***  Parameter for RLC AM in TS 38.322 [4]. Value *t1* corresponds to 1 retransmission, value *t2* corresponds to 2 retransmissions and so on. |
| ***pollByte***  Parameter for RLC AM in TS 38.322 [4]. Value *kB25* corresponds to 25 kBytes, value *kB50* corresponds to 50 kBytes and so on. *infinity* corresponds to an infinite amount of kBytes. |
| ***pollPDU***  Parameter for RLC AM in TS 38.322 [4]. Value *p4* corresponds to 4 PDUs, value *p8* corresponds to 8 PDUs and so on. *infinity* corresponds to an infinite number of PDUs. |
| ***sn-FieldLength***  Indicates the RLC SN field size, see TS 38.322 [4], in bits. Value *size6* means 6 bits, value *size12* means 12 bits, value *size18* means 18 bits. The value of *sn-FieldLength* for a DRB/multicast MRB shall be changed only using reconfiguration with sync. The network configures only value *size12* in *SN-FieldLengthAM* for SRB. |
| ***t-PollRetransmit***  Timer for RLC AM in TS 38.322 [4], in milliseconds. Value *ms5* means 5 ms, value *ms10* means 10 ms and so on. |
| ***t-Reassembly, t-ReassemblyExt***  Timer for reassembly in TS 38.322 [4], in milliseconds. Value *ms0* means 0 ms, value *ms5* means 5 ms and so on. If *t-ReassemblyExt-r17* is configured, the UE shall ignore *t-Reassembly* (without suffix). |
| ***t-StatusProhibit***  Timer for status reporting in TS 38.322 [4], in milliseconds. Value *ms0* means 0 ms, value *ms5* means 5 ms and so on. If *t-StatusProhibit-v1610* is present, the UE shall ignore *t-StatusProhibit* (without suffix). |

|  |  |
| --- | --- |
| Conditional Presence | Explanation |
| *Reestab* | The field is mandatory present at bearer setup. It is optionally present, need M, at RLC re-establishment. Otherwise it is absent. Need M. |

#### – *RLF-TimersAndConstants*

The IE *RLF-TimersAndConstants* is used to configure UE specific timers and constants.

*RLF-TimersAndConstants* information element

-- ASN1START

-- TAG-RLF-TIMERSANDCONSTANTS-START

RLF-TimersAndConstants ::= SEQUENCE {

t310 ENUMERATED {ms0, ms50, ms100, ms200, ms500, ms1000, ms2000, ms4000, ms6000},

n310 ENUMERATED {n1, n2, n3, n4, n6, n8, n10, n20},

n311 ENUMERATED {n1, n2, n3, n4, n5, n6, n8, n10},

...,

[[

t311 ENUMERATED {ms1000, ms3000, ms5000, ms10000, ms15000, ms20000, ms30000}

]]

}

-- TAG-RLF-TIMERSANDCONSTANTS-STOP

-- ASN1STOP

| *RLF-TimersAndConstants* field descriptions |
| --- |
| ***n3xy***  Constants are described in clause 7.3. Value *n1* corresponds to 1, value *n2* corresponds to 2 and so on. |
| ***t3xy***  Timers are described in clause 7.1. Value *ms0* corresponds to 0 ms, value *ms50* corresponds to 50 ms and so on. |

#### – *RNTI-Value*

The IE *RNTI-Value* represents a Radio Network Temporary Identity.

*RNTI-Value* information element

-- ASN1START

-- TAG-RNTI-VALUE-START

RNTI-Value ::= INTEGER (0..65535)

-- TAG-RNTI-VALUE-STOP

-- ASN1STOP

#### – *RSRP-Range*

The IE *RSRP-Range* specifies the value range used in RSRP measurements and thresholds. For measurements, integer value for RSRP measurements is according to Table 10.1.6.1-1 in TS 38.133 [14]. For thresholds, the actual value is (IE value – 156) dBm, except for the IE value 127, in which case the actual value is infinity.

*RSRP-Range* information element

-- ASN1START

-- TAG-RSRP-RANGE-START

RSRP-Range ::= INTEGER(0..127)

-- TAG-RSRP-RANGE-STOP

-- ASN1STOP

#### – *RSRQ-Range*

The IE *RSRQ-Range* specifies the value range used in RSRQ measurements and thresholds. For measurements, integer value for RSRQ measurements is according to Table 10.1.11.1-1 in TS 38.133 [14]. For thresholds, the actual value is (IE value – 87) / 2 dB.

*RSRQ-Range* information element

-- ASN1START

-- TAG-RSRQ-RANGE-START

RSRQ-Range ::= INTEGER(0..127)

-- TAG-RSRQ-RANGE-STOP

-- ASN1STOP

#### – *RSSI-Range*

The IE *RSSI-Range* specifies the value range used in RSSI measurements and thresholds for NR operation with shared spectrum channel access. The integer value for RSSI measurements is according to Table 10.1.34.3-1 in TS 38.133 [14].

*RSSI-Range* information element

-- ASN1START

-- TAG-RSSI-RANGE-START

RSSI-Range-r16 ::= INTEGER(0..76)

-- TAG-RSSI-RANGE-STOP

-- ASN1STOP

#### – *RxTxTimeDiff*

The IE *RxTxTimeDiff* contains the Rx-Tx time difference measurement at either the UE or the gNB.

*RxTxTimeDiff* information element

-- ASN1START

-- TAG-RXTXTIMEDIFF-START

RxTxTimeDiff-r17 ::= SEQUENCE {

result-k5-r17 INTEGER (0..61565) OPTIONAL, -- Need N

...

}

-- TAG-RXTXTIMEDIFF-STOP

-- ASN1STOP

|  |
| --- |
| *RxTxTimeDiff field descriptions* |
| ***result-k5***  This field indicates the Rx-Tx time difference measurement, see TS 38.215 [9], clause 10.1.25.3.1 of 38.133 [14] for UE Rx-Tx time difference and clause 13.2.1 of 38.133 [14] for gNB Rx-Tx time difference. |

#### – *SCellActivationRS-Config*

The IE *SCellActivationRS-Config* is used to configure a Reference Signal for fast activation of the SCell where the IE is included (see TS 38.214 [19], clause 5.2.1.5.3. Usage of an *SCellActivationRS-Config* is indicated by including its *scellActivationRS-Id* in the Enhanced SCell activation MAC CE (see TS 38.321 [3] clause 6.1.3.55).

*SCellActivationRS-Config* information element

-- ASN1START

-- TAG-SCELLACTIVATIONRS-CONFIG-START

SCellActivationRS-Config-r17 ::= SEQUENCE {

scellActivationRS-Id-r17 SCellActivationRS-ConfigId-r17,

resourceSet-r17 NZP-CSI-RS-ResourceSetId,

gapBetweenBursts-r17 INTEGER (2..31) OPTIONAL, -- Need R

qcl-Info-r17 TCI-StateId,

...

}

-- TAG-SCELLACTIVATIONRS-CONFIG-STOP

-- ASN1STOP

|  |
| --- |
| *SCellActivationRS-Config* field descriptions |
| ***gapBetweenBursts***  When this field is present, there are two bursts and it indicates the gap between the two bursts in number of slots. When this field is absent, there is a single burst. |
| ***qcl-Info***  Reference to TCI-State for providing the QCL source and QCL type for each *NZP-CSI-RS-Resource* listed in *nzp-CSI-RS-Resources* of the *NZP-CSI-RS-ResourceSet* indicated by *resourceSet* (see TS 38.214 [19], clause 5.1.6.1.1.1). *TCI-StateId* refers to the *TCI-State* which has this value for *tci-StateId* and is defined in *tci-StatesToAddModList* in the *PDSCH-Config* included in the *BWP-Downlink* of this serving cell indicated by *firstActiveDownlinkBWP-Id* in the *ServingCellConfig* in which this IE is included. |
| ***resourceSet***  *nzp-CSI-ResourceSetId* of the *NZP-CSI-RS-ResourceSet* of this serving cell used as resource configuration for one or two bursts for SCell activation. This NZP-CSI-RS-ResourceSet consists of four NZP CSI-RS resources in two consecutive slots with two NZP CSI-RS resources in each slot (see TS 38.214 [19], clause 5.1.6.1.1.1). The CSI-RS associated with this NZP-CSI-RS-ResourceSet are located in the BWP addressed by firstActiveDownlinkBWP-Id. |

#### – *SCellActivationRS-ConfigId*

The IE *SCellActivationRS-ConfigId* is used to identify one *SCellActivationRS-Config*.

*SCellActivationRS-ConfigId* information element

-- ASN1START

-- TAG-SCELLACTIVATIONRS-CONFIGID-START

SCellActivationRS-ConfigId-r17 ::= INTEGER (1.. maxNrofSCellActRS-r17)

-- TAG-SCELLACTIVATIONRS-CONFIGID-STOP

-- ASN1STOP

#### – *SCellIndex*

The IE *SCellIndex* concerns a short identity, used to identify an SCell. The value range is shared across the Cell Groups.

*SCellIndex* information element

-- ASN1START

-- TAG-SCELLINDEX-START

SCellIndex ::= INTEGER (1..31)

-- TAG-SCELLINDEX-STOP

-- ASN1STOP

#### – *SchedulingRequestConfig*

The IE *SchedulingRequestConfig* is used to configure the parameters, for the dedicated scheduling request (SR) resources.

*SchedulingRequestConfig* information element

-- ASN1START

-- TAG-SCHEDULINGREQUESTCONFIG-START

SchedulingRequestConfig ::= SEQUENCE {

schedulingRequestToAddModList SEQUENCE (SIZE (1..maxNrofSR-ConfigPerCellGroup)) OF SchedulingRequestToAddMod

OPTIONAL, -- Need N

schedulingRequestToReleaseList SEQUENCE (SIZE (1..maxNrofSR-ConfigPerCellGroup)) OF SchedulingRequestId

OPTIONAL -- Need N

}

SchedulingRequestToAddMod ::= SEQUENCE {

schedulingRequestId SchedulingRequestId,

sr-ProhibitTimer ENUMERATED {ms1, ms2, ms4, ms8, ms16, ms32, ms64, ms128} OPTIONAL, -- Need S

sr-TransMax ENUMERATED { n4, n8, n16, n32, n64, spare3, spare2, spare1}

}

SchedulingRequestConfig-v1700 ::= SEQUENCE {

schedulingRequestToAddModListExt-v1700 SEQUENCE (SIZE (1..maxNrofSR-ConfigPerCellGroup)) OF SchedulingRequestToAddModExt-v1700

OPTIONAL -- Need N

}

SchedulingRequestToAddModExt-v1700 ::= SEQUENCE {

sr-ProhibitTimer-v1700 ENUMERATED { ms192, ms256, ms320, ms384, ms448, ms512, ms576, ms640, ms1082, spare7, spare6, spare5, spare4, spare3, spare2, spare1}

OPTIONAL -- Need R

}

-- TAG-SCHEDULINGREQUESTCONFIG-STOP

-- ASN1STOP

|  |
| --- |
| *SchedulingRequestConfig* field descriptions |
| ***schedulingRequestToAddModList, schedulingRequestToAddModListExt***  List of Scheduling Request configurations to add or modify. If *schedulingRequestToAddModListExt* is configured, it contains the same number of entries, and in the same order, as *schedulingRequestToAddModList.* |
| ***schedulingRequestToReleaseList***  List of Scheduling Request configurations to release. |

|  |
| --- |
| *SchedulingRequestToAddMod* field descriptions |
| ***schedulingRequestId***  Used to modify a SR configuration and to indicate, in *LogicalChannelConfig*, the SR configuration to which a logical channel is mapped and to indicate, in *SchedulingRequestresourceConfig*, the SR configuration for which a scheduling request resource is used. |
| ***sr-ProhibitTimer***  Timer for SR transmission on PUCCH in TS 38.321 [3]. Value is in ms. Value *ms1* corresponds to 1ms, value *ms2* corresponds to 2ms, and so on. When the field is absent, the UE applies the value 0. if sr*-ProhibitTimer-v1700* is configured, UE shall ignore *sr-ProhibitTimer* (without suffix). |
| ***sr-TransMax***  Maximum number of SR transmissions as described in TS 38.321 [3]. Value *n4* corresponds to 4, value *n8* corresponds to 8, and so on. |

#### – *SchedulingRequestId*

The IE *SchedulingRequestId* is used to identify a Scheduling Request instance in the MAC layer.

*SchedulingRequestId* information element

-- ASN1START

-- TAG-SCHEDULINGREQUESTID-START

SchedulingRequestId ::= INTEGER (0..7)

-- TAG-SCHEDULINGREQUESTID-STOP

-- ASN1STOP

#### – *SchedulingRequestResourceConfig*

The IE *SchedulingRequestResourceConfig* determines physical layer resources on PUCCH where the UE may send the dedicated scheduling request (D-SR) (see TS 38.213 [13], clause 9.2.4).

*SchedulingRequestResourceConfig* information element

-- ASN1START

-- TAG-SCHEDULINGREQUESTRESOURCECONFIG-START

SchedulingRequestResourceConfig ::= SEQUENCE {

schedulingRequestResourceId SchedulingRequestResourceId,

schedulingRequestID SchedulingRequestId,

periodicityAndOffset CHOICE {

sym2 NULL,

sym6or7 NULL,

sl1 NULL, -- Recurs in every slot

sl2 INTEGER (0..1),

sl4 INTEGER (0..3),

sl5 INTEGER (0..4),

sl8 INTEGER (0..7),

sl10 INTEGER (0..9),

sl16 INTEGER (0..15),

sl20 INTEGER (0..19),

sl40 INTEGER (0..39),

sl80 INTEGER (0..79),

sl160 INTEGER (0..159),

sl320 INTEGER (0..319),

sl640 INTEGER (0..639)

} OPTIONAL, -- Need M

resource PUCCH-ResourceId OPTIONAL -- Need M

}

SchedulingRequestResourceConfigExt-v1610 ::= SEQUENCE {

phy-PriorityIndex-r16 ENUMERATED {p0, p1} OPTIONAL, -- Need M

...

}

SchedulingRequestResourceConfigExt-v1700 ::= SEQUENCE {

periodicityAndOffset-r17 CHOICE {

sl1280 INTEGER (0..1279),

sl2560 INTEGER (0..2559),

sl5120 INTEGER (0..5119)

} OPTIONAL -- Need M

}

-- TAG-SCHEDULINGREQUESTRESOURCECONFIG-STOP

-- ASN1STOP

|  |
| --- |
| *SchedulingRequestResourceConfig* field descriptions |
| ***periodicityAndOffset***  SR periodicity and offset in number of symbols or slots (see TS 38.213 [13], clause 9.2.4) The following periodicities may be configured depending on the chosen subcarrier spacing:  SCS = 15 kHz: 2sym, 7sym, 1sl, 2sl, 4sl, 5sl, 8sl, 10sl, 16sl, 20sl, 40sl, 80sl  SCS = 30 kHz: 2sym, 7sym, 1sl, 2sl, 4sl, 8sl, 10sl, 16sl, 20sl, 40sl, 80sl, 160sl  SCS = 60 kHz: 2sym, 7sym/6sym, 1sl, 2sl, 4sl, 8sl, 16sl, 20sl, 40sl, 80sl, 160sl, 320sl  SCS = 120 kHz: 2sym, 7sym, 1sl, 2sl, 4sl, 8sl, 16sl, 40sl, 80sl, 160sl, 320sl, 640sl  SCS = 480 kHz: 1sl, 2sl, 4sl, 8sl, 16sl, 40sl, 80sl, 160sl, 320sl, 640sl, 1280sl, 2560sl  SCS = 960 kHz: 1sl, 2sl, 4sl, 8sl, 16sl, 40sl, 80sl, 160sl, 320sl, 640sl, 1280sl, 2560sl, 5120sl  sym6or7 corresponds to 6 symbols if extended cyclic prefix and a SCS of 60 kHz are configured, otherwise it corresponds to 7 symbols.  For periodicities 2sym, 7sym and sl1 the UE assumes an offset of 0 slots.  If *periodicityAndOffset-r17* is present, any previously configured *periodicityAndOffset* (without suffix) is released, and vice versa. |
| ***phy-PriorityIndex***  Indicates whether this scheduling request resource is *high* or *low* priority in PHY prioritization/multiplexing handling (see TS 38.213 [13], clause 9.2.4). Value *p0* indicates low priority and value *p1* indicates high priority. |
| ***resource***  ID of the PUCCH resource in which the UE shall send the scheduling request. The actual *PUCCH-Resource* is configured in *PUCCH-Config* of the same UL BWP and serving cell as this *SchedulingRequestResourceConfig*. The network configures a *PUCCH-Resource* of *PUCCH-format0* or *PUCCH-format1* (other formats not supported) (see TS 38.213 [13], clause 9.2.4) |
| ***schedulingRequestID***  The ID of the *SchedulingRequestConfig* that uses this scheduling request resource. |

#### – *SchedulingRequestResourceId*

The IE *SchedulingRequestResourceId* is used to identify scheduling request resources on PUCCH.

*SchedulingRequestResourceId* information element

-- ASN1START

-- TAG-SCHEDULINGREQUESTRESOURCEID-START

SchedulingRequestResourceId ::= INTEGER (1..maxNrofSR-Resources)

-- TAG-SCHEDULINGREQUESTRESOURCEID-STOP

-- ASN1STOP

#### – *ScramblingId*

The IE *ScramblingID* is used for scrambling channels and reference signals.

*ScramblingId* information element

-- ASN1START

-- TAG-SCRAMBLINGID-START

ScramblingId ::= INTEGER(0..1023)

-- TAG-SCRAMBLINGID-STOP

-- ASN1STOP

#### – *SCS-SpecificCarrier*

The IE *SCS-SpecificCarrier* provides parameters determining the location and width of the actual carrier or the carrier bandwidth. It is defined specifically for a numerology (subcarrier spacing (SCS)) and in relation (frequency offset) to Point A.

*SCS-SpecificCarrier* information element

-- ASN1START

-- TAG-SCS-SPECIFICCARRIER-START

SCS-SpecificCarrier ::= SEQUENCE {

offsetToCarrier INTEGER (0..2199),

subcarrierSpacing SubcarrierSpacing,

carrierBandwidth INTEGER (1..maxNrofPhysicalResourceBlocks),

...,

[[

txDirectCurrentLocation INTEGER (0..4095) OPTIONAL -- Need S

]]

}

-- TAG-SCS-SPECIFICCARRIER-STOP

-- ASN1STOP

|  |
| --- |
| *SCS-SpecificCarrier* field descriptions |
| ***carrierBandwidth***  Width of this carrier in number of PRBs (using the *subcarrierSpacing* defined for this carrier) (see TS 38.211 [16], clause 4.4.2). |
| ***offsetToCarrier***  Offset in frequency domain between Point A (lowest subcarrier of common RB 0) and the lowest usable subcarrier on this carrier in number of PRBs (using the subcarrierSpacing defined for this carrier). The maximum value corresponds to 275\*8-1. See TS 38.211 [16], clause 4.4.2. |
| ***txDirectCurrentLocation***  Indicates the downlink Tx Direct Current location for the carrier. A value in the range 0..3299 indicates the subcarrier index within the carrier. The values in the value range 3301..4095 are reserved and ignored by the UE. If this field is absent for downlink within *ServingCellConfigCommon* and *ServingCellConfigCommonSIB*, the UE assumes the default value of 3300 (i.e. "Outside the carrier"). (see TS 38.211 [16], clause 4.4.2). Network does not configure this field via *ServingCellConfig* or for uplink carriers. |
| ***subcarrierSpacing***  Subcarrier spacing of this carrier. It is used to convert the offsetToCarrier into an actual frequency.  Only the following values are applicable depending on the used frequency:  FR1: 15 or 30 kHz  FR2-1: 60 or 120 kHz  FR2-2: 120, 480, or 960 kHz |

#### – *SDAP-Config*

The IE *SDAP-Config* is used to set the configurable SDAP parameters for a data radio bearer. All configured instances of SDAP-Config with the same value of pdu-Session correspond to the same SDAP entity as specified in TS 37.324 [24].

*SDAP-Config* information element

-- ASN1START

-- TAG-SDAP-CONFIG-START

SDAP-Config ::= SEQUENCE {

pdu-Session PDU-SessionID,

sdap-HeaderDL ENUMERATED {present, absent},

sdap-HeaderUL ENUMERATED {present, absent},

defaultDRB BOOLEAN,

mappedQoS-FlowsToAdd SEQUENCE (SIZE (1..maxNrofQFIs)) OF QFI OPTIONAL, -- Need N

mappedQoS-FlowsToRelease SEQUENCE (SIZE (1..maxNrofQFIs)) OF QFI OPTIONAL, -- Need N

...

}

QFI ::= INTEGER (0..maxQFI)

PDU-SessionID ::= INTEGER (0..255)

-- TAG-SDAP-CONFIG-STOP

-- ASN1STOP

|  |
| --- |
| *SDAP-Config* field descriptions |
| ***defaultDRB***  Indicates whether or not this is the default DRB for this PDU session. Among all configured instances of *SDAP-Config* with the same value of *pdu-Session*, this field shall be set to *true* in at most one instance of SDAP-Config and to *false* in all other instances. |
| ***mappedQoS-FlowsToAdd***  Indicates the list of QFIs of UL QoS flows of the PDU session to be additionally mapped to this DRB. A QFI value can be included at most once in all configured instances of *SDAP-Config* with the same value of *pdu-Session*. For QoS flow remapping, the QFI value of the remapped QoS flow is only included in *mappedQoS-FlowsToAdd* in *sdap-Config* corresponding to the new DRB and not included in *mappedQoS-FlowsToRelease* in *sdap-Config* corresponding to the old DRB. |
| ***mappedQoS-FlowsToRelease***  Indicates the list of QFIs of QoS flows of the PDU session to be released from existing QoS flow to DRB mapping of this DRB. |
| ***pdu-Session***  Identity of the PDU session whose QoS flows are mapped to the DRB. |
| ***sdap-HeaderUL***  Indicates whether or not a SDAP header is present for UL data on this DRB. The field cannot be changed after a DRB is established. The network sets this field to *present* if the field *defaultDRB* is set to *true*. |
| ***sdap-HeaderDL***  Indicates whether or not a SDAP header is present for DL data on this DRB. The field cannot be changed after a DRB is established. |

#### – *SearchSpace*

The IE *SearchSpace* defines how/where to search for PDCCH candidates. Each search space is associated with one *ControlResourceSet*. For a scheduled SCell in the case of cross carrier scheduling, except for *nrofCandidates*, all the optional fields are absent (regardless of their presence conditions). For a scheduled SpCell in the case of the cross carrier scheduling, if the search space is linked to another search space in the scheduling SCell, all the optional fields of this search space in the scheduled SpCell are absent (regardless of their presence conditions) except for *nrofCandidates*.

*SearchSpace* information element

-- ASN1START

-- TAG-SEARCHSPACE-START

SearchSpace ::= SEQUENCE {

searchSpaceId SearchSpaceId,

controlResourceSetId ControlResourceSetId OPTIONAL, -- Cond SetupOnly

monitoringSlotPeriodicityAndOffset CHOICE {

sl1 NULL,

sl2 INTEGER (0..1),

sl4 INTEGER (0..3),

sl5 INTEGER (0..4),

sl8 INTEGER (0..7),

sl10 INTEGER (0..9),

sl16 INTEGER (0..15),

sl20 INTEGER (0..19),

sl40 INTEGER (0..39),

sl80 INTEGER (0..79),

sl160 INTEGER (0..159),

sl320 INTEGER (0..319),

sl640 INTEGER (0..639),

sl1280 INTEGER (0..1279),

sl2560 INTEGER (0..2559)

} OPTIONAL, -- Cond Setup4

duration INTEGER (2..2559) OPTIONAL, -- Need S

monitoringSymbolsWithinSlot BIT STRING (SIZE (14)) OPTIONAL, -- Cond Setup

nrofCandidates SEQUENCE {

aggregationLevel1 ENUMERATED {n0, n1, n2, n3, n4, n5, n6, n8},

aggregationLevel2 ENUMERATED {n0, n1, n2, n3, n4, n5, n6, n8},

aggregationLevel4 ENUMERATED {n0, n1, n2, n3, n4, n5, n6, n8},

aggregationLevel8 ENUMERATED {n0, n1, n2, n3, n4, n5, n6, n8},

aggregationLevel16 ENUMERATED {n0, n1, n2, n3, n4, n5, n6, n8}

} OPTIONAL, -- Cond Setup

searchSpaceType CHOICE {

common SEQUENCE {

dci-Format0-0-AndFormat1-0 SEQUENCE {

...

} OPTIONAL, -- Need R

dci-Format2-0 SEQUENCE {

nrofCandidates-SFI SEQUENCE {

aggregationLevel1 ENUMERATED {n1, n2} OPTIONAL, -- Need R

aggregationLevel2 ENUMERATED {n1, n2} OPTIONAL, -- Need R

aggregationLevel4 ENUMERATED {n1, n2} OPTIONAL, -- Need R

aggregationLevel8 ENUMERATED {n1, n2} OPTIONAL, -- Need R

aggregationLevel16 ENUMERATED {n1, n2} OPTIONAL -- Need R

},

...

} OPTIONAL, -- Need R

dci-Format2-1 SEQUENCE {

...

} OPTIONAL, -- Need R

dci-Format2-2 SEQUENCE {

...

} OPTIONAL, -- Need R

dci-Format2-3 SEQUENCE {

dummy1 ENUMERATED {sl1, sl2, sl4, sl5, sl8, sl10, sl16, sl20} OPTIONAL, -- Cond Setup

dummy2 ENUMERATED {n1, n2},

...

} OPTIONAL -- Need R

},

ue-Specific SEQUENCE {

dci-Formats ENUMERATED {formats0-0-And-1-0, formats0-1-And-1-1},

...,

[[

dci-Formats-MT-r16 ENUMERATED {formats2-5} OPTIONAL, -- Need R

dci-FormatsSL-r16 ENUMERATED {formats0-0-And-1-0, formats0-1-And-1-1, formats3-0, formats3-1,

formats3-0-And-3-1} OPTIONAL, -- Need R

dci-FormatsExt-r16 ENUMERATED {formats0-2-And-1-2, formats0-1-And-1-1And-0-2-And-1-2}

OPTIONAL -- Need R

]]

}

} OPTIONAL -- Cond Setup2

}

SearchSpaceExt-r16 ::= SEQUENCE {

controlResourceSetId-r16 ControlResourceSetId-r16 OPTIONAL, -- Cond SetupOnly2

searchSpaceType-r16 SEQUENCE {

common-r16 SEQUENCE {

dci-Format2-4-r16 SEQUENCE {

nrofCandidates-CI-r16 SEQUENCE {

aggregationLevel1-r16 ENUMERATED {n1, n2} OPTIONAL, -- Need R

aggregationLevel2-r16 ENUMERATED {n1, n2} OPTIONAL, -- Need R

aggregationLevel4-r16 ENUMERATED {n1, n2} OPTIONAL, -- Need R

aggregationLevel8-r16 ENUMERATED {n1, n2} OPTIONAL, -- Need R

aggregationLevel16-r16 ENUMERATED {n1, n2} OPTIONAL -- Need R

},

...

} OPTIONAL, -- Need R

dci-Format2-5-r16 SEQUENCE {

nrofCandidates-IAB-r16 SEQUENCE {

aggregationLevel1-r16 ENUMERATED {n1, n2} OPTIONAL, -- Need R

aggregationLevel2-r16 ENUMERATED {n1, n2} OPTIONAL, -- Need R

aggregationLevel4-r16 ENUMERATED {n1, n2} OPTIONAL, -- Need R

aggregationLevel8-r16 ENUMERATED {n1, n2} OPTIONAL, -- Need R

aggregationLevel16-r16 ENUMERATED {n1, n2} OPTIONAL -- Need R

},

...

} OPTIONAL, -- Need R

dci-Format2-6-r16 SEQUENCE {

...

} OPTIONAL, -- Need R

...

}

} OPTIONAL, -- Cond Setup3

searchSpaceGroupIdList-r16 SEQUENCE (SIZE (1.. 2)) OF INTEGER (0..1) OPTIONAL, -- Need R

freqMonitorLocations-r16 BIT STRING (SIZE (5)) OPTIONAL -- Need R

}

SearchSpaceExt-v1700 ::= SEQUENCE {

monitoringSlotPeriodicityAndOffset-v1710 CHOICE {

sl32 INTEGER (0..31),

sl64 INTEGER (0..63),

sl128 INTEGER (0..127),

sl5120 INTEGER (0..5119),

sl10240 INTEGER (0..10239),

sl20480 INTEGER (0..20479)

} OPTIONAL, -- Cond Setup5

monitoringSlotsWithinSlotGroup-r17 CHOICE {

slotGroupLength4-r17 BIT STRING (SIZE (4)),

slotGroupLength8-r17 BIT STRING (SIZE (8))

} OPTIONAL, -- Need R

duration-r17 INTEGER (4..20476) OPTIONAL, -- Need R

searchSpaceType-r17 SEQUENCE{

common-r17 SEQUENCE {

dci-Format4-0-r17 SEQUENCE {

...

} OPTIONAL, -- Need R

dci-Format4-1-r17 SEQUENCE {

...

} OPTIONAL, -- Need R

dci-Format4-2-r17 SEQUENCE {

...

} OPTIONAL, -- Need R

dci-Format4-1-AndFormat4-2-r17 SEQUENCE {

...

} OPTIONAL, -- Need R

dci-Format2-7-r17 SEQUENCE {

nrofCandidates-PEI-r17 SEQUENCE {

aggregationLevel4-r17 ENUMERATED {n0, n1, n2, n3, n4} OPTIONAL, -- Need R

aggregationLevel8-r17 ENUMERATED {n0, n1, n2} OPTIONAL, -- Need R

aggregationLevel16-r17 ENUMERATED {n0, n1} OPTIONAL -- Need R

},

...

} OPTIONAL -- Need R

}

} OPTIONAL, -- Need R

searchSpaceGroupIdList-r17 SEQUENCE (SIZE (1.. 3)) OF INTEGER (0.. maxNrofSearchSpaceGroups-1-r17) OPTIONAL, -- Cond DedicatedOnly

searchSpaceLinkingId-r17 INTEGER (0..maxNrofSearchSpacesLinks-1-r17) OPTIONAL -- Cond DedicatedOnly

}

-- TAG-SEARCHSPACE-STOP

-- ASN1STOP

|  |
| --- |
| *SearchSpace* field descriptions |
| ***common***  Configures this search space as common search space (CSS) and DCI formats to monitor. |
| ***controlResourceSetId***  The CORESET applicable for this SearchSpace. Value 0 identifies the common CORESET#0 configured in MIB and in *ServingCellConfigCommon*. Values 1..*maxNrofControlResourceSets-1* identify CORESETs configured in System Information or by dedicated signalling. The CORESETs with *non-zero controlResourceSetId* are configured in the same BWP as this *SearchSpace* except *commonControlResourceSetExt* which is configured by SIB20. If the field *controlResourceSetId-r16* is present, UE shall ignore the *controlResourceSetId* (without suffix). |
| ***dummy1, dummy2***  This field is not used in the specification. If received it shall be ignored by the UE. |
| ***dci-Format0-0-AndFormat1-0***  If configured, the UE monitors the DCI formats 0\_0 and 1\_0 according to TS 38.213 [13], clause 10.1. |
| ***dci-Format2-0***  If configured, UE monitors the DCI format 2\_0 according to TS 38.213 [13], clause 10.1, 11.1.1. |
| ***dci-Format2-1***  If configured, UE monitors the DCI format 2\_1 according to TS 38.213 [13], clause 10.1, 11.2. |
| ***dci-Format2-2***  If configured, UE monitors the DCI format 2\_2 according to TS 38.213 [13], clause 10.1, 11.3. |
| ***dci-Format2-3***  If configured, UE monitors the DCI format 2\_3 according to TS 38.213 [13], clause 10.1, 11.4 |
| ***dci-Format2-4***  If configured, UE monitors the DCI format 2\_4 according to TS 38.213 [13], clause 11.2A. |
| ***dci-Format2-5***  If configured, IAB-MT monitors the DCI format 2\_5 according to TS 38.213 [13], clause 14. |
| ***dci-Format2-6***  If configured, UE monitors the DCI format 2\_6 according to TS 38.213 [13], clause 10.1, 10.3. DCI format 2\_6 can only be configured on the SpCell. |
| ***dci-Format2-7***  If configured, UE monitors the DCI format 2\_7 according to TS 38.213 [13], clause 10.1, 10.4A. |
| ***dci-Format4-0***  If configured, the UE monitors the DCI format 4\_0 with CRC scrambled by MCCH-RNTI/G-RNTI according to TS 38.213 [13], clause [10.1]. |
| ***dci-Format4-1-AndFormat4-2***  If configured, the UE monitors the DCI format 4\_1 and 4\_2 with CRC scrambled by G-RNTI/G-CS-RNTI according to TS 38.213 [13], clause [11.1]. |
| ***dci-Format4-1***  If configured, the UE monitors the DCI format 4\_1 with CRC scrambled by G-RNTI/G-CS-RNTI according to TS 38.213 [13], clause [10.1]. |
| ***dci-Format4-2***  If configured, the UE monitors the DCI format 4\_2 with CRC scrambled by G-RNTI/G-CS-RNTI according to TS 38.213 [13], clause [10.1]. |
| ***dci-Formats***  Indicates whether the UE monitors in this USS for DCI formats 0-0 and 1-0 or for formats 0-1 and 1-1. |
| ***dci-FormatsExt***  If this field is present, the field *dci-Formats* is ignored and *dci-FormatsExt* is used instead to indicate whether the UE monitors in this USS for DCI format 0\_2 and 1\_2 or formats 0\_1 and 1\_1 and 0\_2 and 1\_2 (see TS 38.212 [17], clause 7.3.1 and TS 38.213 [13], clause 10.1). This field is not configured for operation with shared spectrum channel access in this release*.* |
| ***dci-Formats-MT***  Indicates whether the IAB-MT monitors the DCI formats 2-5 according to TS 38.213 [13], clause 14. |
| ***dci-FormatsSL***  Indicates whether the UE monitors in this USS for DCI formats 0-0 and 1-0 or for formats 0-1 and 1-1 or for format 3-0 or for format 3-1 or for formats 3-0 and 3-1. If this field is present, the field *dci-Formats* is ignored and *dci-FormatsSL* is used. |
| ***duration***  Number of consecutive slots that a SearchSpace lasts in every occasion, i.e., upon every period as given in the *periodicityAndOffset*. If the field is absent, the UE applies the value 1 slot, except for DCI format 2\_0. The UE ignores this field for DCI format 2\_0. The maximum valid duration is periodicity-1 (periodicity as given in the *monitoringSlotPeriodicityAndOffset*).  For SCS 480 kHz and SCS 960 kHz, duration-r17 is used, and the configured duration is restricted to be an integer multiple of L slots and smaller than periodicity, where L is the configured length of the bitmap *monitoringSlotsWithinSlotGroup-r17*. The maximum valid duration is periodicity-L.  For IAB-MT, duration indicates number of consecutive slots that a SearchSpace lasts in every occasion, i.e., upon every period as given in the *periodicityAndOffset*. If the field is absent, the IAB-MT applies the value 1 slot, except for DCI format 2\_0 and DCI format 2\_5. The IAB-MT ignores this field for DCI format 2\_0 and DCI format 2\_5. The maximum valid duration is periodicity-1 (periodicity as given in the *monitoringSlotPeriodicityAndOffset*). |
| ***freqMonitorLocations***  Defines an association of the search space to multiple monitoring locations in the frequency domain and indicates whether the pattern configured in the associated CORESET is replicated to a specific RB set, see TS 38.213, clause 10.1. Each bit in the bitmap corresponds to one RB set, and the leftmost (most significant) bit corresponds to RB set 0 in the BWP. A bit set to 1 indicates that a frequency domain resource allocation replicated from the pattern configured in the associated CORESET is mapped to the RB set. |
| ***monitoringSlotPeriodicityAndOffset***  Slots for PDCCH Monitoring configured as periodicity and offset.  For SCS 15, 30, 60, and 120 kHz and if the UE is configured to monitor:  - DCI format 2\_1, only the values 'sl1', 'sl2' or 'sl4' are applicable.  - DCI format 2\_0, only the values ′sl1′, ′sl2′, ′sl4′, ′sl5′, ′sl8′, ′sl10′, ′sl16′, and ′sl20′ are applicable (see TS 38.213 [13], clause 10).  - DCI format 2\_4, only the values 'sl1', 'sl2', 'sl4', 'sl5', 'sl8' and 'sl10' are applicable.  For SCS 480 kHz and if the UE is configured to monitor:  - DCI format 2\_0, only the values 'sl4', 'sl8', 'sl16', 'sl20', 'sl32', 'sl40', 'sl64', and 'sl80' are applicable.  - DCI format 2\_1, only the values ′sl4′, ′sl8′, and ′sl16′ are applicable.  - DCI format 2\_4, only the values 'sl4', 'sl8', 'sl16', 'sl20', 'sl32', 'sl40' are applicable.  For SCS 960 kHz and if the UE is configured to monitor:  - DCI format 2\_0, only the values 'sl4', 'sl8', 'sl16', 'sl20', 'sl32', 'sl40', 'sl64', and 'sl80' are applicable.  - DCI format 2\_1, only the values ′sl4′, ′sl8′, and ′sl16′ are applicable.  - DCI format 2\_4, only the values 'sl8', 'sl16', 'sl32', 'sl40', 'sl64', 'sl80' are applicable.  For SCS 480 kHz and SCS 960 kHz, and the configured periodicity and offset are restricted to be an integer multiple of L slots, where L is the configured length of the bitmap provided by *monitoringSlotsWithinSlotGroup-r17*, i.e. for a given periodicity, the offset has a range of {0, L, 2\*L, …, L\*FLOOR(1/L\*(periodicity-1))}.  For IAB-MT, If the IAB-MT is configured to monitor DCI format 2\_1, only the values 'sl1', 'sl2' or 'sl4' are applicable. If the IAB-MT is configured to monitor DCI format 2\_0 or DCI format 2\_5, only the values ′sl1′, ′sl2′, ′sl4′, ′sl5′, ′sl8′, ′sl10′, ′sl16′, and ′sl20′ are applicable (see TS 38.213, clause 10).  If *monitoringSlotPeriodicityAndOffset-r17* is present, any previously configured *monitoringSlotPeriodicityAndOffset* is released, and if *monitoringSlotPeriodicityAndOffset* is present, any previously configured *monitoringSlotPeriodicityAndOffset-r17* is released. |
| ***monitoringSlotsWithinSlotGroup***  Indicates which slot(s) within a slot group are configured for multi-slot PDCCH monitoring. The first (leftmost, most significant) bit represents the first slot in the slot group, the second bit represents the second slot in the slot group, and so on. A bit set to '1' indicates that the corresponding slot is configured for multi-slot PDCCH monitoring (see TS 38.213, clause 10). |
| ***monitoringSymbolsWithinSlot***  The first symbol(s) for PDCCH monitoring in the slots configured for (multi-slot) PDCCH monitoring (see *monitoringSlotPeriodicityAndOffset* and *duration*). The most significant (left) bit represents the first OFDM in a slot, and the second most significant (left) bit represents the second OFDM symbol in a slot and so on. The bit(s) set to one identify the first OFDM symbol(s) of the control resource set within a slot. If the cyclic prefix of the BWP is set to extended CP, the last two bits within the bit string shall be ignored by the UE or IAB-MT.  For DCI format 2\_0, the first one symbol applies if the *duration* of CORESET (in the IE *ControlResourceSet*) identified by *controlResourceSetId* indicates 3 symbols, the first two symbols apply if the *duration* of CORESET identified by *controlResourceSetId* indicates 2 symbols, and the first three symbols apply if the *duration* of CORESET identified by *controlResourceSetId* indicates 1 symbol.  See TS 38.213 [13], clause 10.  For IAB-MT: For DCI format 2\_0 or DCI format 2\_5, the first one symbol applies if the duration of CORESET (in the IE *ControlResourceSet*) identified by *controlResourceSetId* indicates 3 symbols, the first two symbols apply if the *duration* of CORESET identified by *controlResourceSetId* indicates 2 symbols, and the first three symbols apply if the *duration* of CORESET identified by *controlResourceSetId* indicates 1 symbol.  See TS 38.213 [13], clause 10. |
| ***nrofCandidates-CI***  The number of PDCCH candidates specifically for format 2-4 for the configured aggregation level. If an aggregation level is absent, the UE does not search for any candidates with that aggregation level. The network configures only one aggregationLevel and the corresponding number of candidates (see TS 38.213 [13], clause 10.1). |
| ***nrofCandidates-PEI***  The number of PDCCH candidates specifically for format 2-7 for the configured aggregation level. |
| ***nrofCandidates-SFI***  The number of PDCCH candidates specifically for format 2-0 for the configured aggregation level. If an aggregation level is absent, the UE does not search for any candidates with that aggregation level. The network configures only one aggregationLevel and the corresponding number of candidates (see TS 38.213 [13], clause 11.1.1). For a search space configured with *freqMonitorLocations-r16*, only value ′n1′ is valid. |
| ***nrofCandidates***  Number of PDCCH candidates per aggregation level. The number of candidates and aggregation levels configured here applies to all formats unless a particular value is specified or a format-specific value is provided (see inside *searchSpaceType*). If configured in the *SearchSpace* of a cross carrier scheduled cell, this field determines the number of candidates and aggregation levels to be used on the linked scheduling cell (see TS 38.213 [13], clause 10). |
| ***searchSpaceGroupIdList***  List of search space group IDs which the search space is associated with. The network configures at most 2 search space groups per BWP where the group ID is either 0 or 1 if *searchSpaceGroupIdList* (i.e. without suffix) is included. The network configures at most 3 search space groups per BWP where the group ID is either 0, 1 or 2 if *searchSpaceGroupIdList-r17* is included. And if *searchSpaceGroupIdList-r17* is included, *searchSpaceGroupIdList* (i.e. without suffix) is ignored. |
| ***searchSpaceId***  Identity of the search space. SearchSpaceId = 0 identifies the *searchSpaceZero* configured via PBCH (MIB) or *ServingCellConfigCommon* and may hence not be used in the *SearchSpace* IE. The *searchSpaceId* is unique among the BWPs of a Serving Cell. In case of cross carrier scheduling, search spaces with the same *searchSpaceId* in scheduled cell and scheduling cell are linked to each other. The UE applies the search space for the scheduled cell only if the DL BWPs in which the linked search spaces are configured in scheduling cell and scheduled cell are both active.  For an IAB-MT, the search space defines how/where to search for PDCCH candidates for an IAB-MT where each search space is associated with one ControlResearchSet and for a scheduled cell in the case of cross carrier scheduling, except for nrofCandidates, all the optional fields are absent. |
| ***SearchSpaceLinkingId***  This parameter is used to link two search spaces of same type in the same BWP. If two search spaces have the same SearchSpaceLinkingId UE assumes these search spaces are linked to PDCCH repetition REF. When PDCCH repetition is monitored in two linked search space (SS) sets, the UE does not expect a third monitored SS set to be linked with any of the two linked SS sets. The two linked SS sets have the same SS set type (USS/CSS). The two linked SS sets have the same DCI formats to monitor. For intra-slot PDCCH repetition: The two SS sets should have the same periodicity and offset (monitoringSlotPeriodicityAndOffset), and the same duration. For linking monitoring occasions across the two SS sets that exist in the same slot: The two SS sets have the same number of monitoring occasions within a slot and n-th monitoring occasion of one SS set is linked to n-th monitoring occasion of the other SS set. The following SS sets cannot be linked with another SS set for PDCCH repetition: SS set 0, searchSpaceSIB1, searchSpaceOtherSystemInformation, pagingSearchSpace, ra-SearchSpace, searchSpaceBroadcast, peiSearchSpace, and sdt-SearchSpace. SS set configured by recoverySearchSpaceId cannot be linked to another SS set for PDCCH repetition. When a scheduled serving cell is configured to be cross-carrier scheduled by a scheduling serving cell, two PDCCH candidates (with the same AL and candidate index associated with the scheduled serving cell) are linked only if the corresponding two SS sets in the scheduling serving cell are linked and two SS sets in the scheduled serving cell with the same SS set IDs are also linked. |
| ***searchSpaceType***  Indicates whether this is a common search space (present) or a UE specific search space as well as DCI formats to monitor for. |
| ***ue-Specific***  Configures this search space as UE specific search space (USS). The UE monitors the DCI format with CRC scrambled by C-RNTI, CS-RNTI (if configured), and SP-CSI-RNTI (if configured) |

|  |  |
| --- | --- |
| Conditional Presence | Explanation |
| *DedicatedOnly* | In PDCCH-Config, the field is optionally present. Otherwise it is absent, Need R. |
| *Setup* | This field is mandatory present upon creation of a new *SearchSpace*. It is optionally present, Need M, otherwise. |
| *Setup2* | This field is mandatory present when a new *SearchSpace* is set up, if the same *SearchSpace* ID is not included in *searchSpacesToAddModListExt-r16* of the parent IE with the field *searchSpaceType-r16* or *searchSpaceType-r17* included. Otherwise it is optionally present, Need M. |
| *Setup3* | This field is mandatory present when a new *SearchSpace* is set up, if the same *SearchSpace* ID is not included in *searchSpacesToAddModListExt* (without suffix) of the parent IE with the field *searchSpaceType* (without suffix) included. Otherwise it is optionally present, Need M. |
| *Setup4* | This field is mandatory present upon creation of a new *SearchSpace* if *monitoringSlotPeriodicityAndOffset-r17* is not included. It is optionally present, Need M, otherwise. |
| *Setup5* | This field is mandatory present upon creation of a new *SearchSpace* if *monitoringSlotPeriodicityAndOffset* (without suffix) is not included. It is optionally present, Need M, otherwise. |
| *SetupOnly* | This field is mandatory present upon creation of a new *SearchSpace*. It is absent, Need M, otherwise. |
| *SetupOnly2* | In PDCCH-Config, the field is optionally present upon creation of a new SearchSpace and absent, Need M upon reconfiguration of an existing SearchSpace.  In PDCCH-ConfigCommon, the field is absent. |

#### – *SearchSpaceId*

The IE *SearchSpaceId* is used to identify Search Spaces. The ID space is used across the BWPs of a Serving Cell. The search space with the *SearchSpaceId* = 0 identifies the search space configured via PBCH (MIB) and in *ServingCellConfigCommon* (*searchSpaceZero*). The number of Search Spaces per BWP is limited to 10 including the common and UE specific Search Spaces.

*SearchSpaceId* information element

-- ASN1START

-- TAG-SEARCHSPACEID-START

SearchSpaceId ::= INTEGER (0..maxNrofSearchSpaces-1)

-- TAG-SEARCHSPACEID-STOP

-- ASN1STOP

#### – *SearchSpaceZero*

The IE *SearchSpaceZero* is used to configure SearchSpace#0 of the initial BWP (see TS 38.213 [13], clause 13).

*SearchSpaceZero* information element

-- ASN1START

-- TAG-SEARCHSPACEZERO-START

SearchSpaceZero ::= INTEGER (0..15)

-- TAG-SEARCHSPACEZERO-STOP

-- ASN1STOP

#### – *SecurityAlgorithmConfig*

The IE *SecurityAlgorithmConfig* is used to configure AS integrity protection algorithm and AS ciphering algorithm for SRBs and DRBs.

*SecurityAlgorithmConfig* information element

-- ASN1START

-- TAG-SECURITYALGORITHMCONFIG-START

SecurityAlgorithmConfig ::= SEQUENCE {

cipheringAlgorithm CipheringAlgorithm,

integrityProtAlgorithm IntegrityProtAlgorithm OPTIONAL, -- Need R

...

}

IntegrityProtAlgorithm ::= ENUMERATED {

nia0, nia1, nia2, nia3, spare4, spare3,

spare2, spare1, ...}

CipheringAlgorithm ::= ENUMERATED {

nea0, nea1, nea2, nea3, spare4, spare3,

spare2, spare1, ...}

-- TAG-SECURITYALGORITHMCONFIG-STOP

-- ASN1STOP

| *SecurityAlgorithmConfig* field descriptions |
| --- |
| ***cipheringAlgorithm***  Indicates the ciphering algorithm to be used for SRBs and DRBs, as specified in TS 33.501 [11]. The algorithms *nea0*-*nea3* are identical to the LTE algorithms eea0-3. The algorithms configured for all bearers using master key shall be the same, and the algorithms configured for all bearers using secondary key, if any, shall be the same. If UE is connected to E-UTRA/EPC, this field indicates the ciphering algorithm to be used for RBs configured with NR PDCP, as specified in TS 33.501 [11]. |
| ***integrityProtAlgorithm***  Indicates the integrity protection algorithm to be used for SRBs and DRBs, as specified in TS 33.501 [11]. The algorithms *nia0-nia3* are identical to the E-UTRA algorithms *eia0-3*. The algorithms configured for all bearers using master key shall be the same and the algorithms configured for all bearers using secondary key, if any, shall be the same. The network does not configure *nia0* except for unauthenticated emergency sessions for unauthenticated UEs in LSM (limited service mode).  If UE is connected to E-UTRA/EPC, this field indicates the integrity protection algorithm to be used for SRBs configured with NR PDCP as specified in TS 33.501 [11], and DRBs configured with integrity protection as specified in TS 33.401 [30]. The network does not configure *nia0* for SRB3. |

#### – *SemiStaticChannelAccessConfig*

The IE *SemiStaticChannelAccessConfig* is used to configure channel access parameters when the network is operating in semi-static channel access mode (see clause 4.3 TS 37.213 [48].

*SemiStaticChannelAccessConfig* information element

-- ASN1START

-- TAG-SEMISTATICCHANNELACCESSCONFIG-START

SemiStaticChannelAccessConfig-r16 ::= SEQUENCE {

period ENUMERATED {ms1, ms2, ms2dot5, ms4, ms5, ms10}

}

-- TAG-SEMISTATICCHANNELACCESSCONFIG-STOP

-- ASN1STOP

|  |
| --- |
| *SemiStaticChannelAccessConfig* field descriptions |
| ***period***  Indicates the periodicity of the semi-static channel access mode (see TS 37.213 [48], clause 4.3). Value ms1 corresponds to 1 ms, value ms2 corresponds to 2 ms, value ms2dot5 corresponds to 2.5 ms, and so on. |

#### – *SemiStaticChannelAccessConfigUE*

The IE *SemiStaticChannelAccessConfigUE* is used to configure channel access parameters for UE initiated semi-static channel access.

*SemiStaticChannelAccessConfigUE* information element

-- ASN1START

-- TAG-SEMISTATICCHANNELACCESSCONFIGUE-START

SemiStaticChannelAccessConfigUE-r17 ::= SEQUENCE {

periodUE-r17 ENUMERATED {ms1, ms2, ms2dot5, ms4, ms5, ms10, spare2, spare1},

offsetUE-r17 INTEGER (0..559)

}

-- TAG-SEMISTATICCHANNELACCESSCONFIGUE-STOP

-- ASN1STOP

|  |
| --- |
| *SemiStaticChannelAccessConfigUE* field descriptions |
| ***periodUE***  Indicates the period of a channel occupancy that the UE can initiate as described in TS 37.213 [48], clause 4.3. Value ms1 corresponds to 1 ms, value ms2 corresponds to 2 ms, value ms2dot5 corresponds to 2.5 ms, and so on. |
| ***offsetUE***  Indicates the number of symbols from the beginning of the even indexed radio frame to the start of the first period within that radio frame that the UE can initiate a channel occupancy (see TS 37.213 [48], clause 4.3), based on the smallest SCS among the configured SCSs in the serving cell. The offset duration indicated by this field is less than the period duration indicated by *periodUE*. The maximum value is 139, 279 and 559 for 15, 30 and 60 kHz subcarrier spacing, respectively. |

#### – *Sensor-LocationInfo*

The IE *Sensor-LocationInfo* is used by the UE to provide sensor information.

*Sensor-LocationInfo* information element

-- ASN1START

-- TAG-SENSORLOCATIONINFO-START

Sensor-LocationInfo-r16 ::= SEQUENCE {

sensor-MeasurementInformation-r16 OCTET STRING OPTIONAL,

sensor-MotionInformation-r16 OCTET STRING OPTIONAL,

...

}

-- TAG-SENSORLOCATIONINFO-STOP

-- ASN1STOP

|  |
| --- |
| *Sensor-LocationInfo* field descriptions |
| ***sensor-MeasurementInformation***  This field provides barometric pressure measurements as *Sensor-MeasurementInformation* defined in TS 37.355 [49]. The first/leftmost bit of the first octet contains the most significant bit. |
| ***sensor-MotionInformation***  This field provides motion sensor measurements as *Sensor-MotionInformation* defined in TS 37.355 [49]. The first/leftmost bit of the first octet contains the most significant bit. |

#### *– ServingCellAndBWP-Id*

The IE *ServingCellAndBWP-Id* is used to indicate a serving cell and an uplink or a downlink BWP.

*ServingCellAndBWP-Id* information element

-- ASN1START

-- TAG-SERVINGCELLANDBWP-ID-START

ServingCellAndBWP-Id-r17 ::= SEQUENCE {

servingcell-r17 ServCellIndex,

bwp-r17 BWP-Id

}

-- TAG-SERVINGCELLANDBWP-ID-STOP

-- ASN1STOP

#### – *ServCellIndex*

The IE *ServCellIndex* concerns a short identity, used to uniquely identify a serving cell (i.e. the PCell, the PSCell or an SCell) across the cell groups. Value 0 applies for the PCell, while the *SCellIndex* that has previously been assigned applies for SCells.

*ServCellIndex* information element

-- ASN1START

-- TAG-SERVCELLINDEX-START

ServCellIndex ::= INTEGER (0..maxNrofServingCells-1)

-- TAG-SERVCELLINDEX-STOP

-- ASN1STOP

#### – *ServingCellConfig*

The IE *ServingCellConfig* is used to configure (add or modify) the UE with a serving cell, which may be the SpCell or an SCell of an MCG or SCG. The parameters herein are mostly UE specific but partly also cell specific (e.g. in additionally configured bandwidth parts). Reconfiguration between a PUCCH and PUCCHless SCell is only supported using an SCell release and add.

*ServingCellConfig* information element

-- ASN1START

-- TAG-SERVINGCELLCONFIG-START

ServingCellConfig ::= SEQUENCE {

tdd-UL-DL-ConfigurationDedicated TDD-UL-DL-ConfigDedicated OPTIONAL, -- Cond TDD

initialDownlinkBWP BWP-DownlinkDedicated OPTIONAL, -- Need M

downlinkBWP-ToReleaseList SEQUENCE (SIZE (1..maxNrofBWPs)) OF BWP-Id OPTIONAL, -- Need N

downlinkBWP-ToAddModList SEQUENCE (SIZE (1..maxNrofBWPs)) OF BWP-Downlink OPTIONAL, -- Need N

firstActiveDownlinkBWP-Id BWP-Id OPTIONAL, -- Cond SyncAndCellAdd

bwp-InactivityTimer ENUMERATED {ms2, ms3, ms4, ms5, ms6, ms8, ms10, ms20, ms30,

ms40,ms50, ms60, ms80,ms100, ms200,ms300, ms500,

ms750, ms1280, ms1920, ms2560, spare10, spare9, spare8,

spare7, spare6, spare5, spare4, spare3, spare2, spare1 } OPTIONAL, --Need R

defaultDownlinkBWP-Id BWP-Id OPTIONAL, -- Need S

uplinkConfig UplinkConfig OPTIONAL, -- Need M

supplementaryUplink UplinkConfig OPTIONAL, -- Need M

pdcch-ServingCellConfig SetupRelease { PDCCH-ServingCellConfig } OPTIONAL, -- Need M

pdsch-ServingCellConfig SetupRelease { PDSCH-ServingCellConfig } OPTIONAL, -- Need M

csi-MeasConfig SetupRelease { CSI-MeasConfig } OPTIONAL, -- Need M

sCellDeactivationTimer ENUMERATED {ms20, ms40, ms80, ms160, ms200, ms240,

ms320, ms400, ms480, ms520, ms640, ms720,

ms840, ms1280, spare2,spare1} OPTIONAL, -- Cond ServingCellWithoutPUCCH

crossCarrierSchedulingConfig CrossCarrierSchedulingConfig OPTIONAL, -- Need M

tag-Id TAG-Id,

dummy1 ENUMERATED {enabled} OPTIONAL, -- Need R

pathlossReferenceLinking ENUMERATED {spCell, sCell} OPTIONAL, -- Cond SCellOnly

servingCellMO MeasObjectId OPTIONAL, -- Cond MeasObject

...,

[[

lte-CRS-ToMatchAround SetupRelease { RateMatchPatternLTE-CRS } OPTIONAL, -- Need M

rateMatchPatternToAddModList SEQUENCE (SIZE (1..maxNrofRateMatchPatterns)) OF RateMatchPattern OPTIONAL, -- Need N

rateMatchPatternToReleaseList SEQUENCE (SIZE (1..maxNrofRateMatchPatterns)) OF RateMatchPatternId OPTIONAL, -- Need N

downlinkChannelBW-PerSCS-List SEQUENCE (SIZE (1..maxSCSs)) OF SCS-SpecificCarrier OPTIONAL -- Need S

]],

[[

supplementaryUplinkRelease-r16 ENUMERATED {true} OPTIONAL, -- Need N

tdd-UL-DL-ConfigurationDedicated-IAB-MT-r16 TDD-UL-DL-ConfigDedicated-IAB-MT-r16 OPTIONAL, -- Cond TDD\_IAB

dormantBWP-Config-r16 SetupRelease { DormantBWP-Config-r16 } OPTIONAL, -- Need M

ca-SlotOffset-r16 CHOICE {

refSCS15kHz INTEGER (-2..2),

refSCS30KHz INTEGER (-5..5),

refSCS60KHz INTEGER (-10..10),

refSCS120KHz INTEGER (-20..20)

} OPTIONAL, -- Cond AsyncCA

dummy2 SetupRelease { DummyJ } OPTIONAL, -- Need M

intraCellGuardBandsDL-List-r16 SEQUENCE (SIZE (1..maxSCSs)) OF IntraCellGuardBandsPerSCS-r16 OPTIONAL, -- Need S

intraCellGuardBandsUL-List-r16 SEQUENCE (SIZE (1..maxSCSs)) OF IntraCellGuardBandsPerSCS-r16 OPTIONAL, -- Need S

csi-RS-ValidationWithDCI-r16 ENUMERATED {enabled} OPTIONAL, -- Need R

lte-CRS-PatternList1-r16 SetupRelease { LTE-CRS-PatternList-r16 } OPTIONAL, -- Need M

lte-CRS-PatternList2-r16 SetupRelease { LTE-CRS-PatternList-r16 } OPTIONAL, -- Need M

crs-RateMatch-PerCORESETPoolIndex-r16 ENUMERATED {enabled} OPTIONAL, -- Need R

enableTwoDefaultTCI-States-r16 ENUMERATED {enabled} OPTIONAL, -- Need R

enableDefaultTCI-StatePerCoresetPoolIndex-r16 ENUMERATED {enabled} OPTIONAL, -- Need R

enableBeamSwitchTiming-r16 ENUMERATED {true} OPTIONAL, -- Need R

cbg-TxDiffTBsProcessingType1-r16 ENUMERATED {enabled} OPTIONAL, -- Need R

cbg-TxDiffTBsProcessingType2-r16 ENUMERATED {enabled} OPTIONAL -- Need R

]],

[[

directionalCollisionHandling-r16 ENUMERATED {enabled} OPTIONAL, -- Need R

channelAccessConfig-r16 SetupRelease { ChannelAccessConfig-r16 } OPTIONAL -- Need M

]],

[[

nr-dl-PRS-PDC-Info-r17 SetupRelease {NR-DL-PRS-PDC-Info-r17} OPTIONAL, -- Need M

semiStaticChannelAccessConfigUE-r17 SetupRelease {SemiStaticChannelAccessConfigUE-r17} OPTIONAL, -- Need M

mimoParam-r17 SetupRelease {MIMOParam-r17} OPTIONAL, -- Need M

channelAccessMode2-r17 ENUMERATED {enabled} OPTIONAL, -- Need R

timeDomainHARQ-BundlingType1-r17 ENUMERATED {enabled} OPTIONAL, -- Need R

nrofHARQ-BundlingGroups-r17 ENUMERATED {n1, n2, n4} OPTIONAL, -- Need R

fdmed-ReceptionMulticast-r17 ENUMERATED {true} OPTIONAL, -- Need R

moreThanOneNackOnlyMode-r17 ENUMERATED {mode2} OPTIONAL, -- Need S

tci-Info-r17 TCI-Info OPTIONAL, -- Cond TCI\_Info

directionalCollisionHandling-DC-r17 ENUMERATED {enabled} OPTIONAL, -- Need R

lte-NeighCellsCRS-AssistInfoList-r17 SetupRelease { LTE-NeighCellsCRS-AssistInfoList-r17 } OPTIONAL -- Need M

]]

}

UplinkConfig ::= SEQUENCE {

initialUplinkBWP BWP-UplinkDedicated OPTIONAL, -- Need M

uplinkBWP-ToReleaseList SEQUENCE (SIZE (1..maxNrofBWPs)) OF BWP-Id OPTIONAL, -- Need N

uplinkBWP-ToAddModList SEQUENCE (SIZE (1..maxNrofBWPs)) OF BWP-Uplink OPTIONAL, -- Need N

firstActiveUplinkBWP-Id BWP-Id OPTIONAL, -- Cond SyncAndCellAdd

pusch-ServingCellConfig SetupRelease { PUSCH-ServingCellConfig } OPTIONAL, -- Need M

carrierSwitching SetupRelease { SRS-CarrierSwitching } OPTIONAL, -- Need M

...,

[[

powerBoostPi2BPSK BOOLEAN OPTIONAL, -- Need M

uplinkChannelBW-PerSCS-List SEQUENCE (SIZE (1..maxSCSs)) OF SCS-SpecificCarrier OPTIONAL -- Need S

]],

[[

enablePL-RS-UpdateForPUSCH-SRS-r16 ENUMERATED {enabled} OPTIONAL, -- Need R

enableDefaultBeamPL-ForPUSCH0-0-r16 ENUMERATED {enabled} OPTIONAL, -- Need R

enableDefaultBeamPL-ForPUCCH-r16 ENUMERATED {enabled} OPTIONAL, -- Need R

enableDefaultBeamPL-ForSRS-r16 ENUMERATED {enabled} OPTIONAL, -- Need R

uplinkTxSwitching-r16 SetupRelease { UplinkTxSwitching-r16 } OPTIONAL, -- Need M

mpr-PowerBoost-FR2-r16 ENUMERATED {true} OPTIONAL -- Need R

]]

}

DummyJ ::= SEQUENCE {

maxEnergyDetectionThreshold-r16 INTEGER(-85..-52),

energyDetectionThresholdOffset-r16 INTEGER (-20..-13),

ul-toDL-COT-SharingED-Threshold-r16 INTEGER (-85..-52) OPTIONAL, -- Need R

absenceOfAnyOtherTechnology-r16 ENUMERATED {true} OPTIONAL -- Need R

}

ChannelAccessConfig-r16 ::= SEQUENCE {

energyDetectionConfig-r16 CHOICE {

maxEnergyDetectionThreshold-r16 INTEGER (-85..-52),

energyDetectionThresholdOffset-r16 INTEGER (-13..20)

} OPTIONAL, -- Need R

ul-toDL-COT-SharingED-Threshold-r16 INTEGER (-85..-52) OPTIONAL, -- Need R

absenceOfAnyOtherTechnology-r16 ENUMERATED {true} OPTIONAL -- Need R

}

IntraCellGuardBandsPerSCS-r16 ::= SEQUENCE {

guardBandSCS-r16 SubcarrierSpacing,

intraCellGuardBands-r16 SEQUENCE (SIZE (1..4)) OF GuardBand-r16

}

GuardBand-r16 ::= SEQUENCE {

startCRB-r16 INTEGER (0..274),

nrofCRBs-r16 INTEGER (0..15)

}

DormancyGroupID-r16 ::= INTEGER (0..4)

DormantBWP-Config-r16::= SEQUENCE {

dormantBWP-Id-r16 BWP-Id OPTIONAL, -- Need M

withinActiveTimeConfig-r16 SetupRelease { WithinActiveTimeConfig-r16 } OPTIONAL, -- Need M

outsideActiveTimeConfig-r16 SetupRelease { OutsideActiveTimeConfig-r16 } OPTIONAL -- Need M

}

WithinActiveTimeConfig-r16 ::= SEQUENCE {

firstWithinActiveTimeBWP-Id-r16 BWP-Id OPTIONAL, -- Need M

dormancyGroupWithinActiveTime-r16 DormancyGroupID-r16 OPTIONAL -- Need R

}

OutsideActiveTimeConfig-r16 ::= SEQUENCE {

firstOutsideActiveTimeBWP-Id-r16 BWP-Id OPTIONAL, -- Need M

dormancyGroupOutsideActiveTime-r16 DormancyGroupID-r16 OPTIONAL -- Need R

}

UplinkTxSwitching-r16 ::= SEQUENCE {

uplinkTxSwitchingPeriodLocation-r16 BOOLEAN,

uplinkTxSwitchingCarrier-r16 ENUMERATED {carrier1, carrier2}

}

MIMOParam-r17 ::= SEQUENCE {

additionalPCI-ToAddModList-r17 SEQUENCE (SIZE(1..maxNrofAdditionalPCI-r17)) OF SSB-MTC-AdditionalPCI-r17 OPTIONAL, -- Need N

additionalPCI-ToReleaseList-r17 SEQUENCE (SIZE(1..maxNrofAdditionalPCI-r17)) OF AdditionalPCIIndex-r17 OPTIONAL, -- Need N

unifiedTCI-StateType-r17 ENUMERATED {separate, joint} OPTIONAL, -- Need R

uplink-PowerControlToAddModList-r17 SEQUENCE (SIZE (1..maxUL-TCI-r17)) OF Uplink-powerControl-r17 OPTIONAL, -- Need N

uplink-PowerControlToReleaseList-r17 SEQUENCE (SIZE (1..maxUL-TCI-r17)) OF Uplink-powerControlId-r17 OPTIONAL, -- Need N

sfnSchemePDCCH-r17 ENUMERATED {sfnSchemeA,sfnSchemeB} OPTIONAL, -- Need R

sfnSchemePDSCH-r17 ENUMERATED {sfnSchemeA,sfnSchemeB} OPTIONAL -- Need R

}

-- TAG-SERVINGCELLCONFIG-STOP

-- ASN1STOP

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| --- |
| *ChannelAccessConfig* field descriptions |
| ***absenceOfAnyOtherTechnology***  Presence of this field indicates absence on a long term basis (e.g. by level of regulation) of any other technology sharing the carrier; absence of this field indicates the potential presence of any other technology sharing the carrier, as specified in TS 37.213 [48] clauses 4.2.1 and 4.2.3. |
| ***energyDetectionConfig***  Indicates whether to use the *maxEnergyDetectionThreshold* or the *energyDetectionThresholdOffset* (see TS 37.213 [48], clause 4.2.3)*.* |
| ***energyDetectionThresholdOffset***  Indicates the offset to the default maximum energy detection threshold value. Unit in dB. Value -13 corresponds to -13dB, value -12 corresponds to -12dB, and so on (i.e. in steps of 1dB) as specified in TS 37.213 [48], clause 4.2.3. |
| ***maxEnergyDetectionThreshold***  Indicates the absolute maximum energy detection threshold value. Unit in dBm. Value -85 corresponds to -85 dBm, value -84 corresponds to -84 dBm, and so on (i.e. in steps of 1dBm) as specified in TS 37.213 [48], clause 4.2.3. |
| ***ul-toDL-COT-SharingED-Threshold***  Maximum energy detection threshold that the UE should use to share channel occupancy with gNB for DL transmission as specified in TS 37.213 [48], clause 4.1.3 for downlink channel access and clause 4.2.3 for uplink channel access. This field is not applicable in semi-static channel access mode. |

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| *ServingCellConfig* field descriptions |
| ***additionalPCIList***  List of information for the additional SSB with different PCI than serving cell PCI. The additional SSBs with different PCIs are not used for measurement event evaluation. |
| ***bwp-InactivityTimer***  The duration in ms after which the UE falls back to the default Bandwidth Part (see TS 38.321 [3], clause 5.15). When the network releases the timer configuration, the UE stops the timer without switching to the default BWP. |
| ***ca-SlotOffset***  Slot offset between the primary cell (PCell/PSCell) and the SCell in unaligned frame boundary with slot alignment and partial SFN alignment inter-band CA. Based on this field, the UE determines the time offset of the SCell as specified in clause 4.5 of TS 38.211 [16]. The granularity of this field is determined by the reference SCS for the slot offset (i.e. the maximum of PCell/PSCell lowest SCS among all the configured SCSs in DL/UL *SCS-SpecificCarrierList* in *ServingCellConfigCommon* or *ServingCellConfigCommonSIB* and this serving cell's lowest SCS among all the configured SCSs in DL/UL *SCS-SpecificCarrierList* in *ServingCellConfigCommon* or *ServingCellConfigCommonSIB*).  The Network configures at most single non-zero offset duration in ms (independent on SCS) among CCs in the unaligned CA configuration. If the field is absent, the UE applies the value of 0. The slot offset value can only be changed with SCell release and add. |
| ***cbg-TxDiffTBsProcessingType1, cbg-TxDiffTBsProcessingType2***  Indicates whether processing types 1 and 2 based CBG based operation is enabled according to Rel-16 UE capabilities. |
| ***channelAccessConfig***  List of parameters used for access procedures of operation with shared spectrum channel access (see TS 37.213 [48). |
| ***channelAccessMode2***  If present, this field indicates that the UE shall apply channel access mode procedures for operation with shared spectrum channel access in accordance with TS 37.213 [48], clause 4.4 for FR2-2. If absent, the UE does not apply these channel access procedures.  Overwrites the corresponding field in *ServingCellConfigCommon* or *ServingCellConfigCommonSIB* for this serving cell. |
| ***crossCarrierSchedulingConfig***  Indicates whether this serving cell is cross-carrier scheduled by another serving cell or whether it cross-carrier schedules another serving cell. If the field *other* is configured for an SpCell (i.e., the SpCell is cross-carrier scheduled by another serving cell), the SpCell can be additionally scheduled by the PDCCH on the SpCell. |
| ***crs-RateMatch-PerCORESETPoolIndex***  Indicates how UE performs rate matching when both lte-CRS-PatternList1-r16 and lte-CRS-PatternList2-r16 are configured as specified in TS 38.214 [19], clause 5.1.4.2. |
| ***csi-RS-ValidationWithDCI***  Indicates how the UE performs periodic and semi-persistent CSI-RS reception in a slot. The presence of this field indicates that the UE uses DCI detection to validate whether to receive CSI-RS (see TS 38.213 [13], clause 11.1). |
| ***defaultDownlinkBWP-Id***  The initial bandwidth part is referred to by BWP-Id = 0. ID of the downlink bandwidth part to be used upon expiry of the BWP inactivity timer. This field is UE specific. When the field is absent the UE uses the initial BWP as default BWP. (see TS 38.213 [13], clause 12 and TS 38.321 [3], clause 5.15). |
| ***directionalCollisionHandling***  Indicates that this serving cell is using directional collision handling between a reference and other cell(s) for half-duplex operation in TDD CA with same SCS as specified in TS 38.213 [13], clause 11.1. The half-duplex operation only applies within the same frequency range and cell group.  The network only configures this field for TDD serving cells that are using the same SCS. |
| ***directionalCollisionHandling-DC***  For the IAB-MT, it indicates that this serving cell is using directional collision handling between a reference and other cell(s) for half-duplex operation in TDD NR-DC with same SCS within same cell group or cross different cell groups. |
| ***dormantBWP-Config***  The dormant BWP configuration for an SCell. This field can be configured only for a (non-PUCCH) SCell. |
| ***downlinkBWP-ToAddModList***  List of additional downlink bandwidth parts to be added or modified. (see TS 38.213 [13], clause 12). |
| ***downlinkBWP-ToReleaseList***  List of additional downlink bandwidth parts to be released. (see TS 38.213 [13], clause 12). |
| ***downlinkChannelBW-PerSCS-List***  A set of UE specific channel bandwidth and location configurations for different subcarrier spacings (numerologies). Defined in relation to Point A. The UE uses the configuration provided in this field only for the purpose of channel bandwidth and location determination. If absent, UE uses the configuration indicated in *scs-SpecificCarrierList* in *DownlinkConfigCommon* / *DownlinkConfigCommonSIB*. Network only configures channel bandwidth that corresponds to the channel bandwidth values defined in TS 38.101-1 [15] and TS 38.101-2 [39]. |
| ***dummy1, dummy 2***  This field is not used in the specification. If received it shall be ignored by the UE. |
| ***enableBeamSwitchTiming***  Indicates the aperiodic CSI-RS triggering with beam switching triggering behaviour as defined in clause 5.2.1.5.1 of TS 38.214 [19]. |
| ***enableDefaultTCI-StatePerCoresetPoolIndex***  Presence of this field indicates the UE shall follow the release 16 behavior of default TCI state per CORESETPoolindex when the UE is configured by higher layer parameter PDCCH-Config that contains two different values of CORESETPoolIndex in ControlResourceSet is enabled. |
| ***enableTwoDefaultTCI-States***  Presence of this field indicates the UE shall follow the release 16 behavior of two default TCI states for PDSCH when at least one TCI codepoint is mapped to two TCI states is enabled |
| ***fdmed-ReceptionMulticast***  Indicates the Type-1 HARQ codebook generation as specified in TS 38.213 [13], clause 9.1.2.1. |
| ***firstActiveDownlinkBWP-Id***  If configured for an SpCell, this field contains the ID of the DL BWP to be activated or to be used for RLM, BFD and measurements if included in an *RRCReconfiguration* message contained in an NR or E-UTRA RRC message indicating that the SCG is deactivated, upon performing the RRC (re-)configuration. If the field is absent, the RRC (re-)configuration does not impose a BWP switch. If the field is absent for the PSCell at SCG deactivation, the UE considers the previously activated DL BWP as the BWP to be used for RLM, BFD and measurements. If the field is absent for the PSCell at SCG activation, the DL BWP to be activated is the DL BWP previously to be used for RLM, BFD and measurements.  If configured for an SCell, this field contains the ID of the downlink bandwidth part to be used upon activation of an SCell. The initial bandwidth part is referred to by BWP-Id = 0.  Upon reconfiguration with *reconfigurationWithSync*, the network sets the *firstActiveDownlinkBWP-Id* and *firstActiveUplinkBWP-Id* to the same value. |
| ***initialDownlinkBWP***  The dedicated (UE-specific) configuration for the initial downlink bandwidth-part (i.e. DL BWP#0). If any of the optional IEs are configured within this IE, the UE considers the BWP#0 to be an RRC configured BWP (from UE capability viewpoint). Otherwise, the UE does not consider the BWP#0 as an RRC configured BWP (from UE capability viewpoint). Network always configures the UE with a value for this field if no other BWPs are configured. NOTE1 |
| ***intraCellGuardBandsDL-List, intraCellGuardBandsUL-List***  List of intra-cell guard bands in a serving cell for operation with shared spectrum channel access. If not configured, the guard bands are defined according to 38.101-1 [15], see TS 38.214 [19], clause 7. For operation in licensed spectrum, this field is absent, and no UE action is required. |
| ***lte-CRS-PatternList1***  A list of LTE CRS patterns around which the UE shall do rate matching for PDSCH. The LTE CRS patterns in this list shall be non-overlapping in frequency. The network does not configure this field and *lte-CRS-ToMatchAround* simultaneously. |
| ***lte-CRS-PatternList2***  A list of LTE CRS patterns around which the UE shall do rate matching for PDSCH scheduled with a DCI detected on a CORESET with CORESETPoolIndex configured with 1. This list is configured only if CORESETPoolIndex configured with 1. The first LTE CRS pattern in this list shall be fully overlapping in frequency with the first LTE CRS pattern in lte-CRS-PatternList1, The second LTE CRS pattern in this list shall be fully overlapping in frequency with the second LTE CRS pattern in lte-CRS-PatternList1, and so on. Network configures this field only if the field *lte-CRS-ToMatchAround* is not configured and there is at least one ControlResourceSet in one DL BWP of this serving cell with *coresetPoolIndex* set to 1. |
| ***lte-CRS-ToMatchAround***  Parameters to determine an LTE CRS pattern that the UE shall rate match around. |
| ***lte-NeighCellsCRS-AssistInfoList***  A list of LTE neighbour cells configuration information which is used to assist the UE to perform CRS interference mitigation (CRS-IM) in scenarios with overlapping spectrum for LTE and NR (see TS 38.101-4 [59]). If the field is included, it replaces any previous list, i.e. all the entries of the list are replaced and each of the *LTE-NeighCellsCRS-AssistInfo* entries is considered to be newly created and the conditions and Need codes for setup of the entry apply. |
| ***nr-dl-PRS-PDC-Info***  Configures the DL PRS for propagation delay compensation. When configured, the UE measures the UE Rx-Tx time difference based on the reference signals configured in this field. |
| ***nrofHARQ-BundlingGroups***  Indicates the number of HARQ bundling groups for type2 HARQ-ACK codebook. |
| ***pathlossReferenceLinking***  Indicates whether UE shall apply as pathloss reference either the downlink of SpCell (PCell for MCG or PSCell for SCG) or of SCell that corresponds with this uplink (see TS 38.213 [13], clause 7). |
| ***pdsch-ServingCellConfig***  PDSCH related parameters that are not BWP-specific. |
| ***rateMatchPatternToAddModList***  Resources patterns which the UE should rate match PDSCH around. The UE rate matches around the union of all resources indicated in the rate match patterns. Rate match patterns defined here on cell level apply only to PDSCH of the same numerology. See TS 38.214 [19], clause 5.1.4.1. If a *RateMatchPattern* with the same *RateMatchPatternId* is configured in both *ServingCellConfig/ServingCellConfigCommon* and in SIB20/MCCH, the entire *RateMatchPattern* configuration shall be the same and they are counted as a single rate match pattern in the total configured rate match patterns as defined in TS 38.214 [19]. |
| ***sCellDeactivationTimer***  SCell deactivation timer in TS 38.321 [3]. If the field is absent, the UE applies the value infinity. |
| ***sfnSchemePDCCH***  This parameter is used to configure SFN scheme for PDCCH: sfnSchemeA or sfnSchemeB as specified (see TS 38.214 [19], clause 5.1). If network includes both *sfnSchemePDCCH* and *sfnSchemePDSCH*, same value shall be configured. |
| ***sfnSchemePDSCH***  This parameter is used to configure SFN scheme for PDSCH: sfnSchemeA or sfnSchemeB as specified (see TS 38.214 [19], clause 5.1). If network includes both *sfnSchemePDCCH* and *sfnSchemePDSCH*, same value shall be configured. |
| ***semiStaticChannelAccessConfigUE***  When this field is configured and when *channelAccessMode-r16* (see IE ServingCellConfigCommon and IE ServingCellConfigCommonSIB) is configured to *semiStatic*, the UE operates in semi-static channel access mode and can initiate a channel occupancy periodically (see TS 37.213 [48], Clause 4.3).  The period can be configured independently from period configured in *SemiStaticChannelAccessConfig-r16* if the UE indicates the corresponding capability. Otherwise, the periodicity configured by *periodUE-r17* is an integer multiple of or an integter factor of the periodicity indicated by *period* in *SemiStaticChannelAccessConfig-r16.* |
| ***servingCellMO***  *measObjectId* of the *MeasObjectNR* in *MeasConfig* which is associated to the serving cell. For this *MeasObjectNR*, the following relationship applies between this MeasObjectNR and *frequencyInfoDL* in *ServingCellConfigCommon* of the serving cell: if *ssbFrequency* is configured, its value is the same as the *absoluteFrequencySSB* and if *csi-rs-ResourceConfigMobility* is configured, the value of its *subcarrierSpacing* is present in one entry of the *scs-SpecificCarrierList*, *csi-RS-CellListMobility* includes an entry corresponding to the serving cell (with *cellId* equal to *physCellId* in *ServingCellConfigCommon*) and the frequency range indicated by the *csi-rs-MeasurementBW* of the entry in *csi-RS-CellListMobility* is included in the frequency range indicated by in the entry of the *scs-SpecificCarrierList*. |
| ***supplementaryUplink***  Network may configure this field only when *supplementaryUplinkConfig* is configured in *ServingCellConfigCommon* or *supplementaryUplink* is configured in *ServingCellConfigCommonSIB*. |
| ***supplementaryUplinkRelease***  If this field is included, the UE shall release the uplink configuration configured by *supplementaryUplink*. The network only includes either *supplementaryUplinkRelease* or *supplementaryUplink* at a time. |
| ***tag-Id***  Timing Advance Group ID, as specified in TS 38.321 [3], which this cell belongs to. |
| ***tci-Info***  If configured for an SCell, or if configured for the PSCell when the SCG is being activated upon the reception of the containing message, the UE shall consider the indicated TCI states as the activated TCI states for PDCCH/PDSCH reception on this serving cell.  If configured for the PSCell when the SCG is indicated as deactivated in the containing message:  - the UE shall consider the indicated TCI states as the TCI states to be activated for PDCCH/PDSCH reception upon a later SCG activation in which *tci-Info* is absent  - if bfd-and-RLM is configured and no RS is configured in *RadioLinkMonitoringConfig* for RLM, respectively for BFD, the UE shall use the indicated TCI states for PDCCH as RS for RLM, respectively for BFD.  When this field is absent for the PSCell and the SCG is being deactivated:  - the UE shall consider the previously activated TCI states as the TCI states to be activated for PDCCH/PDSCH reception upon a later SCG activation in which *tci-Info* is absent  - if *bfd-and-RLM* is configured and no RS is configured in *RadioLinkMonitoringConfig* for RLM, respectively for BFD, the UE shall use the previously activated TCI states for PDCCH as RS for RLM, respectively for BFD. |
| ***tdd-UL-DL-ConfigurationDedicated-IAB-MT***  Resource configuration per IAB-MT D/U/F overrides all symbols (with a limitation that effectively only flexible symbols can be overwritten in Rel-16) per slot over the number of slots as provided by *TDD-UL-DL ConfigurationCommon*. |
| ***unifiedTCI-StateType***  Indicates the unified TCI state type the UE is configured for this serving cell. The value "Separate" means this serving cell is configured with *dl-orJoint-TCI-ToAddModList* for DL TCI state and *ul-TCI-ToAddModList* for UL TCI state. The value "Joint" means this serving cell is configured with *dl-orJoint-TCI-ToAddModList* for joint TCI state for UL and DL operation. |
| ***uplinkConfig***  Network may configure this field only when *uplinkConfigCommon* is configured in *ServingCellConfigCommon* or *ServingCellConfigCommonSIB*. Addition or release of this field can only be done upon SCell addition or release (respectively). |
| ***uplink-PowerControlToAddModList***  Configures UL power control parameters for PUSCH, PUCCH and SRS when field unifiedTCI-StateType is configured for this serving cell. |

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| *UplinkConfig* field descriptions |
| ***carrierSwitching***  Includes parameters for configuration of carrier based SRS switching (see TS 38.214 [19], clause 6.2.1.3. |
| ***enableDefaultBeamPL-ForPUSCH0-0, enableDefaultBeamPL-ForPUCCH, enableDefaultBeamPL-ForSRS***  When the parameter is present, UE derives the spatial relation and the corresponding pathloss reference Rs as specified in 38.213, clauses 7.1.1, 7.2.1, 7.3.1 and 9.2.2. The network only configures these parameters for FR2. |
| ***enablePL-RS-UpdateForPUSCH-SRS***  When this parameter is present, the Rel-16 feature of MAC CE based pathloss RS updates for PUSCH/SRS is enabled. Network only configures this parameter when the UE is configured with *sri-PUSCH-PowerControl*. If this field is not configured, network configures at most 4 pathloss RS resources for PUSCH/PUCCH/SRS transmissions per BWP, not including pathloss RS resources for SRS transmissions for positioning. (See TS 38.213 [13], clause 7). |
| ***firstActiveUplinkBWP-Id***  If configured for an SpCell, this field contains the ID of the UL BWP to be activated upon performing the RRC (re-)configuration. If the field is absent, the RRC (re-)configuration does not impose a BWP switch.  If configured for an SCell, this field contains the ID of the uplink bandwidth part to be used upon activation of an SCell. The initial bandwidth part is referred to by BandiwdthPartId = 0. |
| ***initialUplinkBWP***  The dedicated (UE-specific) configuration for the initial uplink bandwidth-part (i.e. UL BWP#0). If any of the optional IEs are configured within this IE as part of the IE *uplinkConfig*, the UE considers the BWP#0 to be an RRC configured BWP (from UE capability viewpoint). Otherwise, the UE does not consider the BWP#0 as an RRC configured BWP (from UE capability viewpoint). Network always configures the UE with a value for this field if no other BWPs are configured. NOTE1 |
| ***moreThanOneNackOnlyMode***  Indicates the mode of supporting more than one NACK-only feedback in the same PUCCH transmission. Mode 1 means UE multiplexing the HARQ-ACK bits by transforming NACK-only into ACK/NACK HARQ bits. Mode 2 means UE transmitting a specific sequence or a PUCCH transmission corresponding to the combination of more than one NACK-only HARQ feedback. If multicast CFR is not configured, this field is not included. Otherwise, if the field is absent, UE uses mode 1 for multicast CFR. |
| ***mpr-PowerBoost-FR2***  Indicates whether UE is allowed to boost uplink transmission power by suspending in-band emission (IBE) requirements as specified in TS 38.101-2 [39]. Network only configures this field for FR2 serving cells. |
| ***powerBoostPi2BPSK***  If this field is set to *true*, the UE determines the maximum output power for PUCCH/PUSCH transmissions that use pi/2 BPSK modulation according to TS 38.101-1 [15], clause 6.2.4. |
| ***pusch-ServingCellConfig***  PUSCH related parameters that are not BWP-specific. |
| ***uplinkBWP-ToAddModList***  The additional bandwidth parts for uplink to be added or modified. In case of TDD uplink- and downlink BWP with the same *bandwidthPartId* are considered as a BWP pair and must have the same center frequency. |
| ***uplinkBWP-ToReleaseList***  The additional bandwidth parts for uplink to be released. |
| ***uplinkChannelBW-PerSCS-List***  A set of UE specific channel bandwidth and location configurations for different subcarrier spacings (numerologies). Defined in relation to Point A. The UE uses the configuration provided in this field only for the purpose of channel bandwidth and location determination. If absent, UE uses the configuration indicated in *scs-SpecificCarrierList* in *UplinkConfigCommon* / *UplinkConfigCommonSIB*. Network only configures channel bandwidth that corresponds to the channel bandwidth values defined in TS 38.101-1 [15] and TS 38.101-2 [39]. |
| ***uplinkTxSwitchingPeriodLocation***  Indicates whether the location of UL Tx switching period is configured in this uplink carrier in case of inter-band UL CA, SUL, or (NG)EN-DC, as specified in TS 38.101-1 [15] and TS 38.101-3 [34].  In case of (NG)EN-DC, network always configures this field to TRUE for NR carrier (i.e. with (NG)EN-DC, the UL switching period always occurs on the NR carrier).  In case of inter-band UL CA or SUL, for dynamic uplink Tx switching between 2 bands with 2 uplink carriers or 3 uplink carriers as defined in TS 38.101-1 [15], network configures this field to TRUE for the uplink carrier(s) on one band and configures this field to FALSE for the uplink carrier(s) on the other band. This field is set to the same value for the carriers on the same band. |
| ***uplinkTxSwitchingCarrier***  Indicates that the configured carrier is carrier1 or carrier2 for dynamic uplink Tx switching, as defined in TS 38.101-1 [15] and TS 38.101-3 [34]. In case of (NG)EN-DC, network always configures the NR carrier as carrier 2.  In case of inter-band UL CA or SUL, for dynamic uplink Tx switching between 2 bands with 2 uplink carriers or 3 uplink carriers as defined in TS 38.101-1 [15], network configures the uplink carrier(s) on one band as carrier1 and the uplink carrier(s) on the other band as carrier2. This field is set to the same value for the carriers on the same band. |

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| *DormantBWP-Config* field descriptions |
| ***dormancyGroupWithinActiveTime***  This field contains the ID of an SCell group for Dormancy within active time, to which this SCell belongs. The use of the Dormancy within active time SCell groups is specified in TS 38.213 [13]. |
| ***dormancyGroupOutsideActiveTime***  This field contains the ID of an SCell group for Dormancy outside active time, to which this SCell belongs. The use of the Dormancy outside active time SCell groups is specified in TS 38.213 [13]. |
| ***dormantBWP-Id***  This field contains the ID of the downlink bandwidth part to be used as dormant BWP. If this field is configured, its value is different from *defaultDownlinkBWP-Id*, and at least one of the *withinActiveTimeConfig* and *outsideActiveTimeConfig* should be configured. |
| ***firstOutsideActiveTimeBWP-Id***  This field contains the ID of the downlink bandwidth part to be activated when receiving a DCI indication for SCell dormancy outside active time. |
| ***firstWithinActiveTimeBWP-Id***  This field contains the ID of the downlink bandwidth part to be activated when receiving a DCI indication for SCell dormancy within active time. |
| ***outsideActiveTimeConfig***  This field contains the configuration to be used for SCell dormancy outside active time, as specified in TS 38.213 [13]. The field can only be configured when the cell group the SCell belongs to is configured with *dcp-Config*. |
| ***withinActiveTimeConfig***  This field contains the configuration to be used for SCell dormancy within active time, as specified in TS 38.213 [13]. |

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| *GuardBand* field descriptions |
| ***startCRB***  Indicates the starting RB of the guard band. |
| ***nrofCRB***  Indicates the length of the guard band in RBs. When set to 0, zero-size guard band is used. |

NOTE 1: If the dedicated part of initial UL/DL BWP configuration is absent, the initial BWP can be used but with some limitations. For example, changing to another BWP requires *RRCReconfiguration* since DCI format 1\_0 doesn't support DCI-based switching.

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| Conditional Presence | Explanation |
| *AsyncCA* | This field is mandatory present for SCells whose slot offset between the SpCell is not 0. Otherwise it is absent, Need S. |
| *MeasObject* | This field is mandatory present for the SpCell if the UE has a *measConfig*, and it is optionally present, Need M, for SCells and RedCap UEs. |
| *SCellOnly* | This field is optionally present, Need R, for SCells. It is absent otherwise. |
| *ServingCellWithoutPUCCH* | This field is optionally present, Need S, for SCells except PUCCH SCells. It is absent otherwise. |
| *SyncAndCellAdd* | This field is mandatory present for a SpCell upon reconfiguration with *reconfigurationWithSync* and upon *RRCSetup*/*RRCResume*.  The field is optionally present for an SpCell, Need N, upon reconfiguration without *reconfigurationWithSync*.  The field is mandatory present for an SCell upon addition, and absent for SCell in other cases, Need M. |
| *TCI\_Info* | This field is optional Need N for SCells if *sCellState* is configured, otherwise it is absent.  This field is optional Need S for the PSCell when the SCG is indicated as deactivated or is being activated, otherwise it is absent.  This field is absent for the PCell. |
| *TDD* | This field is optionally present, Need R, for TDD cells. It is absent otherwise. |
| *TDD\_IAB* | For IAB-MT, this field is optionally present, Need R, for TDD cells. It is absent otherwise. |

#### – *ServingCellConfigCommon*

The IE *ServingCellConfigCommon* is used to configure cell specific parameters of a UE's serving cell. The IE contains parameters which a UE would typically acquire from SSB, MIB or SIBs when accessing the cell from IDLE. With this IE, the network provides this information in dedicated signalling when configuring a UE with a SCells or with an additional cell group (SCG). It also provides it for SpCells (MCG and SCG) upon reconfiguration with sync.

*ServingCellConfigCommon* information element

-- ASN1START

-- TAG-SERVINGCELLCONFIGCOMMON-START

ServingCellConfigCommon ::= SEQUENCE {

physCellId PhysCellId OPTIONAL, -- Cond HOAndServCellAdd,

downlinkConfigCommon DownlinkConfigCommon OPTIONAL, -- Cond HOAndServCellAdd

uplinkConfigCommon UplinkConfigCommon OPTIONAL, -- Need M

supplementaryUplinkConfig UplinkConfigCommon OPTIONAL, -- Need S

n-TimingAdvanceOffset ENUMERATED { n0, n25600, n39936 } OPTIONAL, -- Need S

ssb-PositionsInBurst CHOICE {

shortBitmap BIT STRING (SIZE (4)),

mediumBitmap BIT STRING (SIZE (8)),

longBitmap BIT STRING (SIZE (64))

} OPTIONAL, -- Cond AbsFreqSSB

ssb-periodicityServingCell ENUMERATED { ms5, ms10, ms20, ms40, ms80, ms160, spare2, spare1 } OPTIONAL, -- Need S

dmrs-TypeA-Position ENUMERATED {pos2, pos3},

lte-CRS-ToMatchAround SetupRelease { RateMatchPatternLTE-CRS } OPTIONAL, -- Need M

rateMatchPatternToAddModList SEQUENCE (SIZE (1..maxNrofRateMatchPatterns)) OF RateMatchPattern OPTIONAL, -- Need N

rateMatchPatternToReleaseList SEQUENCE (SIZE (1..maxNrofRateMatchPatterns)) OF RateMatchPatternId OPTIONAL, -- Need N

ssbSubcarrierSpacing SubcarrierSpacing OPTIONAL, -- Cond HOAndServCellWithSSB

tdd-UL-DL-ConfigurationCommon TDD-UL-DL-ConfigCommon OPTIONAL, -- Cond TDD

ss-PBCH-BlockPower INTEGER (-60..50),

...,

[[

channelAccessMode-r16 CHOICE {

dynamic NULL,

semiStatic SemiStaticChannelAccessConfig-r16

} OPTIONAL, -- Cond SharedSpectrum

discoveryBurstWindowLength-r16 ENUMERATED {ms0dot5, ms1, ms2, ms3, ms4, ms5} OPTIONAL, -- Need R

ssb-PositionQCL-r16 SSB-PositionQCL-Relation-r16 OPTIONAL, -- Cond SharedSpectrum

highSpeedConfig-r16 HighSpeedConfig-r16 OPTIONAL -- Need R

]],

[[

highSpeedConfig-v1700 HighSpeedConfig-v1700 OPTIONAL, -- Need R

channelAccessMode2-r17 ENUMERATED {enabled} OPTIONAL, -- Cond SharedSpectrum2

discoveryBurstWindowLength-r17 ENUMERATED {ms0dot125, ms0dot25, ms0dot5, ms0dot75, ms1, ms1dot25} OPTIONAL, -- Need R

ssb-PositionQCL-r17 SSB-PositionQCL-Relation-r17 OPTIONAL, -- Cond SharedSpectrum2

highSpeedConfigFR2-r17 HighSpeedConfigFR2-r17 OPTIONAL, -- Need R

uplinkConfigCommon-v1700 UplinkConfigCommon-v1700 OPTIONAL, -- Need R

ntn-Config-r17 NTN-Config-r17 OPTIONAL -- Need R

]]

}

-- TAG-SERVINGCELLCONFIGCOMMON-STOP

-- ASN1STOP

|  |
| --- |
| *ServingCellConfigCommon* field descriptions |
| ***channelAccessMode***  If present, this field indicates which channel access procedures to apply for operation with shared spectrum channel access as defined in TS 37.213 [48]. If the field is configured as "semiStatic", the UE shall apply the channel access procedures for semi-static channel occupancy as described in clause 4.3 in TS 37.213. If the field is configured as "dynamic", the UE shall apply the channel access procedures in TS 37.213, with the exception of clause 4.3 of TS 37.213. |
| ***channelAccessMode2***  If present ('enabled'), the UE shall apply channel access mode procedures for operation with shared spectrum channel access in accordance with TS 37.213 [48], clause 4.4 for FR2-2. If absent, the UE shall not apply any channel access procedure. |
| ***dmrs-TypeA-Position***  Position of (first) DM-RS for downlink (see TS 38.211 [16], clause 7.4.1.1.1) and uplink (TS 38.211 [16], clause 6.4.1.1.3). |
| ***downlinkConfigCommon***  The common downlink configuration of the serving cell, including the frequency information configuration and the initial downlink BWP common configuration. The parameters provided herein should match the parameters configured by MIB and SIB1 (if provided) of the serving cell, with the exception of *controlResourceSetZero* and *searchSpaceZero* which can be configured in *ServingCellConfigCommon* even if MIB indicates that they are absent. |
| ***discoveryBurstWindowLength***  Indicates the window length of the discovery burst in ms (see TS 37.213 [48]). The field *discoveryBurstWindowLength-r17* is applicable to SCS 480 kHz and SCS 960 kHz. |
| ***longBitmap***  Bitmap when maximum number of SS/PBCH blocks per half frame equals to 64 as defined in TS 38.213 [13], clause 4.1. |
| ***lte-CRS-ToMatchAround***  Parameters to determine an LTE CRS pattern that the UE shall rate match around. |
| ***mediumBitmap***  Bitmap when maximum number of SS/PBCH blocks per half frame equals to 8 as defined in TS 38.213 [13], clause 4.1. |
| ***n-TimingAdvanceOffset***  The N\_TA-Offset to be applied for all uplink transmissions on this serving cell. If the field is absent, the UE applies the value defined for the duplex mode and frequency range of this serving cell. See TS 38.133 [14], table 7.1.2-2. |
| ***rateMatchPatternToAddModList***  Resources patterns which the UE should rate match PDSCH around. The UE rate matches around the union of all resources indicated in the rate match patterns. Rate match patterns defined here on cell level apply only to PDSCH of the same numerology (see TS 38.214 [19], clause 5.1.4.1). If a *RateMatchPattern* with the same *RateMatchPatternId* is configured in both *ServingCellConfig/ServingCellConfigCommon* and in SIB20/MCCH, the entire *RateMatchPattern* configuration shall be the same and they are counted as a single rate match pattern in the total configured rate match patterns as defined in TS 38.214 [19]. |
| ***shortBitmap***  Bitmap when maximum number of SS/PBCH blocks per half frame equals to 4 as defined in TS 38.213 [13], clause 4.1. |
| ***ss-PBCH-BlockPower***  Average EPRE of the resources elements that carry secondary synchronization signals in dBm that the NW used for SSB transmission, see TS 38.213 [13], clause 7. |
| ***ssb-periodicityServingCell***  The SSB periodicity in ms for the rate matching purpose. If the field is absent, the UE applies the value ms5. (see TS 38.213 [13], clause 4.1) |
| ***ssb-PositionQCL***  Indicates the QCL relation between SSB positions for this serving cell as specified in TS 38.213 [13], clause 4.1. |
| ***ssb-PositionsInBurst***  For operation in licensed spectrum, indicates the time domain positions of the transmitted SS-blocks in a half frame with SS/PBCH blocks as defined in TS 38.213 [13], clause 4.1. The first/leftmost bit corresponds to SS/PBCH block index 0, the second bit corresponds to SS/PBCH block index 1, and so on. Value 0 in the bitmap indicates that the corresponding SS/PBCH block is not transmitted while value 1 indicates that the corresponding SS/PBCH block is transmitted. The network configures the same pattern in this field as in the corresponding field in ServingCellConfigCommonSIB.  For operation with shared spectrum channel access, the UE assumes that one or more SS/PBCH blocks indicated by *ssb-PositionsInBurst* may be transmitted within the discovery burst transmission window and have candidate SS/PBCH blocks indexes corresponding to SS/PBCH block indexes provided by *ssb-PositionsInBurst* (see TS 38.213 [13], clause 4.1). If the k-th bit of *ssb-PositionsInBurst* is set to 1, the UE assumes that one or more SS/PBCH blocks within the discovery burst transmission window with candidate SS/PBCH block indexes corresponding to SS/PBCH block index equal to k – 1 may be transmitted; if the kt-th bit is set to 0, the UE assumes that the corresponding SS/PBCH block(s) are not transmitted. The k-th bit is set to 0, where k > *ssb-PositionQCL* and the number of actually transmitted SS/PBCH blocks is not larger than the number of 1's in the bitmap. The network configures the same pattern in this field as in the corresponding field in *ServingCellConfigCommonSIB*. For operation with shared spectrum channel access in FR1, only *mediumBitmap* is used, and for FR2-2, *longBitmap* is used. |
| ***ssbSubcarrierSpacing***  Subcarrier spacing of SSB.  Only the following values are applicable depending on the used frequency:  FR1: 15 or 30 kHz  FR2-1: 120 or 240 kHz  FR2-2: 120, 480, or 960 kHz |
| ***supplementaryUplinkConfig***  The network configures this field only if *uplinkConfigCommon* is configured. If this field is absent, the UE shall release the *supplementaryUplinkConfig* and the *supplementaryUplink* configured in *ServingCellConfig* of this serving cell, if configured. |
| ***tdd-UL-DL-ConfigurationCommon***  A cell-specific TDD UL/DL configuration, see TS 38.213 [13], clause 11.1. |

|  |  |
| --- | --- |
| Conditional Presence | Explanation |
| *AbsFreqSSB* | The field is absent when *absoluteFrequencySSB* in frequencyInfoDL is absent, otherwise the field is mandatory present. |
| *HOAndServCellAdd* | This field is mandatory present upon SpCell change and upon serving cell (PSCell/SCell) addition. Otherwise, the field is absent. |
| *HOAndServCellWithSSB* | This field is mandatory present upon SpCell change and upon serving cell (SCell with SSB or PSCell) addition. Otherwise, the field is absent. |
| *SharedSpectrum* | This field is mandatory present if this cell operates with shared spectrum channel access in FR1. Otherwise, it is absent, Need R. |
| *SharedSpectrum2* | This field is optionally present if this cell operates with shared spectrum channel access in FR2-2. Otherwise, it is absent, Need R. |
| *TDD* | The field is optionally present, Need R, for TDD cells; otherwise it is absent. |

#### – *ServingCellConfigCommonSIB*

The IE *ServingCellConfigCommonSIB* is used to configure cell specific parameters of a UE's serving cell in SIB1.

*ServingCellConfigCommonSIB* information element

-- ASN1START

-- TAG-SERVINGCELLCONFIGCOMMONSIB-START

ServingCellConfigCommonSIB ::= SEQUENCE {

downlinkConfigCommon DownlinkConfigCommonSIB,

uplinkConfigCommon UplinkConfigCommonSIB OPTIONAL, -- Need R

supplementaryUplink UplinkConfigCommonSIB OPTIONAL, -- Need R

n-TimingAdvanceOffset ENUMERATED { n0, n25600, n39936 } OPTIONAL, -- Need S

ssb-PositionsInBurst SEQUENCE {

inOneGroup BIT STRING (SIZE (8)),

groupPresence BIT STRING (SIZE (8)) OPTIONAL -- Cond FR2-Only

},

ssb-PeriodicityServingCell ENUMERATED {ms5, ms10, ms20, ms40, ms80, ms160},

tdd-UL-DL-ConfigurationCommon TDD-UL-DL-ConfigCommon OPTIONAL, -- Cond TDD

ss-PBCH-BlockPower INTEGER (-60..50),

...,

[[

channelAccessMode-r16 CHOICE {

dynamic NULL,

semiStatic SemiStaticChannelAccessConfig-r16

} OPTIONAL, -- Cond SharedSpectrum

discoveryBurstWindowLength-r16 ENUMERATED {ms0dot5, ms1, ms2, ms3, ms4, ms5} OPTIONAL, -- Need R

highSpeedConfig-r16 HighSpeedConfig-r16 OPTIONAL -- Need R

]],

[[

channelAccessMode2-r17 ENUMERATED {enabled} OPTIONAL, -- Cond SharedSpectrum2

discoveryBurstWindowLength-v1700 ENUMERATED {ms0dot125, ms0dot25, ms0dot5, ms0dot75, ms1, ms1dot25} OPTIONAL, -- Need R

highSpeedConfigFR2-r17 HighSpeedConfigFR2-r17 OPTIONAL, -- Need R

uplinkConfigCommon-v1700 UplinkConfigCommonSIB-v1700 OPTIONAL -- Need R

]]

}

-- TAG-SERVINGCELLCONFIGCOMMONSIB-STOP

-- ASN1STOP

|  |
| --- |
| *ServingCellConfigCommonSIB* field descriptions |
| ***channelAccessMode***  If present, this field indicates which channel access procedures to apply for operation with shared spectrum channel access as defined in TS 37.213 [48]. If the field is configured as "semiStatic", the UE shall apply the channel access procedures for semi-static channel occupancy as described in clause 4.3 in TS 37.213. If the field is configured as "dynamic"t, the UE shall apply the channel access procedures in TS 37.213, with the exception of clause 4.3 of TS 37.213. |
| ***channelAccessMode2***  If present ('enabled'), this field indicates that the UE shall apply channel access mode procedures for operation with shared spectrum channel access in accordance with TS 37.213 [48], clause 4.4 for FR2-2. If absent, the UE shall not apply any channel access procedure. |
| ***discoveryBurstWindowLength***  Indicates the window length of the discovery burst in ms (see TS 37.213 [48]). The field *discoveryBurstWindowLength-v1700* is applicable to SCS 480 kHz and SCS 960 kHz. |
| ***groupPresence***  This field is present when maximum number of SS/PBCH blocks per half frame equals to 64 as defined in TS 38.213 [13], clause 4.1. The first/leftmost bit corresponds to the SS/PBCH index 0-7, the second bit corresponds to SS/PBCH block 8-15, and so on. Value 0 in the bitmap indicates that the SSBs according to *inOneGroup* are absent. Value 1 indicates that the SS/PBCH blocks are transmitted in accordance with *inOneGroup*. |
| ***inOneGroup***  When maximum number of SS/PBCH blocks per half frame equals to 4 as defined in TS 38.213 [13], clause 4.1, only the 4 leftmost bits are valid; the UE ignores the 4 rightmost bits. When maximum number of SS/PBCH blocks per half frame equals to 8 as defined in TS 38.213 [13], clause 4.1, all 8 bits are valid. The first/ leftmost bit corresponds to SS/PBCH block index 0, the second bit corresponds to SS/PBCH block index 1, and so on. When maximum number of SS/PBCH blocks per half frame equals to 64 as defined in TS 38.213 [13], clause 4.1, all 8 bit are valid; The first/ leftmost bit corresponds to the first SS/PBCH block index in the group (i.e., to SSB index 0, 8, and so on); the second bit corresponds to the second SS/PBCH block index in the group (i.e., to SSB index 1, 9, and so on), and so on. Value 0 in the bitmap indicates that the corresponding SS/PBCH block is not transmitted while value 1 indicates that the corresponding SS/PBCH block is transmitted. |
| ***n-TimingAdvanceOffset***  The N\_TA-Offset to be applied for random access on this serving cell. If the field is absent, the UE applies the value defined for the duplex mode and frequency range of this serving cell. See TS 38.133 [14], table 7.1.2-2. |
| ***ssb-PositionsInBurst***  Time domain positions of the transmitted SS-blocks in an SS-burst as defined in TS 38.213 [13], clause 4.1.  For operation with shared spectrum channel access in FR1, only *inOneGroup* is used and the UE interprets this field same as *mediumBitmap* in *ServingCellConfigCommon*. The UE assumes that a bit in *inOneGroup* at position k > is 0, where is obtained from *MIB* as specified in TS 38.213 [13], clause 4.1. For operation with shared spectrum channel access in FR2-2, the m-th bit in *groupPresence* is set to 0 for m > /8, where is obtained from *MIB* as specified in TS 38.213 [13], clause 4.1. |
| ***ss-PBCH-BlockPower***  Average EPRE of the resources elements that carry secondary synchronization signals in dBm that the NW used for SSB transmission, see TS 38.213 [13], clause 7. |

|  |  |
| --- | --- |
| Conditional Presence | Explanation |
| *FR2-Only* | This field is mandatory present for an FR2 carrier frequency. It is absent otherwise and UE releases any configured value. |
| *SharedSpectrum* | This field is mandatory present if this cell operates with shared spectrum channel access in FR1. Otherwise, it is absent, Need R. |
| *SharedSpectrum2* | This field is optionally present if this cell operates with shared spectrum channel access in FR2-2. Otherwise, it is absent, Need R. |
| *TDD* | The field is optionally present, Need R, for TDD cells; otherwise it is absent. |

#### *– ShortI-RNTI-Value*

The IE *ShortI-RNTI-Value* is used to identify the suspended UE context of a UE in RRC\_INACTIVE using fewer bits compared to I-RNTI-Value.

*ShortI-RNTI-Value* information element

-- ASN1START

-- TAG-SHORTI-RNTI-VALUE-START

ShortI-RNTI-Value ::= BIT STRING (SIZE(24))

-- TAG-SHORTI-RNTI-VALUE-STOP

-- ASN1STOP

#### *– ShortMAC-I*

The IE *ShortMAC-I* is used to identify and verify the UE at RRC connection re-establishment. The 16 least significant bits of the MAC-I calculated using the AS security configuration of the source PCell, as specified in 5.3.7.4.

*ShortMAC-I* information element

-- ASN1START

-- TAG-SHORTMAC-I-START

ShortMAC-I ::= BIT STRING (SIZE (16))

-- TAG-SHORTMAC-I-STOP

-- ASN1STOP

#### – *SINR-Range*

The IE *SINR-Range* specifies the value range used in SINR measurements and thresholds. For measurements, integer value for SINR measurements is according to Table 10.1.16.1-1 in TS 38.133 [14]. For thresholds, the actual value is (IE value – 46) / 2 dB.

*SINR-Range* information element

-- ASN1START

-- TAG-SINR-RANGE-START

SINR-Range ::= INTEGER(0..127)

-- TAG-SINR-RANGE-STOP

-- ASN1STOP

#### – *SI-RequestConfig*

The IE *SI-RequestConfig* contains configuration for Msg1 based SI request.

*SI-RequestConfig* information element

-- ASN1START

-- TAG–SI-REQUESTCONFIG-START

SI-RequestConfig ::= SEQUENCE {

rach-OccasionsSI SEQUENCE {

rach-ConfigSI RACH-ConfigGeneric,

ssb-perRACH-Occasion ENUMERATED {oneEighth, oneFourth, oneHalf, one, two, four, eight, sixteen}

} OPTIONAL, -- Need R

si-RequestPeriod ENUMERATED {one, two, four, six, eight, ten, twelve, sixteen} OPTIONAL, -- Need R

si-RequestResources SEQUENCE (SIZE (1..maxSI-Message)) OF SI-RequestResources

}

SI-RequestResources ::= SEQUENCE {

ra-PreambleStartIndex INTEGER (0..63),

ra-AssociationPeriodIndex INTEGER (0..15) OPTIONAL, -- Need R

ra-ssb-OccasionMaskIndex INTEGER (0..15) OPTIONAL -- Need R

}

-- ASN1STOP

-- TAG–SI-REQUESTCONFIG-STOP

|  |
| --- |
| *SI-RequestConfig* field descriptions |
| ***rach-OccasionsSI***  Configuration of dedicated RACH Occasions for SI. If the field is absent, the UE uses the corresponding parameters configured in *rach-ConfigCommon* of the initial uplink BWP. |
| ***si-RequestPeriod***  Periodicity of the *SI-Request* configuration in number of association periods. |
| ***si-RequestResources***  If there is only one entry in the list, the configuration is used for all SI messages for which *si-BroadcastStatus* is set to *notBroadcasting*. Otherwise the 1st entry in the list corresponds to the first SI message in *schedulingInfoList* for which *si-BroadcastStatus* is set to *notBroadcasting*, 2nd entry in the list corresponds to the second SI message in *schedulingInfoList* for which *si-BroadcastStatus* is set to *notBroadcasting* and so on. Change of *si-RequestResources* should not result in system information change notification. |

|  |
| --- |
| *SI-RequestResources* field descriptions |
| ***ra-AssociationPeriodIndex***  Index of the association period in the si-RequestPeriod in which the UE can send the SI request for SI message(s) corresponding to this *SI-RequestResources*, using the preambles indicated by *ra-PreambleStartIndex* and rach occasions indicated by *ra-ssb-OccasionMaskIndex*. |
| ***ra-PreambleStartIndex***  If N SSBs are associated with a RACH occasion, where N > = 1, for the i-th SSB (i=0, …, N-1) the preamble with preamble index = *ra-PreambleStartIndex* + i is used for SI request; For N < 1, the preamble with preamble index = *ra-PreambleStartIndex* is used for SI request. |

#### – *SI-SchedulingInfo*

The IE *SI-SchedulingInfo* contains information needed for acquisition of SI messages.

*SI-SchedulingInfo* information element

-- ASN1START

-- TAG–SI-SCHEDULINGINFO-START

SI-SchedulingInfo ::= SEQUENCE {

schedulingInfoList SEQUENCE (SIZE (1..maxSI-Message)) OF SchedulingInfo,

si-WindowLength ENUMERATED {s5, s10, s20, s40, s80, s160, s320, s640, s1280, s2560-v1710, s5120-v1710 },

si-RequestConfig SI-RequestConfig OPTIONAL, -- Cond MSG-1

si-RequestConfigSUL SI-RequestConfig OPTIONAL, -- Cond SUL-MSG-1

systemInformationAreaID BIT STRING (SIZE (24)) OPTIONAL, -- Need R

...

}

SchedulingInfo ::= SEQUENCE {

si-BroadcastStatus ENUMERATED {broadcasting, notBroadcasting},

si-Periodicity ENUMERATED {rf8, rf16, rf32, rf64, rf128, rf256, rf512},

sib-MappingInfo SIB-Mapping

}

SI-SchedulingInfo-v1700 ::= SEQUENCE {

schedulingInfoList2-r17 SEQUENCE (SIZE (1..maxSI-Message)) OF SchedulingInfo2-r17,

si-RequestConfig-RedCap-r17 SI-RequestConfig OPTIONAL -- Cond REDCAP-MSG-1

}

SchedulingInfo2-r17 ::= SEQUENCE {

si-BroadcastStatus-r17 ENUMERATED {broadcasting, notBroadcasting},

si-WindowPosition-r17 INTEGER (1..256),

si-Periodicity-r17 ENUMERATED {rf8, rf16, rf32, rf64, rf128, rf256, rf512},

sib-MappingInfo-r17 SIB-Mapping-v1700

}

SIB-Mapping ::= SEQUENCE (SIZE (1..maxSIB)) OF SIB-TypeInfo

SIB-Mapping-v1700 ::= SEQUENCE (SIZE (1..maxSIB)) OF SIB-TypeInfo-v1700

SIB-TypeInfo ::= SEQUENCE {

type ENUMERATED {sibType2, sibType3, sibType4, sibType5, sibType6, sibType7, sibType8, sibType9,

sibType10-v1610, sibType11-v1610, sibType12-v1610, sibType13-v1610,

sibType14-v1610, spare3, spare2, spare1,... },

valueTag INTEGER (0..31) OPTIONAL, -- Cond SIB-TYPE

areaScope ENUMERATED {true} OPTIONAL -- Need S

}

SIB-TypeInfo-v1700 ::= SEQUENCE {

sibType-r17 CHOICE {

type1-r17 ENUMERATED {sibType15, sibType16, sibType17, sibType18, sibType19, sibType20, sibType21,

spare9, spare8, spare7, spare6, spare5, spare4, spare3, spare2, spare1,...},

type2-r17 SEQUENCE {

posSibType-r17 ENUMERATED {posSibType1-9, posSibType1-10, posSibType2-24, posSibType2-25,

posSibType6-4, posSibType6-5, posSibType6-6, spare9, spare8, spare7, spare6,

spare5, spare4, spare3, spare2, spare1,...},

encrypted-r17 ENUMERATED { true } OPTIONAL, -- Need R

gnss-id-r17 GNSS-ID-r16 OPTIONAL, -- Need R

sbas-id-r17 SBAS-ID-r16 OPTIONAL -- Need R

}

},

valueTag-r17 INTEGER (0..31) OPTIONAL, -- Cond NonPosSIB

areaScope-r17 ENUMERATED {true} OPTIONAL -- Need S

}

-- TAG-SI-SCHEDULINGINFO-STOP

-- ASN1STOP

|  |
| --- |
| *SchedulingInfo* field descriptions |
| ***areaScope***  Indicates that a SIB is area specific. If the field is absent, the SIB is cell specific. |
| ***si-BroadcastStatus***  Indicates if the SI message is being broadcasted or not. Change of *si-BroadcastStat*us should not result in system information change notifications in Short Message transmitted with P-RNTI over DCI (see clause 6.5). The value of the indication is valid until the end of the BCCH modification period when set to *broadcasting*. *si-BroadcastStatus* of the SI where SIB19 is mapped is set to broadcasting. |
| ***si-Periodicity***  Periodicity of the SI-message in radio frames. Value *rf8* corresponds to 8 radio frames, value *rf16* corresponds to 16 radio frames, and so on. |

|  |
| --- |
| *SI-SchedulingInfo* field descriptions |
| ***si-RequestConfig***  Configuration of Msg1 resources that the UE uses for requesting SI-messages for which *si-BroadcastStatus* is set to notBroadcasting. |
| ***si-RequestConfig-RedCap***  Configuration of Msg1 resources for *initialUplinkBWP-RedCap*that the RedCap UE uses for requesting SI-messages for which *si-BroadcastStatus* is set to *notBroadcasting*. |
| ***si-RequestConfigSUL***  Configuration of Msg1 resources that the UE uses for requesting SI-messages for which *si-BroadcastStatus* is set to notBroadcasting. |
| ***si-WindowLength***  The length of the SI scheduling window. Value *s5* corresponds to 5 slots, value *s10* corresponds to 10 slots and so on. The network always configures *si-WindowLength* to be shorter than or equal to the *si-Periodicity*. The values *s2560-v1710* and *s5120-v1710* are only applicable for SCS 480 kHz. |
| ***systemInformationAreaID***  Indicates the system information area that the cell belongs to, if any. Any SIB with *areaScope* within the SI is considered to belong to this *systemInformationAreaID*. The systemInformationAreaID is unique within a PLMN/SNPN. |

|  |
| --- |
| *SchedulingInfo2* field descriptions |
| ***encrypted***  The presence of this field indicates that the pos-sib-type is encrypted as specified in TS 37.355 [49]. |
| ***gnss-id***  The presence of this field indicates that the positioning SIB type is for a specific GNSS. Indicates a specific GNSS (see also TS 37.355 [49]) |
| ***posSibType***  The posSIBs as defined in TS 37.355 [49] mapped to SI for scheduling using*schedulingInfoList2*. |
| ***sbas-id***  The presence of this field indicates that the positioning SIB type is for a specific SBAS. Indicates a specific SBAS (see also TS 37.355 [49]). |
| ***si-WindowPosition***  This field indicates the SI window position of the associated SI-message. The network provides *si-WindowPosition* in an ascending order, i.e. *si-WindowPosition* in the subsequent entry in *schedulingInfoList2* has always value higher than in the previous entry of *schedulingInfoList2*. The network configures this field in a way that ensures that SI messages scheduled by *schedulingInfoList* and/or *posSchedulingInfoList* do not overlap with SI messages scheduled by *schedulingInfoList2*. |
| ***sib-MappingInfo***  Indicates which SIBs or posSIBs are contained in the SI message. |
| ***type1, type2***  The SIBs/posSIBs mapped to SI for scheduling using*schedulingInfoList2*. |

| Conditional presence | Explanation |
| --- | --- |
| *MSG-1* | The field is optionally present, Need R, if *si-BroadcastStatus* is set to *notBroadcasting* for any SI-message included in *SchedulingInfo*. It is absent otherwise. |
| *SIB-TYPE* | The field is mandatory present if the SIB type is different from *SIB6*, *SIB7* or *SIB8*. For *SIB6*, *SIB7* and *SIB8* it is absent. |
| *NonPosSIB* | The field is mandatory present if the SIB type is *type1*. For *type2* it is absent. |
| *SUL-MSG-1* | The field is optionally present, Need R, if *supplementaryUplink* is configured in *ServingCellConfigCommonSIB* and if *si-BroadcastStatus* is set to *notBroadcasting* for any SI-message included in *SchedulingInfo*. It is absent otherwise. |
| *REDCAP-MSG-1* | The field is optionally present, Need R, if *initialUplinkBWP-RedCap* is configured in *UplinkConfigCommonSIB* and if *si-BroadcastStatus* is set to *notBroadcasting* for any SI-message included in *SchedulingInfo*. It is absent otherwise. |

#### *– SK-Counter*

The IE *SK-Counter* is a counter used upon initial configuration of SN security for NR-DC and NE-DC, as well as upon refresh of S-KgNB or S-KeNB based on the current or newly derived KgNB during RRC Resume or RRC Reconfiguration, as defined in TS 33.501 [11].

-- ASN1START

-- TAG-SKCOUNTER-START

SK-Counter ::= INTEGER (0..65535)

-- TAG-SKCOUNTER-STOP

-- ASN1STOP

#### – *SlotFormatCombinationsPerCell*

The IE *SlotFormatCombinationsPerCell* is used to configure the SlotFormatCombinations applicable for one serving cell (see TS 38.213 [13], clause 11.1.1).

*SlotFormatCombinationsPerCell* information element

-- ASN1START

-- TAG-SLOTFORMATCOMBINATIONSPERCELL-START

SlotFormatCombinationsPerCell ::= SEQUENCE {

servingCellId ServCellIndex,

subcarrierSpacing SubcarrierSpacing,

subcarrierSpacing2 SubcarrierSpacing OPTIONAL, -- Need R

slotFormatCombinations SEQUENCE (SIZE (1..maxNrofSlotFormatCombinationsPerSet)) OF SlotFormatCombination

OPTIONAL, -- Need M

positionInDCI INTEGER(0..maxSFI-DCI-PayloadSize-1) OPTIONAL, -- Need M

...,

[[

enableConfiguredUL-r16 ENUMERATED {enabled} OPTIONAL -- Need R

]]

}

SlotFormatCombination ::= SEQUENCE {

slotFormatCombinationId SlotFormatCombinationId,

slotFormats SEQUENCE (SIZE (1..maxNrofSlotFormatsPerCombination)) OF INTEGER (0..255)

}

SlotFormatCombinationId ::= INTEGER (0..maxNrofSlotFormatCombinationsPerSet-1)

-- TAG-SLOTFORMATCOMBINATIONSPERCELL-STOP

-- ASN1STOP

|  |
| --- |
| *SlotFormatCombination* field descriptions |
| ***slotFormatCombinationId***  This ID is used in the DCI payload to dynamically select this *SlotFormatCombination* (see TS 38.213 [13], clause 11.1.1). |
| ***slotFormats***  Slot formats that occur in consecutive slots in time domain order as listed here (see TS 38.213 [13], clause 11.1.1 and TS 38.213 [13], clause 14 for IAB-MT). |

|  |
| --- |
| *SlotFormatCombinationsPerCell* field descriptions |
| ***enableConfiguredUL***  If configured, the UE is allowed to transmit uplink signals/channels (SRS, PUCCH, CG-PUSCH) in the set of symbols of the slot when the UE does not detect a DCI format 2\_0 providing a slot format for the set of symbols (see TS 38.213 [13], 11.1.1). This field is applicable only if *cg-RetransmissionTimer-r16* is configured. |
| ***positionInDCI***  The (starting) position (bit) of the slotFormatCombinationId (SFI-Index) for this serving cell (servingCellId) within the DCI payload (see TS 38.213 [13], clause 11.1.1). |
| ***servingCellId***  The ID of the serving cell for which the slotFormatCombinations are applicable. |
| ***slotFormatCombinations***  A list with *SlotFormatCombinations*. Each *SlotFormatCombination* comprises of one or more *SlotFormats* (see TS 38.211 [16], clause 4.3.2). The total number of *slotFormats* in the *slotFormatCombinations* list does not exceed 512. |
| ***subcarrierSpacing2***  Reference subcarrier spacing for a Slot Format Combination on an FDD or SUL cell (see TS 38.213 [13], clause 11.1.1). For FDD, subcarrierSpacing (SFI-scs) is the reference SCS for DL BWP and subcarrierSpacing2 (SFI-scs2) is the reference SCS for UL BWP. For SUL, *subcarrierSpacing* (SFI-scs) is the reference SCS for non-SUL carrier and *subcarrierSpacing2* (SFI-scs2) is the reference SCS for SUL carrier. The network configures a value that is smaller than or equal to any SCS of configured BWPs of the serving cell that the command applies to. And the network configures a value that is smaller than or equal to the SCS of the serving cell which the UE monitors for SFI indications. |
| ***subcarrierSpacing***  Reference subcarrier spacing for this Slot Format Combination. The network configures a value that is smaller than or equal to any SCS of configured BWPs of the serving cell that the command applies to. And the network configures a value that is smaller than or equal to the SCS of the serving cell which the UE monitors for SFI indications (see TS 38.213 [13], clause 11.1.1). |

#### – *SlotFormatIndicator*

The IE *SlotFormatIndicator* is used to configure monitoring a Group-Common-PDCCH for Slot-Format-Indicators (SFI).

*SlotFormatIndicator* information element

-- ASN1START

-- TAG-SLOTFORMATINDICATOR-START

SlotFormatIndicator ::= SEQUENCE {

sfi-RNTI RNTI-Value,

dci-PayloadSize INTEGER (1..maxSFI-DCI-PayloadSize),

slotFormatCombToAddModList SEQUENCE (SIZE(1..maxNrofAggregatedCellsPerCellGroup)) OF SlotFormatCombinationsPerCell

OPTIONAL, -- Need N

slotFormatCombToReleaseList SEQUENCE (SIZE(1..maxNrofAggregatedCellsPerCellGroup)) OF ServCellIndex OPTIONAL, -- Need N

...,

[[

availableRB-SetsToAddModList-r16 SEQUENCE (SIZE(1..maxNrofAggregatedCellsPerCellGroup)) OF AvailableRB-SetsPerCell-r16 OPTIONAL, -- Need N

availableRB-SetsToReleaseList-r16 SEQUENCE (SIZE(1..maxNrofAggregatedCellsPerCellGroup)) OF ServCellIndex OPTIONAL, -- Need N

switchTriggerToAddModList-r16 SEQUENCE (SIZE(1..4)) OF SearchSpaceSwitchTrigger-r16 OPTIONAL, -- Need N

switchTriggerToReleaseList-r16 SEQUENCE (SIZE(1..4)) OF ServCellIndex OPTIONAL, -- Need N

co-DurationsPerCellToAddModList-r16 SEQUENCE (SIZE(1..maxNrofAggregatedCellsPerCellGroup)) OF CO-DurationsPerCell-r16 OPTIONAL, -- Need N

co-DurationsPerCellToReleaseList-r16 SEQUENCE (SIZE(1..maxNrofAggregatedCellsPerCellGroup)) OF ServCellIndex OPTIONAL -- Need N

]],

[[

switchTriggerToAddModListSizeExt-r16 SEQUENCE (SIZE(1..maxNrofAggregatedCellsPerCellGroupMinus4-r16)) OF

SearchSpaceSwitchTrigger-r16 OPTIONAL, -- Need N

switchTriggerToReleaseListSizeExt-r16 SEQUENCE (SIZE(1.. maxNrofAggregatedCellsPerCellGroupMinus4-r16)) OF

ServCellIndex OPTIONAL -- Need N

]],

[[

co-DurationsPerCellToAddModList-r17 SEQUENCE (SIZE(1..maxNrofAggregatedCellsPerCellGroup)) OF CO-DurationsPerCell-r17 OPTIONAL -- Need N

]]

}

CO-DurationsPerCell-r16 ::= SEQUENCE {

servingCellId-r16 ServCellIndex,

positionInDCI-r16 INTEGER(0..maxSFI-DCI-PayloadSize-1),

subcarrierSpacing-r16 SubcarrierSpacing,

co-DurationList-r16 SEQUENCE (SIZE(1..64)) OF CO-Duration-r16

}

CO-DurationsPerCell-r17 ::= SEQUENCE {

servingCellId-r17 ServCellIndex,

positionInDCI-r17 INTEGER(0..maxSFI-DCI-PayloadSize-1),

subcarrierSpacing-r17 SubcarrierSpacing,

co-DurationList-r17 SEQUENCE (SIZE(1..64)) OF CO-Duration-r17

}

CO-Duration-r16 ::= INTEGER (0..1120)

CO-Duration-r17 ::= INTEGER (0..4480)

AvailableRB-SetsPerCell-r16 ::= SEQUENCE {

servingCellId-r16 ServCellIndex,

positionInDCI-r16 INTEGER(0..maxSFI-DCI-PayloadSize-1)

}

SearchSpaceSwitchTrigger-r16 ::= SEQUENCE {

servingCellId-r16 ServCellIndex,

positionInDCI-r16 INTEGER(0..maxSFI-DCI-PayloadSize-1)

}

-- TAG-SLOTFORMATINDICATOR-STOP

-- ASN1STOP

|  |
| --- |
| *SlotFormatIndicator* field descriptions |
| ***availableRB-SetsToAddModList***  A list of *AvailableRB-SetsPerCell* objects (see TS 38.213 [13], clause 11.1.1). |
| ***co-DurationsPerCellToAddModList***  A list of *CO-DurationPerCell* objects. If not configured, the UE uses the slot format indicator (SFI), if available, to determine the channel occupancy duration (see TS 38.213 [13], clause 11.1.1). |
| ***dci-PayloadSize***  Total length of the DCI payload scrambled with SFI-RNTI (see TS 38.213 [13], clause 11.1.1). |
| ***sfi-RNTI***  RNTI used for SFI on the given cell (see TS 38.213 [13], clause 11.1.1). |
| ***slotFormatCombToAddModList***  A list of SlotFormatCombinations for the UE's serving cells (see TS 38.213 [13], clause 11.1.1). |
| ***switchTriggerToAddModList, switchTriggerToAddModListSizeExt***  A list of *SearchSpaceSwitchTrigger* objects. Each *SearchSpaceSwitchTrigger* object provides position in DCI of the bit field indicating search space switching flag for a serving cell or, if *cellGroupsForSwitchList* is configured, group of serving cells (see TS 38.213 [13], clause 10.4). If *cellGroupsForSwitchList* is configured, only one of the cells belonging to the same cell group is added/modified, and the configuration applies to all cells belonging to the *cellGroupsForSwitchList* (see TS 38.213 [13], clause 10.4). The network configures more than 4 *SearchSpaceSwitchTrigger* objects only if *cellGroupsForSwitchList* is not configured. The UE shall consider entries in *switchTriggerToAddModList* and in *switchTriggerToAddModListSizeExt* as a single list, i.e. an entry created using *switchTriggerToAddModList* can be modifed using *switchTriggerToAddModListSizeExt* and vice-versa. |
| ***switchTriggerToReleaseModList, switchTriggerToReleaseListSizeExt***  A list of *SearchSpaceSwitchTriggers* to be released. If *cellGroupsForSwitchList* is configured, the *SearchSpaceSwitchTrigger* is released for all serving cells belonging to the same *CellGroupForSwitch*. The UE shall consider entries in *switchTriggerToReleaseList* and in *switchTriggerToReleaseListSizeExt* as a single list, i.e. an entry created using *switchTriggerToAddModList* or *switchTriggerToAddModListSizeExt* can be deleted using *switchTriggerToReleaseList* or *switchTriggerToReleaseListSizeExt*. |

|  |
| --- |
| *AvailableRB-SetsPerCell* field descriptions |
| ***positionInDCI***  The (starting) position of the bits within DCI payload indicating the availability of the RB sets of a serving cell (see TS 38.213 [13], clause 11.1.1). |
| ***servingCelIId***  The ID of the serving cell for which the configuration is applicable. |

|  |
| --- |
| *CO-DurationsPerCell* field descriptions |
| ***co-DurationList***  A list of Channel Occupancy duration in symbols.  The maximum duration that can be configured for the following SCS  120 kHz: 560.  480 kHz: 2240.  960 kHz: 4480. |
| ***positionInDCI***  Position in DCI of the bit field indicating Channel Occupancy duration for UE's serving cells (see TS 38.213 [13], clause 11.1.1). |
| ***servingCelIId***  The ID of the serving cell for which the configuration is applicable. |
| ***subcarrierSpacing***  Reference subcarrier spacing for the list of Channel Occupancy durations (see TS 38.213 [13], clause 11.1.1). |

|  |
| --- |
| *SearchSpaceSwitchTrigger* field descriptions |
| ***positionInDCI***  The position of the bit within DCI payload containing a search space switching flag (see TS 38.213 [13], clause 11.1.1). |
| ***servingCellId***  The ID of the serving cell for which the configuration is applicable or the group of serving cells as indicated by *CellGroupsForSwitch-r16* containing this *servingCellId*. |

#### – *S-NSSAI*

The IE *S-NSSAI (Single Network Slice Selection Assistance Information)* identifies a Network Slice end to end and comprises a slice/service type and a slice differentiator, see TS 23.003 [21].

*S-NSSAI* information element

-- ASN1START

-- TAG-S-NSSAI-START

S-NSSAI ::= CHOICE{

sst BIT STRING (SIZE (8)),

sst-SD BIT STRING (SIZE (32))

}

-- TAG-S-NSSAI-STOP

-- ASN1STOP

|  |
| --- |
| *S-NSSAI* field descriptions |
| ***sst***  Indicates the S-NSSAI consisting of Slice/Service Type, see TS 23.003 [21]. |
| ***sst-SD***  Indicates the S-NSSAI consisting of Slice/Service Type and Slice Differentiator, see TS 23.003 [21]. |

#### – *SpeedStateScaleFactors*

The IE *SpeedStateScaleFactors* concerns factors, to be applied when the UE is in medium or high speed state, used for scaling a mobility control related parameter.

*SpeedStateScaleFactors* information element

-- ASN1START

-- TAG-SPEEDSTATESCALEFACTORS-START

SpeedStateScaleFactors ::= SEQUENCE {

sf-Medium ENUMERATED {oDot25, oDot5, oDot75, lDot0},

sf-High ENUMERATED {oDot25, oDot5, oDot75, lDot0}

}

-- TAG-SPEEDSTATESCALEFACTORS-STOP

-- ASN1STOP

| *SpeedStateScaleFactors* field descriptions |
| --- |
| ***sf-High***  The concerned mobility control related parameter is multiplied with this factor if the UE is in High Mobility state as defined in TS 38.304 [20]. Value *oDot25* corresponds to 0.25, value *oDot5* corresponds to 0.5, *oDot75* corresponds to 0.75 and so on. |
| ***sf-Medium***  The concerned mobility control related parameter is multiplied with this factor if the UE is in Medium Mobility state as defined in TS 38.304 [20]. Value *oDot25* corresponds to 0.25, value *oDot5* corresponds to 0.5, value *oDot75* corresponds to 0.75, and so on. |

#### – *SPS-Config*

The IE *SPS-Config* is used to configure downlink semi-persistent transmission. Multiple Downlink SPS configurations may be configured in one BWP of a serving cell.

*SPS-Config* information element

-- ASN1START

-- TAG-SPS-CONFIG-START

SPS-Config ::= SEQUENCE {

periodicity ENUMERATED {ms10, ms20, ms32, ms40, ms64, ms80, ms128, ms160, ms320, ms640,

spare6, spare5, spare4, spare3, spare2, spare1},

nrofHARQ-Processes INTEGER (1..8),

n1PUCCH-AN PUCCH-ResourceId OPTIONAL, -- Need M

mcs-Table ENUMERATED {qam64LowSE} OPTIONAL, -- Need S

...,

[[

sps-ConfigIndex-r16 SPS-ConfigIndex-r16 OPTIONAL, -- Cond SPS-List

harq-ProcID-Offset-r16 INTEGER (0..15) OPTIONAL, -- Need R

periodicityExt-r16 INTEGER (1..5120) OPTIONAL, -- Need R

harq-CodebookID-r16 INTEGER (1..2) OPTIONAL, -- Need R

pdsch-AggregationFactor-r16 ENUMERATED {n1, n2, n4, n8 } OPTIONAL -- Need S

]],

[[

sps-HARQ-Deferral-r17 INTEGER (1..32) OPTIONAL, -- Need R

n1PUCCH-AN-PUCCHsSCell-r17 PUCCH-ResourceId OPTIONAL, -- Need R

periodicityExt-r17 INTEGER (1..40960) OPTIONAL, -- Need R

nrofHARQ-Processes-v1710 INTEGER(9..32) OPTIONAL, -- Need R

harq-ProcID-Offset-v1700 INTEGER (16..31) OPTIONAL -- Need R

]]

}

-- TAG-SPS-CONFIG-STOP

-- ASN1STOP

|  |
| --- |
| *SPS-Config* field descriptions |
| ***harq-CodebookID***  Indicates the HARQ-ACK codebook index for the corresponding HARQ-ACK codebook for SPS PDSCH and ACK for SPS PDSCH release. |
| ***harq-ProcID-Offset***  Indicates the offset used in deriving the HARQ process IDs, see TS 38.321 [3], clause 5.3.1. |
| ***mcs-Table***  Indicates the MCS table the UE shall use for DL SPS (see TS 38.214 [19],clause 5.1.3.1. If present, the UE shall use the MCS table of low-SE 64QAM table indicated in Table 5.1.3.1-3 of TS 38.214 [19]. If this field is absent and field mcs-table in PDSCH-Config is set to 'qam256' and the activating DCI is of format 1\_1, the UE applies the 256QAM table indicated in Table 5.1.3.1-2 of TS 38.214 [19]. If this field is absent and the field *mcs-Table-r17* in *PDSCH-Config* is set to 'qam1024' and the activating DCI is format 1\_1, the UE applies the 1024QAM table indicated in Table 5.1.3.1-4 of TS 38.214 [19]. Otherwise, the UE applies the non-low-SE 64QAM table indicated in Table 5.1.3.1-1 of TS 38.214 [19]. |
| ***n1PUCCH-AN***  HARQ resource for PUCCH for DL SPS. The network configures the resource either as format0 or format1. The actual *PUCCH-Resource* is configured in *PUCCH-Config* and referred to by its ID. See TS 38.213 [13], clause 9.2.3. |
| ***n1PUCCH-AN-PUCCHsSCell***  HARQ resource for PUCCH on PUCCH switching SCell (sSCell) for DL SPS. The network configures the resource either as format 0 or format 1. The actual PUCCH-Resource is configured in PUCCH-Config of the PUCCH sSCell and referred to by its ID. See TS 38.213 [13], clause 9.2.3. |
| ***nrofHARQ-Processes***  Number of configured HARQ processes for SPS DL (see TS 38.321 [3], clause 5.8.1). If UE is configured with *nrofHARQ-Processes-v1710* UE shall ignore *nrofHARQ-Processes (without suffix)*. |
| ***pdsch-AggregationFactor***  Number of repetitions for SPS PDSCH (see TS 38.214 [19], clause 5.1.2.1). When the field is absent, the UE applies PDSCH aggregation factor of PDSCH-Config. |
| ***periodicity***  Periodicity for DL SPS (see TS 38.214 [19] and TS 38.321 [3], clause 5.8.1). |
| ***periodicityExt***  This field is used to calculate the periodicity for DL SPS (see TS 38.214 [19] and see TS 38.321 [3], clause 5,8.1). If this field is present, the field *periodicity* is ignored.  The following periodicities are supported depending on the configured subcarrier spacing [ms]:  15 kHz: *periodicityExt*, where *periodicityExt* has a value between 1 and 640.  30 kHz: 0.5 x *periodicityExt*, where *periodicityExt* has a value between 1 and 1280.  60 kHz with normal CP. 0.25 x *periodicityExt*, where *periodicityExt* has a value between 1 and 2560.  60 kHz with ECP: 0.25 x *periodicityExt*, where *periodicityExt* has a value between 1 and 2560.  120 kHz: 0.125 x *periodicityExt*, where *periodicityExt* has a value between 1 and 5120.  480 kHz: 0.0625 x periodicityExt, where periodicityExt has a value between 1 and 20480.  960 kHz: 0.03125 x periodicityExt, where periodicityExt has a value between 1 and 40960.  *periodicityExt-r17* is only applicable for SCS 480 kHz and 960 kHz. |
| ***sps-ConfigIndex***  Indicates the index of one of multiple SPS configurations. |
| ***sps-HARQ-Deferral***  Indicates the maximum number of slots or subslots the transmission of DL SPS HARQ-ACK in a slot or subslot can be deferred (see TS 38.213 [13], clause 9.2.5.4). |

|  |  |
| --- | --- |
| Conditional Presence | Explanation |
| *SPS-List* | The field is mandatory present when included in *sps-ConfigToAddModList-r16*, otherwise the field is absent. |

#### – *SPS-ConfigIndex*

The IE *SPS-ConfigIndex* is used to indicate the index of one of multiple DL SPS configurations in one BWP.

*SPS-ConfigIndex* information element

-- ASN1START

-- TAG-SPS-CONFIGINDEX-START

SPS-ConfigIndex-r16 ::= INTEGER (0.. maxNrofSPS-Config-1-r16)

-- TAG-SPS-CONFIGINDEX-STOP

-- ASN1STOP

#### – *SPS-PUCCH-AN*

The IE *SPS-PUCCH-AN* is used to indicate a PUCCH resource for HARQ ACK and configure the corresponding maximum payload size for the PUCCH resource.

*SPS-PUCCH-AN* information element

-- ASN1START

-- TAG-SPS-PUCCH-AN-START

SPS-PUCCH-AN-r16 ::= SEQUENCE {

sps-PUCCH-AN-ResourceID-r16 PUCCH-ResourceId,

maxPayloadSize-r16 INTEGER (4..256) OPTIONAL -- Need R

}

-- TAG-SPS-PUCCH-AN-STOP

-- ASN1STOP

|  |
| --- |
| *SPS-PUCCH-AN field descriptions* |
| ***maxPayloadSize***  Indicates the maximum payload size for the corresponding PUCCH resource ID. |
| ***sps-PUCCH-AN-ResourceID***  Indicates the PUCCH resource ID |

#### – *SPS-PUCCH-AN-List*

The IE *SPS-PUCCH-AN-List* is used to configure the list of PUCCH resources per HARQ ACK codebook

*SPS-PUCCH-AN-List* information element

-- ASN1START

-- TAG-SPS-PUCCH-AN-LIST-START

SPS-PUCCH-AN-List-r16 ::= SEQUENCE (SIZE(1..4)) OF SPS-PUCCH-AN-r16

-- TAG-SPS-PUCCH-AN-LIST-STOP

-- ASN1STOP

#### – *SRB-Identity*

The IE SRB-Identity is used to identify a Signalling Radio Bearer (SRB) used by a UE.

*SRB-Identity* information element

-- ASN1START

-- TAG-SRB-IDENTITY-START

SRB-Identity ::= INTEGER (1..3)

SRB-Identity-v1700 ::= INTEGER (4)

-- TAG-SRB-IDENTITY-STOP

-- ASN1STOP

#### – *SRS-CarrierSwitching*

The IE *SRS-CarrierSwitching* is used to configure for SRS carrier switching when PUSCH is not configured and independent SRS power control from that of PUSCH.

*SRS-CarrierSwitching* information element

-- ASN1START

-- TAG-SRS-CARRIERSWITCHING-START

SRS-CarrierSwitching ::= SEQUENCE {

srs-SwitchFromServCellIndex INTEGER (0..31) OPTIONAL, -- Need M

srs-SwitchFromCarrier ENUMERATED {sUL, nUL},

srs-TPC-PDCCH-Group CHOICE {

typeA SEQUENCE (SIZE (1..32)) OF SRS-TPC-PDCCH-Config,

typeB SRS-TPC-PDCCH-Config

} OPTIONAL, -- Need M

monitoringCells SEQUENCE (SIZE (1..maxNrofServingCells)) OF ServCellIndex OPTIONAL, -- Need M

...

}

SRS-TPC-PDCCH-Config ::= SEQUENCE {

srs-CC-SetIndexlist SEQUENCE (SIZE(1..4)) OF SRS-CC-SetIndex OPTIONAL -- Need M

}

SRS-CC-SetIndex ::= SEQUENCE {

cc-SetIndex INTEGER (0..3) OPTIONAL, -- Need M

cc-IndexInOneCC-Set INTEGER (0..7) OPTIONAL -- Need M

}

-- TAG-SRS-CARRIERSWITCHING-STOP

-- ASN1STOP

|  |
| --- |
| *SRS-CC-SetIndex* field descriptions |
| ***cc-IndexInOneCC-Set***  Indicates the CC index in one CC set for Type A (see TS 38.212 [17], TS 38.213 [13], clause 7.3.1, 11.4). The network always includes this field when the *srs-TPC-PDCCH-Group* is set to *typeA.* |
| ***cc-SetIndex***  Indicates the CC set index for Type A associated (see TS 38.212 [17], TS 38.213 [13], clause 7.3.1, 11.4). The network always includes this field when the *srs-TPC-PDCCH-Group* is set to *typeA.* The network does not configure this field to 3 in this release of specification. |

|  |
| --- |
| *SRS-CarrierSwitching* field descriptions |
| ***monitoringCells***  A set of serving cells for monitoring PDCCH conveying SRS DCI format with CRC scrambled by TPC-SRS-RNTI (see TS 38.212 [17], TS 38.213 [13], clause 7.3.1, 11.3). |
| ***srs-SwitchFromServCellIndex***  Indicates the serving cell whose UL transmission may be interrupted during SRS transmission on a PUSCH-less SCell. During SRS transmission on a PUSCH-less SCell, the UE may temporarily suspend the UL transmission on a serving cell with PUSCH in the same CG to allow the PUSCH-less SCell to transmit SRS. (see TS 38.214 [19], clause 6.2.1.3). |
| ***srs-TPC-PDCCH-Group***  Network configures the UE with either typeA-SRS-TPC-PDCCH-Group or typeB-SRS-TPC-PDCCH-Group, if any. |
| ***typeA***  Type A trigger configuration for SRS transmission on a PUSCH-less SCell (see TS 38.213 [13], clause 11.4). In this release, the network configures at most one entry (the first entry) of *typeA*, and the first entry corresponds to the serving cell in which the *SRS-CarrierSwitching* field is configured. SRS carrier switching to SUL carrier is not supported in this version of the specification. |
| ***typeB***  Type B trigger configuration for SRS transmission on a PUSCH-less SCell (see TS 38.213 [13], clause 11.4). |

|  |
| --- |
| *SRS-TPC-PDCCH-Config* field descriptions |
| ***srs-CC-SetIndexlist***  A list of pairs of [cc-SetIndex; cc-IndexInOneCC-Set] (see TS 38.212 [17], TS 38.213 [13], clause 7.3.1, 11.4). The network does not configure this field for *typeB*. |

#### – *SRS-Config*

The IE *SRS-Config* is used to configure sounding reference signal transmissions. The configuration defines a list of SRS-Resources, a list of SRS-PosResources, a list of SRS-PosResourceSets and a list of SRS-ResourceSets. Each resource set defines a set of SRS-Resources or SRS-PosResources. The network triggers the transmission of the set of SRS-Resources or SRS-PosResources using a configured aperiodicSRS-ResourceTrigger (L1 DCI). The network does not configure SRS specific power control parameters, *alpha, p0* or *pathlossReferenceRS* if *unifiedTCI-StateType* is configured for the serving cell.

*SRS-Config* information element

-- ASN1START

-- TAG-SRS-CONFIG-START

SRS-Config ::= SEQUENCE {

srs-ResourceSetToReleaseList SEQUENCE (SIZE(1..maxNrofSRS-ResourceSets)) OF SRS-ResourceSetId OPTIONAL, -- Need N

srs-ResourceSetToAddModList SEQUENCE (SIZE(1..maxNrofSRS-ResourceSets)) OF SRS-ResourceSet OPTIONAL, -- Need N

srs-ResourceToReleaseList SEQUENCE (SIZE(1..maxNrofSRS-Resources)) OF SRS-ResourceId OPTIONAL, -- Need N

srs-ResourceToAddModList SEQUENCE (SIZE(1..maxNrofSRS-Resources)) OF SRS-Resource OPTIONAL, -- Need N

tpc-Accumulation ENUMERATED {disabled} OPTIONAL, -- Need S

...,

[[

srs-RequestDCI-1-2-r16 INTEGER (1..2) OPTIONAL, -- Need S

srs-RequestDCI-0-2-r16 INTEGER (1..2) OPTIONAL, -- Need S

srs-ResourceSetToAddModListDCI-0-2-r16 SEQUENCE (SIZE(1..maxNrofSRS-ResourceSets)) OF SRS-ResourceSet OPTIONAL, -- Need N

srs-ResourceSetToReleaseListDCI-0-2-r16 SEQUENCE (SIZE(1..maxNrofSRS-ResourceSets)) OF SRS-ResourceSetId OPTIONAL, -- Need N

srs-PosResourceSetToReleaseList-r16 SEQUENCE (SIZE(1..maxNrofSRS-PosResourceSets-r16)) OF SRS-PosResourceSetId-r16

OPTIONAL, -- Need N

srs-PosResourceSetToAddModList-r16 SEQUENCE (SIZE(1..maxNrofSRS-PosResourceSets-r16)) OF SRS-PosResourceSet-r16 OPTIONAL,-- Need N

srs-PosResourceToReleaseList-r16 SEQUENCE (SIZE(1..maxNrofSRS-PosResources-r16)) OF SRS-PosResourceId-r16 OPTIONAL,-- Need N

srs-PosResourceToAddModList-r16 SEQUENCE (SIZE(1..maxNrofSRS-PosResources-r16)) OF SRS-PosResource-r16 OPTIONAL -- Need N

]]

}

SRS-ResourceSet ::= SEQUENCE {

srs-ResourceSetId SRS-ResourceSetId,

srs-ResourceIdList SEQUENCE (SIZE(1..maxNrofSRS-ResourcesPerSet)) OF SRS-ResourceId OPTIONAL, -- Cond Setup

resourceType CHOICE {

aperiodic SEQUENCE {

aperiodicSRS-ResourceTrigger INTEGER (1..maxNrofSRS-TriggerStates-1),

csi-RS NZP-CSI-RS-ResourceId OPTIONAL, -- Cond NonCodebook

slotOffset INTEGER (1..32) OPTIONAL, -- Need S

...,

[[

aperiodicSRS-ResourceTriggerList SEQUENCE (SIZE(1..maxNrofSRS-TriggerStates-2))

OF INTEGER (1..maxNrofSRS-TriggerStates-1) OPTIONAL -- Need M

]]

},

semi-persistent SEQUENCE {

associatedCSI-RS NZP-CSI-RS-ResourceId OPTIONAL, -- Cond NonCodebook

...

},

periodic SEQUENCE {

associatedCSI-RS NZP-CSI-RS-ResourceId OPTIONAL, -- Cond NonCodebook

...

}

},

usage ENUMERATED {beamManagement, codebook, nonCodebook, antennaSwitching},

alpha Alpha OPTIONAL, -- Need S

p0 INTEGER (-202..24) OPTIONAL, -- Cond Setup

pathlossReferenceRS PathlossReferenceRS-Config OPTIONAL, -- Need M

srs-PowerControlAdjustmentStates ENUMERATED { sameAsFci2, separateClosedLoop} OPTIONAL, -- Need S

...,

[[

pathlossReferenceRSList-r16 SetupRelease { PathlossReferenceRSList-r16} OPTIONAL -- Need M

]],

[[

usagePDC-r17 ENUMERATED {true} OPTIONAL, -- Need R

availableSlotOffsetList-r17 SEQUENCE (SIZE(1..4)) OF AvailableSlotOffset-r17 OPTIONAL, -- Need R

followUnifiedTCIstateSRS-r17 ENUMERATED {enabled} OPTIONAL -- Need R

]]

}

AvailableSlotOffset-r17 ::= INTEGER (0..7)

PathlossReferenceRS-Config ::= CHOICE {

ssb-Index SSB-Index,

csi-RS-Index NZP-CSI-RS-ResourceId

}

PathlossReferenceRSList-r16 ::= SEQUENCE (SIZE (1..maxNrofSRS-PathlossReferenceRS-r16)) OF PathlossReferenceRS-r16

PathlossReferenceRS-r16 ::= SEQUENCE {

srs-PathlossReferenceRS-Id-r16 SRS-PathlossReferenceRS-Id-r16,

pathlossReferenceRS-r16 PathlossReferenceRS-Config

}

SRS-PathlossReferenceRS-Id-r16 ::= INTEGER (0..maxNrofSRS-PathlossReferenceRS-1-r16)

SRS-PosResourceSet-r16 ::= SEQUENCE {

srs-PosResourceSetId-r16 SRS-PosResourceSetId-r16,

srs-PosResourceIdList-r16 SEQUENCE (SIZE(1..maxNrofSRS-ResourcesPerSet)) OF SRS-PosResourceId-r16

OPTIONAL, -- Cond Setup

resourceType-r16 CHOICE {

aperiodic-r16 SEQUENCE {

aperiodicSRS-ResourceTriggerList-r16 SEQUENCE (SIZE(1..maxNrofSRS-TriggerStates-1))

OF INTEGER (1..maxNrofSRS-TriggerStates-1) OPTIONAL, -- Need M

...

},

semi-persistent-r16 SEQUENCE {

...

},

periodic-r16 SEQUENCE {

...

}

},

alpha-r16 Alpha OPTIONAL, -- Need S

p0-r16 INTEGER (-202..24) OPTIONAL, -- Cond Setup

pathlossReferenceRS-Pos-r16 CHOICE {

ssb-IndexServing-r16 SSB-Index,

ssb-Ncell-r16 SSB-InfoNcell-r16,

dl-PRS-r16 DL-PRS-Info-r16

} OPTIONAL, -- Need M

...

}

SRS-ResourceSetId ::= INTEGER (0..maxNrofSRS-ResourceSets-1)

SRS-PosResourceSetId-r16 ::= INTEGER (0..maxNrofSRS-PosResourceSets-1-r16)

SRS-Resource ::= SEQUENCE {

srs-ResourceId SRS-ResourceId,

nrofSRS-Ports ENUMERATED {port1, ports2, ports4},

ptrs-PortIndex ENUMERATED {n0, n1 } OPTIONAL, -- Need R

transmissionComb CHOICE {

n2 SEQUENCE {

combOffset-n2 INTEGER (0..1),

cyclicShift-n2 INTEGER (0..7)

},

n4 SEQUENCE {

combOffset-n4 INTEGER (0..3),

cyclicShift-n4 INTEGER (0..11)

}

},

resourceMapping SEQUENCE {

startPosition INTEGER (0..5),

nrofSymbols ENUMERATED {n1, n2, n4},

repetitionFactor ENUMERATED {n1, n2, n4}

},

freqDomainPosition INTEGER (0..67),

freqDomainShift INTEGER (0..268),

freqHopping SEQUENCE {

c-SRS INTEGER (0..63),

b-SRS INTEGER (0..3),

b-hop INTEGER (0..3)

},

groupOrSequenceHopping ENUMERATED { neither, groupHopping, sequenceHopping },

resourceType CHOICE {

aperiodic SEQUENCE {

...

},

semi-persistent SEQUENCE {

periodicityAndOffset-sp SRS-PeriodicityAndOffset,

...

},

periodic SEQUENCE {

periodicityAndOffset-p SRS-PeriodicityAndOffset,

...

}

},

sequenceId INTEGER (0..1023),

spatialRelationInfo SRS-SpatialRelationInfo OPTIONAL, -- Need R

...,

[[

resourceMapping-r16 SEQUENCE {

startPosition-r16 INTEGER (0..13),

nrofSymbols-r16 ENUMERATED {n1, n2, n4},

repetitionFactor-r16 ENUMERATED {n1, n2, n4}

} OPTIONAL -- Need R

]],

[[

spatialRelationInfo-PDC-r17 SetupRelease { SpatialRelationInfo-PDC-r17 } OPTIONAL, -- Need M

resourceMapping-r17 SEQUENCE {

startPosition-r17 INTEGER (0..13),

nrofSymbols-r17 ENUMERATED {n1, n2, n4, n8, n10, n12, n14},

repetitionFactor-r17 ENUMERATED {n1, n2, n4, n5, n6, n7, n8, n10, n12, n14}

} OPTIONAL, -- Need R

partialFreqSounding-r17 SEQUENCE {

startRBIndexFScaling-r17 CHOICE{

startRBIndexAndFreqScalingFactor2-r17 INTEGER (0..1),

startRBIndexAndFreqScalingFactor4-r17 INTEGER (0..3)

},

enableStartRBHopping-r17 ENUMERATED {enable} OPTIONAL -- Need R

} OPTIONAL, -- Need R

transmissionComb-n8-r17 SEQUENCE {

combOffset-n8-r17 INTEGER (0..7),

cyclicShift-n8-r17 INTEGER (0..5)

} OPTIONAL, -- Need R

srs-TCIState-r17 CHOICE {

srs-UL-TCIState-r17 TCI-UL-State-Id-r17,

srs-DLorJoint-TCIState-r17 TCI-StateId

} OPTIONAL -- Need R

]]

}

-- Editor's note: It is FFS to determine whether to introduce serving cell ID and/or BWP ID to be associated with srs-UL-TCIState-r17

-- or srs DLorJoint-TCIState-r17.

SRS-PosResource-r16::= SEQUENCE {

srs-PosResourceId-r16 SRS-PosResourceId-r16,

transmissionComb-r16 CHOICE {

n2-r16 SEQUENCE {

combOffset-n2-r16 INTEGER (0..1),

cyclicShift-n2-r16 INTEGER (0..7)

},

n4-r16 SEQUENCE {

combOffset-n4-r16 INTEGER (0..3),

cyclicShift-n4-r16 INTEGER (0..11)

},

n8-r16 SEQUENCE {

combOffset-n8-r16 INTEGER (0..7),

cyclicShift-n8-r16 INTEGER (0..5)

},

...

},

resourceMapping-r16 SEQUENCE {

startPosition-r16 INTEGER (0..13),

nrofSymbols-r16 ENUMERATED {n1, n2, n4, n8, n12}

},

freqDomainShift-r16 INTEGER (0..268),

freqHopping-r16 SEQUENCE {

c-SRS-r16 INTEGER (0..63),

...

},

groupOrSequenceHopping-r16 ENUMERATED { neither, groupHopping, sequenceHopping },

resourceType-r16 CHOICE {

aperiodic-r16 SEQUENCE {

slotOffset-r16 INTEGER (1..32) OPTIONAL, -- Need S

...

},

semi-persistent-r16 SEQUENCE {

periodicityAndOffset-sp-r16 SRS-PeriodicityAndOffset-r16,

...

},

periodic-r16 SEQUENCE {

periodicityAndOffset-p-r16 SRS-PeriodicityAndOffset-r16,

...

}

},

sequenceId-r16 INTEGER (0..65535),

spatialRelationInfoPos-r16 SRS-SpatialRelationInfoPos-r16 OPTIONAL, -- Need R

...

}

SRS-SpatialRelationInfo ::= SEQUENCE {

servingCellId ServCellIndex OPTIONAL, -- Need S

referenceSignal CHOICE {

ssb-Index SSB-Index,

csi-RS-Index NZP-CSI-RS-ResourceId,

srs SEQUENCE {

resourceId SRS-ResourceId,

uplinkBWP BWP-Id

}

}

}

SRS-SpatialRelationInfoPos-r16 ::= CHOICE {

servingRS-r16 SEQUENCE {

servingCellId ServCellIndex OPTIONAL, -- Need S

referenceSignal-r16 CHOICE {

ssb-IndexServing-r16 SSB-Index,

csi-RS-IndexServing-r16 NZP-CSI-RS-ResourceId,

srs-SpatialRelation-r16 SEQUENCE {

resourceSelection-r16 CHOICE {

srs-ResourceId-r16 SRS-ResourceId,

srs-PosResourceId-r16 SRS-PosResourceId-r16

},

uplinkBWP-r16 BWP-Id

}

}

},

ssb-Ncell-r16 SSB-InfoNcell-r16,

dl-PRS-r16 DL-PRS-Info-r16

}

SSB-Configuration-r16 ::= SEQUENCE {

ssb-Freq-r16 ARFCN-ValueNR,

halfFrameIndex-r16 ENUMERATED {zero, one},

ssbSubcarrierSpacing-r16 SubcarrierSpacing,

ssb-Periodicity-r16 ENUMERATED { ms5, ms10, ms20, ms40, ms80, ms160, spare2,spare1 } OPTIONAL, -- Need S

sfn0-Offset-r16 SEQUENCE {

sfn-Offset-r16 INTEGER (0..1023),

integerSubframeOffset-r16 INTEGER (0..9) OPTIONAL -- Need R

} OPTIONAL, -- Need R

sfn-SSB-Offset-r16 INTEGER (0..15),

ss-PBCH-BlockPower-r16 INTEGER (-60..50) OPTIONAL -- Cond Pathloss

}

SSB-InfoNcell-r16 ::= SEQUENCE {

physicalCellId-r16 PhysCellId,

ssb-IndexNcell-r16 SSB-Index OPTIONAL, -- Need S

ssb-Configuration-r16 SSB-Configuration-r16 OPTIONAL -- Need S

}

DL-PRS-Info-r16 ::= SEQUENCE {

dl-PRS-ID-r16 INTEGER (0..255),

dl-PRS-ResourceSetId-r16 INTEGER (0..7),

dl-PRS-ResourceId-r16 INTEGER (0..63) OPTIONAL -- Need S

}

SRS-ResourceId ::= INTEGER (0..maxNrofSRS-Resources-1)

SRS-PosResourceId-r16 ::= INTEGER (0..maxNrofSRS-PosResources-1-r16)

SRS-PeriodicityAndOffset ::= CHOICE {

sl1 NULL,

sl2 INTEGER(0..1),

sl4 INTEGER(0..3),

sl5 INTEGER(0..4),

sl8 INTEGER(0..7),

sl10 INTEGER(0..9),

sl16 INTEGER(0..15),

sl20 INTEGER(0..19),

sl32 INTEGER(0..31),

sl40 INTEGER(0..39),

sl64 INTEGER(0..63),

sl80 INTEGER(0..79),

sl160 INTEGER(0..159),

sl320 INTEGER(0..319),

sl640 INTEGER(0..639),

sl1280 INTEGER(0..1279),

sl2560 INTEGER(0..2559)

}

SRS-PeriodicityAndOffset-r16 ::= CHOICE {

sl1 NULL,

sl2 INTEGER(0..1),

sl4 INTEGER(0..3),

sl5 INTEGER(0..4),

sl8 INTEGER(0..7),

sl10 INTEGER(0..9),

sl16 INTEGER(0..15),

sl20 INTEGER(0..19),

sl32 INTEGER(0..31),

sl40 INTEGER(0..39),

sl64 INTEGER(0..63),

sl80 INTEGER(0..79),

sl160 INTEGER(0..159),

sl320 INTEGER(0..319),

sl640 INTEGER(0..639),

sl1280 INTEGER(0..1279),

sl2560 INTEGER(0..2559),

sl5120 INTEGER(0..5119),

sl10240 INTEGER(0..10239),

sl40960 INTEGER(0..40959),

sl81920 INTEGER(0..81919),

...

}

SpatialRelationInfo-PDC-r17 ::= SEQUENCE {

referenceSignal CHOICE {

ssb-Index SSB-Index,

csi-RS-Index NZP-CSI-RS-ResourceId,

dl-PRS-PDC NR-DL-PRS-ResourceID-r17,

srs SEQUENCE {

resourceId SRS-ResourceId,

uplinkBWP BWP-Id

},

...

},

...

}

-- TAG-SRS-CONFIG-STOP

-- ASN1STOP

|  |
| --- |
| *SRS-Config* field descriptions |
| ***tpc-Accumulation***  If the field is absent, UE applies TPC commands via accumulation. If disabled, UE applies the TPC command without accumulation (this applies to SRS when a separate closed loop is configured for SRS) (see TS 38.213 [13], clause 7.3). |

|  |
| --- |
| *SRS-Resource, SRS-PosResource* field descriptions |
| ***cyclicShift-n2***  Cyclic shift configuration (see TS 38.214 [19], clause 6.2.1). |
| ***cyclicShift-n4***  Cyclic shift configuration (see TS 38.214 [19], clause 6.2.1). |
| ***enableStartRBHopping***  When this RRC parameter is configured, start RB location hopping is enabled for partial frequency sounding in different SRS frequency hopping periods for periodic/semi-persistent/aperiodic SRS as described in Clause 6.4.1.4 in TS 38.211. |
| ***freqHopping***  Includes parameters capturing SRS frequency hopping (see TS 38.214 [19], clause 6.2.1). For CLI SRS-RSRP measurement, the network always configures this field such that *b-hop* > *b-SRS*. |
| ***groupOrSequenceHopping***  Parameter(s) for configuring group or sequence hopping (see TS 38.211 [16], clause 6.4.1.4.2). For CLI SRS-RSRP measurement, the network always configures this parameter to 'neither'. |
| ***nrofSRS-Ports***  Number of ports. For CLI SRS-RSRP measurement, the network always configures this parameter to 'port1'. |
| ***periodicityAndOffset-p***  Periodicity and slot offset for this SRS resource. All values are in "number of slots". Value *sl1* corresponds to a periodicity of 1 slot, value *sl2* corresponds to a periodicity of 2 slots, and so on. For each periodicity the corresponding offset is given in number of slots. For periodicity *sl1* the offset is 0 slots (see TS 38.214 [19], clause 6.2.1). For CLI SRS-RSRP measurement, *sl1280* and *sl2560* cannot be configured. |
| ***periodicityAndOffset-sp***  Periodicity and slot offset for this SRS resource. All values are in "number of slots". Value *sl1* corresponds to a periodicity of 1 slot, value *sl2* corresponds to a periodicity of 2 slots, and so on. For each periodicity the corresponding offset is given in number of slots. For periodicity *sl1* the offset is 0 slots (see TS 38.214 [19], clause 6.2.1). |
| ***ptrs-PortIndex***  The PTRS port index for this SRS resource for non-codebook based UL MIMO. This is only applicable when the corresponding *PTRS-UplinkConfig* is set to CP-OFDM. The *ptrs-PortIndex* configured here must be smaller than the *maxNrofPorts* configured in the *PTRS-UplinkConfig* (see TS 38.214 [19], clause 6.2.3.1). This parameter is not applicable to CLI SRS-RSRP measurement. |
| ***resourceMapping***  OFDM symbol location of the SRS resource within a slot including *nrofSymbols* (number of OFDM symbols), *startPosition* (value 0 refers to the last symbol, value 1 refers to the second last symbol, and so on) and *repetitionFactor* (see TS 38.214 [19], clause 6.2.1 and TS 38.211 [16], clause 6.4.1.4). The configured SRS resource does not exceed the slot boundary. If *resourceMapping-r16* is signalled, UE shall ignore the *resourceMapping* (without suffix). If *resourceMapping-r17* is signalled, UE shall ignore the *resourceMapping* (without suffix) and only the values of nrofSymbols which are integer multiples of the configured repetitionFactor can be configured. For CLI SRS-RSRP measurement, the network always configures *nrofSymbols* and *repetitionFactor* to 'n1'. |
| ***resourceType***  Periodicity and offset for semi-persistent and periodic SRS resource (see TS 38.214 [19], clause 6.2.1). For CLI SRS-RSRP measurement, only 'periodic' is applicable for *resourceType*. |
| ***sequenceId***  Sequence ID used to initialize pseudo random group and sequence hopping (see TS 38.214 [19], clause 6.2.1). |
| ***servingCellId***  The serving Cell ID of the source SSB, CSI-RS, or SRS for the spatial relation of the target SRS resource. If this field is absent the SSB, the CSI-RS, or the SRS is from the same serving cell where the SRS is configured. |
| ***spatialRelationInfo***  Configuration of the spatial relation between a reference RS and the target SRS. Reference RS can be SSB/CSI-RS/SRS (see TS 38.214 [19], clause 6.2.1). This parameter is not applicable to CLI SRS-RSRP measurement. |
| ***spatialRelationInfo-PDC***  Configuration of the spatial relation between a reference RS and the target SRS. Reference RS can be SSB/CSI-RS/SRS/DL-PRS-PDC (see TS 38.214 [19], clause 6.2.1). The field is present in case of *resourceType=periodic* and *usagePDC-r17=true* in the *SRS-ResourceSet*, otherwise the field is absent. |
| ***spatialRelationInfoPos***  Configuration of the spatial relation between a reference RS and the target SRS. Reference RS can be SSB/CSI-RS/SRS/DL-PRS (see TS 38.214 [19], clause 6.2.1).  If the IE *srs-ResourceId-Ext* is present, the IE *srs-ResourceId* in *spatialRelationInfoPos* represents the index from 0 to 63. Otherwise the IE *srs-ResourceId* in *spatialRelationInfoPos* represents the index from 0 to 31. |
| ***srs-RequestDCI-0-2***  Indicate the number of bits for "SRS request"in DCI format 0\_2. When the field is absent, then the value of 0 bit for "SRS request" in DCI format 0\_2 is applied. If the parameter *srs-RequestDCI-0-2* is configured to value 1, 1 bit is used to indicate one of the first two rows of Table 7.3.1.1.2-24 in TS 38.212 [17] for triggered aperiodic SRS resource set. If the value 2 is configured, 2 bits are used to indicate one of the rows of Table 7.3.1.1.2-24 in TS 38.212 [17]. When UE is configured with *supplementaryUplink*, an extra bit (the first bit of the SRS request field) is used for the non-SUL/SUL indication. |
| ***srs-RequestDCI-1-2***  Indicate the number of bits for "SRS request" in DCI format 1\_2. When the field is absent, then the value of 0 bit for "SRS request" in DCI format 1\_2 is applied. When the UE is configured with *supplementaryUplink*, an extra bit (the first bit of the SRS request field) is used for the non-SUL/SUL indication (see TS 38.214 [19], clause 6.1.1.2). |
| ***srs-ResourceSetToAddModListDCI-0-2***  List of SRS resource set to be added or modified for DCI format 0\_2 (see TS 38.212 [17], clause 7.3.1). |
| ***srs-ResourceSetToReleaseListDCI-0-2***  List of SRS resource set to be released for DCI format 0\_2 (see TS 38.212 [17], clause 7.3.1). |
| ***srs-TCIState***  Configuration of either a UL TCI state or a joint TCI state for the SRS resource. This field is absent when the SRS resource is in a *SRS-ResourceSet* configured with *followUnifiedTCIstateSRS-r17* or when the field *unifiedTCI-StateType* is not configured to the serving cell which the SRS resource is located in. |
| ***startRBIndexAndFreqScalingFactor***  Configures the UE with the startRBIndex and freqScalingFactor for partial frequency sounding as described in Clause 6.4.1.4 in TS 38.211. The startRBIndexForFScaling2 gives the startRBIndex when freqScalingFactor is 2 and the startRBIndexForFScaling4 gives the startRBIndex when FreqScalingFactor is 4 |
| ***transmissionComb, transmissionComb-n8***  Comb value (2 or 4 or 8) and comb offset (0..combValue-1) (see TS 38.214 [19], clause 6.2.1). |

|  |
| --- |
| *SRS-ResourceSet, SRS-PosResourceSet* field descriptions |
| ***alpha***  alpha value for SRS power control (see TS 38.213 [13], clause 7.3). When the field is absent the UE applies the value 1. |
| ***aperiodicSRS-ResourceTriggerList***  An additional list of DCI "code points" upon which the UE shall transmit SRS according to this SRS resource set configuration (see TS 38.214 [19], clause 6). When the field is not included during a reconfiguration of *SRS-ResourceSet* of *resourceType* set to *aperiodic*, UE maintains this value based on the Need M; that is, this list is not considered as an extension of *aperiodicSRS-ResourceTrigger* for purpose of applying the general rule for extended list in clause 6.1.3. |
| ***aperiodicSRS-ResourceTrigger***  The DCI "code point" upon which the UE shall transmit SRS according to this SRS resource set configuration (see TS 38.214 [19], clause 6). |
| ***associatedCSI-RS***  ID of CSI-RS resource associated with this SRS resource set in non-codebook based operation (see TS 38.214 [19], clause 6.1.1.2). |
| ***availableSlotOffset***  Indicates the number of available slots from slot n+k to the slot where the aperiodic SRS resource set is transmitted, where slot n is the slot with the triggering DCI, and k is the legacy triggering offset (slotOffset, not based on availabel slot) as described in clause 6.2.1 of TS 38.214. |
| ***csi-RS***  ID of CSI-RS resource associated with this SRS resource set. (see TS 38.214 [19], clause 6.1.1.2). |
| ***csi-RS-IndexServingcell***  Indicates CSI-RS index belonging to a serving cell |
| ***followUnifiedTCIstateSRS***  When set to enabled, for SRS resource Set, the UE applies the "indicated" Rel-17 UL only TCI or joint TCI as specified in TS 38.214 clause 5.1.5. This parameter may be configured for aperiodic SRS for BM or SRS of any time-domain behavior for codebook, non-codebook, and antenna switching. |
| ***p0***  P0 value for SRS power control. The value is in dBm. Only even values (step size 2) are allowed (see TS 38.213 [13], clause 7.3). |
| ***pathlossReferenceRS***  A reference signal (e.g. a CSI-RS config or a SS block) to be used for SRS path loss estimation (see TS 38.213 [13], clause 7.3). |
| ***pathlossReferenceRS-Pos***  A reference signal (e.g. a SS block or a DL-PRS config) to be used for SRS path loss estimation (see TS 38.213 [13], clause 7.3). |
| ***pathlossReferenceRSList***  Multiple candidate pathloss reference RS(s) for SRS power control, where one candidate RS can be mapped to SRS Resource Set via MAC CE (clause 6.1.3.27 in TS 38.321 [3]). The network can only configure this field if *pathlossReferenceRS* is not configured in the same *SRS-ResourceSet*. |
| ***resourceSelection***  Indicates whether the configured SRS spatial relation resource is a *SRS-Resource* or *SRS-PosResource*. |
| ***resourceType***  Time domain behavior of SRS resource configuration, see TS 38.214 [19], clause 6.2.1. The network configures SRS resources in the same resource set with the same time domain behavior on periodic, aperiodic and semi-persistent SRS. The aperiodic SRS is not applicable for the UE in RRC\_INACTIVE. |
| ***slotOffset***  An offset in number of slots between the triggering DCI and the actual transmission of this *SRS-ResourceSet*. If the field is absent the UE applies no offset (value 0). |
| ***srs-PowerControlAdjustmentStates***  Indicates whether hsrs,c(i) = fc(i,1) or hsrs,c(i) = fc(i,2) (if twoPUSCH-PC-AdjustmentStates are configured) or separate close loop is configured for SRS. This parameter is applicable only for Uls on which UE also transmits PUSCH. If absent or release, the UE applies the value sameAs-Fci1 (see TS 38.213 [13], clause 7.3). |
| ***srs-ResourceIdList, srs-PosResourceIdList***  The IDs of the SRS-Resources/SRS-PosResource used in this *SRS-ResourceSet/SRS-PosResourceSet*. If this *SRS-ResourceSet* is configured with usage set to codebook, the *srs-ResourceIdList* contains at most 2 entries. If this *SRS-ResourceSet* is configured with *usage* set to *nonCodebook*, the *srs-ResourceIdList* contains at most 4 entries. |
| ***srs-ResourceSetId, srs-PosResourceSetId***  The ID of this resource set. It is unique in the context of the BWP in which the parent *SRS-Config* is defined. |
| ***ssb-IndexSevingcell***  Indicates SSB index belonging to a serving cell |
| ***ssb-NCell***  This field indicates a SSB configuration from neighboring cell |
| ***usage***  Indicates if the SRS resource set is used for beam management, codebook based or non-codebook based transmission or antenna switching. See TS 38.214 [19], clause 6.2.1. Reconfiguration between codebook based and non-codebook based transmission is not supported. |
| ***usagePDC***  If configured, it indicates that this SRS resource set is used for propagation delay compensation. The field can be present in only one *SRS-ResourceSet*. If this field is present, the UE ignore the field *usage*. |

|  |
| --- |
| *SSB-InfoNCell* field descriptions |
| ***physicalCellId***  This field specifies the physical cell ID of the neighbour cell for which SSB configuration is provided. |
| ***ssb-IndexNcell***  This field specifies the index of the SSB for a neighbour cell. See TS 38.213 [13]. If this field is absent, the UE determines the *ssb-IndexNcell* of the *physicalCellId*  based on its SSB measurement from the cell. |
| ***ssb-Configuration***  This field specifies the full configuration of the SSB. If this field is absent, the UE obtains the configuration for the SSB from *nr-SSB-Config* received as part of DL-PRS assistance data in LPP*,* see TS 37.355 [49], by looking up the corresponding SSB configuration using the field *physicalCellId*. |

|  |
| --- |
| *DL-PRS-Info* field descriptions |
| ***dl-PRS-ID***  This field specifies the UE specific TRP ID (see TS 37.355 [49]) for which PRS configuration is provided. |
| ***dl-PRS-ResourceSetId***  This field specifies the PRS-ResourceSet ID of a PRS resourceSet. |
| ***dl-PRS-ResourceId***  This field specifies the PRS-Resource ID of a PRS resource. If this field is absent, the UE determines the *dl-PRS-ResourceID* based on its PRS measurement from the TRP (see TS 37.355 [49]) and DL-PRS Resource Set. |

|  |
| --- |
| *SSB-Configuration* field descriptions |
| ***halfFrameIndex***  Indicates whether SSB is in the first half or the second half of the frame. Value zero indicates the first half and value 1 indicates the second half. |
| ***integerSubframeOffset***  Indicates the subframe boundary offset of the cell in which SSB is transmited. |
| ***sfn0-Offset***  Indiactes the time offset of the SFN0 slot 0 for the cell with respect to SFN0 slot 0 of serving cell. |
| ***sfn-Offset***  Specifies the SFN offset between the cell in which SSB is transmited and serving cell. The offset corresponds to the number of full radio frames counted from the beginning of a radio frame #0 of serving cell to the beginning of the closest subsequent radio frame #0 of the cell in which SSB is transmitted. |
| ***sfn-SSB-Offset***  Indicates the SFN offset of the transmitted SSB relative to the start of the SSB period. Value 0 indicates that the SSB is transmitted in the first system frame, value 1 indicates that SSB is transmitted in the second system frame and so on. The network configures this field according to the field *ssb-Periodicity* such that the indicated system frame does not exceed the configured SSB periodicity. |
| ***ssb-Freq***  Indicates the frequency of the SSB. |
| ***ss-PBCH-BlockPower***  Average EPRE of the resources elements that carry secondary synchronization signals in dBm that the NW used for SSB transmission, see TS 38.213 [13], clause 7. |
| ***ssb-Periodicity***  Indicates the periodicity of the SSB. If the field is absent, the UE applies the value ms5. (see TS 38.213 [13], clause 4.1) |
| ***ssbSubcarrierSpacing***  Subcarrier spacing of SSB.  Only the following values are applicable depending on the used frequency:  FR1: 15 or 30 kHz  FR2-1: 120 or 240 kHz  FR2-2: 120, 480, or 960 kHz |

|  |  |
| --- | --- |
| Conditional Presence | Explanation |
| *Setup* | This field is mandatory present upon configuration of *SRS-ResourceSet* or *SRS-Resource* and optionally present, Need M, otherwise. |
| *NonCodebook* | This field is optionally present, Need M, in case of non-codebook based transmission, otherwise the field is absent. |
| *Pathloss* | The field is mandatory present if the IE *SSB-InfoNcell* is included in *pathlossReferenceRS-Pos*; otherwise it is optionally present, Need R |

#### – *SRS-RSRP-Range*

The IE *SRS-RSRP-Range* specifies the value range used in SRS-RSRP measurements and thresholds. The integer value for SRS-RSRP measurements is according to Table 10.1.22.1.2-1 in TS 38.133 [14]. For thresholds, the actual value is (IE value –140) dBm, except for the IE value 98, in which case the actual value is infinity.

*SRS-RSRP-Range* information element

-- ASN1START

-- TAG-SRS-RSRP-RANGE-START

SRS-RSRP-Range-r16 ::= INTEGER(0..98)

-- TAG-SRS-RSRP-RANGE-STOP

-- ASN1STOP

#### – *SRS-TPC-CommandConfig*

The IE *SRS-TPC-CommandConfig* is used to configure the UE for extracting TPC commands for SRS from a group-TPC messages on DCI

*SRS-TPC-CommandConfig* information element

-- ASN1START

-- TAG-SRS-TPC-COMMANDCONFIG-START

SRS-TPC-CommandConfig ::= SEQUENCE {

startingBitOfFormat2-3 INTEGER (1..31) OPTIONAL, -- Need R

fieldTypeFormat2-3 INTEGER (0..1) OPTIONAL, -- Need R

...,

[[

startingBitOfFormat2-3SUL INTEGER (1..31) OPTIONAL -- Need R

]]

}

-- TAG-SRS-TPC-COMMANDCONFIG-STOP

-- ASN1STOP

|  |
| --- |
| *SRS-TPC-CommandConfig* field descriptions |
| ***fieldTypeFormat2-3***  The type of a field within the group DCI with SRS request fields (optional), which indicates how many bits in the field are for SRS request (0 or 2).  Note that for Type A, there is a common SRS request field for all SCells in the set, but each SCell has its own TPC command bits. See TS 38.212 [17] clause 7.3.1 and , TS 38.213 [13], clause 11.3. |
| ***startingBitOfFormat2-3***  The starting bit position of a block within the group DCI with SRS request fields (optional) and TPC commands. The value 1 of the field corresponds to the first/left most bit of format2-3. The value 2 of the field corresponds to the second bit format2-3, and so on (see TS 38.212 [17], clause 7.3.1 and TS 38.213 [13], clause 11.3). |
| ***startingBitOfFormat2-3SUL***  The starting bit position of a block within the group DCI with SRS request fields (optional) and TPC commands for SUL carrier (see TS 38.212 [17], clause 7.3.1 and TS 38.213 [13], clause 11.3). |

#### – *SSB-Index*

The IE *SSB-Index* identifies an SS-Block within an SS-Burst. See TS 38.213 [13], clause 4.1.

*SSB-Index* information element

-- ASN1START

-- TAG-SSB-INDEX-START

SSB-Index ::= INTEGER (0..maxNrofSSBs-1)

-- TAG-SSB-INDEX-STOP

-- ASN1STOP

#### – *SSB-MTC*

The IE *SSB-MTC* is used to configure measurement timing configurations, i.e., timing occasions at which the UE measures SSBs.

*SSB-MTC* information element

-- ASN1START

-- TAG-SSB-MTC-START

SSB-MTC ::= SEQUENCE {

periodicityAndOffset CHOICE {

sf5 INTEGER (0..4),

sf10 INTEGER (0..9),

sf20 INTEGER (0..19),

sf40 INTEGER (0..39),

sf80 INTEGER (0..79),

sf160 INTEGER (0..159)

},

duration ENUMERATED { sf1, sf2, sf3, sf4, sf5 }

}

SSB-MTC2 ::= SEQUENCE {

pci-List SEQUENCE (SIZE (1..maxNrofPCIsPerSMTC)) OF PhysCellId OPTIONAL, -- Need M

periodicity ENUMERATED {sf5, sf10, sf20, sf40, sf80, spare3, spare2, spare1}

}

SSB-MTC2-LP-r16 ::= SEQUENCE {

pci-List SEQUENCE (SIZE (1..maxNrofPCIsPerSMTC)) OF PhysCellId OPTIONAL, -- Need R

periodicity ENUMERATED {sf10, sf20, sf40, sf80, sf160, spare3, spare2, spare1}

}

SSB-MTC3-r16 ::= SEQUENCE {

periodicityAndOffset-r16 CHOICE {

sf5-r16 INTEGER (0..4),

sf10-r16 INTEGER (0..9),

sf20-r16 INTEGER (0..19),

sf40-r16 INTEGER (0..39),

sf80-r16 INTEGER (0..79),

sf160-r16 INTEGER (0..159),

sf320-r16 INTEGER (0..319),

sf640-r16 INTEGER (0..639),

sf1280-r16 INTEGER (0..1279)

},

duration-r16 ENUMERATED {sf1, sf2, sf3, sf4, sf5},

pci-List-r16 SEQUENCE (SIZE (1..maxNrofPCIsPerSMTC)) OF PhysCellId OPTIONAL, -- Need M

ssb-ToMeasure-r16 SetupRelease { SSB-ToMeasure } OPTIONAL -- Need M

}

SSB-MTC4-r17 ::= SEQUENCE {

pci-List-r17 SEQUENCE (SIZE (1..maxNrofPCIsPerSMTC)) OF PhysCellId OPTIONAL, -- Need M

offset-r17 INTEGER (0..159)

}

-- Editor's note: UE assistance information for SMTC/MG could be captured, and the content is FFS

SSB-MTC-AdditionalPCI-r17 ::= SEQUENCE {

additionalPCIIndex-r17 AdditionalPCIIndex-r17,

additionalPCI-r17 PhysCellId,

periodicity-r17 ENUMERATED { ms5, ms10, ms20, ms40, ms80, ms160, spare2, spare1 },

ssb-PositionsInBurst-r17 CHOICE {

shortBitmap BIT STRING (SIZE (4)),

mediumBitmap BIT STRING (SIZE (8)),

longBitmap BIT STRING (SIZE (64))

},

ss-PBCH-BlockPower-r17 INTEGER (-60..50)

}

AdditionalPCIIndex-r17 ::= INTEGER(1..maxNrofAdditionalPCI-r17)

-- TAG-SSB-MTC-STOP

-- ASN1STOP

|  |
| --- |
| *SSB-MTC* field descriptions |
| ***duration***  Duration of the measurement window in which to receive SS/PBCH blocks. It is given in number of subframes (see TS 38.213 [13], clause 4.1). |
| ***periodicityAndOffset***  Periodicity and offset of the measurement window in which to receive SS/PBCH blocks, see 5.5.2.10. Periodicity and offset are given in number of subframes. |

|  |
| --- |
| *SSB-MTC2* field descriptions |
| ***pci-List***  PCIs that are known to follow this SMTC. |

|  |
| --- |
| *SSB-MTC3* field descriptions |
| ***duration***  Duration of the measurement window in which to receive SS/PBCH blocks. It is given in number of subframes (see TS 38.213 [13], clause 4.1). |
| ***pci-List***  PCIs that are known to follow this SMTC, used for IAB-node discovery. |
| ***periodicityAndOffset***  Periodicity and offset of the measurement window in which to receive SS/PBCH blocks, see 5.5.2.10. Periodicity and offset are given in number of subframes. |
| ***ssb-ToMeasure***  The set of SS blocks to be measured within the SMTC measurement duration. The first/leftmost bit corresponds to SS block index 0, the second bit corresponds to SS block index 1, and so on. Value 0 in the bitmap indicates that the corresponding SS block is not to be measured while value 1 indicates that the corresponding SS block is to be measured (see TS 38.215 [9]). When the field is not configured the IAB-MT measures on all SS blocks. Regardless of the value of this field, SS blocks outside of the applicable *smtc* are not to be measured. See TS 38.215 [9] clause 5.1.1. |

|  |
| --- |
| *SSB-MTC4* field descriptions |
| ***pci-List***  PCIs that are known to follow this SMTC. |
| ***offset***  Offset of the measurement window in which to receive SS/PBCH blocks, see 5.5.2.10. Offset is given in number of subframes. |

|  |
| --- |
| *SSB-MTC-AdditionalPCI* field descriptions |
| ***additionalPCI***  PCI of the additional SSB different from serving cell PCI. |
| ***periodicity***  Periodicity of the SS/PBCH blocks, see 5.5.2.10. Periodicity is given in number of subframes. |
| ***ssb-PositionsInBurst***  Indicates the time domain positions of the transmitted SS-blocks in a half frame with SS/PBCH blocks as defined in TS 38.213 [13], clause 4.1. The first/leftmost bit corresponds to SS/PBCH block index 0, the second bit corresponds to SS/PBCH block index 1, and so on. Value 0 in the bitmap indicates that the corresponding SS/PBCH block is not transmitted while value 1 indicates that the corresponding SS/PBCH block is transmitted. |
| ***ss-PBCH-BlockPower***  Average EPRE of the resources elements that carry secondary synchronization signals in dBm that the NW used for SSB transmission, see TS 38.213 [13], clause 7. |

#### – *SSB-PositionQCL-Relation*

The IE *SSB-PositionQCL-Relation* is used to indicate the QCL relationship between SSB positions on the frequency indicated by *ssbFrequency* (see TS 38.213 [13], clause 4.1) for operation with shared spectrum channel access. Value n1 corresponds to 1, value n2 corresponds to 2 and so on.

*SSB-PositionQCL-Relation* information element

-- ASN1START

-- TAG-SSB-POSITIONQCL-RELATION-START

SSB-PositionQCL-Relation-r16 ::= ENUMERATED {n1,n2,n4,n8}

SSB-PositionQCL-Relation-r17 ::= ENUMERATED {n32, n64}

-- TAG-SSB-POSITIONQCL-RELATION-STOP

-- ASN1STOP

#### – *SSB-ToMeasure*

The IE *SSB-ToMeasure* is used to configure a pattern of SSBs. For operation with shared spectrum channel access in FR1, only *mediumBitmap* is used, and for FR2-2, *longBitmap* is used.

*SSB-ToMeasure* information element

-- ASN1START

-- TAG-SSB-TOMEASURE-START

SSB-ToMeasure ::= CHOICE {

shortBitmap BIT STRING (SIZE (4)),

mediumBitmap BIT STRING (SIZE (8)),

longBitmap BIT STRING (SIZE (64))

}

-- TAG-SSB-TOMEASURE-STOP

-- ASN1STOP

|  |
| --- |
| *SSB-ToMeasure* field descriptions |
| ***longBitmap***  Bitmap when maximum number of SS/PBCH blocks per half frame equals to 64 as defined in TS 38.213 [13], clause 4.1. For operation with shared spectrum channel access in FR2-2, if the k-th bit is set to 1, the UE assumes that one or more SS/PBCH blocks within the SMTC measurement duration with candidate SS/PBCH block indexes corresponding to SS/PBCH block index equal to (k– 1) may be transmitted; if the k-th bit is set to 0, the UE assumes that the corresponding SS/PBCH block(s) are not transmitted. |
| ***mediumBitmap***  Bitmap when maximum number of SS/PBCH blocks per half frame equals to 8 as defined in TS 38.213 [13], clause 4.1. For operation with shared spectrum channel access, if the k-th bit is set to 1, the UE assumes that one or more SS/PBCH blocks within the SMTC measurement duration with candidate SS/PBCH block indexes corresponding to SS/PBCH block index equal to k – 1 may be transmitted; if the kt-th bit is set to 0, the UE assumes that the corresponding SS/PBCH block(s) are not transmitted. The k-th bit is set to 0, where k > *ssb-PositionQCL-Common* and the number of actually transmitted SS/PBCH blocks is not larger than the number of 1's in the bitmap. If *ssb-PositionQCL* is configured with a value smaller than *ssb-PositionQCL-Common*, only the leftmost K bits (K = *ssb-PositionQCL*) are applicable for the corresponding cell. |
| ***shortBitmap***  Bitmap when maximum number of SS/PBCH blocks per half frame equals to 4 as defined in TS 38.213 [13], clause 4.1. |

#### – *SS-RSSI-Measurement*

The IE *SS-RSSI-Measurement* is used to configure RSSI measurements based on synchronization reference signals.

*SS-RSSI-Measurement* information element

-- ASN1START

-- TAG-SS-RSSI-MEASUREMENT-START

SS-RSSI-Measurement ::= SEQUENCE {

measurementSlots BIT STRING (SIZE (1..80)),

endSymbol INTEGER(0..3)

}

-- TAG-SS-RSSI-MEASUREMENT-STOP

-- ASN1STOP

|  |
| --- |
| *SS-RSSI-Measurement* field descriptions |
| ***endSymbol***  Within a slot that is configured for RSSI measurements (see *measurementSlots*) the UE measures the RSSI from symbol 0 to symbol *endSymbol*. This field identifies the entry in Table 5.1.3-1 in TS 38.215 [9], which determines the actual end symbol. |
| ***measurementSlots***  Indicates the slots in which the UE can perform RSSI measurements. The length of the BIT STRING is equal to the number of slots in the configured SMTC window (determined by the duration and by the subcarrierSpacing). The first (left-most / most significant) bit in the bitmap corresponds to the first slot in the SMTC window, the second bit in the bitmap corresponds to the second slot in the SMTC window, and so on. The UE measures in slots for which the corresponding bit in the bitmap is set to 1. In case this field is configured for a SCell with *ca-SlotOffset-r16*, the bits in the bitmap corresponds to the slots that are fully contained in the SMTC window. |

#### – *SubcarrierSpacing*

The IE *SubcarrierSpacing* determines the subcarrier spacing. Restrictions applicable for certain frequencies, channels or signals are clarified in the fields that use this IE.

*SubcarrierSpacing* information element

-- ASN1START

-- TAG-SUBCARRIERSPACING-START

SubcarrierSpacing ::= ENUMERATED {kHz15, kHz30, kHz60, kHz120, kHz240, kHz480-v1700, kHz960-v1700, spare1}

-- TAG-SUBCARRIERSPACING-STOP

-- ASN1STOP

#### – *TAG-Config*

The IE *TAG-Config* is used to configure parameters for a time-alignment group.

*TAG-Config* information element

-- ASN1START

-- TAG-TAG-CONFIG-START

TAG-Config ::= SEQUENCE {

tag-ToReleaseList SEQUENCE (SIZE (1..maxNrofTAGs)) OF TAG-Id OPTIONAL, -- Need N

tag-ToAddModList SEQUENCE (SIZE (1..maxNrofTAGs)) OF TAG OPTIONAL -- Need N

}

TAG ::= SEQUENCE {

tag-Id TAG-Id,

timeAlignmentTimer TimeAlignmentTimer,

...

}

TAG-Id ::= INTEGER (0..maxNrofTAGs-1)

-- TAG-TAG-CONFIG-STOP

-- ASN1STOP

|  |
| --- |
| *TAG* field descriptions |
| ***tag-Id***  Indicates the TAG of the SpCell or an SCell, see TS 38.321 [3]. Uniquely identifies the TAG within the scope of a Cell Group (i.e. MCG or SCG). |
| ***timeAlignmentTimer***  The *timeAlignmentTimer* for TAG with ID *tag-Id*, as specified in TS 38.321 [3]. |

#### – *TAR-Config*

The IE *TAR-Config* is used to configure Timing Advance reporting in non-terrestrial networks.

*TAR-Config* information element

-- ASN1START

-- TAG-TAR-CONFIG-START

TAR-Config-r17 ::= SEQUENCE {

offsetThresholdTA-r17 ENUMERATED {ms0dot5, ms1, ms2, ms3, ms4, ms5, ms6 ,ms7, ms8, ms9, ms10, ms11, ms12,

ms13, ms14, ms15, spare13, spare12, spare11, spare10, spare9, spare8, spare7,

spare6, spare5, spare4, spare3, spare2, spare1} OPTIONAL, -- Need R

timingAdvanceSR-r17 ENUMERATED {enabled} OPTIONAL, -- Need R

...

}

-- TAG-TAR-CONFIG-STOP

-- ASN1STOP

|  |
| --- |
| *TAR-Config* field descriptions |
| ***offsetThresholdTA***  Offset for TA reporting as specified in TS 38.321 [3]. This parameter is only applicable to MCG. |
| ***timingAdvanceSR***  Used to configure whether a Timing Advance report may trigger a Scheduling Request as specified in TS 38.321 [3]. |

#### – *TCI-Info*

The IE *TCI-Info* is used to refer to configured TCI states for PDSCH and/or PDCCH of the PSCell or of an SCell.

*TCI-Info* information element

-- ASN1START

-- TAG-TCI-INFO-START

TCI-Info ::= SEQUENCE {

pdcch-TCI-r17 SEQUENCE (SIZE (1..5)) OF TCI-StateId,

pdsch-TCI-r17 BIT STRING (SIZE (1..maxNrofTCI-States))

}

-- Editor's note: This IE is currently a starting point for discussion, details are FFS.

-- TAG-TCI-INFO-STOP

-- ASN1STOP

|  |
| --- |
| *TCI-Info* field descriptions |
| ***pdcch-TCI***  Indicates the TCI state for PDCCH for each configured CORESET of the DL BWP to be activated at SCell activation, to be activated for the PSCell at SCG activation and/or to be used for BFD, RLM and measurements while the SCG is deactivated. The list includes exactly as many entries as CORESETs configured in this BWP, ordered by increasing values of *ControlResourceSet-Id*, i.e. the first entry indicates the TCI state for the configured CORESET with the lowest *ControlResourceset-Id value*, the second value indicates the TCI states for the configured CORESET with the second lowest *ControlResourceset-Id* value, and so on. |
| ***pdsch-TCI***  Indicates TCI states for PDSCH reception at SCell addition/activation or of the PSCell at SCG activation. This field includes exactly one bit for each configured TCI state in this BWP ordered by increasing values of *TCI-StateId*, i.e. the first bit indicates the activation state of the TCI state with the lowest *TCI-StateId* value, the second value indicates the activation status of the TCI state with the second lowest *TCI-State-Id* value, and so on. A bit set to 0 indicates that the corresponding TCI state is deactivated, a bit set to 1 indicates that the TCI state is activated. |

#### – *TCI-State*

The IE *TCI-State* associates one or two DL reference signals with a corresponding quasi-colocation (QCL) type.

*TCI-State* information element

-- ASN1START

-- TAG-TCI-STATE-START

TCI-State ::= SEQUENCE {

tci-StateId TCI-StateId,

qcl-Type1 QCL-Info,

qcl-Type2 QCL-Info OPTIONAL, -- Need R

...,

[[

additionalPCI-r17 AdditionalPCIIndex-r17 OPTIONAL, -- Need R

pathlossReferenceRS-Id-r17 PUSCH-PathlossReferenceRS-Id OPTIONAL, -- Cond JointTCI

ul-powerControl-r17 Uplink-powerControlId-r17 OPTIONAL -- Cond JointTCI

]]

}

QCL-Info ::= SEQUENCE {

cell ServCellIndex OPTIONAL, -- Need R

bwp-Id BWP-Id OPTIONAL, -- Cond CSI-RS-Indicated

referenceSignal CHOICE {

csi-rs NZP-CSI-RS-ResourceId,

ssb SSB-Index

},

qcl-Type ENUMERATED {typeA, typeB, typeC, typeD},

...

}

-- TAG-TCI-STATE-STOP

-- ASN1STOP

|  |
| --- |
| *QCL-Info* field descriptions |
| ***bwp-Id***  The DL BWP which the RS is located in. |
| ***cell***  The UE's serving cell in which the *referenceSignal* is configured. If the field is absent, it applies to the serving cell in which the *TCI-State* is configured. The RS can be located on a serving cell other than the serving cell in which the *TCI-State* is configured only if the *qcl-Type* is configured as *typeC* or *typeD*. See TS 38.214 [19] clause 5.1.5. |
| ***referenceSignal***  Reference signal with which quasi-collocation information is provided as specified in TS 38.214 [19] clause 5.1.5. |
| ***qcl-Type***  QCL type as specified in TS 38.214 [19] clause 5.1.5. |

|  |
| --- |
| *TCI-State* field descriptions |
| ***additionalPCI***  Indicates that this TCI state refers to an additional PCI different from serving cell PCI, as configured in *ServingCellConfig*. |
| ***pathlossReferenceRS-Id***  The ID of the reference Signal (e.g. a CSI-RS config or a SS block) used for PUSCH path loss estimation. |
| ***qcl-Type1, qcl-Type2***  QCL information for the TCI state as specified in TS 38.214 [19] clause 5.1.5. |
| ***tci-StateId***  ID number of the TCI state. |
| **ul-PowerControl**  Configures power control parameters for PUCCH, PUSCH and SRS for this TCI state. The field is present here only if *ul-powerControl* is not configured in any *BWP-Uplink-Dedicated* of this serving cell. |

|  |  |
| --- | --- |
| Conditional Presence | Explanation |
| *CSI-RS-Indicated* | This field is mandatory present if *csi-rs* is included, absent otherwise |
| *JointTCI* | This field is optionally present, Need R,if this serving cell is configured with *unifiedTCI-StateType* set to '*joint*'. It is absent, Need R, otherwise. |

#### – *TCI-StateId*

The IE *TCI-StateId* is used to identify one *TCI-State* configuration.

*TCI-StateId* information element

-- ASN1START

-- TAG-TCI-STATEID-START

TCI-StateId ::= INTEGER (0..maxNrofTCI-States-1)

-- TAG-TCI-STATEID-STOP

-- ASN1STOP

#### – *TCI-UL-State*

The IE *TCI-UL-State* associates one or two DL or UL reference signals with a corresponding quasi-colocation (QCL) type.

*TCI-UL-State* information element

-- ASN1START

-- TAG-TCI-UL-STATE-START

TCI-UL-State-r17 ::= SEQUENCE {

tci-UL-State-Id-r17 TCI-UL-State-Id-r17,

servingCellId-r17 ServCellIndex OPTIONAL, -- Need R

bwp-Id-r17 BWP-Id OPTIONAL, -- Cond CSI-RSorSRS-Indicated

referenceSignal-r17 CHOICE {

ssb-Index-r17 SSB-Index,

csi-RS-Index-r17 NZP-CSI-RS-ResourceId,

srs-r17 SRS-ResourceId

},

additionalPCI-r17 AdditionalPCIIndex-r17 OPTIONAL, -- Need R

ul-powerControl-r17 Uplink-powerControlId-r17 OPTIONAL, -- Need R

pathlossReferenceRS-Id-r17 PUSCH-PathlossReferenceRS-Id-r17 OPTIONAL, -- Need R

...

}

-- TAG-TCI-UL-STATE-STOP

-- ASN1STOP

|  |
| --- |
| *TCI-UL-State* field descriptions |
| ***additionalPCI***  Indicates the physical cell IDs (PCI) of the SSBs. |
| ***bwp-Id***  The DL BWP which the CSI-RS is located in or UL BWP where the SRS is located in. |
| ***servingCellId***  The UE's serving cell in which the *referenceSignal* is configured. If the field is absent, it applies to the serving cell in which the *TCI-State* is configured. The RS can be located on a serving cell other than the serving cell in which the *TCI-State* is configured only if the *qcl-Type* is configured as *typeC* or *typeD*. See TS 38.214 [19] clause 5.1.5. |
| ***pathlossReferenceRS-Id***  The ID of the reference Signal (e.g. a CSI-RS config or a SS block) used for PUSCH path loss estimation. |
| ***ul-powerControl***  Configures power control parameters for PUCCH, PUSCH and SRS for this TCI state. The field is present here only if *ul-powerControl* is not configured in any *BWP-Uplink-Dedicated* of this serving cell. |

|  |  |
| --- | --- |
| Conditional Presence | Explanation |
| *CSI-RSorSRS-Indicated* | This field is mandatory present if *csi-rs* or *srs* is included, absent otherwise |

#### – *TCI-UL-StateId*

The IE *TCI-UL-StateId* is used to identify one *TCI-UL-State* configuration.

*TCI-UL-StateId* information element

-- ASN1START

-- TAG-TCI-UL-STATEID-START

TCI-UL-State-Id-r17 ::= INTEGER (0..maxUL-TCI-1-r17)

-- TAG-TCI-UL-STATEID-STOP

-- ASN1STOP

#### – *TDD-UL-DL-ConfigCommon*

The IE *TDD-UL-DL-ConfigCommon* determines the cell specific Uplink/Downlink TDD configuration.

*TDD-UL-DL-ConfigCommon* information element

-- ASN1START

-- TAG-TDD-UL-DL-CONFIGCOMMON-START

TDD-UL-DL-ConfigCommon ::= SEQUENCE {

referenceSubcarrierSpacing SubcarrierSpacing,

pattern1 TDD-UL-DL-Pattern,

pattern2 TDD-UL-DL-Pattern OPTIONAL, -- Need R

...

}

TDD-UL-DL-Pattern ::= SEQUENCE {

dl-UL-TransmissionPeriodicity ENUMERATED {ms0p5, ms0p625, ms1, ms1p25, ms2, ms2p5, ms5, ms10},

nrofDownlinkSlots INTEGER (0..maxNrofSlots),

nrofDownlinkSymbols INTEGER (0..maxNrofSymbols-1),

nrofUplinkSlots INTEGER (0..maxNrofSlots),

nrofUplinkSymbols INTEGER (0..maxNrofSymbols-1),

...,

[[

dl-UL-TransmissionPeriodicity-v1530 ENUMERATED {ms3, ms4} OPTIONAL -- Need R

]]

}

-- TAG-TDD-UL-DL-CONFIGCOMMON-STOP

-- ASN1STOP

|  |
| --- |
| *TDD-UL-DL-ConfigCommon* field descriptions |
| ***referenceSubcarrierSpacing***  Reference SCS used to determine the time domain boundaries in the UL-DL pattern which must be common across all subcarrier specific carriers, i.e., independent of the actual subcarrier spacing using for data transmission.  Only the following values are applicable depending on the used frequency:  FR1: 15, 30, or 60 kHz  FR2-1: 60 or 120 kHz  FR2-2: 120, 480, or 960 kHz  The network configures a not larger than any SCS of configured BWPs for the serving cell. The network or *SL-PreconfigGeneral* configures a not larger than the SCS of (pre-)configured SL BWP.See TS 38.213 [13], clause 11.1. |

|  |
| --- |
| *TDD-UL-DL-Pattern* field descriptions |
| ***dl-UL-TransmissionPeriodicity***  Periodicity of the DL-UL pattern, see TS 38.213 [13], clause 11.1. If the *dl-UL-TransmissionPeriodicity-v1530* is signalled, UE shall ignore the *dl-UL-TransmissionPeriodicity* (without suffix). |
| ***nrofDownlinkSlots***  Number of consecutive full DL slots at the beginning of each DL-UL pattern, see TS 38.213 [13], clause 11.1. In this release, the maximum value for this field is 80. |
| ***nrofDownlinkSymbols***  Number of consecutive DL symbols in the beginning of the slot following the last full DL slot (as derived from *nrofDownlinkSlots*). The value 0 indicates that there is no partial-downlink slot. (see TS 38.213 [13], clause 11.1). |
| ***nrofUplinkSlots***  Number of consecutive full UL slots at the end of each DL-UL pattern, see TS 38.213 [13], clause 11.1. In this release, the maximum value for this field is 80. |
| ***nrofUplinkSymbols***  Number of consecutive UL symbols in the end of the slot preceding the first full UL slot (as derived from *nrofUplinkSlots*). The value 0 indicates that there is no partial-uplink slot. (see TS 38.213 [13], clause 11.1). |

#### – *TDD-UL-DL-ConfigDedicated*

The IE *TDD-UL-DL-ConfigDedicated* determines the UE-specific Uplink/Downlink TDD configuration.

*TDD-UL-DL-ConfigDedicated* information element

-- ASN1START

-- TAG-TDD-UL-DL-CONFIGDEDICATED-START

TDD-UL-DL-ConfigDedicated ::= SEQUENCE {

slotSpecificConfigurationsToAddModList SEQUENCE (SIZE (1..maxNrofSlots)) OF TDD-UL-DL-SlotConfig OPTIONAL, -- Need N

slotSpecificConfigurationsToReleaseList SEQUENCE (SIZE (1..maxNrofSlots)) OF TDD-UL-DL-SlotIndex OPTIONAL, -- Need N

...

}

TDD-UL-DL-ConfigDedicated-IAB-MT-r16::= SEQUENCE {

slotSpecificConfigurationsToAddModList-IAB-MT-r16 SEQUENCE (SIZE (1..maxNrofSlots)) OF TDD-UL-DL-SlotConfig-IAB-MT-r16 OPTIONAL, -- Need N

slotSpecificConfigurationsToReleaseList-IAB-MT-r16 SEQUENCE (SIZE (1..maxNrofSlots)) OF TDD-UL-DL-SlotIndex OPTIONAL, -- Need N

...

}

TDD-UL-DL-SlotConfig ::= SEQUENCE {

slotIndex TDD-UL-DL-SlotIndex,

symbols CHOICE {

allDownlink NULL,

allUplink NULL,

explicit SEQUENCE {

nrofDownlinkSymbols INTEGER (1..maxNrofSymbols-1) OPTIONAL, -- Need S

nrofUplinkSymbols INTEGER (1..maxNrofSymbols-1) OPTIONAL -- Need S

}

}

}

TDD-UL-DL-SlotConfig-IAB-MT-r16::= SEQUENCE {

slotIndex-r16 TDD-UL-DL-SlotIndex,

symbols-IAB-MT-r16 CHOICE {

allDownlink-r16 NULL,

allUplink-r16 NULL,

explicit-r16 SEQUENCE {

nrofDownlinkSymbols-r16 INTEGER (1..maxNrofSymbols-1) OPTIONAL, -- Need S

nrofUplinkSymbols-r16 INTEGER (1..maxNrofSymbols-1) OPTIONAL -- Need S

},

explicit-IAB-MT-r16 SEQUENCE {

nrofDownlinkSymbols-r16 INTEGER (1..maxNrofSymbols-1) OPTIONAL, -- Need S

nrofUplinkSymbols-r16 INTEGER (1..maxNrofSymbols-1) OPTIONAL -- Need S

}

}

}

TDD-UL-DL-SlotIndex ::= INTEGER (0..maxNrofSlots-1)

-- TAG-TDD-UL-DL-CONFIGDEDICATED-STOP

-- ASN1STOP

|  |
| --- |
| *TDD-UL-DL-ConfigDedicated* field descriptions |
| ***slotSpecificConfigurationsToAddModList***  The *slotSpecificConfigurationToAddModList* allows overriding UL/DL allocations provided in tdd-UL-DL-configurationCommon, see TS 38.213 [13], clause 11.1. |

|  |
| --- |
| *TDD-UL-DL-ConfigDedicated-IAB-MT field descriptions* |
| ***slotSpecificConfigurationsToAddModList-IAB-MT***  The *slotSpecificConfigurationToAddModList-IAB-MT* allows overriding UL/DL allocations provided in tdd-UL-DL-configurationCommon with a limitation that effectively only flexible symbols can be overwritten in Rel-16. |
| ***slotSpecificConfigurationsToReleaseList-IAB-MT***  The *slotSpecificConfigurationsToReleaseList-IAB-MT* allows release of a set of slot configuration previously add with *slotSpecificConfigurationToAddModList-IAB-MT*. |

|  |
| --- |
| *TDD-UL-DL-SlotConfig* field descriptions |
| ***nrofDownlinkSymbols***  Number of consecutive DL symbols in the beginning of the slot identified by *slotIndex*. If the field is absent the UE assumes that there are no leading DL symbols. (see TS 38.213 [13], clause 11.1). |
| ***nrofUplinkSymbols***  Number of consecutive UL symbols in the end of the slot identified by *slotIndex*. If the field is absent the UE assumes that there are no trailing UL symbols. (see TS 38.213 [13], clause 11.1). |
| ***slotIndex***  Identifies a slot within a slot configuration periodgiven in *tdd-UL-DL-configurationCommon*, see TS 38.213 [13], clause 11.1. |
| ***symbols***  The direction (downlink or uplink) for the symbols in this slot. Value *allDownlink* indicates that all symbols in this slot are used for downlink; value *allUplink* indicates that all symbols in this slot are used for uplink; value *explicit* indicates explicitly how many symbols in the beginning and end of this slot are allocated to downlink and uplink, respectively. |

|  |
| --- |
| *TDD-UL-DL-SlotConfig-IAB-MT* field descriptions |
| ***symbols-IAB-MT***  The *symbols-IAB-MT*is used to configure an IAB-MT with the SlotConfig applicable for one serving cell. Value *allDownlink* indicates that all symbols in this slot are used for downlink; value *allUplink* indicates that all symbols in this slot are used for uplink; value *explicit* indicates explicitly how many symbols in the beginning and end of this slot are allocated to downlink and uplink, respectively; value *explicit-IAB-MT* indicates explicitly how many symbols in the beginning and end of this slot are allocated to uplink and downlink, respectively. |

#### – *TrackingAreaCode*

The IE *TrackingAreaCode* is used to identify a tracking area within the scope of a PLMN/SNPN, see TS 24.501 [23].

*TrackingAreaCode* information element

-- ASN1START

-- TAG-TRACKINGAREACODE-START

TrackingAreaCode ::= BIT STRING (SIZE (24))

-- TAG-TRACKINGAREACODE-STOP

-- ASN1STOP

#### – *T-Reselection*

The IE *T-Reselection* concerns the cell reselection timer TreselectionRAT for NR and E-UTRA Value in seconds. For value 0, behaviour as specified in 7.1.2 applies.

*T-Reselection*information element

-- ASN1START

-- TAG-TRESELECTION-START

T-Reselection ::= INTEGER (0..7)

-- TAG-TRESELECTION-STOP

-- ASN1STOP

#### – *TimeAlignmentTimer*

The IE *TimeAlignmentTimer* is used to configure the time alignment timer as specified in TS 38.321 [3]. The values are in ms.

*TimeAlignmentTimer* information element

-- ASN1START

-- TAG-TIMEALIGNMENTTIMER-START

TimeAlignmentTimer ::= ENUMERATED {ms500, ms750, ms1280, ms1920, ms2560, ms5120, ms10240, infinity}

-- TAG-TIMEALIGNMENTTIMER -STOP

-- ASN1STOP

#### – *TimeToTrigger*

The IE *TimeToTrigger* specifies the value range used for time to trigger parameter, which concerns the time during which specific criteria for the event needs to be met in order to trigger a measurement report. Value *ms0* corresponds to 0 ms and behaviour as specified in 7.1.2 applies, value *ms40* corresponds to 40 ms, and so on.

*TimeToTrigger* information element

-- ASN1START

-- TAG-TIMETOTRIGGER-START

TimeToTrigger ::= ENUMERATED {

ms0, ms40, ms64, ms80, ms100, ms128, ms160, ms256,

ms320, ms480, ms512, ms640, ms1024, ms1280, ms2560,

ms5120}

-- TAG-TIMETOTRIGGER-STOP

-- ASN1STOP

#### *– UAC-BarringInfoSetIndex*

The IE *UAC-BarringInfoSetIndex* provides the index of the entry in *uac-BarringInfoSetList*. Value 1 corresponds to the first entry in *uac-BarringInfoSetList,* value 2 corresponds to the second entry in this list and so on. An index value referring to an entry not included in *uac-BarringInfoSetList* indicates no barring.

*UAC-BarringInfoSetIndex* information element

-- ASN1START

-- TAG-UAC-BARRINGINFOSETINDEX-START

UAC-BarringInfoSetIndex ::= INTEGER (1..maxBarringInfoSet)

-- TAG-UAC-BARRINGINFOSETINDEX-STOP

-- ASN1STOP

#### *– UAC-BarringInfoSetList*

The IE *UAC-BarringInfoSetList* provides a list of access control parameter sets. An access category can be configured with access parameters according to one of the sets.

*UAC-BarringInfoSetList* information element

-- ASN1START

-- TAG-UAC-BARRINGINFOSETLIST-START

UAC-BarringInfoSetList ::= SEQUENCE (SIZE(1..maxBarringInfoSet)) OF UAC-BarringInfoSet

UAC-BarringInfoSetList-v1700 ::= SEQUENCE (SIZE(1..maxBarringInfoSet)) OF UAC-BarringInfoSet-v1700

UAC-BarringInfoSet ::= SEQUENCE {

uac-BarringFactor ENUMERATED {p00, p05, p10, p15, p20, p25, p30, p40,

p50, p60, p70, p75, p80, p85, p90, p95},

uac-BarringTime ENUMERATED {s4, s8, s16, s32, s64, s128, s256, s512},

uac-BarringForAccessIdentity BIT STRING (SIZE(7))

}

UAC-BarringInfoSet-v1700 ::= SEQUENCE {

uac-BarringFactorForAI3-r17 ENUMERATED {p00, p05, p10, p15, p20, p25, p30, p40, p50, p60, p70, p75, p80, p85, p90, p95}

OPTIONAL -- Need S

}

-- TAG-UAC-BARRINGINFOSETLIST-STOP

-- ASN1STOP

|  |
| --- |
| *UAC-BarringInfoSetList* field descriptions |
| ***uac-BarringInfoSetList***  List of access control parameter sets. Each access category can be configured with access parameters corresponding to a particular set by *uac-barringInfoSetIndex*. Association of an access category with an index that has no corresponding entry in the *uac-BarringInfoSetList* is valid configuration and indicates no barring. |
| ***uac-BarringForAccessIdentity***  Indicates whether access attempt is allowed for each Access Identity. The leftmost bit, bit 0 in the bit string corresponds to Access Identity 1, bit 1 in the bit string corresponds to Access Identity 2, bit 2 in the bit string corresponds to Access Identity 11, bit 3 in the bit string corresponds to Access Identity 12, bit 4 in the bit string corresponds to Access Identity 13, bit 5 in the bit string corresponds to Access Identity 14, and bit 6 in the bit string corresponds to Access Identity 15. Value 0 means that access attempt is allowed for the corresponding access identity. |
| ***uac-BarringFactor***  Represents the probability that access attempt would be allowed during access barring check. |
| ***uac-BarringFactorForAI3***  Barring factor applicable for Access Identity 3. Represents the probability that access attempt would be allowed during access barring check. If absent, the UE considers the access attempt as allowed. |
| ***uac-BarringTime***  The average time in seconds before a new access attempt is to be performed after an access attempt was barred at access barring check for the same access category, see 5.3.14.5. |

#### *– UAC-BarringPerCatList*

The IE *UAC-BarringPerCatList* provides access control parameters for a list of access categories.

*UAC-BarringPerCatList* information element

-- ASN1START

-- TAG-UAC-BARRINGPERCATLIST-START

UAC-BarringPerCatList ::= SEQUENCE (SIZE (1..maxAccessCat-1)) OF UAC-BarringPerCat

UAC-BarringPerCat ::= SEQUENCE {

accessCategory INTEGER (1..maxAccessCat-1),

uac-barringInfoSetIndex UAC-BarringInfoSetIndex

}

-- TAG-UAC-BARRINGPERCATLIST-STOP

-- ASN1STOP

|  |
| --- |
| *UAC-BarringPerCatList* field descriptions |
| ***accessCategory***  The Access Category according to TS 22.261 [25]. |

#### *– UAC-BarringPerPLMN-List*

The IE *UAC-BarringPerPLMN-List* provides access category specific access control parameters, which are configured per PLMN/SNPN.

*UAC-BarringPerPLMN-List* information element

-- ASN1START

-- TAG-UAC-BARRINGPERPLMN-LIST-START

UAC-BarringPerPLMN-List ::= SEQUENCE (SIZE (1.. maxPLMN)) OF UAC-BarringPerPLMN

UAC-BarringPerPLMN ::= SEQUENCE {

plmn-IdentityIndex INTEGER (1..maxPLMN),

uac-ACBarringListType CHOICE{

uac-ImplicitACBarringList SEQUENCE (SIZE(maxAccessCat-1)) OF UAC-BarringInfoSetIndex,

uac-ExplicitACBarringList UAC-BarringPerCatList

} OPTIONAL -- Need S

}

-- TAG-UAC-BARRINGPERPLMN-LIST-STOP

-- ASN1STOP

|  |
| --- |
| *UAC-BarringPerPLMN-List* field descriptions |
| ***uac-ACBarringListType***  Access control parameters for each access category valid only for a specific PLMN or SNPN. UE behaviour upon absence of this field is specified in clause 5.3.14.2. |
| ***plmn-IdentityIndex***  Index of the PLMN or SNPN across the *plmn-IdentityInfoList* and *npn-IdentityInfoList* fields included in SIB1. |

#### – *UE-TimersAndConstants*

The IE UE-TimersAndConstants contains timers and constants used by the UE in RRC\_CONNECTED, RRC\_INACTIVE and RRC\_IDLE.

*UE-TimersAndConstants* information element

-- ASN1START

-- TAG-UE-TIMERSANDCONSTANTS-START

UE-TimersAndConstants ::= SEQUENCE {

t300 ENUMERATED {ms100, ms200, ms300, ms400, ms600, ms1000, ms1500, ms2000},

t301 ENUMERATED {ms100, ms200, ms300, ms400, ms600, ms1000, ms1500, ms2000},

t310 ENUMERATED {ms0, ms50, ms100, ms200, ms500, ms1000, ms2000},

n310 ENUMERATED {n1, n2, n3, n4, n6, n8, n10, n20},

t311 ENUMERATED {ms1000, ms3000, ms5000, ms10000, ms15000, ms20000, ms30000},

n311 ENUMERATED {n1, n2, n3, n4, n5, n6, n8, n10},

t319 ENUMERATED {ms100, ms200, ms300, ms400, ms600, ms1000, ms1500, ms2000},

...

}

-- TAG-UE-TIMERSANDCONSTANTS-STOP

-- ASN1STOP

#### – *UE-TimersAndConstantsRemoteUE*

The IE *UE-TimersAndConstantsRemoteUE* contains timers and constants used by the L2 U2N Remote UE in RRC\_CONNECTED, RRC\_INACTIVE and RRC\_IDLE.

*UE-TimersAndConstantsRemoteUE* information element

-- ASN1START

-- TAG-UE-TIMERSANDCONSTANTSREMOTEUE-START

UE-TimersAndConstantsRemoteUE-r17 ::= SEQUENCE {

t300-RemoteUE-r17 ENUMERATED {ms100, ms200, ms300, ms400, ms600, ms1000, ms1500, ms2000} OPTIONAL, -- Need S

t301-RemoteUE-r17 ENUMERATED {ms100, ms200, ms300, ms400, ms600, ms1000, ms1500, ms2000} OPTIONAL, -- Need S

t319-RemoteUE-r17 ENUMERATED {ms100, ms200, ms300, ms400, ms600, ms1000, ms1500, ms2000} OPTIONAL, -- Need S

...

}

-- TAG-UE-TIMERSANDCONSTANTSREMOTEUE-STOP

-- ASN1STOP

|  |
| --- |
| *UE-TimersAndConstantsRemoteUE* field descriptions |
| ***t300-RemoteUE***  Indicates the timer value of T300 used by L2 U2N Remote UE. If the field is absent, the timer value indicated in t300 applies to L2 U2N Remote UE. |
| ***t301-RemoteUE***  Indicates the timer value of T301 used by L2 U2N Remote UE. If the field is absent, the timer value indicated in t301 applies to L2 U2N Remote UE. |
| ***t319-RemoteUE***  Indicates the timer value of T319 used by L2 U2N Remote UE. If the field is absent, the timer value indicated in t319 applies to L2 U2N Remote UE. |

#### – *UL-DelayValueConfig*

The IE *UL-DelayValueConfig* specifies the configuration of the UL PDCP Packet Delay value per DRB measurement specified in TS 38.314 [53].

*UL-DelayValueConfig* information element

-- ASN1START

-- TAG-ULDELAYVALUECONFIG-START

UL-DelayValueConfig-r16 ::= SEQUENCE {

delay-DRBlist-r16 SEQUENCE (SIZE(1..maxDRB)) OF DRB-Identity

}

-- TAG-ULDELAYVALUECONFIG-STOP

-- ASN1STOP

| *UL-DelayValueConfig* field descriptions |
| --- |
| ***delay-DRBlist***  Indicates the DRB IDs used by UE to provide results of UL PDCP Packet Delay value per DRB measurement as specified in TS 38.314 [53]. |

#### – *UL-ExcessDelayConfig*

The IE *UL-ExcessDelayConfig* IE specifies the configuration of the UL PDCP Excess Packet Delay per DRB measurement specified in TS 38.314 [53].

*UL-ExcessDelayConfig* information element

-- ASN1START

-- TAG-ULEXCESSDELAYCONFIG-START

UL-ExcessDelayConfig-r17 ::= SEQUENCE {

excessDelay-DRBlist-r17 SEQUENCE (SIZE(1..maxDRB)) OF ExcessDelay-DRB-IdentityInfo-r17

}

ExcessDelay-DRB-IdentityInfo-r17 ::= SEQUENCE {

drb-IdentityList SEQUENCE (SIZE (1..maxDRB)) OF DRB-Identity,

delayThreshold ENUMERATED {ms0dot25, ms0dot5, ms1, ms2, ms4, ms5, ms10, ms20, ms30, ms40, ms50, ms60, ms70,

ms80, ms90, ms100, ms150, ms300, ms500}

}

-- TAG-ULEXCESSDELAYCONFIG-STOP

-- ASN1STOP

| *UL-ExcessDelayConfig* field descriptions |
| --- |
| ***drb-IdentityList***  Indicates the DRB IDs used by UE to provide results of UL PDCP Excess Packet Delay per DRB measurement as specified in TS 38.314 [53]. |
| ***delayThreshold***  Indicates the delay threshold for the DRB IDs indicated in DRB-IdentityList. Value ms0dot25 corresponds to 0.25ms, ms0dot5 corresponds to 0.5ms, ms1 corresponds to 1ms and so on. |

#### – *UL-GapFR2-Config*

The IE *UL-GapFR2-Config* specifies the FR2 uplink gap configuration.

*UL-GapFR2-Config* information element

-- ASN1START

-- TAG-UL-GAPFR2-CONFIG-START

UL-GapFR2-Config-r17 ::= SEQUENCE {

gapOffset-r17 INTEGER (0..159),

ugl-r17 ENUMERATED {ms0dot125, ms0dot25, ms0dot5, ms1},

ugrp-r17 ENUMERATED {ms5, ms20, ms40, ms160},

refFR2-ServCellAsyncCA-r17 ServCellIndex OPTIONAL -- Cond AsyncCA

}

-- TAG-UL-GAPFR2-CONFIG-STOP

-- ASN1STOP

| *UL-GapFR2-Config* field descriptions |
| --- |
| ***gapOffset***  Value *gapOffset* is the gap offset of the FR2 UL gap pattern with UGRP indicated in the field *ugrp*. The value range is from 0 to *ugrp*-1. |
| ***refFR2-ServCellAsyncCA***  Indicates the FR2 serving cell identifier whose SFN and subframe is used for FR2 UL gap calculation for this gap pattern with asynchronous CA involving FR2 carrier(s). |
| ***ugl***  Value ugl is the gap length in ms of the FR2 UL gap. The FR2 UL gap length is according to in Table 9.1.7 in TS 38.133 [14]. Value *ms0dot125* corresponds to 0.125 ms, *ms0dot25* corresponds to 0.25 ms and so on. |
| ***ugrp***  Value ugrp is the gap repetition period in (ms) of the FR2 UL gap. The FR2 UL gap repetition period is according to Table 9.1.7 in TS 38.133 [14]. |

|  |  |
| --- | --- |
| Conditional Presence | Explanation |
| *AsyncCA* | This field is mandatory present when configuring FR2 UL gap pattern to UE in:  - (NG)EN-DC, NR SA, NE-DC or NR-DC without FR2-FR2 band combination, with asynchronous CA involving FR2 carriers. |

#### – *UplinkCancellation*

The IE *UplinkCancellation* is used to configure the UE to monitor PDCCH for the CI-RNTI.

*UplinkCancellation* information element

-- ASN1START

-- TAG-UPLINKCANCELLATION-START

UplinkCancellation-r16 ::= SEQUENCE {

ci-RNTI-r16 RNTI-Value,

dci-PayloadSizeForCI-r16 INTEGER (0..maxCI-DCI-PayloadSize-r16),

ci-ConfigurationPerServingCell-r16 SEQUENCE (SIZE (1..maxNrofServingCells)) OF CI-ConfigurationPerServingCell-r16,

...

}

CI-ConfigurationPerServingCell-r16 ::= SEQUENCE {

servingCellId ServCellIndex,

positionInDCI-r16 INTEGER (0..maxCI-DCI-PayloadSize-1-r16),

positionInDCI-ForSUL-r16 INTEGER (0..maxCI-DCI-PayloadSize-1-r16) OPTIONAL, -- Cond SUL-Only

ci-PayloadSize-r16 ENUMERATED {n1, n2, n4, n5, n7, n8, n10, n14, n16, n20, n28, n32, n35, n42, n56, n112},

timeFrequencyRegion-r16 SEQUENCE {

timeDurationForCI-r16 ENUMERATED {n2, n4, n7, n14} OPTIONAL, -- Cond SymbolPeriodicity

timeGranularityForCI-r16 ENUMERATED {n1, n2, n4, n7, n14, n28},

frequencyRegionForCI-r16 INTEGER (0..37949),

deltaOffset-r16 INTEGER (0..2),

...

},

uplinkCancellationPriority-v1610 ENUMERATED {enabled} OPTIONAL -- Need S

}

-- TAG-UPLINKCANCELLATION-STOP

-- ASN1STOP

|  |
| --- |
| *UplinkCancellation* field descriptions |
| ***ci-ConfigurationPerServingCell***  Indicates (per serving cell) the position of the *ci-PaylaodSize* bit CI values inside the DCI payload (see TS 38.213 [13], clause 11.2A). |
| ***ci-RNTI***  RNTI used for indication cancellation in UL (see TS 38.212 [17] clause 7.3.1 and TS 38.213 [13], clause 11.2A). |
| ***dci-PayloadSizeForCI***  Total length of the DCI payload scrambled with CI-RNTI (see TS 38.213 [13], clause 11.2A). |

|  |
| --- |
| *CI-ConfigurationPerServingCell* field descriptions |
| ***ci-PayloadSize***  Configures the field size for each UL cancelation indicator of this serving cell (servingCellId) (see TS 38.213 [13], clause 11.2A). |
| ***deltaOffset***  Configures the additional offset from the end of a PDCCH reception where the UE detects the DCI format 2\_4 and the first symbol of the T\_"CI" symbols, in the unit of OFDM symbols (see TS 38.213 [13], clause 11.2A). |
| ***frequencyRegionForCI***  Configures the reference frequency region where a detected UL CI is applicable (see TS 38.213 [13], clause 11.2A). It is defined in the same way as *locationAndBandwidth*. |
| ***positionInDCI***  Starting position (in number of bit) of the *ci-PayloadSize* bit CI value applicable for this serving cell (servingCellId) within the DCI payload (see TS 38.213 [13], clause 11.2A). |
| ***positionInDCI-ForSUL***  Starting position (in number of bit) of the *ci-PayloadSize* bit CI value applicable for SUL of this serving cell (servingCellId) within the DCI payload (see TS 38.213 [13], clause 11.2A). |
| ***timeDurationForCI***  Configures the duration of the reference time region in symbols where a detected UL CI is applicable of this serving cell (servingCellId) (see TS 38.213 [13], clause 11.2A). If the field is absent, i.e., the configured UL CI monitoring periodicity indicated by *monitoringSlotPeriodicityAndOffset* for DCI format 2\_4 is larger than 1 slot or 1 slot with only one monitoring occasion, the UE applies the value of the configured UL CI monitoring periodicity, |
| ***timeFrequencyRegion***  Configures the reference time and frequency region where a detected UL CI is applicable of this serving cell (servingCellId) (see TS 38.213 [13], clause 11.2A). |
| ***timeGranularityForCI***  Configures the number of partitions within the time region of this serving cell (servingCellId) (see TS 38.213 [13], clause 11.2A). |
| ***uplinkCancellationPriority***  Configures uplink cancellation behavior if both UL CI and intra-UE priority indicator are configured for a given UE. If the field is present, then UL CI is only applicable to the UL transmissions indicated/configured as low priority level. If the field is absent, UL CI is applicable to UL transmission irrespective of its priority level (see TS 38.213 [13], clause 11.2A). |

|  |  |
| --- | --- |
| Conditional Presence | Explanation |
| *SUL-Only* | The field is optionally present, Need R, if *supplementaryUplink* is configured in *ServingCellConfig*. It is absent otherwise. |
| *SymbolPeriodicity* | This field is mandatory present if the configured UL CI monitoring periodicity indicated by *monitoringSlotPeriodicityAndOffset* for DCI format 2\_4 is 1 slot with more than one monitoring occasion, otherwise absent. |

#### *– UplinkConfigCommon*

The IE *UplinkConfigCommon* provides common uplink parameters of a cell.

*UplinkConfigCommon* information element

-- ASN1START

-- TAG-UPLINKCONFIGCOMMON-START

UplinkConfigCommon ::= SEQUENCE {

frequencyInfoUL FrequencyInfoUL OPTIONAL, -- Cond InterFreqHOAndServCellAdd

initialUplinkBWP BWP-UplinkCommon OPTIONAL, -- Cond ServCellAdd

dummy TimeAlignmentTimer

}

UplinkConfigCommon-v1700 ::= SEQUENCE {

initialUplinkBWP-RedCap-r17 BWP-UplinkCommon OPTIONAL -- Need R

}

-- TAG-UPLINKCONFIGCOMMON-STOP

-- ASN1STOP

|  |
| --- |
| *UplinkConfigCommon* field descriptions |
| ***frequencyInfoUL***  Absolute uplink frequency configuration and subcarrier specific virtual carriers. |
| ***initialUplinkBWP***  The initial uplink BWP configuration for a serving cell (see TS 38.213 [13], clause 12). |
| ***initialUplinkBWP-RedCap***  If present, RedCap UEs use this UL BWP instead of *initialUplinkBWP*.  If absent, RedCap UEs use *initialUplinkBWP* provided that it does not exceed the RedCap UE maximum bandwidth (see also clause 5.2.2.4.2). |

|  |  |
| --- | --- |
| Conditional Presence | Explanation |
| *InterFreqHOAndServCellAdd* | This field is mandatory present for inter-frequency handover and upon serving cell (PSCell/SCell) addition. Otherwise, the field is optionally present, Need M. |
| *ServCellAdd* | This field is mandatory present upon serving cell addition (for PSCell and SCell) and upon handover from E-UTRA to NR. It is optionally present, Need M otherwise. |

#### – *UplinkConfigCommonSIB*

The IE *UplinkConfigCommonSIB* provides common uplink parameters of a cell.

*UplinkConfigCommonSIB* information element

-- ASN1START

-- TAG-UPLINKCONFIGCOMMONSIB-START

UplinkConfigCommonSIB ::= SEQUENCE {

frequencyInfoUL FrequencyInfoUL-SIB,

initialUplinkBWP BWP-UplinkCommon,

timeAlignmentTimerCommon TimeAlignmentTimer

}

UplinkConfigCommonSIB-v1700 ::= SEQUENCE {

initialUplinkBWP-RedCap-r17 BWP-UplinkCommon OPTIONAL -- Need R

}

-- TAG-UPLINKCONFIGCOMMONSIB-STOP

-- ASN1STOP

|  |
| --- |
| *UplinkConfigCommonSIB* field descriptions |
| ***frequencyInfoUL***  Absolute uplink frequency configuration and subcarrier specific virtual carriers. |
| ***InitialUplinkBWP***  The initial uplink BWP configuration for a PCell (see TS 38.213 [13], clause 12). |
| ***initialUplinkBWP-RedCap***  If present, RedCap UEs use this UL BWP instead of *initialUplinkBWP*.  If absent, RedCap UEs use *initialUplinkBWP* provided that it does not exceed the RedCap UE maximum bandwidth (see also clause 5.2.2.4.2). |

#### – *Uplink-PowerControl*

The IE *Uplink-PowerControl* is used to configure UE specific power control parameter for PUSCH, PUCCH and SRS.

*Uplink-PowerControl* information element

-- ASN1START

-- TAG-UPLINK-POWERCONTROL-START

Uplink-powerControl-r17 ::= SEQUENCE {

ul-powercontrolId-r17 Uplink-powerControlId-r17,

p0AlphaSetforPUSCH-r17 P0AlphaSet-r17 OPTIONAL, -- Need R

p0AlphaSetforPUCCH-r17 P0AlphaSet-r17 OPTIONAL, -- Need R

p0AlphaSetforSRS-r17 P0AlphaSet-r17 OPTIONAL -- Need R

}

P0AlphaSet-r17 ::= SEQUENCE {

p0-r17 INTEGER (-16..15) OPTIONAL, -- Need R

alpha-r17 Alpha OPTIONAL, -- Need R

closedLoopIndex-r17 ENUMERATED { i0, i1 }

}

Uplink-powerControlId-r17 ::= INTEGER(1.. maxUL-TCI-r17)

-- editor's note: how to handle any legacy power control parameters, where to state those are not configred/applied?

-- TAG-UPLINK-POWERCONTROL-STOP

-- ASN1STOP

|  |
| --- |
| *Uplink-PowerControl* field descriptions |
| ***p0AlphaSetforPUSCH, p0AlphaSetforPUCCH, p0AlphaSetforSRS***  Configures power control parameters for PUSCH, PUCCH and SRS (see TS 38.213 [13], clause 7.2). |

#### – *Uu-RelayRLC-ChannelConfig*

The IE *Uu-RelayRLC-ChannelConfig* is used to configure an RLC entity, a corresponding logical channel in MAC for Uu Relay RLC channel between L2 U2N Relay UE and network.

*Uu-RelayRLC-ChannelConfig* information element

-- ASN1START

-- TAG-UURELAYRLCCHANNELCONFIG-START

Uu-RelayRLC-ChannelConfig-r17::= SEQUENCE {

uu-LogicalChannelIdentity-r17 LogicalChannelIdentity OPTIONAL, -- Cond RelayLCH-SetupOnly

uu-RelayRLC-ChannelID-r17 Uu-RelayRLC-ChannelID-r17,

reestablishRLC-r17 ENUMERATED {true} OPTIONAL, -- Need N

rlc-Config-r17 RLC-Config OPTIONAL, -- Cond RelayLCH-Setup

mac-LogicalChannelConfig-r17 LogicalChannelConfig OPTIONAL, -- Cond RelayLCH-Setup

...

}

-- TAG-UURELAYRLCCHANNELCONFIG-STOP

-- ASN1STOP

|  |
| --- |
| *Uu-RelayRLC-ChannelConfig* field descriptions |
| ***uu-LogicalChannelIdentity***  Indicates the logical channel id for Uu Relay RLC channel of the L2 U2N Relay UE. |
| ***uu-RelayRLC-ChannelID***  Indicates the Uu Relay RLC channel in the link between L2 U2N Relay UE and network. |
| ***reestablishRLC***  Indicates that RLC should be re-established. |
| ***rlc-Config***  Determines the RLC mode (UM, AM) and provides corresponding parameters. |

|  |  |
| --- | --- |
| Conditional Presence | Explanation |
| *RelayLCH-Setup* | This field is mandatory present upon creation of a new logical channel for a Uu Relay RLC channel. It is optionally present, Need M, otherwise. |
| *RelayLCH-SetupOnly* | This field is mandatory present upon creation of a new logical channel for a Uu Relay RLC channel. It is absent otherwise. |

#### – *Uu-RelayRLC-ChannelID*

The IE *Uu-RelayRLC-ChannelID* is used to identify a Uu Relay RLC channel in the link between L2 U2N Relay UE and network.

*Uu-RelayRLC-ChannelID* information element

-- ASN1START

-- TAG-UURELAYRLCCHANNELID-START

Uu-RelayRLC-ChannelID-r17 ::= INTEGER (1..maxLC-ID)

-- TAG-UURELAYRLCCHANNELID-STOP

-- ASN1STOP

#### – *UplinkTxDirectCurrentList*

The IE *UplinkTxDirectCurrentList* indicates the Tx Direct Current locations per serving cell for each configured UL BWP in the serving cell, based on the BWP numerology and the associated carrier bandwidth.

*UplinkTxDirectCurrentList* information element

-- ASN1START

-- TAG-UPLINKTXDIRECTCURRENTLIST-START

UplinkTxDirectCurrentList ::= SEQUENCE (SIZE (1..maxNrofServingCells)) OF UplinkTxDirectCurrentCell

UplinkTxDirectCurrentCell ::= SEQUENCE {

servCellIndex ServCellIndex,

uplinkDirectCurrentBWP SEQUENCE (SIZE (1..maxNrofBWPs)) OF UplinkTxDirectCurrentBWP,

...,

[[

uplinkDirectCurrentBWP-SUL SEQUENCE (SIZE (1..maxNrofBWPs)) OF UplinkTxDirectCurrentBWP OPTIONAL

]]

}

UplinkTxDirectCurrentBWP ::= SEQUENCE {

bwp-Id BWP-Id,

shift7dot5kHz BOOLEAN,

txDirectCurrentLocation INTEGER (0..3301)

}

-- TAG-UPLINKTXDIRECTCURRENTLIST-STOP

-- ASN1STOP

|  |
| --- |
| *UplinkTxDirectCurrentBWP* field descriptions |
| ***bwp-Id***  The BWP-Id of the corresponding uplink BWP. |
| ***shift7dot5kHz***  Indicates whether there is 7.5 kHz shift or not. 7.5 kHz shift is applied if the field is set to *true*. Otherwise 7.5 kHz shift is not applied. |
| ***txDirectCurrentLocation***  The uplink Tx Direct Current location for the carrier. Only values in the value range of this field between 0 and 3299, which indicate the subcarrier index within the carrier corresponding to the numerology of the corresponding uplink BWP and value 3300, which indicates "Outside the carrier" and value 3301, which indicates "Undetermined position within the carrier" are used in this version of the specification. |

|  |
| --- |
| *UplinkTxDirectCurrentCell* field descriptions |
| ***servCellIndex***  The serving cell ID of the serving cell corresponding to the *uplinkDirectCurrentBWP*. |
| ***uplinkDirectCurrentBWP***  The Tx Direct Current locations for all the uplink BWPs configured at the corresponding serving cell. |
| ***uplinkDirectCurrentBWP-SUL***  The Tx Direct Current locations for all the supplementary uplink BWPs configured at the corresponding serving cell. |

#### – *UplinkTxDirectCurrentTwoCarrierList*

The IE *UplinkTxDirectCurrentTwoCarrierList* indicates the Tx Direct Current locations when uplink intra-band CA with two carriers is configured, based on the configured carriers and BWP numerology and the associated carrier bandwidth of the carriers. The UE does not report the uplink Direct Current location information for SUL carrier(s).

*UplinkTxDirectCurrentTwoCarrierList* information element

-- ASN1START

-- TAG-UPLINKTXDIRECTCURRENTTWOCARRIERLIST-START

UplinkTxDirectCurrentTwoCarrierList-r16 ::= SEQUENCE (SIZE (1..maxNrofTxDC-TwoCarrier-r16)) OF UplinkTxDirectCurrentTwoCarrier-r16

UplinkTxDirectCurrentTwoCarrier-r16 ::= SEQUENCE {

carrierOneInfo-r16 UplinkTxDirectCurrentCarrierInfo-r16,

carrierTwoInfo-r16 UplinkTxDirectCurrentCarrierInfo-r16,

singlePA-TxDirectCurrent-r16 UplinkTxDirectCurrentTwoCarrierInfo-r16,

secondPA-TxDirectCurrent-r16 UplinkTxDirectCurrentTwoCarrierInfo-r16 OPTIONAL

}

UplinkTxDirectCurrentCarrierInfo-r16 ::= SEQUENCE {

servCellIndex-r16 ServCellIndex,

servCellInfo-r16 CHOICE {

bwp-Id-r16 BWP-Id,

deactivatedCarrier-r16 ENUMERATED {deactivated}

}

}

UplinkTxDirectCurrentTwoCarrierInfo-r16 ::= SEQUENCE {

referenceCarrierIndex-r16 ServCellIndex,

shift7dot5kHz-r16 BOOLEAN,

txDirectCurrentLocation-r16 INTEGER (0..3301)

}

-- TAG-UPLINKTXDIRECTCURRENTTWOCARRIERLIST-STOP

-- ASN1STOP

|  |
| --- |
| *UplinkTxDirectCurrentTwoCarrierInfo* field descriptions |
| ***referenceCarrierIndex***  The serving cell ID of the carrier which is to be used as the reference for interpreting the Tx Direction Current location as reported using *txDirectCurrentLocation-r16*. The numerology of the uplink BWP ID reported with *bwp-Id-r16* for this serving cell is the numerology used for interpreting the reported subcarrier location. |
| ***shift7dot5kHz***  Indicates whether there is 7.5 kHz shift or not. 7.5 kHz shift is applied if the field is set to *true*. Otherwise 7.5 kHz shift is not applied. |
| ***txDirectCurrentLocation***  The uplink Tx Direct Current location for the two carrier uplink CA with the serving cells reported using *carrierOneInfo-r16* and *carrierTwoInfo-r16*. Values in the range of this field between 0 and 3299 indicate the subcarrier index of the uplink Tx Direct Current location with the subcarrier taken from the serving cell with ID *referenceCarrierIndex* and the numerology of the corresponding uplink BWP reported for this serving cell. Value 3300 indicates "Outside the carrier" and value 3301 indicates "Undetermined position within the carrier". |

|  |
| --- |
| *UplinkTxDirectCurrentCarrierInfo* field descriptions |
| ***bwp-Id***  The BWP ID of the serving cell which is part of the two carrier uplink carrier aggregation. The UE shall not report this field if the serving cell is reported as deactivated using *deactivatedCarrier-r16.* |
| ***deactivatedCarrier***  For the reported uplink Tx Direct Current location(s) corresponding to *singlePA-TxDirectCurrent-r16*, indicates whether the carrier is deactivated or not for this serving cell. If the carrier refers to the PCell, the UE shall not set this field to *deactivated*. |
| ***servCellIndex***  The serving cell ID of the serving cell which is part of the two carrier uplink carrier aggregation. |

|  |
| --- |
| *UplinkTxDirectCurrentTwoCarrier* field descriptions |
| ***carrierOneInfo***  The serving cell ID and BWP ID of the first carrier of the uplink carrier aggregation for which the uplink Tx Direct Current location(s) are being reported. |
| ***carrierTwoInfo***  The serving cell ID and BWP ID of the second carrier of the uplink carrier aggregation for which the uplink Tx Direct Current location(s) are being reported. |
| ***singlePA-TxDirectCurrent***  The uplink Tx Direct Current location for the UE which support single PA for this uplink carrier aggregation. For the UEs which support dual PA for this uplink carrier aggregation, this field is for reporting the uplink Tx Direct Current location of the first PA. |
| ***secondPA-TxDirectCurrent***  The uplink Tx Direct Current location used by the UE with the second PA for the UEs which support dual PA for this uplink carrier aggregation. This field shall be absent for the *UplinkTxDirectCurrentTwoCarrier* entity where *deactivatedCarrier* of *carrierOneInfo* or *carrierTwoInfo* is set to *deactivated*. |

#### – *ZP-CSI-RS-Resource*

The IE *ZP-CSI-RS-Resource* is used to configure a Zero-Power (ZP) CSI-RS resource (see TS 38.214 [19], clause 5.1.4.2). Reconfiguration of a *ZP-CSI-RS-Resource* between periodic or semi-persistent and aperiodic is not supported.

*ZP-CSI-RS-Resource* information element

-- ASN1START

-- TAG-ZP-CSI-RS-RESOURCE-START

ZP-CSI-RS-Resource ::= SEQUENCE {

zp-CSI-RS-ResourceId ZP-CSI-RS-ResourceId,

resourceMapping CSI-RS-ResourceMapping,

periodicityAndOffset CSI-ResourcePeriodicityAndOffset OPTIONAL, --Cond PeriodicOrSemiPersistent

...

}

ZP-CSI-RS-ResourceId ::= INTEGER (0..maxNrofZP-CSI-RS-Resources-1)

-- TAG-ZP-CSI-RS-RESOURCE-STOP

-- ASN1STOP

|  |
| --- |
| *ZP-CSI-RS-Resource* field descriptions |
| ***periodicityAndOffset***  Periodicity and slot offset for periodic/semi-persistent ZP-CSI-RS (see TS 38.214 [19], clause 5.1.4.2). Network always configures the UE with a value for this field for periodic and semi-persistent ZP-CSI-RS resource (as indicated in PDSCH-Config). |
| ***resourceMapping***  OFDM symbol and subcarrier occupancy of the ZP-CSI-RS resource within a slot. |
| ***zp-CSI-RS-ResourceId***  ZP CSI-RS resource configuration ID (see TS 38.214 [19], clause 5.1.4.2). |

|  |  |
| --- | --- |
| Conditional Presence | Explanation |
| *PeriodicOrSemiPersistent* | The field is optionally present, Need M, for periodic and semi-persistent ZP-CSI-RS-Resources (as indicated in PDSCH-Config). The field is absent otherwise. |

#### – *ZP-CSI-RS-ResourceSet*

The IE *ZP-CSI-RS-ResourceSet* refers to a set of *ZP-CSI-RS-Resources* using their *ZP-CSI-RS-ResourceId*s.

*ZP-CSI-RS-ResourceSet* information element

-- ASN1START

-- TAG-ZP-CSI-RS-RESOURCESET-START

ZP-CSI-RS-ResourceSet ::= SEQUENCE {

zp-CSI-RS-ResourceSetId ZP-CSI-RS-ResourceSetId,

zp-CSI-RS-ResourceIdList SEQUENCE (SIZE(1..maxNrofZP-CSI-RS-ResourcesPerSet)) OF ZP-CSI-RS-ResourceId,

...

}

-- TAG-ZP-CSI-RS-RESOURCESET-STOP

-- ASN1STOP

|  |
| --- |
| *ZP-CSI-RS-ResourceSet* field descriptions |
| ***zp-CSI-RS-ResourceIdList***  The list of *ZP-CSI-RS-ResourceId* identifying the *ZP-CSI-RS-Resource* elements belonging to this set. |

#### – *ZP-CSI-RS-ResourceSetId*

The IE *ZP-CSI-RS-ResourceSetId* identifies a *ZP-CSI-RS-ResourceSet*.

*ZP-CSI-RS-ResourceSetId* information element

-- ASN1START

-- TAG-ZP-CSI-RS-RESOURCESETID-START

ZP-CSI-RS-ResourceSetId ::= INTEGER (0..maxNrofZP-CSI-RS-ResourceSets-1)

-- TAG-ZP-CSI-RS-RESOURCESETID-STOP

-- ASN1STOP

### 6.3.3 UE capability information elements

#### – *AccessStratumRelease*

The IE *AccessStratumRelease* indicates the release supported by the UE.

*AccessStratumRelease* information element

-- ASN1START

-- TAG-ACCESSSTRATUMRELEASE-START

AccessStratumRelease ::= ENUMERATED {

rel15, rel16, rel17, spare5, spare4, spare3, spare2, spare1, ... }

-- TAG-ACCESSSTRATUMRELEASE-STOP

-- ASN1STOP

#### – *AppLayerMeasParameters*

The IE *AppLayerMeasParameters* is used to convey the capabilities supported by the UE for application layer measurements.

*ApplicationLayerMeasurement-Parameters* information element

-- ASN1START

-- TAG-APPLAYERMEASPARAMETERS-START

AppLayerMeasParameters-r17 ::= SEQUENCE {

qoe-Streaming-MeasReport-r17 ENUMERATED {supported} OPTIONAL,

qoe-MTSI-MeasReport-r17 ENUMERATED {supported} OPTIONAL,

qoe-VR-MeasReport-r17 ENUMERATED {supported} OPTIONAL,

ran-VisibleQoE-Streaming-MeasReport-r17 ENUMERATED {supported} OPTIONAL,

ran-VisibleQoE-VR-MeasReport-r17 ENUMERATED {supported} OPTIONAL,

ul-MeasurementReportAppLayer-Seg-r17 ENUMERATED {supported} OPTIONAL,

...

}

-- TAG-APPLAYERMEASPARAMETERS-STOP

-- ASN1STOP

#### – *BandCombinationList*

The IE *BandCombinationList* contains a list of NR CA, NR non-CA and/or MR-DC band combinations (also including DL only or UL only band).

*BandCombinationList* information element

-- ASN1START

-- TAG-BANDCOMBINATIONLIST-START

BandCombinationList ::= SEQUENCE (SIZE (1..maxBandComb)) OF BandCombination

BandCombinationList-v1540 ::= SEQUENCE (SIZE (1..maxBandComb)) OF BandCombination-v1540

BandCombinationList-v1550 ::= SEQUENCE (SIZE (1..maxBandComb)) OF BandCombination-v1550

BandCombinationList-v1560 ::= SEQUENCE (SIZE (1..maxBandComb)) OF BandCombination-v1560

BandCombinationList-v1570 ::= SEQUENCE (SIZE (1..maxBandComb)) OF BandCombination-v1570

BandCombinationList-v1580 ::= SEQUENCE (SIZE (1..maxBandComb)) OF BandCombination-v1580

BandCombinationList-v1590 ::= SEQUENCE (SIZE (1..maxBandComb)) OF BandCombination-v1590

BandCombinationList-v15g0 ::= SEQUENCE (SIZE (1..maxBandComb)) OF BandCombination-v15g0

BandCombinationList-v1610 ::= SEQUENCE (SIZE (1..maxBandComb)) OF BandCombination-v1610

BandCombinationList-v1630 ::= SEQUENCE (SIZE (1..maxBandComb)) OF BandCombination-v1630

BandCombinationList-v1640 ::= SEQUENCE (SIZE (1..maxBandComb)) OF BandCombination-v1640

BandCombinationList-v1650 ::= SEQUENCE (SIZE (1..maxBandComb)) OF BandCombination-v1650

BandCombinationList-v1680 ::= SEQUENCE (SIZE (1..maxBandComb)) OF BandCombination-v1680

BandCombinationList-v1690 ::= SEQUENCE (SIZE (1..maxBandComb)) OF BandCombination-v1690

BandCombinationList-v1700 ::= SEQUENCE (SIZE (1..maxBandComb)) OF BandCombination-v1700

BandCombinationList-UplinkTxSwitch-r16 ::= SEQUENCE (SIZE (1..maxBandComb)) OF BandCombination-UplinkTxSwitch-r16

BandCombinationList-UplinkTxSwitch-v1630 ::= SEQUENCE (SIZE (1..maxBandComb)) OF BandCombination-UplinkTxSwitch-v1630

BandCombinationList-UplinkTxSwitch-v1640 ::= SEQUENCE (SIZE (1..maxBandComb)) OF BandCombination-UplinkTxSwitch-v1640

BandCombinationList-UplinkTxSwitch-v1650 ::= SEQUENCE (SIZE (1..maxBandComb)) OF BandCombination-UplinkTxSwitch-v1650

BandCombinationList-UplinkTxSwitch-v1670 ::= SEQUENCE (SIZE (1..maxBandComb)) OF BandCombination-UplinkTxSwitch-v1670

BandCombinationList-UplinkTxSwitch-v1690 ::= SEQUENCE (SIZE (1..maxBandComb)) OF BandCombination-UplinkTxSwitch-v1690

BandCombinationList-UplinkTxSwitch-v1700 ::= SEQUENCE (SIZE (1..maxBandComb)) OF BandCombination-UplinkTxSwitch-v1700

BandCombination ::= SEQUENCE {

bandList SEQUENCE (SIZE (1..maxSimultaneousBands)) OF BandParameters,

featureSetCombination FeatureSetCombinationId,

ca-ParametersEUTRA CA-ParametersEUTRA OPTIONAL,

ca-ParametersNR CA-ParametersNR OPTIONAL,

mrdc-Parameters MRDC-Parameters OPTIONAL,

supportedBandwidthCombinationSet BIT STRING (SIZE (1..32)) OPTIONAL,

powerClass-v1530 ENUMERATED {pc2} OPTIONAL

}

BandCombination-v1540::= SEQUENCE {

bandList-v1540 SEQUENCE (SIZE (1..maxSimultaneousBands)) OF BandParameters-v1540,

ca-ParametersNR-v1540 CA-ParametersNR-v1540 OPTIONAL

}

BandCombination-v1550 ::= SEQUENCE {

ca-ParametersNR-v1550 CA-ParametersNR-v1550

}

BandCombination-v1560::= SEQUENCE {

ne-DC-BC ENUMERATED {supported} OPTIONAL,

ca-ParametersNRDC CA-ParametersNRDC OPTIONAL,

ca-ParametersEUTRA-v1560 CA-ParametersEUTRA-v1560 OPTIONAL,

ca-ParametersNR-v1560 CA-ParametersNR-v1560 OPTIONAL

}

BandCombination-v1570 ::= SEQUENCE {

ca-ParametersEUTRA-v1570 CA-ParametersEUTRA-v1570

}

BandCombination-v1580 ::= SEQUENCE {

mrdc-Parameters-v1580 MRDC-Parameters-v1580

}

BandCombination-v1590::= SEQUENCE {

supportedBandwidthCombinationSetIntraENDC BIT STRING (SIZE (1..32)) OPTIONAL,

mrdc-Parameters-v1590 MRDC-Parameters-v1590

}

BandCombination-v15g0::= SEQUENCE {

ca-ParametersNR-v15g0 CA-ParametersNR-v15g0 OPTIONAL,

ca-ParametersNRDC-v15g0 CA-ParametersNRDC-v15g0 OPTIONAL,

mrdc-Parameters-v15g0 MRDC-Parameters-v15g0 OPTIONAL

}

BandCombination-v1610 ::= SEQUENCE {

bandList-v1610 SEQUENCE (SIZE (1..maxSimultaneousBands)) OF BandParameters-v1610 OPTIONAL,

ca-ParametersNR-v1610 CA-ParametersNR-v1610 OPTIONAL,

ca-ParametersNRDC-v1610 CA-ParametersNRDC-v1610 OPTIONAL,

powerClass-v1610 ENUMERATED {pc1dot5} OPTIONAL,

powerClassNRPart-r16 ENUMERATED {pc1, pc2, pc3, pc5} OPTIONAL,

featureSetCombinationDAPS-r16 FeatureSetCombinationId OPTIONAL,

mrdc-Parameters-v1620 MRDC-Parameters-v1620 OPTIONAL

}

BandCombination-v1630 ::= SEQUENCE {

ca-ParametersNR-v1630 CA-ParametersNR-v1630 OPTIONAL,

ca-ParametersNRDC-v1630 CA-ParametersNRDC-v1630 OPTIONAL,

mrdc-Parameters-v1630 MRDC-Parameters-v1630 OPTIONAL,

supportedTxBandCombListPerBC-Sidelink-r16 BIT STRING (SIZE (1..maxBandComb)) OPTIONAL,

supportedRxBandCombListPerBC-Sidelink-r16 BIT STRING (SIZE (1..maxBandComb)) OPTIONAL,

scalingFactorTxSidelink-r16 SEQUENCE (SIZE (1..maxBandComb)) OF ScalingFactorSidelink-r16 OPTIONAL,

scalingFactorRxSidelink-r16 SEQUENCE (SIZE (1..maxBandComb)) OF ScalingFactorSidelink-r16 OPTIONAL

}

BandCombination-v1640 ::= SEQUENCE {

ca-ParametersNR-v1640 CA-ParametersNR-v1640 OPTIONAL,

ca-ParametersNRDC-v1640 CA-ParametersNRDC-v1640 OPTIONAL

}

BandCombination-v1650 ::= SEQUENCE {

ca-ParametersNRDC-v1650 CA-ParametersNRDC-v1650 OPTIONAL

}

BandCombination-v1680 ::= SEQUENCE {

intrabandConcurrentOperationPowerClass-r16 SEQUENCE (SIZE (1..maxBandComb)) OF IntraBandPowerClass-r16 OPTIONAL

}

BandCombination-v1690 ::= SEQUENCE {

ca-ParametersNR-v1690 CA-ParametersNR-v1690 OPTIONAL

}

BandCombination-v1700 ::= SEQUENCE {

ca-ParametersNR-v1700 CA-ParametersNR-v1700 OPTIONAL,

ca-ParametersNRDC-v1700 CA-ParametersNRDC-v1700 OPTIONAL,

mrdc-Parameters-v1700 MRDC-Parameters-v1700 OPTIONAL,

bandList-v1710 SEQUENCE (SIZE (1..maxSimultaneousBands)) OF BandParameters-v1710 OPTIONAL,

supportedBandCombListPerBC-SL-RelayDiscovery-r17 BIT STRING (SIZE (1..maxBandComb)) OPTIONAL,

supportedBandCombListPerBC-SL-NonRelayDiscovery-r17 BIT STRING (SIZE (1..maxBandComb)) OPTIONAL

}

BandCombination-UplinkTxSwitch-r16 ::= SEQUENCE {

bandCombination-r16 BandCombination,

bandCombination-v1540 BandCombination-v1540 OPTIONAL,

bandCombination-v1560 BandCombination-v1560 OPTIONAL,

bandCombination-v1570 BandCombination-v1570 OPTIONAL,

bandCombination-v1580 BandCombination-v1580 OPTIONAL,

bandCombination-v1590 BandCombination-v1590 OPTIONAL,

bandCombination-v1610 BandCombination-v1610 OPTIONAL,

supportedBandPairListNR-r16 SEQUENCE (SIZE (1..maxULTxSwitchingBandPairs)) OF ULTxSwitchingBandPair-r16,

uplinkTxSwitching-OptionSupport-r16 ENUMERATED {switchedUL, dualUL, both} OPTIONAL,

uplinkTxSwitching-PowerBoosting-r16 ENUMERATED {supported} OPTIONAL,

...,

[[

-- R4 16-5 UL-MIMO coherence capability for dynamic Tx switching between 3CC 1Tx-2Tx switching

uplinkTxSwitching-PUSCH-TransCoherence-r16 ENUMERATED {nonCoherent, fullCoherent} OPTIONAL

]]

}

-- Editor's Note: whether switching option can be reported differently for 1T2T and 2T2T is FFS.

BandCombination-UplinkTxSwitch-v1630 ::= SEQUENCE {

bandCombination-v1630 BandCombination-v1630 OPTIONAL

}

BandCombination-UplinkTxSwitch-v1640 ::= SEQUENCE {

bandCombination-v1640 BandCombination-v1640 OPTIONAL

}

BandCombination-UplinkTxSwitch-v1650 ::= SEQUENCE {

bandCombination-v1650 BandCombination-v1650 OPTIONAL

}

BandCombination-UplinkTxSwitch-v1670 ::= SEQUENCE {

bandCombination-v15g0 BandCombination-v15g0 OPTIONAL

}

BandCombination-UplinkTxSwitch-v1690 ::= SEQUENCE {

bandCombination-v1690 BandCombination-v1690 OPTIONAL

}

BandCombination-UplinkTxSwitch-v1700 ::= SEQUENCE {

bandCombination-v1700 BandCombination-v1700 OPTIONAL,

-- R4 16-1/16-2/16-3 Dynamic Tx switching between 2CC/3CC 2Tx-2Tx/1Tx-2Tx switching

supportedBandPairListNR-v1700 SEQUENCE (SIZE (1..maxULTxSwitchingBandPairs)) OF ULTxSwitchingBandPair-v1700 OPTIONAL,

-- R4 16-6: UL-MIMO coherence capability for dynamic Tx switching between 2Tx-2Tx switching

uplinkTxSwitchingBandParametersList-v1700 SEQUENCE (SIZE (1.. maxSimultaneousBands)) OF UplinkTxSwitchingBandParameters-v1700 OPTIONAL

}

ULTxSwitchingBandPair-r16 ::= SEQUENCE {

bandIndexUL1-r16 INTEGER(1..maxSimultaneousBands),

bandIndexUL2-r16 INTEGER(1..maxSimultaneousBands),

uplinkTxSwitchingPeriod-r16 ENUMERATED {n35us, n140us, n210us},

uplinkTxSwitching-DL-Interruption-r16 BIT STRING (SIZE(1..maxSimultaneousBands)) OPTIONAL

}

ULTxSwitchingBandPair-v1700 ::= SEQUENCE {

uplinkTxSwitchingPeriod2T2T-r17 ENUMERATED {n35us, n140us, n210us} OPTIONAL

}

UplinkTxSwitchingBandParameters-v1700 ::= SEQUENCE {

bandIndex-r17 INTEGER(1..maxSimultaneousBands),

uplinkTxSwitching2T2T-PUSCH-TransCoherence-r17 ENUMERATED {nonCoherent, fullCoherent} OPTIONAL

}

BandParameters ::= CHOICE {

eutra SEQUENCE {

bandEUTRA FreqBandIndicatorEUTRA,

ca-BandwidthClassDL-EUTRA CA-BandwidthClassEUTRA OPTIONAL,

ca-BandwidthClassUL-EUTRA CA-BandwidthClassEUTRA OPTIONAL

},

nr SEQUENCE {

bandNR FreqBandIndicatorNR,

ca-BandwidthClassDL-NR CA-BandwidthClassNR OPTIONAL,

ca-BandwidthClassUL-NR CA-BandwidthClassNR OPTIONAL

}

}

BandParameters-v1540 ::= SEQUENCE {

srs-CarrierSwitch CHOICE {

nr SEQUENCE {

srs-SwitchingTimesListNR SEQUENCE (SIZE (1..maxSimultaneousBands)) OF SRS-SwitchingTimeNR

},

eutra SEQUENCE {

srs-SwitchingTimesListEUTRA SEQUENCE (SIZE (1..maxSimultaneousBands)) OF SRS-SwitchingTimeEUTRA

}

} OPTIONAL,

srs-TxSwitch SEQUENCE {

supportedSRS-TxPortSwitch ENUMERATED {t1r2, t1r4, t2r4, t1r4-t2r4, t1r1, t2r2, t4r4, notSupported},

txSwitchImpactToRx INTEGER (1..32) OPTIONAL,

txSwitchWithAnotherBand INTEGER (1..32) OPTIONAL

} OPTIONAL

}

BandParameters-v1610 ::= SEQUENCE {

srs-TxSwitch-v1610 SEQUENCE {

supportedSRS-TxPortSwitch-v1610 ENUMERATED {t1r1-t1r2, t1r1-t1r2-t1r4, t1r1-t1r2-t2r2-t2r4, t1r1-t1r2-t2r2-t1r4-t2r4,

t1r1-t2r2, t1r1-t2r2-t4r4}

} OPTIONAL

}

BandParameters-v1710 ::= SEQUENCE {

-- R1 23-8-3 SRS Antenna switching for >4Rx

srs-AntennaSwitchingBeyond4RX-r17 SEQUENCE {

-- 1. Support of SRS antenna switching xTyR with y>4

supportedSRS-TxPortSwitchBeyond4Rx-r17 BIT STRING (SIZE (11)),

-- 2. Report the entry number of the first-listed band with UL in the band combination that affects this DL

entryNumberAffectBeyond4Rx-r17 INTEGER (1..32) OPTIONAL,

-- 3. Report the entry number of the first-listed band with UL in the band combination that switches together with this UL

entryNumberSwitchBeyond4Rx-r17 INTEGER (1..32) OPTIONAL

} OPTIONAL

}

ScalingFactorSidelink-r16 ::= ENUMERATED {f0p4, f0p75, f0p8, f1}

IntraBandPowerClass-r16 ::= ENUMERATED {pc2, pc3, spare6, spare5, spare4, spare3, spare2, spare1}

-- TAG-BANDCOMBINATIONLIST-STOP

-- ASN1STOP

|  |
| --- |
| *BandCombination* field descriptions |
| ***BandCombinationList-v1540, BandCombinationList-v1550, BandCombinationList-v1560, BandCombinationList-v1570, BandCombinationList-v1580, BandCombinationList-v1590, BandCombinationList-v15g0, BandCombinationList-v1610*, *BandCombinationList-v1630*, *BandCombinationList-v1640*, *BandCombinationList-v1650-r16, BandCombinationList-v1680, BandCombinationList-v1690, BandCombinationList-v1700***  The UE shall include the same number of entries, and listed in the same order, as in *BandCombinationList* (without suffix). If the field is included in *supportedBandCombinationListNEDC-Only-v1610*, the UE shall include the same number of entries, and listed in the same order, as in *BandCombinationList* of *supportedBandCombinationListNEDC-Only* (without suffix) field.  If the field is included in *supportedBandCombinationListNEDC-Only-v15a0*, the UE shall include the same number of entries, and listed in the same order, as in *BandCombinationList* (without suffix) of *supportedBandCombinationListNEDC-Only* (without suffix) field. |
| ***BandCombinationList-UplinkTxSwitch-r16, BandCombinationList-UplinkTxSwitch-v1630, BandCombinationList-UplinkTxSwitch-v1640, BandCombinationList-UplinkTxSwitch-v1650, BandCombinationList-UplinkTxSwitch-v1690, BandCombinationList-UplinkTxSwitch-v1700***  The UE shall include the same number of entries, and listed in the same order, as in *BandCombinationList-UplinkTxSwitch-r16*.  For the field of *supportedBandCombinationList-UplinkTxSwitch-v1700*, if the UE does not support 2Tx-2Tx switching for a given band combination, the field of *supportedBandPairListNR-v1700* in the corresponding entry is absent. |
| ***ca-ParametersNRDC***  If the field is included for a band combination in the NR capability container, the field indicates support of NR-DC. Otherwise, the field is absent. |
| ***featureSetCombinationDAPS***  If this field is present for a band combination, it reports the feature set combination supported for the band combination when any DAPS bearer is configured. |
| ***ne-DC-BC***  If the field is included for a band combination in the MR-DC capability container, the field indicates support of NE-DC. Otherwise, the field is absent. |
| ***supportedBandPairListNR-r16, supportedBandPairListNR-v1700***  Indicates a list of band pair supporting UL Tx switching as defined in TS 38.101-1 [15] for a given band combination.  A UE supporting 2Tx-2Tx switching should include both of *supportedBandPairListNR-r16* and *supportedBandPairListNR-v1700*. And the UE shall include the same number of entries listed in the same order as in *supportedBandPairListNR-r16*.  If the UE does not support 2Tx-2Tx switching for a given band pair, the field of *uplinkTxSwitchingPeriod2T2T* in the corresponding entry is absent. |
| ***srs-SwitchingTimesListNR***  Indicates, for a particular pair of NR bands, the RF retuning time when switching between a NR carrier corresponding to this band entry and another (PUSCH-less) NR carrier corresponding to the band entry in the order indicated below:  - For the first NR band, the UE shall include the same number of entries for NR bands as in *bandList*, i.e. first entry corresponds to first NR band in *bandList* and so on,  - For the second NR band, the UE shall include one entry less, i.e. first entry corresponds to the second NR band in *bandList* and so on  - And so on |
| ***srs-SwitchingTimesListEUTRA***  Indicates, for a particular pair of E-UTRA bands, the RF retuning time when switching between an E-UTRA carrier corresponding to this band entry and another (PUSCH-less) E-UTRA carrier corresponding to the band entry in the order indicated below:  - For the first E-UTRA band, the UE shall include the same number of entries for E-UTRA bands as in *bandList,* i.e. first entry corresponds to first E-UTRA band in *bandList* and so on,  - For the second E-UTRA band, the UE shall include one entry less, i.e. first entry corresponds to the second E-UTRA band in *bandList* and so on  - And so on |
| ***srs-TxSwitch***  Indicates supported SRS antenna switch capability for the associated band. If the UE indicates support of *SRS-SwitchingTimeNR*, the UE is allowed to set this field for a band with associated *FeatureSetUplinkId* set to 0 for SRS carrier switching. | |
| ***uplinkTxSwitchingBandParametersList-v1700***  Indicates a list of per band per band combination capabilities for UL Tx switching. | |

#### – *BandCombinationListSidelinkEUTRA-NR*

The IE *BandCombinationListSidelinkEUTRA-NR* contains a list of V2X sidelink and NR sidelink band combinations.

BandCombinationListSidelinkEUTRA-NR information element

-- ASN1START

-- TAG-BANDCOMBINATIONLISTSIDELINKEUTRANR-START

BandCombinationListSidelinkEUTRA-NR-r16 ::= SEQUENCE (SIZE (1..maxBandComb)) OF BandCombinationParametersSidelinkEUTRA-NR-r16

BandCombinationListSidelinkEUTRA-NR-v1630 ::= SEQUENCE (SIZE (1..maxBandComb)) OF BandCombinationParametersSidelinkEUTRA-NR-v1630

BandCombinationListSidelinkEUTRA-NR-v1710 ::= SEQUENCE (SIZE (1..maxBandComb)) OF BandCombinationParametersSidelinkEUTRA-NR-v1710

BandCombinationParametersSidelinkEUTRA-NR-r16 ::= SEQUENCE (SIZE (1..maxSimultaneousBands)) OF BandParametersSidelinkEUTRA-NR-r16

BandCombinationParametersSidelinkEUTRA-NR-v1630 ::= SEQUENCE (SIZE (1..maxSimultaneousBands)) OF BandParametersSidelinkEUTRA-NR-v1630

BandCombinationParametersSidelinkEUTRA-NR-v1710 ::= SEQUENCE (SIZE (1..maxSimultaneousBands)) OF BandParametersSidelinkEUTRA-NR-v1710

BandParametersSidelinkEUTRA-NR-r16 ::= CHOICE {

eutra SEQUENCE {

bandParametersSidelinkEUTRA1-r16 OCTET STRING OPTIONAL,

bandParametersSidelinkEUTRA2-r16 OCTET STRING OPTIONAL

},

nr SEQUENCE {

bandParametersSidelinkNR-r16 BandParametersSidelink-r16

}

}

BandParametersSidelinkEUTRA-NR-v1630 ::= CHOICE {

eutra NULL,

nr SEQUENCE {

tx-Sidelink-r16 ENUMERATED {supported} OPTIONAL,

rx-Sidelink-r16 ENUMERATED {supported} OPTIONAL,

sl-CrossCarrierScheduling-r16 ENUMERATED {supported} OPTIONAL

}

}

BandParametersSidelinkEUTRA-NR-v1710 ::= CHOICE {

eutra NULL,

nr SEQUENCE {

--32-4

sl-TransmissionMode2-PartialSensing-r17 SEQUENCE {

harq-TxProcessModeTwoSidelink-r17 ENUMERATED {n8, n16},

scs-CP-PatternTxSidelinkModeTwo-r17 CHOICE {

fr1-r17 SEQUENCE {

scs-15kHz-r17 BIT STRING (SIZE (16)) OPTIONAL,

scs-30kHz-r17 BIT STRING (SIZE (16)) OPTIONAL,

scs-60kHz-r17 BIT STRING (SIZE (16)) OPTIONAL

},

fr2-r17 SEQUENCE {

scs-60kHz-r17 BIT STRING (SIZE (16)) OPTIONAL,

scs-120kHz-r17 BIT STRING (SIZE (16)) OPTIONAL

}

} OPTIONAL,

extendedCP-Mode2PartialSensing-r17 ENUMERATED {supported} OPTIONAL,

dl-openLoopPC-Sidelink-r17 ENUMERATED {supported} OPTIONAL

} OPTIONAL,

--32-2a: Receiving NR sidelink of PSFCH

rx-sidelinkPSFCH-r17 ENUMERATED {n5, n15, n25, n32, n35, n45, n50, n64} OPTIONAL,

--32-5a-1

tx-IUC-Scheme1-Mode2Sidelink-r17 ENUMERATED {supported} OPTIONAL,

--32-5b-1

tx-IUC-Scheme2-Mode2Sidelink-r17 ENUMERATED {n4, n8, n16} OPTIONAL

}

}

BandParametersSidelink-r16 ::= SEQUENCE {

freqBandSidelink-r16 FreqBandIndicatorNR

}

-- TAG-BANDCOMBINATIONLISTSIDELINKEUTRANR-STOP

-- ASN1STOP

|  |
| --- |
| *BandParametersSidelinkEUTRA-NR* field descriptions |
| ***bandParametersSidelinkEUTRA1,*** ***bandParametersSidelinkEUTRA2***  This field includes the *V2X-BandParameters-r14* and *V2X-BandParameters-v1530* IE as specified in 36.331 [10]. It is used for reporting the per-band capability for V2X sidelink communication. |

#### – *CA-BandwidthClassEUTRA*

The IE *CA-BandwidthClassEUTRA* indicates the E-UTRA CA bandwidth class as defined in TS 36.101 [22], table 5.6A-1.

*CA-BandwidthClassEUTRA* information element

-- ASN1START

-- TAG-CA-BANDWIDTHCLASSEUTRA-START

CA-BandwidthClassEUTRA ::= ENUMERATED {a, b, c, d, e, f, ...}

-- TAG-CA-BANDWIDTHCLASSEUTRA-STOP

-- ASN1STOP

#### – *CA-BandwidthClassNR*

The IE *CA-BandwidthClassNR* indicates the NR CA bandwidth class as defined in TS 38.101-1 [15], table 5.3A.5-1 and TS 38.101-2 [39], table 5.3A.4-1.

*CA-BandwidthClassNR* information element

-- ASN1START

-- TAG-CA-BANDWIDTHCLASSNR-START

CA-BandwidthClassNR ::= ENUMERATED {a, b, c, d, e, f, g, h, i, j, k, l, m, n, o, p, q, ...}

-- TAG-CA-BANDWIDTHCLASSNR-STOP

-- ASN1STOP

#### – *CA-ParametersEUTRA*

The IE *CA-ParametersEUTRA* contains the E-UTRA part of band combination parameters for a given MR-DC band combination.

NOTE: If additional E-UTRA band combination parameters are defined in TS 36.331 [10], which are supported for MR-DC, they will be defined here as well.

*CA-ParametersEUTRA* information element

-- ASN1START

-- TAG-CA-PARAMETERSEUTRA-START

CA-ParametersEUTRA ::= SEQUENCE {

multipleTimingAdvance ENUMERATED {supported} OPTIONAL,

simultaneousRx-Tx ENUMERATED {supported} OPTIONAL,

supportedNAICS-2CRS-AP BIT STRING (SIZE (1..8)) OPTIONAL,

additionalRx-Tx-PerformanceReq ENUMERATED {supported} OPTIONAL,

ue-CA-PowerClass-N ENUMERATED {class2} OPTIONAL,

supportedBandwidthCombinationSetEUTRA-v1530 BIT STRING (SIZE (1..32)) OPTIONAL,

...

}

CA-ParametersEUTRA-v1560 ::= SEQUENCE {

fd-MIMO-TotalWeightedLayers INTEGER (2..128) OPTIONAL

}

CA-ParametersEUTRA-v1570 ::= SEQUENCE {

dl-1024QAM-TotalWeightedLayers INTEGER (0..10) OPTIONAL

}

-- TAG-CA-PARAMETERSEUTRA-STOP

-- ASN1STOP

#### – *CA-ParametersNR*

The IE *CA-ParametersNR* contains carrier aggregation and inter-frequency DAPS handover related capabilities that are defined per band combination.

*CA-ParametersNR* information element

-- ASN1START

-- TAG-CA-PARAMETERSNR-START

CA-ParametersNR ::= SEQUENCE {

dummy ENUMERATED {supported} OPTIONAL,

parallelTxSRS-PUCCH-PUSCH ENUMERATED {supported} OPTIONAL,

parallelTxPRACH-SRS-PUCCH-PUSCH ENUMERATED {supported} OPTIONAL,

simultaneousRxTxInterBandCA ENUMERATED {supported} OPTIONAL,

simultaneousRxTxSUL ENUMERATED {supported} OPTIONAL,

diffNumerologyAcrossPUCCH-Group ENUMERATED {supported} OPTIONAL,

diffNumerologyWithinPUCCH-GroupSmallerSCS ENUMERATED {supported} OPTIONAL,

supportedNumberTAG ENUMERATED {n2, n3, n4} OPTIONAL,

...

}

CA-ParametersNR-v1540 ::= SEQUENCE {

simultaneousSRS-AssocCSI-RS-AllCC INTEGER (5..32) OPTIONAL,

csi-RS-IM-ReceptionForFeedbackPerBandComb SEQUENCE {

maxNumberSimultaneousNZP-CSI-RS-ActBWP-AllCC INTEGER (1..64) OPTIONAL,

totalNumberPortsSimultaneousNZP-CSI-RS-ActBWP-AllCC INTEGER (2..256) OPTIONAL

} OPTIONAL,

simultaneousCSI-ReportsAllCC INTEGER (5..32) OPTIONAL,

dualPA-Architecture ENUMERATED {supported} OPTIONAL

}

CA-ParametersNR-v1550 ::= SEQUENCE {

dummy ENUMERATED {supported} OPTIONAL

}

CA-ParametersNR-v1560 ::= SEQUENCE {

diffNumerologyWithinPUCCH-GroupLargerSCS ENUMERATED {supported} OPTIONAL

}

CA-ParametersNR-v15g0 ::= SEQUENCE {

simultaneousRxTxInterBandCAPerBandPair SimultaneousRxTxPerBandPair OPTIONAL,

simultaneousRxTxSULPerBandPair SimultaneousRxTxPerBandPair OPTIONAL

}

CA-ParametersNR-v1610 ::= SEQUENCE {

-- R1 9-3: Parallel MsgA and SRS/PUCCH/PUSCH transmissions across CCs in inter-band CA

parallelTxMsgA-SRS-PUCCH-PUSCH-r16 ENUMERATED {supported} OPTIONAL,

-- R1 9-4: MsgA operation in a band combination including SUL

msgA-SUL-r16 ENUMERATED {supported} OPTIONAL,

-- R1 10-9c: Joint search space group switching across multiple cells

jointSearchSpaceSwitchAcrossCells-r16 ENUMERATED {supported} OPTIONAL,

-- R1 14-5: Half-duplex UE behaviour in TDD CA for same SCS

half-DuplexTDD-CA-SameSCS-r16 ENUMERATED {supported} OPTIONAL,

-- R1 18-4: SCell dormancy within active time

scellDormancyWithinActiveTime-r16 ENUMERATED {supported} OPTIONAL,

-- R1 18-4a: SCell dormancy outside active time

scellDormancyOutsideActiveTime-r16 ENUMERATED {supported} OPTIONAL,

-- R1 18-6: Cross-carrier A-CSI RS triggering with different SCS

crossCarrierA-CSI-trigDiffSCS-r16 ENUMERATED {higherA-CSI-SCS,lowerA-CSI-SCS,both} OPTIONAL,

-- R1 18-6a: Default QCL assumption for cross-carrier A-CSI-RS triggering

defaultQCL-CrossCarrierA-CSI-Trig-r16 ENUMERATED {diffOnly, both} OPTIONAL,

-- R1 18-7: CA with non-aligned frame boundaries for inter-band CA

interCA-NonAlignedFrame-r16 ENUMERATED {supported} OPTIONAL,

simul-SRS-Trans-BC-r16 ENUMERATED {n2} OPTIONAL,

interFreqDAPS-r16 SEQUENCE {

interFreqAsyncDAPS-r16 ENUMERATED {supported} OPTIONAL,

interFreqDiffSCS-DAPS-r16 ENUMERATED {supported} OPTIONAL,

interFreqMultiUL-TransmissionDAPS-r16 ENUMERATED {supported} OPTIONAL,

interFreqSemiStaticPowerSharingDAPS-Mode1-r16 ENUMERATED {supported} OPTIONAL,

interFreqSemiStaticPowerSharingDAPS-Mode2-r16 ENUMERATED {supported} OPTIONAL,

interFreqDynamicPowerSharingDAPS-r16 ENUMERATED {short, long} OPTIONAL,

interFreqUL-TransCancellationDAPS-r16 ENUMERATED {supported} OPTIONAL

} OPTIONAL,

codebookParametersPerBC-r16 CodebookParameters-v1610 OPTIONAL,

-- R1 16-2a-10 Value of R for BD/CCE

blindDetectFactor-r16 INTEGER (1..2) OPTIONAL,

-- R1 11-2a: Capability on the number of CCs for monitoring a maximum number of BDs and non-overlapped CCEs per span when configured

-- with DL CA with Rel-16 PDCCH monitoring capability on all the serving cells

pdcch-MonitoringCA-r16 SEQUENCE {

maxNumberOfMonitoringCC-r16 INTEGER (2..16),

supportedSpanArrangement-r16 ENUMERATED {alignedOnly, alignedAndNonAligned}

} OPTIONAL,

-- R1 11-2c: Number of carriers for CCE/BD scaling with DL CA with mix of Rel. 16 and Rel. 15 PDCCH monitoring capabilities on

-- different carriers

pdcch-BlindDetectionCA-Mixed-r16 SEQUENCE {

pdcch-BlindDetectionCA1-r16 INTEGER (1..15),

pdcch-BlindDetectionCA2-r16 INTEGER (1..15),

supportedSpanArrangement-r16 ENUMERATED {alignedOnly, alignedAndNonAligned}

} OPTIONAL,

-- R1 11-2d: Capability on the number of CCs for monitoring a maximum number of BDs and non-overlapped CCEs per span for MCG and for

-- SCG when configured for NR-DC operation with Rel-16 PDCCH monitoring capability on all the serving cells

pdcch-BlindDetectionMCG-UE-r16 INTEGER (1..14) OPTIONAL,

pdcch-BlindDetectionSCG-UE-r16 INTEGER (1..14) OPTIONAL,

-- R1 11-2e: Number of carriers for CCE/BD scaling for MCG and for SCG when configured for NR-DC operation with mix of Rel. 16 and

-- Rel. 15 PDCCH monitoring capabilities on different carriers

pdcch-BlindDetectionMCG-UE-Mixed-r16 SEQUENCE {

pdcch-BlindDetectionMCG-UE1-r16 INTEGER (0..15),

pdcch-BlindDetectionMCG-UE2-r16 INTEGER (0..15)

} OPTIONAL,

pdcch-BlindDetectionSCG-UE-Mixed-r16 SEQUENCE {

pdcch-BlindDetectionSCG-UE1-r16 INTEGER (0..15),

pdcch-BlindDetectionSCG-UE2-r16 INTEGER (0..15)

} OPTIONAL,

-- R1 18-5 cross-carrier scheduling with different SCS in DL CA

crossCarrierSchedulingDL-DiffSCS-r16 ENUMERATED {low-to-high, high-to-low, both} OPTIONAL,

-- R1 18-5a Default QCL assumption for cross-carrier scheduling

crossCarrierSchedulingDefaultQCL-r16 ENUMERATED {diff-only, both} OPTIONAL,

-- R1 18-5b cross-carrier scheduling with different SCS in UL CA

crossCarrierSchedulingUL-DiffSCS-r16 ENUMERATED {low-to-high, high-to-low, both} OPTIONAL,

-- R1 13.19a Simultaneous positioning SRS and MIMO SRS transmission for a given BC

simul-SRS-MIMO-Trans-BC-r16 ENUMERATED {n2} OPTIONAL,

-- R1 16-3a, 16-3a-1, 16-3b, 16-3b-1: New Individual Codebook

codebookParametersAdditionPerBC-r16 CodebookParametersAdditionPerBC-r16 OPTIONAL,

-- R1 16-8: Mixed codebook

codebookComboParametersAdditionPerBC-r16 CodebookComboParametersAdditionPerBC-r16 OPTIONAL

}

CA-ParametersNR-v1630 ::= SEQUENCE {

-- R1 22-5b: Simultaneous transmission of SRS for antenna switching and SRS for CB/NCB /BM for inter-band UL CA

-- R1 22-5d: Simultaneous transmission of SRS for antenna switching for inter-band UL CA

simulTX-SRS-AntSwitchingInterBandUL-CA-r16 SimulSRS-ForAntennaSwitching-r16 OPTIONAL,

-- R4 8-5: supported beam management type for inter-band CA

beamManagementType-r16 ENUMERATED {ibm, dummy} OPTIONAL,

-- R4 7-3a: UL frequency separation class with aggregate BW and Gap BW

intraBandFreqSeparationUL-AggBW-GapBW-r16 ENUMERATED {classI, classII, classIII} OPTIONAL,

-- RAN 89: Case B in case of Inter-band CA with non-aligned frame boundaries

interCA-NonAlignedFrame-B-r16 ENUMERATED {supported} OPTIONAL

}

CA-ParametersNR-v1640 ::= SEQUENCE {

-- R4 7-5: Support of reporting UL Tx DC locations for uplink intra-band CA.

uplinkTxDC-TwoCarrierReport-r16 ENUMERATED {supported} OPTIONAL,

-- RAN 22-6: Support of up to 3 different numerologies in the same NR PUCCH group for NR part of EN-DC, NGEN-DC, NE-DC and NR-CA

-- where UE is not configured with two NR PUCCH groups

maxUpTo3Diff-NumerologiesConfigSinglePUCCH-grp-r16 PUCCH-Grp-CarrierTypes-r16 OPTIONAL,

-- RAN 22-6a: Support of up to 4 different numerologies in the same NR PUCCH group for NR part of EN-DC, NGEN-DC, NE-DC and NR-CA

-- where UE is not configured with two NR PUCCH groups

maxUpTo4Diff-NumerologiesConfigSinglePUCCH-grp-r16 PUCCH-Grp-CarrierTypes-r16 OPTIONAL,

-- RAN 22-7: Support two PUCCH groups for NR-CA with 3 or more bands with at least two carrier types

twoPUCCH-Grp-ConfigurationsList-r16 SEQUENCE (SIZE (1..maxTwoPUCCH-Grp-ConfigList-r16)) OF TwoPUCCH-Grp-Configurations-r16 OPTIONAL,

-- R1 22-7a: Different numerology across NR PUCCH groups

diffNumerologyAcrossPUCCH-Group-CarrierTypes-r16 ENUMERATED {supported} OPTIONAL,

-- R1 22-7b: Different numerologies across NR carriers within the same NR PUCCH group, with PUCCH on a carrier of smaller SCS

diffNumerologyWithinPUCCH-GroupSmallerSCS-CarrierTypes-r16 ENUMERATED {supported} OPTIONAL,

-- R1 22-7c: Different numerologies across NR carriers within the same NR PUCCH group, with PUCCH on a carrier of larger SCS

diffNumerologyWithinPUCCH-GroupLargerSCS-CarrierTypes-r16 ENUMERATED {supported} OPTIONAL,

-- R1 11-2f: add the replicated FGs of 11-2a/c with restriction for non-aligned span case

-- with DL CA with Rel-16 PDCCH monitoring capability on all the serving cells

pdcch-MonitoringCA-NonAlignedSpan-r16 INTEGER (2..16) OPTIONAL,

-- R1 11-2g: add the replicated FGs of 11-2a/c with restriction for non-aligned span case

pdcch-BlindDetectionCA-Mixed-NonAlignedSpan-r16 SEQUENCE {

pdcch-BlindDetectionCA1-r16 INTEGER (1..15),

pdcch-BlindDetectionCA2-r16 INTEGER (1..15)

} OPTIONAL

}

CA-ParametersNR-v1690 ::= SEQUENCE {

csi-ReportingCrossPUCCH-Grp-r16 SEQUENCE {

computationTimeForA-CSI-r16 ENUMERATED {sameAsNoCross, relaxed},

additionalSymbols-r16 SEQUENCE {

scs-15kHz-additionalSymbols-r16 ENUMERATED {sl4, s28} OPTIONAL,

scs-30kHz-additionalSymbols-r16 ENUMERATED {sl4, s28} OPTIONAL,

scs-60kHz-additionalSymbols-r16 ENUMERATED {sl4, s28, s56} OPTIONAL,

scs-120kHz-additionalSymbols-r16 ENUMERATED {sl4, s28, s56} OPTIONAL

} OPTIONAL,

sp-CSI-ReportingOnPUCCH-r16 ENUMERATED {supported} OPTIONAL,

sp-CSI-ReportingOnPUSCH-r16 ENUMERATED {supported} OPTIONAL,

carrierTypePairList-r16 SEQUENCE (SIZE (1..maxCarrierTypePairList-r16)) OF CarrierTypePair-r16

} OPTIONAL

}

CA-ParametersNR-v1700 ::= SEQUENCE {

-- R1 23-9-1: Basic Features of Further Enhanced Port-Selection Type II Codebook (FeType-II) per band combination information

codebookParametersfetype2PerBC-r17 CodebookParametersfetype2PerBC-r17 OPTIONAL,

-- R4 18-4: Support of enhanced Demodulation requirements for CA in HST SFN FR1

demodulationEnhancementCA-r17 ENUMERATED {supported} OPTIONAL,

-- R4 20-1: Maximum uplink duty cycle for NR inter-band CA power class 2

maxUplinkDutyCycle-interBandCA-PC2-r17 ENUMERATED {n50, n60, n70, n80, n90, n100} OPTIONAL,

-- R4 20-2: Maximum uplink duty cycle for NR SUL combination power class 2

maxUplinkDutyCycle-SULcombination-PC2-r17 ENUMERATED {n50, n60, n70, n80, n90, n100} OPTIONAL,

beamManagementType-CBM-r17 ENUMERATED {supported} OPTIONAL,

-- R1 25-18: Parallel PUCCH and PUSCH transmission across CCs in inter-band CA

parallelTxPUCCH-PUSCH-r17 ENUMERATED {supported} OPTIONAL,

-- R1 23-9-5 Active CSI-RS resources and ports for mixed codebook types in any slot per band combination

codebookComboParameterMixedTypePerBC-r17 CodebookComboParameterMixedTypePerBC-r17 OPTIONAL,

-- R1 23-7-1 Basic Features of CSI Enhancement for Multi-TRP

mTRP-CSI-EnhancementPerBC-r17 SEQUENCE {

maxNumNZP-CSI-RS-r17 INTEGER (2..8),

cSI-Report-mode-r17 ENUMERATED {mode1, mode2, both},

supportedComboAcrossCCs-r17 SEQUENCE (SIZE (1..16)) OF CSI-MultiTRP-SupportedCombinations-r17,

codebookMode-NCJT-r17 ENUMERATED{mode1,mode1And2}

} OPTIONAL,

-- R1 23-7-1b Active CSI-RS resources and ports in the presence of multi-TRP CSI

codebookComboParameterMultiTRP-PerBC-r17 CodebookComboParameterMultiTRP-PerBC-r17 OPTIONAL,

-- R1 24-8b: 32 DL HARQ processes for FR 2-2 - maximum number of component carriers

maxCC-32-DL-HARQ-ProcessFR2-2-r17 ENUMERATED {n1, n2, n3, n4, n6, n8, n16, n32} OPTIONAL,

-- R1 24-9b: 32 UL HARQ processes for FR 2-2 - maximum number of component carriers

maxCC-32-UL-HARQ-ProcessFR2-2-r17 ENUMERATED {n1, n2, n3, n4, n5, n8, n16, n32} OPTIONAL,

-- R1 34-2: Cross-carrier scheduling from SCell to PCell/PSCell (Type B)

crossCarrierSchedulingSCell-SpCellTypeB-r17 CrossCarrierSchedulingSCell-SpCell-r17 OPTIONAL,

-- R1 34-1: Cross-carrier scheduling from SCell to PCell/PSCell with search space restrictions (Type A)

crossCarrierSchedulingSCell-SpCellTypeA-r17 CrossCarrierSchedulingSCell-SpCell-r17 OPTIONAL,

-- R1 34-1a: DCI formats on PCell/PSCell USS set(s) support

dci-FormatsPCellPSCellUSS-Sets-r17 ENUMERATED {supported} OPTIONAL,

-- R1 34-3: Disabling scaling factor α when sSCell is deactivated

disablingScalingFactorDeactSCell-r17 ENUMERATED {supported} OPTIONAL,

-- R1 34-4: Disabling scaling factor α when sSCell is deactivated

disablingScalingFactorDormantSCell-r17 ENUMERATED {supported} OPTIONAL,

-- R1 34-5: Non-aligned frame boundaries between PCell/PSCell and sSCell

non-AlignedFrameBoundaries-r17 SEQUENCE {

scs15kHz-15kHz-r17 BIT STRING (SIZE (1..496)) OPTIONAL,

scs15kHz-30kHz-r17 BIT STRING (SIZE (1..496)) OPTIONAL,

scs15kHz-60kHz-r17 BIT STRING (SIZE (1..496)) OPTIONAL,

scs30kHz-30kHz-r17 BIT STRING (SIZE (1..496)) OPTIONAL,

scs30kHz-60kHz-r17 BIT STRING (SIZE (1..496)) OPTIONAL,

scs60kHz-60kHz-r17 BIT STRING (SIZE (1..496)) OPTIONAL

} OPTIONAL

}

CrossCarrierSchedulingSCell-SpCell-r17 ::= SEQUENCE {

supportedSCS-Combinations-r17 SEQUENCE {

scs15kHz-15kHz-r17 ENUMERATED {supported} OPTIONAL,

scs15kHz-30kHz-r17 ENUMERATED {supported} OPTIONAL,

scs15kHz-60kHz-r17 ENUMERATED {supported} OPTIONAL,

scs30kHz-30kHz-r17 BIT STRING (SIZE (1..496)) OPTIONAL,

scs30kHz-60kHz-r17 BIT STRING (SIZE (1..496)) OPTIONAL,

scs60kHz-60kHz-r17 BIT STRING (SIZE (1..496)) OPTIONAL

},

pdcch-MonitoringOccasion-r17 ENUMERATED {val1, val2}

}

SimulSRS-ForAntennaSwitching-r16 ::= SEQUENCE {

supportSRS-xTyR-xLessThanY-r16 ENUMERATED {supported} OPTIONAL,

supportSRS-xTyR-xEqualToY-r16 ENUMERATED {supported} OPTIONAL,

supportSRS-AntennaSwitching-r16 ENUMERATED {supported} OPTIONAL

}

TwoPUCCH-Grp-Configurations-r16 ::= SEQUENCE {

pucch-PrimaryGroupMapping-r16 TwoPUCCH-Grp-ConfigParams-r16,

pucch-SecondaryGroupMapping-r16 TwoPUCCH-Grp-ConfigParams-r16

}

TwoPUCCH-Grp-ConfigParams-r16 ::= SEQUENCE {

pucch-GroupMapping-r16 PUCCH-Grp-CarrierTypes-r16,

pucch-TX-r16 PUCCH-Grp-CarrierTypes-r16

}

CarrierTypePair-r16 ::= SEQUENCE {

carrierForCSI-Measurement-r16 PUCCH-Grp-CarrierTypes-r16,

carrierForCSI-Reporting-r16 PUCCH-Grp-CarrierTypes-r16

}

PUCCH-Grp-CarrierTypes-r16 ::= SEQUENCE {

fr1-NonSharedTDD-r16 ENUMERATED {supported} OPTIONAL,

fr1-SharedTDD-r16 ENUMERATED {supported} OPTIONAL,

fr1-NonSharedFDD-r16 ENUMERATED {supported} OPTIONAL,

fr2-r16 ENUMERATED {supported} OPTIONAL

}

-- TAG-CA-PARAMETERSNR-STOP

-- ASN1STOP

|  |
| --- |
| *CA-ParametersNR* field description |
| ***codebookParametersPerBC***  For a given supported band combination, this field indicates the alternative list of *SupportedCSI-RS-Resource* supported for each codebook type, amongst the supported CSI-RS resources included in *codebookParametersPerBand* in *MIMO-ParametersPerBand*. |

#### – *CA-ParametersNRDC*

The IE *CA-ParametersNRDC* contains dual connectivity related capabilities that are defined per band combination.

*CA-ParametersNRDC* information element

-- ASN1START

-- TAG-CA-PARAMETERS-NRDC-START

CA-ParametersNRDC ::= SEQUENCE {

ca-ParametersNR-ForDC CA-ParametersNR OPTIONAL,

ca-ParametersNR-ForDC-v1540 CA-ParametersNR-v1540 OPTIONAL,

ca-ParametersNR-ForDC-v1550 CA-ParametersNR-v1550 OPTIONAL,

ca-ParametersNR-ForDC-v1560 CA-ParametersNR-v1560 OPTIONAL,

featureSetCombinationDC FeatureSetCombinationId OPTIONAL

}

CA-ParametersNRDC-v15g0 ::= SEQUENCE {

ca-ParametersNR-ForDC-v15g0 CA-ParametersNR-v15g0 OPTIONAL

}

CA-ParametersNRDC-v1610 ::= SEQUENCE {

-- R1 18-1: Semi-static power sharing mode1 between MCG and SCG cells of same FR for NR dual connectivity

intraFR-NR-DC-PwrSharingMode1-r16 ENUMERATED {supported} OPTIONAL,

-- R1 18-1a: Semi-static power sharing mode 2 between MCG and SCG cells of same FR for NR dual connectivity

intraFR-NR-DC-PwrSharingMode2-r16 ENUMERATED {supported} OPTIONAL,

-- R1 18-1b: Dynamic power sharing between MCG and SCG cells of same FR for NR dual connectivity

intraFR-NR-DC-DynamicPwrSharing-r16 ENUMERATED {short, long} OPTIONAL,

asyncNRDC-r16 ENUMERATED {supported} OPTIONAL

}

CA-ParametersNRDC-v1630 ::= SEQUENCE {

ca-ParametersNR-ForDC-v1610 CA-ParametersNR-v1610 OPTIONAL,

ca-ParametersNR-ForDC-v1630 CA-ParametersNR-v1630 OPTIONAL

}

CA-ParametersNRDC-v1640 ::= SEQUENCE {

ca-ParametersNR-ForDC-v1640 CA-ParametersNR-v1640 OPTIONAL

}

CA-ParametersNRDC-v1650 ::= SEQUENCE {

supportedCellGrouping-r16 BIT STRING (SIZE (1..maxCellGroupings-r16)) OPTIONAL

}

CA-ParametersNRDC-v1700 ::= SEQUENCE {

-- R1 31-9: Indicates the support of simultaneous transmission and reception of an IAB-node from multiple parent nodes

simultaneousRxTx-IAB-MultipleParents-r17 ENUMERATED {supported} OPTIONAL,

condPSCellAdditionNRDC-r17 ENUMERATED {supported} OPTIONAL,

scg-ActivationDeactivationNRDC-r17 ENUMERATED {supported} OPTIONAL,

scg-ActivationDeactivationResumeNRDC-r17 ENUMERATED {supported} OPTIONAL,

beamManagementType-CBM-r17 ENUMERATED {supported} OPTIONAL

}

-- TAG-CA-PARAMETERS-NRDC-STOP

-- ASN1STOP

|  |
| --- |
| *CA-ParametersNRDC* field descriptions |
| ***ca-ParametersNR-forDC (with and without suffix)***  If this field is present for a band combination, it reports the UE capabilities when NR-DC is configured with the band combination. If a version of this field (i.e., with or without suffix) is absent for a band combination, the corresponding *ca-ParametersNR* field version in *BandCombination* is applicable to the UE configured with NR-DC for the band combination. If a version of this field (i.e., with or without suffix) is present for a band combination but does not contain any parameters, the UE does not support the corresponding field version when configured with NR-DC for the band combination. |
| ***featureSetCombinationDC***  If this field is present for a band combination, it reports the feature set combination supported for the band combination when NR-DC is configured. If this field is absent for a band combination, the *featureSetCombination* in *BandCombination* (without suffix) is applicable to the UE configured with NR-DC for the band combination. |

#### – *CarrierAggregationVariant*

The IE *CarrierAggregationVariant* informs the network about supported "placement" of the SpCell in an NR cell group.

*CarrierAggregationVariant* information element

-- ASN1START

-- TAG-CARRIERAGGREGATIONVARIANT-START

CarrierAggregationVariant ::= SEQUENCE {

fr1fdd-FR1TDD-CA-SpCellOnFR1FDD ENUMERATED {supported} OPTIONAL,

fr1fdd-FR1TDD-CA-SpCellOnFR1TDD ENUMERATED {supported} OPTIONAL,

fr1fdd-FR2TDD-CA-SpCellOnFR1FDD ENUMERATED {supported} OPTIONAL,

fr1fdd-FR2TDD-CA-SpCellOnFR2TDD ENUMERATED {supported} OPTIONAL,

fr1tdd-FR2TDD-CA-SpCellOnFR1TDD ENUMERATED {supported} OPTIONAL,

fr1tdd-FR2TDD-CA-SpCellOnFR2TDD ENUMERATED {supported} OPTIONAL,

fr1fdd-FR1TDD-FR2TDD-CA-SpCellOnFR1FDD ENUMERATED {supported} OPTIONAL,

fr1fdd-FR1TDD-FR2TDD-CA-SpCellOnFR1TDD ENUMERATED {supported} OPTIONAL,

fr1fdd-FR1TDD-FR2TDD-CA-SpCellOnFR2TDD ENUMERATED {supported} OPTIONAL

}

-- TAG-CARRIERAGGREGATIONVARIANT-STOP

-- ASN1STOP

#### – *CodebookParameters*

The IE *CodebookParameters* is used to convey codebook related parameters.

*CodebookParameters* information element

-- ASN1START

-- TAG-CODEBOOKPARAMETERS-START

CodebookParameters ::= SEQUENCE {

type1 SEQUENCE {

singlePanel SEQUENCE {

supportedCSI-RS-ResourceList SEQUENCE (SIZE (1.. maxNrofCSI-RS-Resources)) OF SupportedCSI-RS-Resource,

modes ENUMERATED {mode1, mode1andMode2},

maxNumberCSI-RS-PerResourceSet INTEGER (1..8)

},

multiPanel SEQUENCE {

supportedCSI-RS-ResourceList SEQUENCE (SIZE (1.. maxNrofCSI-RS-Resources)) OF SupportedCSI-RS-Resource,

modes ENUMERATED {mode1, mode2, both},

nrofPanels ENUMERATED {n2, n4},

maxNumberCSI-RS-PerResourceSet INTEGER (1..8)

} OPTIONAL

},

type2 SEQUENCE {

supportedCSI-RS-ResourceList SEQUENCE (SIZE (1.. maxNrofCSI-RS-Resources)) OF SupportedCSI-RS-Resource,

parameterLx INTEGER (2..4),

amplitudeScalingType ENUMERATED {wideband, widebandAndSubband},

amplitudeSubsetRestriction ENUMERATED {supported} OPTIONAL

} OPTIONAL,

type2-PortSelection SEQUENCE {

supportedCSI-RS-ResourceList SEQUENCE (SIZE (1.. maxNrofCSI-RS-Resources)) OF SupportedCSI-RS-Resource,

parameterLx INTEGER (2..4),

amplitudeScalingType ENUMERATED {wideband, widebandAndSubband}

} OPTIONAL

}

CodebookParameters-v1610 ::= SEQUENCE {

supportedCSI-RS-ResourceListAlt-r16 SEQUENCE {

type1-SinglePanel-r16 SEQUENCE (SIZE (1..maxNrofCSI-RS-Resources)) OF INTEGER (0..maxNrofCSI-RS-ResourcesAlt-1-r16) OPTIONAL,

type1-MultiPanel-r16 SEQUENCE (SIZE (1..maxNrofCSI-RS-Resources)) OF INTEGER (0..maxNrofCSI-RS-ResourcesAlt-1-r16) OPTIONAL,

type2-r16 SEQUENCE (SIZE (1..maxNrofCSI-RS-Resources)) OF INTEGER (0..maxNrofCSI-RS-ResourcesAlt-1-r16) OPTIONAL,

type2-PortSelection-r16 SEQUENCE (SIZE (1..maxNrofCSI-RS-Resources)) OF INTEGER (0..maxNrofCSI-RS-ResourcesAlt-1-r16) OPTIONAL

} OPTIONAL

}

CodebookParametersAddition-r16 ::= SEQUENCE {

etype2-r16 SEQUENCE {

-- R1 16-3a Regular eType 2 R=1

etype2R1-r16 SEQUENCE {

supportedCSI-RS-ResourceListAdd-r16 SEQUENCE (SIZE (1..maxNrofCSI-RS-ResourcesExt-r16)) OF

INTEGER (0..maxNrofCSI-RS-ResourcesAlt-1-r16)

},

-- R1 16-3a-1 Regular eType 2 R=2

etype2R2-r16 SEQUENCE {

supportedCSI-RS-ResourceListAdd-r16 SEQUENCE (SIZE (1..maxNrofCSI-RS-ResourcesExt-r16)) OF

INTEGER (0..maxNrofCSI-RS-ResourcesAlt-1-r16)

} OPTIONAL,

-- R1 16-3a-2: Support of parameter combinations 7-8

paramComb7-8-r16 ENUMERATED {supported} OPTIONAL,

-- R1 16-3a-3: Support of rank 3,4

rank3-4-r16 ENUMERATED {supported} OPTIONAL,

-- R1 16-3a-4: CBSR with soft amplitude restriction

amplitudeSubsetRestriction-r16 ENUMERATED {supported} OPTIONAL

} OPTIONAL,

etype2-PS-r16 SEQUENCE {

-- R1 16-3b Regular eType 2 R=1 PortSelection

etype2R1-PortSelection-r16 SEQUENCE {

supportedCSI-RS-ResourceListAdd-r16 SEQUENCE (SIZE (1..maxNrofCSI-RS-ResourcesExt-r16)) OF

INTEGER (0..maxNrofCSI-RS-ResourcesAlt-1-r16)

},

-- R1 16-3b-1 Regular eType 2 R=2 PortSelection

etype2R2-PortSelection-r16 SEQUENCE {

supportedCSI-RS-ResourceListAdd-r16 SEQUENCE (SIZE (1..maxNrofCSI-RS-ResourcesExt-r16)) OF

INTEGER (0..maxNrofCSI-RS-ResourcesAlt-1-r16)

} OPTIONAL,

-- R1 16-3b-2: Support of rank 3,4

rank3-4-r16 ENUMERATED {supported} OPTIONAL

} OPTIONAL

}

CodebookComboParametersAddition-r16 ::= SEQUENCE {

-- R1 16-8 Mixed codebook types

type1SP-Type2-null-r16 SEQUENCE {

supportedCSI-RS-ResourceListAdd-r16 SEQUENCE (SIZE (1..maxNrofCSI-RS-ResourcesExt-r16)) OF INTEGER (0..maxNrofCSI-RS-ResourcesAlt-1-r16)

} OPTIONAL,

type1SP-Type2PS-null-r16 SEQUENCE {

supportedCSI-RS-ResourceListAdd-r16 SEQUENCE (SIZE (1..maxNrofCSI-RS-ResourcesExt-r16)) OF INTEGER (0..maxNrofCSI-RS-ResourcesAlt-1-r16)

} OPTIONAL,

type1SP-eType2R1-null-r16 SEQUENCE {

supportedCSI-RS-ResourceListAdd-r16 SEQUENCE (SIZE (1..maxNrofCSI-RS-ResourcesExt-r16)) OF INTEGER (0..maxNrofCSI-RS-ResourcesAlt-1-r16)

} OPTIONAL,

type1SP-eType2R2-null-r16 SEQUENCE {

supportedCSI-RS-ResourceListAdd-r16 SEQUENCE (SIZE (1..maxNrofCSI-RS-ResourcesExt-r16)) OF INTEGER (0..maxNrofCSI-RS-ResourcesAlt-1-r16)

} OPTIONAL,

type1SP-eType2R1PS-null-r16 SEQUENCE {

supportedCSI-RS-ResourceListAdd-r16 SEQUENCE (SIZE (1..maxNrofCSI-RS-ResourcesExt-r16)) OF INTEGER (0..maxNrofCSI-RS-ResourcesAlt-1-r16)

} OPTIONAL,

type1SP-eType2R2PS-null-r16 SEQUENCE {

supportedCSI-RS-ResourceListAdd-r16 SEQUENCE (SIZE (1..maxNrofCSI-RS-ResourcesExt-r16)) OF INTEGER (0..maxNrofCSI-RS-ResourcesAlt-1-r16)

} OPTIONAL,

type1SP-Type2-Type2PS-r16 SEQUENCE {

supportedCSI-RS-ResourceListAdd-r16 SEQUENCE (SIZE (1..maxNrofCSI-RS-ResourcesExt-r16)) OF INTEGER (0..maxNrofCSI-RS-ResourcesAlt-1-r16)

} OPTIONAL,

type1MP-Type2-null-r16 SEQUENCE {

supportedCSI-RS-ResourceListAdd-r16 SEQUENCE (SIZE (1..maxNrofCSI-RS-ResourcesExt-r16)) OF INTEGER (0..maxNrofCSI-RS-ResourcesAlt-1-r16)

} OPTIONAL,

type1MP-Type2PS-null-r16 SEQUENCE {

supportedCSI-RS-ResourceListAdd-r16 SEQUENCE (SIZE (1..maxNrofCSI-RS-ResourcesExt-r16)) OF INTEGER (0..maxNrofCSI-RS-ResourcesAlt-1-r16)

} OPTIONAL,

type1MP-eType2R1-null-r16 SEQUENCE {

supportedCSI-RS-ResourceListAdd-r16 SEQUENCE (SIZE (1..maxNrofCSI-RS-ResourcesExt-r16)) OF INTEGER (0..maxNrofCSI-RS-ResourcesAlt-1-r16)

} OPTIONAL,

type1MP-eType2R2-null-r16 SEQUENCE {

supportedCSI-RS-ResourceListAdd-r16 SEQUENCE (SIZE (1..maxNrofCSI-RS-ResourcesExt-r16)) OF INTEGER (0..maxNrofCSI-RS-ResourcesAlt-1-r16)

} OPTIONAL,

type1MP-eType2R1PS-null-r16 SEQUENCE {

supportedCSI-RS-ResourceListAdd-r16 SEQUENCE (SIZE (1..maxNrofCSI-RS-ResourcesExt-r16)) OF INTEGER (0..maxNrofCSI-RS-ResourcesAlt-1-r16)

} OPTIONAL,

type1MP-eType2R2PS-null-r16 SEQUENCE {

supportedCSI-RS-ResourceListAdd-r16 SEQUENCE (SIZE (1..maxNrofCSI-RS-ResourcesExt-r16)) OF INTEGER (0..maxNrofCSI-RS-ResourcesAlt-1-r16)

} OPTIONAL,

type1MP-Type2-Type2PS-r16 SEQUENCE {

supportedCSI-RS-ResourceListAdd-r16 SEQUENCE (SIZE (1..maxNrofCSI-RS-ResourcesExt-r16)) OF INTEGER (0..maxNrofCSI-RS-ResourcesAlt-1-r16)

} OPTIONAL

}

CodebookParametersfetype2-r17 ::= SEQUENCE {

-- R1 23-9-1 Basic Features of Further Enhanced Port-Selection Type II Codebook (FeType-II)

fetype2basic-r17 SEQUENCE (SIZE (1.. maxNrofCSI-RS-ResourcesExt-r16)) OF INTEGER (0..maxNrofCSI-RS-ResourcesAlt-1-r16),

-- R1 23-9-2 Support of M=2 and R=1 for FeType-II

fetype2Rank1-r17 SEQUENCE (SIZE (1..maxNrofCSI-RS-ResourcesExt-r17)) OF INTEGER (0.. maxNrofCSI-RS-ResourcesAlt-1-r16)

OPTIONAL,

-- R1 23-9-4 Support of R = 2 for FeType-II

fetype2Rank2-r17 SEQUENCE (SIZE (1..maxNrofCSI-RS-ResourcesExt-r17)) OF INTEGER (0.. maxNrofCSI-RS-ResourcesAlt-1-r16)

OPTIONAL,

-- R1 23-9-3 Support of rank 3, 4 for FeType-II

fetype2Rank3Rank4-r17 ENUMERATED {supported} OPTIONAL

}

CodebookComboParameterMixedType-r17 ::= SEQUENCE {

-- R1 23-9-5 Active CSI-RS resources and ports for mixed codebook types in any slot

type1SP-feType2PS-null-r17 SEQUENCE (SIZE (1..maxNrofCSI-RS-ResourcesExt-r16)) OF INTEGER (0..maxNrofCSI-RS-ResourcesAlt-1-r16)

OPTIONAL,

type1SP-feType2PS-M2R1-null-r17 SEQUENCE (SIZE (1..maxNrofCSI-RS-ResourcesExt-r16)) OF INTEGER (0..maxNrofCSI-RS-ResourcesAlt-1-r16)

OPTIONAL,

type1SP-feType2PS-M2R2-null-r1 SEQUENCE (SIZE (1..maxNrofCSI-RS-ResourcesExt-r16)) OF INTEGER (0..maxNrofCSI-RS-ResourcesAlt-1-r16)

OPTIONAL,

type1SP-Type2-feType2-PS-M1-r17 SEQUENCE (SIZE (1..maxNrofCSI-RS-ResourcesExt-r16)) OF INTEGER (0..maxNrofCSI-RS-ResourcesAlt-1-r16)

OPTIONAL,

type1SP-Type2-feType2-PS-M2R1-r17 SEQUENCE (SIZE (1..maxNrofCSI-RS-ResourcesExt-r16)) OF INTEGER (0..maxNrofCSI-RS-ResourcesAlt-1-r16)

OPTIONAL,

type1SP-eType2R1-feType2-PS-M1-r17 SEQUENCE (SIZE (1..maxNrofCSI-RS-ResourcesExt-r16)) OF INTEGER (0..maxNrofCSI-RS-ResourcesAlt-1-r16)

OPTIONAL,

type1SP-eType2R1-feType2-PS-M2R1-r17 SEQUENCE (SIZE (1..maxNrofCSI-RS-ResourcesExt-r16)) OF INTEGER (0..maxNrofCSI-RS-ResourcesAlt-1-r16)

OPTIONAL,

type1MP-feType2PS-null-r17 SEQUENCE (SIZE (1..maxNrofCSI-RS-ResourcesExt-r16)) OF INTEGER (0..maxNrofCSI-RS-ResourcesAlt-1-r16)

OPTIONAL,

type1MP-feType2PS-M2R1-null-r17 SEQUENCE (SIZE (1..maxNrofCSI-RS-ResourcesExt-r16)) OF INTEGER (0..maxNrofCSI-RS-ResourcesAlt-1-r16)

OPTIONAL,

type1MP-feType2PS-M2R2-null-r17 SEQUENCE (SIZE (1..maxNrofCSI-RS-ResourcesExt-r16)) OF INTEGER (0..maxNrofCSI-RS-ResourcesAlt-1-r16)

OPTIONAL,

type1MP-Type2-feType2-PS-M1-r17 SEQUENCE (SIZE (1..maxNrofCSI-RS-ResourcesExt-r16)) OF INTEGER (0..maxNrofCSI-RS-ResourcesAlt-1-r16)

OPTIONAL,

type1MP-Type2-feType2-PS-M2R1-r17 SEQUENCE (SIZE (1..maxNrofCSI-RS-ResourcesExt-r16)) OF INTEGER (0..maxNrofCSI-RS-ResourcesAlt-1-r16)

OPTIONAL,

type1MP-eType2R1-feType2-PS-M1-r17 SEQUENCE (SIZE (1..maxNrofCSI-RS-ResourcesExt-r16)) OF INTEGER (0..maxNrofCSI-RS-ResourcesAlt-1-r16)

OPTIONAL,

type1MP-eType2R1-feType2-PS-M2R1-r17 SEQUENCE (SIZE (1..maxNrofCSI-RS-ResourcesExt-r16)) OF INTEGER (0..maxNrofCSI-RS-ResourcesAlt-1-r16)

OPTIONAL

}

CodebookComboParameterMultiTRP-r17::= SEQUENCE {

-- R1 23-7-1b Active CSI-RS resources and ports in the presence of multi-TRP CSI

-- {Codebook 2, Codebook 3} =(NULL, NULL}

nCJT-null-null SEQUENCE (SIZE (1..maxNrofCSI-RS-ResourcesExt-r16)) OF INTEGER (0..maxNrofCSI-RS-ResourcesAlt-1-r16)

OPTIONAL,

nCJT1SP-null-null SEQUENCE (SIZE (1..maxNrofCSI-RS-ResourcesExt-r16)) OF INTEGER (0..maxNrofCSI-RS-ResourcesAlt-1-r16)

OPTIONAL,

-- {Codebook 2, Codebook 3} = {( {"Rel 16 combinations in FG 16-8"}

nCJT-Type2-null-r16 SEQUENCE (SIZE (1..maxNrofCSI-RS-ResourcesExt-r16)) OF INTEGER (0..maxNrofCSI-RS-ResourcesAlt-1-r16)

OPTIONAL,

nCJT-Type2PS-null-r16 SEQUENCE (SIZE (1..maxNrofCSI-RS-ResourcesExt-r16)) OF INTEGER (0..maxNrofCSI-RS-ResourcesAlt-1-r16)

OPTIONAL,

nCJT-eType2R1-null-r16 SEQUENCE (SIZE (1..maxNrofCSI-RS-ResourcesExt-r16)) OF INTEGER (0..maxNrofCSI-RS-ResourcesAlt-1-r16)

OPTIONAL,

nCJT-eType2R2-null-r16 SEQUENCE (SIZE (1..maxNrofCSI-RS-ResourcesExt-r16)) OF INTEGER (0..maxNrofCSI-RS-ResourcesAlt-1-r16)

OPTIONAL,

nCJT-eType2R1PS-null-r16 SEQUENCE (SIZE (1..maxNrofCSI-RS-ResourcesExt-r16)) OF INTEGER (0..maxNrofCSI-RS-ResourcesAlt-1-r16)

OPTIONAL,

nCJT-eType2R2PS-null-r16 SEQUENCE (SIZE (1..maxNrofCSI-RS-ResourcesExt-r16)) OF INTEGER (0..maxNrofCSI-RS-ResourcesAlt-1-r16)

OPTIONAL,

nCJT-Type2-Type2PS-r16 SEQUENCE (SIZE (1..maxNrofCSI-RS-ResourcesExt-r16)) OF INTEGER (0..maxNrofCSI-RS-ResourcesAlt-1-r16)

OPTIONAL,

nCJT1SP-Type2-null-r16 SEQUENCE (SIZE (1..maxNrofCSI-RS-ResourcesExt-r16)) OF INTEGER (0..maxNrofCSI-RS-ResourcesAlt-1-r16)

OPTIONAL,

nCJT1SP-Type2PS-null-r16 SEQUENCE (SIZE (1..maxNrofCSI-RS-ResourcesExt-r16)) OF INTEGER (0..maxNrofCSI-RS-ResourcesAlt-1-r16)

OPTIONAL,

nCJT1SP-eType2R1-null-r16 SEQUENCE (SIZE (1..maxNrofCSI-RS-ResourcesExt-r16)) OF INTEGER (0..maxNrofCSI-RS-ResourcesAlt-1-r16)

OPTIONAL,

nCJT1SP-eType2R2-null-r16 SEQUENCE (SIZE (1..maxNrofCSI-RS-ResourcesExt-r16)) OF INTEGER (0..maxNrofCSI-RS-ResourcesAlt-1-r16)

OPTIONAL,

nCJT1SP-eType2R1PS-null-r16 SEQUENCE (SIZE (1..maxNrofCSI-RS-ResourcesExt-r16)) OF INTEGER (0..maxNrofCSI-RS-ResourcesAlt-1-r16)

OPTIONAL,

nCJT1SP-eType2R2PS-null-r16 SEQUENCE (SIZE (1..maxNrofCSI-RS-ResourcesExt-r16)) OF INTEGER (0..maxNrofCSI-RS-ResourcesAlt-1-r16)

OPTIONAL,

nCJT1SP-Type2-Type2PS-r16 SEQUENCE (SIZE (1..maxNrofCSI-RS-ResourcesExt-r16)) OF INTEGER (0..maxNrofCSI-RS-ResourcesAlt-1-r16)

OPTIONAL,

-- {Codebook 2, Codebook 3} = {"New Rel17 combinations in FG 23-9-5"}

nCJT-feType2PS-null-r17 SEQUENCE (SIZE (1..maxNrofCSI-RS-ResourcesExt-r16)) OF INTEGER (0..maxNrofCSI-RS-ResourcesAlt-1-r16)

OPTIONAL,

nCJT-feType2PS-M2R1-null-r17 SEQUENCE (SIZE (1..maxNrofCSI-RS-ResourcesExt-r16)) OF INTEGER (0..maxNrofCSI-RS-ResourcesAlt-1-r16)

OPTIONAL,

nCJT-feType2PS-M2R2-null-r17 SEQUENCE (SIZE (1..maxNrofCSI-RS-ResourcesExt-r16)) OF INTEGER (0..maxNrofCSI-RS-ResourcesAlt-1-r16)

OPTIONAL,

nCJT-Type2-feType2-PS-M1-r17 SEQUENCE (SIZE (1..maxNrofCSI-RS-ResourcesExt-r16)) OF INTEGER (0..maxNrofCSI-RS-ResourcesAlt-1-r16)

OPTIONAL,

nCJT-Type2-feType2-PS-M2R1-r17 SEQUENCE (SIZE (1..maxNrofCSI-RS-ResourcesExt-r16)) OF INTEGER (0..maxNrofCSI-RS-ResourcesAlt-1-r16)

OPTIONAL,

nCJT-eType2R1-feType2-PS-M1-r17 SEQUENCE (SIZE (1..maxNrofCSI-RS-ResourcesExt-r16)) OF INTEGER (0..maxNrofCSI-RS-ResourcesAlt-1-r16)

OPTIONAL,

nCJT-eType2R1-feType2-PS-M2R1-r17 SEQUENCE (SIZE (1..maxNrofCSI-RS-ResourcesExt-r16)) OF INTEGER (0..maxNrofCSI-RS-ResourcesAlt-1-r16)

OPTIONAL,

nCJT1SP-feType2PS-null-r17 SEQUENCE (SIZE (1..maxNrofCSI-RS-ResourcesExt-r16)) OF INTEGER (0..maxNrofCSI-RS-ResourcesAlt-1-r16)

OPTIONAL,

nCJT1SP-feType2PS-M2R1-null-r17 SEQUENCE (SIZE (1..maxNrofCSI-RS-ResourcesExt-r16)) OF INTEGER (0..maxNrofCSI-RS-ResourcesAlt-1-r16)

OPTIONAL,

nCJT1SP-feType2PS-M2R2-null-r1 SEQUENCE (SIZE (1..maxNrofCSI-RS-ResourcesExt-r16)) OF INTEGER (0..maxNrofCSI-RS-ResourcesAlt-1-r16)

OPTIONAL,

nCJT1SP-Type2-feType2-PS-M1-r17 SEQUENCE (SIZE (1..maxNrofCSI-RS-ResourcesExt-r16)) OF INTEGER (0..maxNrofCSI-RS-ResourcesAlt-1-r16)

OPTIONAL,

nCJT1SP-Type2-feType2-PS-M2R1-r17 SEQUENCE (SIZE (1..maxNrofCSI-RS-ResourcesExt-r16)) OF INTEGER (0..maxNrofCSI-RS-ResourcesAlt-1-r16)

OPTIONAL,

nCJT1SP-eType2R1-feType2-PS-M1-r17 SEQUENCE (SIZE (1..maxNrofCSI-RS-ResourcesExt-r16)) OF INTEGER (0..maxNrofCSI-RS-ResourcesAlt-1-r16)

OPTIONAL,

nCJT1SP-eType2R1-feType2-PS-M2R1-r17 SEQUENCE (SIZE (1..maxNrofCSI-RS-ResourcesExt-r16)) OF INTEGER (0..maxNrofCSI-RS-ResourcesAlt-1-r16)

OPTIONAL

}

CodebookParametersAdditionPerBC-r16::= SEQUENCE {

-- R1 16-3a Regular eType 2 R=1

etype2R1-r16 SEQUENCE (SIZE (1..maxNrofCSI-RS-ResourcesExt-r16)) OF INTEGER (0..maxNrofCSI-RS-ResourcesAlt-1-r16)

OPTIONAL,

-- R1 16-3a-1 Regular eType 2 R=2

etype2R2-r16 SEQUENCE (SIZE (1..maxNrofCSI-RS-ResourcesExt-r16)) OF INTEGER (0..maxNrofCSI-RS-ResourcesAlt-1-r16)

OPTIONAL,

-- R1 16-3b Regular eType 2 R=1 PortSelection

etype2R1-PortSelection-r16 SEQUENCE (SIZE (1..maxNrofCSI-RS-ResourcesExt-r16)) OF INTEGER (0..maxNrofCSI-RS-ResourcesAlt-1-r16)

OPTIONAL,

-- R1 16-3b-1 Regular eType 2 R=2 PortSelection

etype2R2-PortSelection-r16 SEQUENCE (SIZE (1..maxNrofCSI-RS-ResourcesExt-r16)) OF INTEGER (0..maxNrofCSI-RS-ResourcesAlt-1-r16)

OPTIONAL

}

CodebookComboParametersAdditionPerBC-r16::= SEQUENCE {

-- R1 16-8 Mixed codebook types

type1SP-Type2-null-r16 SEQUENCE (SIZE (1..maxNrofCSI-RS-ResourcesExt-r16)) OF INTEGER (0..maxNrofCSI-RS-ResourcesAlt-1-r16)

OPTIONAL,

type1SP-Type2PS-null-r16 SEQUENCE (SIZE (1..maxNrofCSI-RS-ResourcesExt-r16)) OF INTEGER (0..maxNrofCSI-RS-ResourcesAlt-1-r16)

OPTIONAL,

type1SP-eType2R1-null-r16 SEQUENCE (SIZE (1..maxNrofCSI-RS-ResourcesExt-r16)) OF INTEGER (0..maxNrofCSI-RS-ResourcesAlt-1-r16)

OPTIONAL,

type1SP-eType2R2-null-r16 SEQUENCE (SIZE (1..maxNrofCSI-RS-ResourcesExt-r16)) OF INTEGER (0..maxNrofCSI-RS-ResourcesAlt-1-r16)

OPTIONAL,

type1SP-eType2R1PS-null-r16 SEQUENCE (SIZE (1..maxNrofCSI-RS-ResourcesExt-r16)) OF INTEGER (0..maxNrofCSI-RS-ResourcesAlt-1-r16)

OPTIONAL,

type1SP-eType2R2PS-null-r16 SEQUENCE (SIZE (1..maxNrofCSI-RS-ResourcesExt-r16)) OF INTEGER (0..maxNrofCSI-RS-ResourcesAlt-1-r16)

OPTIONAL,

type1SP-Type2-Type2PS-r16 SEQUENCE (SIZE (1..maxNrofCSI-RS-ResourcesExt-r16)) OF INTEGER (0..maxNrofCSI-RS-ResourcesAlt-1-r16)

OPTIONAL,

type1MP-Type2-null-r16 SEQUENCE (SIZE (1..maxNrofCSI-RS-ResourcesExt-r16)) OF INTEGER (0..maxNrofCSI-RS-ResourcesAlt-1-r16)

OPTIONAL,

type1MP-Type2PS-null-r16 SEQUENCE (SIZE (1..maxNrofCSI-RS-ResourcesExt-r16)) OF INTEGER (0..maxNrofCSI-RS-ResourcesAlt-1-r16)

OPTIONAL,

type1MP-eType2R1-null-r16 SEQUENCE (SIZE (1..maxNrofCSI-RS-ResourcesExt-r16)) OF INTEGER (0..maxNrofCSI-RS-ResourcesAlt-1-r16)

OPTIONAL,

type1MP-eType2R2-null-r16 SEQUENCE (SIZE (1..maxNrofCSI-RS-ResourcesExt-r16)) OF INTEGER (0..maxNrofCSI-RS-ResourcesAlt-1-r16)

OPTIONAL,

type1MP-eType2R1PS-null-r16 SEQUENCE (SIZE (1..maxNrofCSI-RS-ResourcesExt-r16)) OF INTEGER (0..maxNrofCSI-RS-ResourcesAlt-1-r16)

OPTIONAL,

type1MP-eType2R2PS-null-r16 SEQUENCE (SIZE (1..maxNrofCSI-RS-ResourcesExt-r16)) OF INTEGER (0..maxNrofCSI-RS-ResourcesAlt-1-r16)

OPTIONAL,

type1MP-Type2-Type2PS-r16 SEQUENCE (SIZE (1..maxNrofCSI-RS-ResourcesExt-r16)) OF INTEGER (0..maxNrofCSI-RS-ResourcesAlt-1-r16)

OPTIONAL

}

CodebookParametersfetype2PerBC-r17 ::= SEQUENCE {

-- R1 23-9-1 Basic Features of Further Enhanced Port-Selection Type II Codebook (FeType-II)

fetype2basic-r17 SEQUENCE (SIZE (1.. maxNrofCSI-RS-ResourcesExt-r16)) OF INTEGER (0..maxNrofCSI-RS-ResourcesAlt-1-r16),

-- R1 23-9-2 Support of M=2 and R=1 for FeType-II

fetype2Rank1-r17 SEQUENCE (SIZE (1..maxNrofCSI-RS-ResourcesExt-r17)) OF INTEGER (0.. maxNrofCSI-RS-ResourcesAlt-1-r16)

OPTIONAL,

-- R1 23-9-4 Support of R = 2 for FeType-II

fetype2Rank2-r17 SEQUENCE (SIZE (1..maxNrofCSI-RS-ResourcesExt-r17)) OF INTEGER (0.. maxNrofCSI-RS-ResourcesAlt-1-r16)

OPTIONAL

}

CodebookComboParameterMixedTypePerBC-r17 ::= SEQUENCE {

-- R1 23-9-5 Active CSI-RS resources and ports for mixed codebook types in any slot

type1SP-feType2PS-null-r17 SEQUENCE (SIZE (1..maxNrofCSI-RS-ResourcesExt-r16)) OF INTEGER (0..maxNrofCSI-RS-ResourcesAlt-1-r16)

OPTIONAL,

type1SP-feType2PS-M2R1-null-r17 SEQUENCE (SIZE (1..maxNrofCSI-RS-ResourcesExt-r16)) OF INTEGER (0..maxNrofCSI-RS-ResourcesAlt-1-r16)

OPTIONAL,

type1SP-feType2PS-M2R2-null-r17 SEQUENCE (SIZE (1..maxNrofCSI-RS-ResourcesExt-r16)) OF INTEGER (0..maxNrofCSI-RS-ResourcesAlt-1-r16)

OPTIONAL,

type1SP-Type2-feType2-PS-M1-r17 SEQUENCE (SIZE (1..maxNrofCSI-RS-ResourcesExt-r16)) OF INTEGER (0..maxNrofCSI-RS-ResourcesAlt-1-r16)

OPTIONAL,

type1SP-Type2-feType2-PS-M2R1-r17 SEQUENCE (SIZE (1..maxNrofCSI-RS-ResourcesExt-r16)) OF INTEGER (0..maxNrofCSI-RS-ResourcesAlt-1-r16)

OPTIONAL,

type1SP-eType2R1-feType2-PS-M1-r17 SEQUENCE (SIZE (1..maxNrofCSI-RS-ResourcesExt-r16)) OF INTEGER (0..maxNrofCSI-RS-ResourcesAlt-1-r16)

OPTIONAL,

type1SP-eType2R1-feType2-PS-M2R1-r17 SEQUENCE (SIZE (1..maxNrofCSI-RS-ResourcesExt-r16)) OF INTEGER (0..maxNrofCSI-RS-ResourcesAlt-1-r16)

OPTIONAL,

type1MP-feType2PS-null-r17 SEQUENCE (SIZE (1..maxNrofCSI-RS-ResourcesExt-r16)) OF INTEGER (0..maxNrofCSI-RS-ResourcesAlt-1-r16)

OPTIONAL,

type1MP-feType2PS-M2R1-null-r17 SEQUENCE (SIZE (1..maxNrofCSI-RS-ResourcesExt-r16)) OF INTEGER (0..maxNrofCSI-RS-ResourcesAlt-1-r16)

OPTIONAL,

type1MP-feType2PS-M2R2-null-r17 SEQUENCE (SIZE (1..maxNrofCSI-RS-ResourcesExt-r16)) OF INTEGER (0..maxNrofCSI-RS-ResourcesAlt-1-r16)

OPTIONAL,

type1MP-Type2-feType2-PS-M1-r17 SEQUENCE (SIZE (1..maxNrofCSI-RS-ResourcesExt-r16)) OF INTEGER (0..maxNrofCSI-RS-ResourcesAlt-1-r16)

OPTIONAL,

type1MP-Type2-feType2-PS-M2R1-r17 SEQUENCE (SIZE (1..maxNrofCSI-RS-ResourcesExt-r16)) OF INTEGER (0..maxNrofCSI-RS-ResourcesAlt-1-r16)

OPTIONAL,

type1MP-eType2R1-feType2-PS-M1-r17 SEQUENCE (SIZE (1..maxNrofCSI-RS-ResourcesExt-r16)) OF INTEGER (0..maxNrofCSI-RS-ResourcesAlt-1-r16)

OPTIONAL,

type1MP-eType2R1-feType2-PS-M2R1-r17 SEQUENCE (SIZE (1..maxNrofCSI-RS-ResourcesExt-r16)) OF INTEGER (0..maxNrofCSI-RS-ResourcesAlt-1-r16)

OPTIONAL

}

CodebookComboParameterMultiTRP-PerBC-r17::= SEQUENCE {

-- R1 23-7-1b Active CSI-RS resources and ports in the presence of multi-TRP CSI

-- {Codebook 2, Codebook 3} =(NULL, NULL}

nCJT-null-null SEQUENCE (SIZE (1..maxNrofCSI-RS-ResourcesExt-r16)) OF INTEGER (0..maxNrofCSI-RS-ResourcesAlt-1-r16)

OPTIONAL,

nCJT1SP-null-null SEQUENCE (SIZE (1..maxNrofCSI-RS-ResourcesExt-r16)) OF INTEGER (0..maxNrofCSI-RS-ResourcesAlt-1-r16)

OPTIONAL,

-- {Codebook 2, Codebook 3} = {( {"Rel 16 combinations in FG 16-8"}

nCJT-Type2-null-r16 SEQUENCE (SIZE (1..maxNrofCSI-RS-ResourcesExt-r16)) OF INTEGER (0..maxNrofCSI-RS-ResourcesAlt-1-r16)

OPTIONAL,

nCJT-Type2PS-null-r16 SEQUENCE (SIZE (1..maxNrofCSI-RS-ResourcesExt-r16)) OF INTEGER (0..maxNrofCSI-RS-ResourcesAlt-1-r16)

OPTIONAL,

nCJT-eType2R1-null-r16 SEQUENCE (SIZE (1..maxNrofCSI-RS-ResourcesExt-r16)) OF INTEGER (0..maxNrofCSI-RS-ResourcesAlt-1-r16)

OPTIONAL,

nCJT-eType2R2-null-r16 SEQUENCE (SIZE (1..maxNrofCSI-RS-ResourcesExt-r16)) OF INTEGER (0..maxNrofCSI-RS-ResourcesAlt-1-r16)

OPTIONAL,

nCJT-eType2R1PS-null-r16 SEQUENCE (SIZE (1..maxNrofCSI-RS-ResourcesExt-r16)) OF INTEGER (0..maxNrofCSI-RS-ResourcesAlt-1-r16)

OPTIONAL,

nCJT-eType2R2PS-null-r16 SEQUENCE (SIZE (1..maxNrofCSI-RS-ResourcesExt-r16)) OF INTEGER (0..maxNrofCSI-RS-ResourcesAlt-1-r16)

OPTIONAL,

nCJT-Type2-Type2PS-r16 SEQUENCE (SIZE (1..maxNrofCSI-RS-ResourcesExt-r16)) OF INTEGER (0..maxNrofCSI-RS-ResourcesAlt-1-r16)

OPTIONAL,

nCJT1SP-Type2-null-r16 SEQUENCE (SIZE (1..maxNrofCSI-RS-ResourcesExt-r16)) OF INTEGER (0..maxNrofCSI-RS-ResourcesAlt-1-r16)

OPTIONAL,

nCJT1SP-Type2PS-null-r16 SEQUENCE (SIZE (1..maxNrofCSI-RS-ResourcesExt-r16)) OF INTEGER (0..maxNrofCSI-RS-ResourcesAlt-1-r16)

OPTIONAL,

nCJT1SP-eType2R1-null-r16 SEQUENCE (SIZE (1..maxNrofCSI-RS-ResourcesExt-r16)) OF INTEGER (0..maxNrofCSI-RS-ResourcesAlt-1-r16)

OPTIONAL,

nCJT1SP-eType2R2-null-r16 SEQUENCE (SIZE (1..maxNrofCSI-RS-ResourcesExt-r16)) OF INTEGER (0..maxNrofCSI-RS-ResourcesAlt-1-r16)

OPTIONAL,

nCJT1SP-eType2R1PS-null-r16 SEQUENCE (SIZE (1..maxNrofCSI-RS-ResourcesExt-r16)) OF INTEGER (0..maxNrofCSI-RS-ResourcesAlt-1-r16)

OPTIONAL,

nCJT1SP-eType2R2PS-null-r16 SEQUENCE (SIZE (1..maxNrofCSI-RS-ResourcesExt-r16)) OF INTEGER (0..maxNrofCSI-RS-ResourcesAlt-1-r16)

OPTIONAL,

nCJT1SP-Type2-Type2PS-r16 SEQUENCE (SIZE (1..maxNrofCSI-RS-ResourcesExt-r16)) OF INTEGER (0..maxNrofCSI-RS-ResourcesAlt-1-r16)

OPTIONAL,

-- {Codebook 2, Codebook 3} = {"New Rel17 combinations in FG 23-9-5"}

nCJT-feType2PS-null-r17 SEQUENCE (SIZE (1..maxNrofCSI-RS-ResourcesExt-r16)) OF INTEGER (0..maxNrofCSI-RS-ResourcesAlt-1-r16)

OPTIONAL,

nCJT-feType2PS-M2R1-null-r17 SEQUENCE (SIZE (1..maxNrofCSI-RS-ResourcesExt-r16)) OF INTEGER (0..maxNrofCSI-RS-ResourcesAlt-1-r16)

OPTIONAL,

nCJT-feType2PS-M2R2-null-r17 SEQUENCE (SIZE (1..maxNrofCSI-RS-ResourcesExt-r16)) OF INTEGER (0..maxNrofCSI-RS-ResourcesAlt-1-r16)

OPTIONAL,

nCJT-Type2-feType2-PS-M1-r17 SEQUENCE (SIZE (1..maxNrofCSI-RS-ResourcesExt-r16)) OF INTEGER (0..maxNrofCSI-RS-ResourcesAlt-1-r16)

OPTIONAL,

nCJT-Type2-feType2-PS-M2R1-r17 SEQUENCE (SIZE (1..maxNrofCSI-RS-ResourcesExt-r16)) OF INTEGER (0..maxNrofCSI-RS-ResourcesAlt-1-r16)

OPTIONAL,

nCJT-eType2R1-feType2-PS-M1-r17 SEQUENCE (SIZE (1..maxNrofCSI-RS-ResourcesExt-r16)) OF INTEGER (0..maxNrofCSI-RS-ResourcesAlt-1-r16)

OPTIONAL,

nCJT-eType2R1-feType2-PS-M2R1-r17 SEQUENCE (SIZE (1..maxNrofCSI-RS-ResourcesExt-r16)) OF INTEGER (0..maxNrofCSI-RS-ResourcesAlt-1-r16)

OPTIONAL,

nCJT1SP-feType2PS-null-r17 SEQUENCE (SIZE (1..maxNrofCSI-RS-ResourcesExt-r16)) OF INTEGER (0..maxNrofCSI-RS-ResourcesAlt-1-r16)

OPTIONAL,

nCJT1SP-feType2PS-M2R1-null-r17 SEQUENCE (SIZE (1..maxNrofCSI-RS-ResourcesExt-r16)) OF INTEGER (0..maxNrofCSI-RS-ResourcesAlt-1-r16)

OPTIONAL,

nCJT1SP-feType2PS-M2R2-null-r1 SEQUENCE (SIZE (1..maxNrofCSI-RS-ResourcesExt-r16)) OF INTEGER (0..maxNrofCSI-RS-ResourcesAlt-1-r16)

OPTIONAL,

nCJT1SP-Type2-feType2-PS-M1-r17 SEQUENCE (SIZE (1..maxNrofCSI-RS-ResourcesExt-r16)) OF INTEGER (0..maxNrofCSI-RS-ResourcesAlt-1-r16)

OPTIONAL,

nCJT1SP-Type2-feType2-PS-M2R1-r17 SEQUENCE (SIZE (1..maxNrofCSI-RS-ResourcesExt-r16)) OF INTEGER (0..maxNrofCSI-RS-ResourcesAlt-1-r16)

OPTIONAL,

nCJT1SP-eType2R1-feType2-PS-M1-r17 SEQUENCE (SIZE (1..maxNrofCSI-RS-ResourcesExt-r16)) OF INTEGER (0..maxNrofCSI-RS-ResourcesAlt-1-r16)

OPTIONAL,

nCJT1SP-eType2R1-feType2-PS-M2R1-r17 SEQUENCE (SIZE (1..maxNrofCSI-RS-ResourcesExt-r16)) OF INTEGER (0..maxNrofCSI-RS-ResourcesAlt-1-r16)

OPTIONAL

}

CodebookVariantsList-r16 ::= SEQUENCE (SIZE (1..maxNrofCSI-RS-ResourcesAlt-r16)) OF SupportedCSI-RS-Resource

SupportedCSI-RS-Resource ::= SEQUENCE {

maxNumberTxPortsPerResource ENUMERATED {p2, p4, p8, p12, p16, p24, p32},

maxNumberResourcesPerBand INTEGER (1..64),

totalNumberTxPortsPerBand INTEGER (2..256)

}

-- TAG-CODEBOOKPARAMETERS-STOP

-- ASN1STOP

|  |
| --- |
| *CodebookParameters* field descriptions |
| ***supportedCSI-RS-ResourceListAlt***  This field indicates the alternative list of *SupportedCSI-RS-Resource* supported for each codebook type. The supported CSI-RS resource is indicated by an integer value which pinpoints *SupportedCSI-RS-Resource* defined in *CodebookVariantsList*. The value 0 corresponds to the first entry of *CodebookVariantsList*. The value 1 corresponds to the second entry of *CodebookVariantsList*, and so on. For each codebook type, the field shall be included in both *codebookParametersPerBC* and *codebookParametersPerBand*. |

#### – *FeatureSetCombination*

The IE *FeatureSetCombination* is a two-dimensional matrix of *FeatureSet* entries.

Each *FeatureSetsPerBand* contains a list of feature sets applicable to the carrier(s) of one band entry of the associated band combination. Across the associated bands, the UE shall support the combination of *FeatureSets* at the same position in the *FeatureSetsPerBand*. All *FeatureSetsPerBand* in one *FeatureSetCombination* must have the same number of entries.

The number of *FeatureSetsPerBand* in the *FeatureSetCombination* must be equal to the number of band entries in an associated band combination. The first *FeatureSetPerBand* applies to the first band entry of the band combination, and so on.

Each *FeatureSet* contains either a pair of NR or E-UTRA feature set IDs for UL and DL.

In case of NR, the actual feature sets for UL and DL are defined in the *FeatureSets* IE and referred to from here by their ID, i.e., their position in the *featureSetsUplink* / *featureSetsDownlink* list in the FeatureSet IE.

In case of E-UTRA, the feature sets referred to from this list are defined in TS 36.331 [10] and conveyed as part of the *UE-EUTRA-Capability* container.

The *FeatureSetUplink* and *FeatureSetDownlink* referred to from the *FeatureSet* comprise, among other information, a set of *FeatureSetUplinkPerCC-Ids* and *FeatureSetDownlinkPerCC-Ids*. The number of these per-CC IDs determines the number of carriers that the UE is able to aggregate contiguously in frequency domain in the corresponding band. The number of carriers supported by the UE is also restricted by the bandwidth class indicated in the associated *BandCombination*, if present.

In feature set combinations the UE shall exclude entries with same or lower capabilities, since the network may anyway assume that the UE supports those.

NOTE 1: The UE may advertise fallback band-combinations in which it supports additional functionality explicitly in two ways: Either by setting FeatureSet IDs to zero (inter-band and intra-band non-contiguous fallback) and by reducing the number of FeatureSet-PerCC Ids in a Feature Set (intra-band contiguous fallback). Or by separate *BandCombination* entries with associated *FeatureSetCombinations*.

NOTE 2: The UE may advertise a *FeatureSetCombination* containing only fallback band combinations. That means, in a *FeatureSetCombination,* each group of *FeatureSets* across the bands may contain at least one pair of *FeatureSetUplinkId* and *FeatureSetDownlinkId* which is set to 0/0.

NOTE 3: The Network configures serving cell(s) and BWP(s) configuration to comply with capabilities derived from the combination of FeatureSets at the same position in the FeatureSetsPerBand, regardless of activated/deactivated serving cell(s) and BWP(s).

*FeatureSetCombination* information element

-- ASN1START

-- TAG-FEATURESETCOMBINATION-START

FeatureSetCombination ::= SEQUENCE (SIZE (1..maxSimultaneousBands)) OF FeatureSetsPerBand

FeatureSetsPerBand ::= SEQUENCE (SIZE (1..maxFeatureSetsPerBand)) OF FeatureSet

FeatureSet ::= CHOICE {

eutra SEQUENCE {

downlinkSetEUTRA FeatureSetEUTRA-DownlinkId,

uplinkSetEUTRA FeatureSetEUTRA-UplinkId

},

nr SEQUENCE {

downlinkSetNR FeatureSetDownlinkId,

uplinkSetNR FeatureSetUplinkId

}

}

-- TAG-FEATURESETCOMBINATION-STOP

-- ASN1STOP

#### – *FeatureSetCombinationId*

The IE *FeatureSetCombinationId* identifies a *FeatureSetCombination*. The *FeatureSetCombinationId* of a *FeatureSetCombination* is the position of the *FeatureSetCombination* in the featureSetCombinations list (in *UE-NR-Capability* or *UE-MRDC-Capability*). The *FeatureSetCombinationId* = 0 refers to the first entry in the *featureSetCombinations* list (in *UE-NR-Capability* or *UE-MRDC-Capability*).

NOTE: The *FeatureSetCombinationId* = 1024 is not used due to the maximum entry number of *featureSetCombinations*.

*FeatureSetCombinationId* information element

-- ASN1START

-- TAG-FEATURESETCOMBINATIONID-START

FeatureSetCombinationId ::= INTEGER (0.. maxFeatureSetCombinations)

-- TAG-FEATURESETCOMBINATIONID-STOP

-- ASN1STOP

#### – *FeatureSetDownlink*

The IE *FeatureSetDownlink* indicates a set of features that the UE supports on the carriers corresponding to one band entry in a band combination.

*FeatureSetDownlink* information element

-- ASN1START

-- TAG-FEATURESETDOWNLINK-START

FeatureSetDownlink ::= SEQUENCE {

featureSetListPerDownlinkCC SEQUENCE (SIZE (1..maxNrofServingCells)) OF FeatureSetDownlinkPerCC-Id,

intraBandFreqSeparationDL FreqSeparationClass OPTIONAL,

scalingFactor ENUMERATED {f0p4, f0p75, f0p8} OPTIONAL,

dummy8 ENUMERATED {supported} OPTIONAL,

scellWithoutSSB ENUMERATED {supported} OPTIONAL,

csi-RS-MeasSCellWithoutSSB ENUMERATED {supported} OPTIONAL,

dummy1 ENUMERATED {supported} OPTIONAL,

type1-3-CSS ENUMERATED {supported} OPTIONAL,

pdcch-MonitoringAnyOccasions ENUMERATED {withoutDCI-Gap, withDCI-Gap} OPTIONAL,

dummy2 ENUMERATED {supported} OPTIONAL,

ue-SpecificUL-DL-Assignment ENUMERATED {supported} OPTIONAL,

searchSpaceSharingCA-DL ENUMERATED {supported} OPTIONAL,

timeDurationForQCL SEQUENCE {

scs-60kHz ENUMERATED {s7, s14, s28} OPTIONAL,

scs-120kHz ENUMERATED {s14, s28} OPTIONAL

} OPTIONAL,

pdsch-ProcessingType1-DifferentTB-PerSlot SEQUENCE {

scs-15kHz ENUMERATED {upto2, upto4, upto7} OPTIONAL,

scs-30kHz ENUMERATED {upto2, upto4, upto7} OPTIONAL,

scs-60kHz ENUMERATED {upto2, upto4, upto7} OPTIONAL,

scs-120kHz ENUMERATED {upto2, upto4, upto7} OPTIONAL

} OPTIONAL,

dummy3 DummyA OPTIONAL,

dummy4 SEQUENCE (SIZE (1.. maxNrofCodebooks)) OF DummyB OPTIONAL,

dummy5 SEQUENCE (SIZE (1.. maxNrofCodebooks)) OF DummyC OPTIONAL,

dummy6 SEQUENCE (SIZE (1.. maxNrofCodebooks)) OF DummyD OPTIONAL,

dummy7 SEQUENCE (SIZE (1.. maxNrofCodebooks)) OF DummyE OPTIONAL

}

FeatureSetDownlink-v1540 ::= SEQUENCE {

oneFL-DMRS-TwoAdditionalDMRS-DL ENUMERATED {supported} OPTIONAL,

additionalDMRS-DL-Alt ENUMERATED {supported} OPTIONAL,

twoFL-DMRS-TwoAdditionalDMRS-DL ENUMERATED {supported} OPTIONAL,

oneFL-DMRS-ThreeAdditionalDMRS-DL ENUMERATED {supported} OPTIONAL,

pdcch-MonitoringAnyOccasionsWithSpanGap SEQUENCE {

scs-15kHz ENUMERATED {set1, set2, set3} OPTIONAL,

scs-30kHz ENUMERATED {set1, set2, set3} OPTIONAL,

scs-60kHz ENUMERATED {set1, set2, set3} OPTIONAL,

scs-120kHz ENUMERATED {set1, set2, set3} OPTIONAL

} OPTIONAL,

pdsch-SeparationWithGap ENUMERATED {supported} OPTIONAL,

pdsch-ProcessingType2 SEQUENCE {

scs-15kHz ProcessingParameters OPTIONAL,

scs-30kHz ProcessingParameters OPTIONAL,

scs-60kHz ProcessingParameters OPTIONAL

} OPTIONAL,

pdsch-ProcessingType2-Limited SEQUENCE {

differentTB-PerSlot-SCS-30kHz ENUMERATED {upto1, upto2, upto4, upto7}

} OPTIONAL,

dl-MCS-TableAlt-DynamicIndication ENUMERATED {supported} OPTIONAL

}

FeatureSetDownlink-v15a0 ::= SEQUENCE {

supportedSRS-Resources SRS-Resources OPTIONAL

}

FeatureSetDownlink-v1610 ::= SEQUENCE {

-- R1 22-4e/4f/4g/4h: CBG based reception for DL with unicast PDSCH(s) per slot per CC with UE processing time Capability 1

cbgPDSCH-ProcessingType1-DifferentTB-PerSlot-r16 SEQUENCE {

scs-15kHz-r16 ENUMERATED {one, upto2, upto4, upto7} OPTIONAL,

scs-30kHz-r16 ENUMERATED {one, upto2, upto4, upto7} OPTIONAL,

scs-60kHz-r16 ENUMERATED {one, upto2, upto4, upto7} OPTIONAL,

scs-120kHz-r16 ENUMERATED {one, upto2, upto4, upto7} OPTIONAL

} OPTIONAL,

-- R1 22-3e/3f/3g/3h: CBG based reception for DL with unicast PDSCH(s) per slot per CC with UE processing time Capability 2

cbgPDSCH-ProcessingType2-DifferentTB-PerSlot-r16 SEQUENCE {

scs-15kHz-r16 ENUMERATED {one, upto2, upto4, upto7} OPTIONAL,

scs-30kHz-r16 ENUMERATED {one, upto2, upto4, upto7} OPTIONAL,

scs-60kHz-r16 ENUMERATED {one, upto2, upto4, upto7} OPTIONAL,

scs-120kHz-r16 ENUMERATED {one, upto2, upto4, upto7} OPTIONAL

} OPTIONAL,

intraFreqDAPS-r16 SEQUENCE {

intraFreqDiffSCS-DAPS-r16 ENUMERATED {supported} OPTIONAL,

intraFreqAsyncDAPS-r16 ENUMERATED {supported} OPTIONAL

} OPTIONAL,

intraBandFreqSeparationDL-v1620 FreqSeparationClassDL-v1620 OPTIONAL,

intraBandFreqSeparationDL-Only-r16 FreqSeparationClassDL-Only-r16 OPTIONAL,

-- R1 11-2: Rel-16 PDCCH monitoring capability

pdcch-Monitoring-r16 SEQUENCE {

pdsch-ProcessingType1-r16 SEQUENCE {

scs-15kHz-r16 PDCCH-MonitoringOccasions-r16 OPTIONAL,

scs-30kHz-r16 PDCCH-MonitoringOccasions-r16 OPTIONAL

} OPTIONAL,

pdsch-ProcessingType2-r16 SEQUENCE {

scs-15kHz-r16 PDCCH-MonitoringOccasions-r16 OPTIONAL,

scs-30kHz-r16 PDCCH-MonitoringOccasions-r16 OPTIONAL

} OPTIONAL

} OPTIONAL,

-- R1 11-2b: Mix of Rel. 16 PDCCH monitoring capability and Rel. 15 PDCCH monitoring capability on different carriers

pdcch-MonitoringMixed-r16 ENUMERATED {supported} OPTIONAL,

-- R1 18-5c: Processing up to X unicast DCI scheduling for DL per scheduled CC

crossCarrierSchedulingProcessing-DiffSCS-r16 SEQUENCE {

scs-15kHz-120kHz-r16 ENUMERATED {n1,n2,n4} OPTIONAL,

scs-15kHz-60kHz-r16 ENUMERATED {n1,n2,n4} OPTIONAL,

scs-30kHz-120kHz-r16 ENUMERATED {n1,n2,n4} OPTIONAL,

scs-15kHz-30kHz-r16 ENUMERATED {n2} OPTIONAL,

scs-30kHz-60kHz-r16 ENUMERATED {n2} OPTIONAL,

scs-60kHz-120kHz-r16 ENUMERATED {n2} OPTIONAL

} OPTIONAL,

-- R1 16-2b-1: Support of single-DCI based SDM scheme

singleDCI-SDM-scheme-r16 ENUMERATED {supported} OPTIONAL

}

FeatureSetDownlink-v1700 ::= SEQUENCE {

-- R1 36-2: Scaling factor to be applied to 1024QAM for FR1

scalingFactor-1024QAM-FR1-r17 ENUMERATED {f0p4, f0p75, f0p8} OPTIONAL,

-- R1 24 feature for existing UE cap to include new SCS

timeDurationForQCL-v1710 SEQUENCE {

scs-480kHz ENUMERATED {s56, s112} OPTIONAL,

scs-960kHz ENUMERATED {s112, s224} OPTIONAL

} OPTIONAL,

-- R1 23-6-1 SFN scheme A (scheme 1) for PDSCH and PDCCH

sfn-SchemeA-r17 ENUMERATED {supported} OPTIONAL,

-- R1 23-6-1-1 SFN scheme A (scheme 1) for PDCCH only

sfn-SchemeA-PDCCH-only-r17 ENUMERATED {supported} OPTIONAL,

-- R1 23-6-1a Dynamic switching - scheme A

sfn-SchemeA-DynamicSwitching-r17 ENUMERATED {supported} OPTIONAL,

-- R1 23-6-1b SFN scheme A (scheme 1) for PDSCH only

sfn-SchemeA-PDSCH-only-r17 ENUMERATED {supported} OPTIONAL,

-- R1 23-6-2 SFN scheme B (TRP based pre-compensation) for PDSCH and PDCCH

sfn-SchemeB-r17 ENUMERATED {supported} OPTIONAL,

-- R1 23-6-2a Dynamic switching - scheme B

sfn-SchemeB-DynamicSwitching-r17 ENUMERATED {supported} OPTIONAL,

-- R1 23-6-2b SFN scheme B (TRP based pre-compensation) for PDSCH only

sfn-SchemeB-PDSCH-only-r17 ENUMERATED {supported} OPTIONAL,

-- R1 23-2-1d PDCCH repetition for Case 2 PDCCH monitoring with a span gap

mTRP-PDCCH-Case2-1SpanGap-r17 SEQUENCE {

scs-15kHz-r17 PDCCH-RepetitionParameters-r17 OPTIONAL,

scs-30kHz-r17 PDCCH-RepetitionParameters-r17 OPTIONAL,

scs-60kHz-r17 PDCCH-RepetitionParameters-r17 OPTIONAL,

scs-120kHz-r17 PDCCH-RepetitionParameters-r17 OPTIONAL

} OPTIONAL,

-- R1 23-2-1e PDCCH repetition for Rel-16 PDCCH monitoring

mTRP-PDCCH-legacyMonitoring-r17 SEQUENCE {

scs-15kHz-r17 PDCCH-RepetitionParameters-r17 OPTIONAL,

scs-30kHz-r17 PDCCH-RepetitionParameters-r17 OPTIONAL

} OPTIONAL,

-- R1 23-2-4 Simultaneous configuration of PDCCH repetition and multi-DCI based multi-TRP

mTRP-PDCCH-multiDCI-multiTRP-r17 ENUMERATED {supported} OPTIONAL,

-- R1 33-2: Dynamic scheduling for multicast for PCell

dynamicMulticastPCell-r17 ENUMERATED {supported} OPTIONAL,

-- R1 23-2-1 PDCCH repetition

mTRP-PDCCH-Repetition-r17 SEQUENCE {

numBD-twoPDCCH-r17 INTEGER (2..3),

maxNumOverlaps-r17 ENUMERATED {n1,n2,n3,n5,n10,n20,n40}

} OPTIONAL

}

PDCCH-MonitoringOccasions-r16 ::= SEQUENCE {

period7span3-r16 ENUMERATED {supported} OPTIONAL,

period4span3-r16 ENUMERATED {supported} OPTIONAL,

period2span2-r16 ENUMERATED {supported} OPTIONAL

}

PDCCH-RepetitionParameters-r17 ::= SEQUENCE {

supportedMode-r17 ENUMERATED {intra-span, inter-span, both},

limitX-PerCC-r17 ENUMERATED {n4, n8, n16, n32, n44, n64, nolimit} OPTIONAL,

limitX-AcrossCC-r17 ENUMERATED {n4, n8, n16, n32, n44, n64, n128, n256, n512, nolimit} OPTIONAL

}

DummyA ::= SEQUENCE {

maxNumberNZP-CSI-RS-PerCC INTEGER (1..32),

maxNumberPortsAcrossNZP-CSI-RS-PerCC ENUMERATED {p2, p4, p8, p12, p16, p24, p32, p40, p48, p56, p64, p72, p80,

p88, p96, p104, p112, p120, p128, p136, p144, p152, p160, p168,

p176, p184, p192, p200, p208, p216, p224, p232, p240, p248, p256},

maxNumberCS-IM-PerCC ENUMERATED {n1, n2, n4, n8, n16, n32},

maxNumberSimultaneousCSI-RS-ActBWP-AllCC ENUMERATED {n5, n6, n7, n8, n9, n10, n12, n14, n16, n18, n20, n22, n24, n26,

n28, n30, n32, n34, n36, n38, n40, n42, n44, n46, n48, n50, n52,

n54, n56, n58, n60, n62, n64},

totalNumberPortsSimultaneousCSI-RS-ActBWP-AllCC ENUMERATED {p8, p12, p16, p24, p32, p40, p48, p56, p64, p72, p80,

p88, p96, p104, p112, p120, p128, p136, p144, p152, p160, p168,

p176, p184, p192, p200, p208, p216, p224, p232, p240, p248, p256}

}

DummyB ::= SEQUENCE {

maxNumberTxPortsPerResource ENUMERATED {p2, p4, p8, p12, p16, p24, p32},

maxNumberResources INTEGER (1..64),

totalNumberTxPorts INTEGER (2..256),

supportedCodebookMode ENUMERATED {mode1, mode1AndMode2},

maxNumberCSI-RS-PerResourceSet INTEGER (1..8)

}

DummyC ::= SEQUENCE {

maxNumberTxPortsPerResource ENUMERATED {p8, p16, p32},

maxNumberResources INTEGER (1..64),

totalNumberTxPorts INTEGER (2..256),

supportedCodebookMode ENUMERATED {mode1, mode2, both},

supportedNumberPanels ENUMERATED {n2, n4},

maxNumberCSI-RS-PerResourceSet INTEGER (1..8)

}

DummyD ::= SEQUENCE {

maxNumberTxPortsPerResource ENUMERATED {p4, p8, p12, p16, p24, p32},

maxNumberResources INTEGER (1..64),

totalNumberTxPorts INTEGER (2..256),

parameterLx INTEGER (2..4),

amplitudeScalingType ENUMERATED {wideband, widebandAndSubband},

amplitudeSubsetRestriction ENUMERATED {supported} OPTIONAL,

maxNumberCSI-RS-PerResourceSet INTEGER (1..8)

}

DummyE ::= SEQUENCE {

maxNumberTxPortsPerResource ENUMERATED {p4, p8, p12, p16, p24, p32},

maxNumberResources INTEGER (1..64),

totalNumberTxPorts INTEGER (2..256),

parameterLx INTEGER (2..4),

amplitudeScalingType ENUMERATED {wideband, widebandAndSubband},

maxNumberCSI-RS-PerResourceSet INTEGER (1..8)

}

-- TAG-FEATURESETDOWNLINK-STOP

-- ASN1STOP

|  |
| --- |
| *FeatureSetDownlink* field descriptions |
| ***featureSetListPerDownlinkCC***  Indicates which features the UE supports on the individual DL carriers of the feature set (and hence of a band entry that refer to the feature set). The UE shall hence include at least as many *FeatureSetDownlinkPerCC-Id* in this list as the number of carriers it supports according to the *ca-BandwidthClassDL*, except if indicating additional functionality by reducing the number of *FeatureSetDownlinkPerCC-Id* in the feature set (see NOTE 1 in *FeatureSetCombination* IE description). The order of the elements in this list is not relevant, i.e., the network may configure any of the carriers in accordance with any of the *FeatureSetDownlinkPerCC-Id* in this list. |
| ***supportedSRS-Resources***  Indicates supported SRS resources for SRS carrier switching to the band associated with this *FeatureSetDownlink*. The UE is only allowed to set this field for a band with associated *FeatureSetUplinkId* set to 0. |

#### – *FeatureSetDownlinkId*

The IE *FeatureSetDownlinkId* identifies a downlink feature set. The *FeatureSetDownlinkId* of a *FeatureSetDownlink* is the index position of the *FeatureSetDownlink* in the *featureSetsDownlink* list in the *FeatureSets* IE. The first element in that list is referred to by *FeatureSetDownlinkId* = 1. The *FeatureSetDownlinkId=0* is not used by an actual *FeatureSetDownlink* but means that the UE does not support a carrier in this band of a band combination.

*FeatureSetDownlinkId* information element

-- ASN1START

-- TAG-FEATURESETDOWNLINKID-START

FeatureSetDownlinkId ::= INTEGER (0..maxDownlinkFeatureSets)

-- TAG-FEATURESETDOWNLINKID-STOP

-- ASN1STOP

#### – *FeatureSetDownlinkPerCC*

The IE *FeatureSetDownlinkPerCC* indicates a set of features that the UE supports on the corresponding carrier of one band entry of a band combination.

*FeatureSetDownlinkPerCC* information element

-- ASN1START

-- TAG-FEATURESETDOWNLINKPERCC-START

FeatureSetDownlinkPerCC ::= SEQUENCE {

supportedSubcarrierSpacingDL SubcarrierSpacing,

supportedBandwidthDL SupportedBandwidth,

channelBW-90mhz ENUMERATED {supported} OPTIONAL,

maxNumberMIMO-LayersPDSCH MIMO-LayersDL OPTIONAL,

supportedModulationOrderDL ModulationOrder OPTIONAL

}

FeatureSetDownlinkPerCC-v1620 ::= SEQUENCE {

-- R1 16-2a: Mulit-DCI based multi-TRP

multiDCI-MultiTRP-r16 MultiDCI-MultiTRP-r16 OPTIONAL,

-- R1 16-2b-3: Support of single-DCI based FDMSchemeB

supportFDM-SchemeB-r16 ENUMERATED {supported} OPTIONAL

}

FeatureSetDownlinkPerCC-v1700 ::= SEQUENCE {

supportedMinBandwidthDL-r17 SupportedBandwidth-v1700 OPTIONAL,

broadcastSCell-r17 ENUMERATED {supported} OPTIONAL,

-- R1 33-2g: MIMO layers for multicast PDSCH

maxNumberMIMO-LayersMulticastPDSCH-r17 ENUMERATED {n2, n4, n8} OPTIONAL,

-- R1 33-2h: Dynamic scheduling for multicast for SCell

dynamicMulticastSCell-r17 ENUMERATED {supported} OPTIONAL,

supportedBandwidthDL-v1710 SupportedBandwidth-v1700 OPTIONAL,

-- R4 24-1/24-2/24-3/24-4/24-5

supportedCRS-InterfMitigation-r17 CRS-InterfMitigation-r17 OPTIONAL

}

MultiDCI-MultiTRP-r16 ::= SEQUENCE {

maxNumberCORESET-r16 ENUMERATED {n2, n3, n4, n5},

maxNumberCORESETPerPoolIndex-r16 INTEGER (1..3),

maxNumberUnicastPDSCH-PerPool-r16 ENUMERATED {n1, n2, n3, n4, n7}

}

CRS-InterfMitigation-r17 ::= SEQUENCE {

-- R4 24-1 CRS-IM (Interference Mitigation) in DSS scenario

crs-IM-DSS-15kHzSCS-r17 ENUMERATED {supported} OPTIONAL,

-- R4 24-2 CRS-IM in non-DSS and 15 kHz NR SCS scenario, without the assistance of network signaling on LTE channel bandwidth

crs-IM-nonDSS-15kHzSCS-r17 ENUMERATED {supported} OPTIONAL,

-- R4 24-3 CRS-IM in non-DSS and 15 kHz NR SCS scenario, with the assistance of network signaling on LTE channel bandwidth

crs-IM-nonDSS-NWA-15kHzSCS-r17 ENUMERATED {supported} OPTIONAL,

-- R4 24-4 CRS-IM in non-DSS and 30 kHz NR SCS scenario, without the assistance of network signaling on LTE channel bandwidth

crs-IM-nonDSS-30kHzSCS-r17 ENUMERATED {supported} OPTIONAL,

-- R4 24-5 CRS-IM in non-DSS and 30 kHz NR SCS scenario, with the assistance of network signaling on LTE channel bandwidth

crs-IM-nonDSS-NWA-30kHzSCS-r17 ENUMERATED {supported} OPTIONAL

}

-- TAG-FEATURESETDOWNLINKPERCC-STOP

-- ASN1STOP

#### – *FeatureSetDownlinkPerCC-Id*

The IE *FeatureSetDownlinkPerCC-Id* identifies a set of features applicable to one carrier of a feature set. The *FeatureSetDownlinkPerCC-Id* of a *FeatureSetDownlinkPerCC* is the index position of the *FeatureSetDownlinkPerCC* in the *featureSetsDownlinkPerCC*. The first element in the list is referred to by *FeatureSetDownlinkPerCC-Id* = 1, and so on.

*FeatureSetDownlinkPerCC-Id* information element

-- ASN1START

-- TAG-FEATURESETDOWNLINKPERCC-ID-START

FeatureSetDownlinkPerCC-Id ::= INTEGER (1..maxPerCC-FeatureSets)

-- TAG-FEATURESETDOWNLINKPERCC-ID-STOP

-- ASN1STOP

#### – *FeatureSetEUTRA-DownlinkId*

The IE *FeatureSetEUTRA-DownlinkId* identifies a downlink feature set in E-UTRA list (see TS 36.331 [10]. The first element in that list is referred to by *FeatureSetEUTRA-DownlinkId* = 1. The *FeatureSetEUTRA-DownlinkId=0* is used when the UE does not support a carrier in this band of a band combination.

*FeatureSetEUTRA-DownlinkId* information element

-- ASN1START

-- TAG-FEATURESETEUTRADOWNLINKID-START

FeatureSetEUTRA-DownlinkId ::= INTEGER (0..maxEUTRA-DL-FeatureSets)

-- TAG-FEATURESETEUTRADOWNLINKID-STOP

-- ASN1STOP

#### – *FeatureSetEUTRA-UplinkId*

The IE *FeatureSetEUTRA-UplinkId* identifies an uplink feature set in E-UTRA list (see TS 36.331 [10]. The first element in that list is referred to by *FeatureSetEUTRA-UplinkId* = 1. The *FeatureSetEUTRA-UplinkId* *=0* is used when the UE does not support a carrier in this band of a band combination.

*FeatureSetEUTRA-UplinkId* information element

-- ASN1START

-- TAG-FEATURESETEUTRAUPLINKID-START

FeatureSetEUTRA-UplinkId ::= INTEGER (0..maxEUTRA-UL-FeatureSets)

-- TAG-FEATURESETEUTRAUPLINKID-STOP

-- ASN1STOP

#### – *FeatureSets*

The IE *FeatureSets* is used to provide pools of downlink and uplink features sets. A *FeatureSetCombination* refers to the IDs of the feature set(s) that the UE supports in that *FeatureSetCombination*. The *BandCombination* entries in the *BandCombinationList* then indicate the ID of the *FeatureSetCombination* that the UE supports for that band combination.

The entries in the lists in this IE are identified by their index position. For example, the *FeatureSetUplinkPerCC-Id* = 4 identifies the 4th element in the *featureSetsUplinkPerCC* list.

NOTE: When feature sets (per CC) IEs require extension in future versions of the specification, new versions of the *FeatureSetDownlink*, *FeatureSetUplink*, *FeatureSets*, *FeatureSetDownlinkPerCC* and/or *FeatureSetUplinkPerCC* will be created and instantiated in corresponding new lists in the *FeatureSets* IE. For example, if new capability bits are to be added to the *FeatureSetDownlink*, they will instead be defined in a new *FeatureSetDownlink-rxy* which will be instantiated in a new *featureSetDownlinkList-rxy* list. If a UE indicates in a *FeatureSetCombination* that it supports the *FeatureSetDownlink* with ID #5, it implies that it supports both the features in *FeatureSetDownlink* #5 and *FeatureSetDownlink-rxy* #5 (if present). The number of entries in the new list(s) shall be the same as in the original list(s).

*FeatureSets* information element

-- ASN1START

-- TAG-FEATURESETS-START

FeatureSets ::= SEQUENCE {

featureSetsDownlink SEQUENCE (SIZE (1..maxDownlinkFeatureSets)) OF FeatureSetDownlink OPTIONAL,

featureSetsDownlinkPerCC SEQUENCE (SIZE (1..maxPerCC-FeatureSets)) OF FeatureSetDownlinkPerCC OPTIONAL,

featureSetsUplink SEQUENCE (SIZE (1..maxUplinkFeatureSets)) OF FeatureSetUplink OPTIONAL,

featureSetsUplinkPerCC SEQUENCE (SIZE (1..maxPerCC-FeatureSets)) OF FeatureSetUplinkPerCC OPTIONAL,

...,

[[

featureSetsDownlink-v1540 SEQUENCE (SIZE (1..maxDownlinkFeatureSets)) OF FeatureSetDownlink-v1540 OPTIONAL,

featureSetsUplink-v1540 SEQUENCE (SIZE (1..maxUplinkFeatureSets)) OF FeatureSetUplink-v1540 OPTIONAL,

featureSetsUplinkPerCC-v1540 SEQUENCE (SIZE (1..maxPerCC-FeatureSets)) OF FeatureSetUplinkPerCC-v1540 OPTIONAL

]],

[[

featureSetsDownlink-v15a0 SEQUENCE (SIZE (1..maxDownlinkFeatureSets)) OF FeatureSetDownlink-v15a0 OPTIONAL

]],

[[

featureSetsDownlink-v1610 SEQUENCE (SIZE (1..maxDownlinkFeatureSets)) OF FeatureSetDownlink-v1610 OPTIONAL,

featureSetsUplink-v1610 SEQUENCE (SIZE (1..maxUplinkFeatureSets)) OF FeatureSetUplink-v1610 OPTIONAL,

featureSetDownlinkPerCC-v1620 SEQUENCE (SIZE (1..maxPerCC-FeatureSets)) OF FeatureSetDownlinkPerCC-v1620 OPTIONAL

]],

[[

featureSetsUplink-v1630 SEQUENCE (SIZE (1..maxUplinkFeatureSets)) OF FeatureSetUplink-v1630 OPTIONAL

]],

[[

featureSetsUplink-v1640 SEQUENCE (SIZE (1..maxUplinkFeatureSets)) OF FeatureSetUplink-v1640 OPTIONAL

]],

[[

featureSetsDownlink-v1700 SEQUENCE (SIZE (1..maxDownlinkFeatureSets)) OF FeatureSetDownlink-v1700 OPTIONAL,

featureSetsDownlinkPerCC-v1700 SEQUENCE (SIZE (1..maxPerCC-FeatureSets)) OF FeatureSetDownlinkPerCC-v1700 OPTIONAL,

featureSetsUplink-v1710 SEQUENCE (SIZE (1..maxUplinkFeatureSets)) OF FeatureSetUplink-v1710 OPTIONAL,

featureSetsUplinkPerCC-v1700 SEQUENCE (SIZE (1..maxPerCC-FeatureSets)) OF FeatureSetUplinkPerCC-v1700 OPTIONAL

]]

}

-- TAG-FEATURESETS-STOP

-- ASN1STOP

#### – *FeatureSetUplink*

The IE *FeatureSetUplink* is used to indicate the features that the UE supports on the carriers corresponding to one band entry in a band combination.

*FeatureSetUplink* information element

-- ASN1START

-- TAG-FEATURESETUPLINK-START

FeatureSetUplink ::= SEQUENCE {

featureSetListPerUplinkCC SEQUENCE (SIZE (1.. maxNrofServingCells)) OF FeatureSetUplinkPerCC-Id,

scalingFactor ENUMERATED {f0p4, f0p75, f0p8} OPTIONAL,

dummy3 ENUMERATED {supported} OPTIONAL,

intraBandFreqSeparationUL FreqSeparationClass OPTIONAL,

searchSpaceSharingCA-UL ENUMERATED {supported} OPTIONAL,

dummy1 DummyI OPTIONAL,

supportedSRS-Resources SRS-Resources OPTIONAL,

twoPUCCH-Group ENUMERATED {supported} OPTIONAL,

dynamicSwitchSUL ENUMERATED {supported} OPTIONAL,

simultaneousTxSUL-NonSUL ENUMERATED {supported} OPTIONAL,

pusch-ProcessingType1-DifferentTB-PerSlot SEQUENCE {

scs-15kHz ENUMERATED {upto2, upto4, upto7} OPTIONAL,

scs-30kHz ENUMERATED {upto2, upto4, upto7} OPTIONAL,

scs-60kHz ENUMERATED {upto2, upto4, upto7} OPTIONAL,

scs-120kHz ENUMERATED {upto2, upto4, upto7} OPTIONAL

} OPTIONAL,

dummy2 DummyF OPTIONAL

}

FeatureSetUplink-v1540 ::= SEQUENCE {

zeroSlotOffsetAperiodicSRS ENUMERATED {supported} OPTIONAL,

pa-PhaseDiscontinuityImpacts ENUMERATED {supported} OPTIONAL,

pusch-SeparationWithGap ENUMERATED {supported} OPTIONAL,

pusch-ProcessingType2 SEQUENCE {

scs-15kHz ProcessingParameters OPTIONAL,

scs-30kHz ProcessingParameters OPTIONAL,

scs-60kHz ProcessingParameters OPTIONAL

} OPTIONAL,

ul-MCS-TableAlt-DynamicIndication ENUMERATED {supported} OPTIONAL

}

FeatureSetUplink-v1610 ::= SEQUENCE {

-- R1 11-5: PUsCH repetition Type B

pusch-RepetitionTypeB-r16 SEQUENCE {

maxNumberPUSCH-Tx-r16 ENUMERATED {n2, n3, n4, n7, n8, n12},

hoppingScheme-r16 ENUMERATED {interSlotHopping, interRepetitionHopping, both}

} OPTIONAL,

-- R1 11-7: UL cancelation scheme for self-carrier

ul-CancellationSelfCarrier-r16 ENUMERATED {supported} OPTIONAL,

-- R1 11-7a: UL cancelation scheme for cross-carrier

ul-CancellationCrossCarrier-r16 ENUMERATED {supported} OPTIONAL,

-- R1 16-5c: The maximum number of SRS resources in one SRS resource set with usage set to 'codebook' for Mode 2

ul-FullPwrMode2-MaxSRS-ResInSet-r16 ENUMERATED {n1, n2, n4} OPTIONAL,

-- R1 22-4a/4b/4c/4d: CBG based transmission for UL with unicast PUSCH(s) per slot per CC with UE processing time Capability 1

cbgPUSCH-ProcessingType1-DifferentTB-PerSlot-r16 SEQUENCE {

scs-15kHz-r16 ENUMERATED {one-pusch, upto2, upto4, upto7} OPTIONAL,

scs-30kHz-r16 ENUMERATED {one-pusch, upto2, upto4, upto7} OPTIONAL,

scs-60kHz-r16 ENUMERATED {one-pusch, upto2, upto4, upto7} OPTIONAL,

scs-120kHz-r16 ENUMERATED {one-pusch, upto2, upto4, upto7} OPTIONAL

} OPTIONAL,

-- R1 22-3a/3b/3c/3d: CBG based transmission for UL with unicast PUSCH(s) per slot per CC with UE processing time Capability 2

cbgPUSCH-ProcessingType2-DifferentTB-PerSlot-r16 SEQUENCE {

scs-15kHz-r16 ENUMERATED {one-pusch, upto2, upto4, upto7} OPTIONAL,

scs-30kHz-r16 ENUMERATED {one-pusch, upto2, upto4, upto7} OPTIONAL,

scs-60kHz-r16 ENUMERATED {one-pusch, upto2, upto4, upto7} OPTIONAL,

scs-120kHz-r16 ENUMERATED {one-pusch, upto2, upto4, upto7} OPTIONAL

} OPTIONAL,

supportedSRS-PosResources-r16 SRS-AllPosResources-r16 OPTIONAL,

intraFreqDAPS-UL-r16 SEQUENCE {

dummy ENUMERATED {supported} OPTIONAL,

intraFreqTwoTAGs-DAPS-r16 ENUMERATED {supported} OPTIONAL,

dummy1 ENUMERATED {supported} OPTIONAL,

dummy2 ENUMERATED {supported} OPTIONAL,

dummy3 ENUMERATED {short, long} OPTIONAL

} OPTIONAL,

intraBandFreqSeparationUL-v1620 FreqSeparationClassUL-v1620 OPTIONAL,

-- R1 11-3: More than one PUCCH for HARQ-ACK transmission within a slot

multiPUCCH-r16 SEQUENCE {

sub-SlotConfig-NCP-r16 ENUMERATED {set1, set2} OPTIONAL,

sub-SlotConfig-ECP-r16 ENUMERATED {set1, set2} OPTIONAL

} OPTIONAL,

-- R1 11-3c: 2 PUCCH of format 0 or 2 for a single 7\*2-symbol subslot based HARQ-ACK codebook

twoPUCCH-Type1-r16 ENUMERATED {supported} OPTIONAL,

-- R1 11-3d: 2 PUCCH of format 0 or 2 for a single 2\*7-symbol subslot based HARQ-ACK codebook

twoPUCCH-Type2-r16 ENUMERATED {supported} OPTIONAL,

-- R1 11-3e: 1 PUCCH format 0 or 2 and 1 PUCCH format 1, 3 or 4 in the same subslot for a single 2\*7-symbol HARQ-ACK codebooks

twoPUCCH-Type3-r16 ENUMERATED {supported} OPTIONAL,

-- R1 11-3f: 2 PUCCH transmissions in the same subslot for a single 2\*7-symbol HARQ-ACK codebooks which are not covered by 11-3d and

-- 11-3e

twoPUCCH-Type4-r16 ENUMERATED {supported} OPTIONAL,

-- R1 11-3g: SR/HARQ-ACK multiplexing once per subslot using a PUCCH (or HARQ-ACK piggybacked on a PUSCH) when SR/HARQ-ACK

-- are supposed to be sent with different starting symbols in a subslot

mux-SR-HARQ-ACK-r16 ENUMERATED {supported} OPTIONAL,

dummy1 ENUMERATED {supported} OPTIONAL,

dummy2 ENUMERATED {supported} OPTIONAL,

-- R1 11-4c: 2 PUCCH of format 0 or 2 for two HARQ-ACK codebooks with one 7\*2-symbol sub-slot based HARQ-ACK codebook

twoPUCCH-Type5-r16 ENUMERATED {supported} OPTIONAL,

-- R1 11-4d: 2 PUCCH of format 0 or 2 in consecutive symbols for two HARQ-ACK codebooks with one 2\*7-symbol sub-slot based HARQ-ACK

-- codebook

twoPUCCH-Type6-r16 ENUMERATED {supported} OPTIONAL,

-- R1 11-4e: 2 PUCCH of format 0 or 2 for two subslot based HARQ-ACK codebooks

twoPUCCH-Type7-r16 ENUMERATED {supported} OPTIONAL,

-- R1 11-4f: 1 PUCCH format 0 or 2 and 1 PUCCH format 1, 3 or 4 in the same subslot for HARQ-ACK codebooks with one 2\*7-symbol

-- subslot based HARQ-ACK codebook

twoPUCCH-Type8-r16 ENUMERATED {supported} OPTIONAL,

-- R1 11-4g: 1 PUCCH format 0 or 2 and 1 PUCCH format 1, 3 or 4 in the same subslot for two subslot based HARQ-ACK codebooks

twoPUCCH-Type9-r16 ENUMERATED {supported} OPTIONAL,

-- R1 11-4h: 2 PUCCH transmissions in the same subslot for two HARQ-ACK codebooks with one 2\*7-symbol subslot which are not covered

-- by 11-4c and 11-4e

twoPUCCH-Type10-r16 ENUMERATED {supported} OPTIONAL,

-- R1 11-4i: 2 PUCCH transmissions in the same subslot for two subslot based HARQ-ACK codebooks which are not covered by 11-4d and

-- 11-4f

twoPUCCH-Type11-r16 ENUMERATED {supported} OPTIONAL,

-- R1 12-1: UL intra-UE multiplexing/prioritization of overlapping channel/signals with two priority levels in physical layer

ul-IntraUE-Mux-r16 SEQUENCE {

pusch-PreparationLowPriority-r16 ENUMERATED {sym0, sym1, sym2},

pusch-PreparationHighPriority-r16 ENUMERATED {sym0, sym1, sym2}

} OPTIONAL,

-- R1 16-5a: Supported UL full power transmission mode of fullpower

ul-FullPwrMode-r16 ENUMERATED {supported} OPTIONAL,

-- R1 18-5d: Processing up to X unicast DCI scheduling for UL per scheduled CC

crossCarrierSchedulingProcessing-DiffSCS-r16 SEQUENCE {

scs-15kHz-120kHz-r16 ENUMERATED {n1,n2,n4} OPTIONAL,

scs-15kHz-60kHz-r16 ENUMERATED {n1,n2,n4} OPTIONAL,

scs-30kHz-120kHz-r16 ENUMERATED {n1,n2,n4} OPTIONAL,

scs-15kHz-30kHz-r16 ENUMERATED {n2} OPTIONAL,

scs-30kHz-60kHz-r16 ENUMERATED {n2} OPTIONAL,

scs-60kHz-120kHz-r16 ENUMERATED {n2} OPTIONAL

} OPTIONAL,

-- R1 16-5b: Supported UL full power transmission mode of fullpowerMode1

ul-FullPwrMode1-r16 ENUMERATED {supported} OPTIONAL,

-- R1 16-5c-2: Ports configuration for Mode 2

ul-FullPwrMode2-SRSConfig-diffNumSRSPorts-r16 ENUMERATED {p1-2, p1-4, p1-2-4} OPTIONAL,

-- R1 16-5c-3: TPMI group for Mode 2

ul-FullPwrMode2-TPMIGroup-r16 SEQUENCE {

twoPorts-r16 BIT STRING(SIZE(2)) OPTIONAL,

fourPortsNonCoherent-r16 ENUMERATED{g0, g1, g2, g3} OPTIONAL,

fourPortsPartialCoherent-r16 ENUMERATED{g0, g1, g2, g3, g4, g5, g6} OPTIONAL

} OPTIONAL

}

FeatureSetUplink-v1630 ::= SEQUENCE {

-- R1 22-8: For SRS for CB PUSCH and antenna switching on FR1 with symbol level offset for aperiodic SRS transmission

offsetSRS-CB-PUSCH-Ant-Switch-fr1-r16 ENUMERATED {supported} OPTIONAL,

-- R1 22-8a: PDCCH monitoring on any span of up to 3 consecutive OFDM symbols of a slot and constrained timeline for SRS for CB

-- PUSCH and antenna switching on FR1

offsetSRS-CB-PUSCH-PDCCH-MonitorSingleOcc-fr1-r16 ENUMERATED {supported} OPTIONAL,

-- R1 22-8b: For type 1 CSS with dedicated RRC configuration, type 3 CSS, and UE-SS, monitoring occasion can be any OFDM symbol(s)

-- of a slot for Case 2 and constrained timeline for SRS for CB PUSCH and antenna switching on FR1

offsetSRS-CB-PUSCH-PDCCH-MonitorAnyOccWithoutGap-fr1-r16 ENUMERATED {supported} OPTIONAL,

-- R1 22-8c: For type 1 CSS with dedicated RRC configuration, type 3 CSS, and UE-SS, monitoring occasion can be any OFDM symbol(s)

-- of a slot for Case 2 with a DCI gap and constrained timeline for SRS for CB PUSCH and antenna switching on FR1

offsetSRS-CB-PUSCH-PDCCH-MonitorAnyOccWithGap-fr1-r16 ENUMERATED {supported} OPTIONAL,

dummy ENUMERATED {supported} OPTIONAL,

-- R1 22-9: Cancellation of PUCCH, PUSCH or PRACH with a DCI scheduling a PDSCH or CSI-RS or a DCI format 2\_0 for SFI

partialCancellationPUCCH-PUSCH-PRACH-TX-r16 ENUMERATED {supported} OPTIONAL

}

FeatureSetUplink-v1640 ::= SEQUENCE {

-- R1 11-4: Two HARQ-ACK codebooks with up to one sub-slot based HARQ-ACK codebook (i.e. slot-based + slot-based, or slot-based +

-- sub-slot based) simultaneously constructed for supporting HARQ-ACK codebooks with different priorities at a UE

twoHARQ-ACK-Codebook-type1-r16 SubSlot-Config-r16 OPTIONAL,

-- R1 11-4a: Two sub-slot based HARQ-ACK codebooks simultaneously constructed for supporting HARQ-ACK codebooks with different

-- priorities at a UE

twoHARQ-ACK-Codebook-type2-r16 SubSlot-Config-r16 OPTIONAL,

-- R1 22-8d: All PDCCH monitoring occasion can be any OFDM symbol(s) of a slot for Case 2 with a span gap and constrained timeline

-- for SRS for CB PUSCH and antenna switching on FR1

offsetSRS-CB-PUSCH-PDCCH-MonitorAnyOccWithSpanGap-fr1-r16 SEQUENCE {

scs-15kHz-r16 ENUMERATED {set1, set2, set3} OPTIONAL,

scs-30kHz-r16 ENUMERATED {set1, set2, set3} OPTIONAL,

scs-60kHz-r16 ENUMERATED {set1, set2, set3} OPTIONAL

} OPTIONAL

}

FeatureSetUplink-v1710 ::= SEQUENCE {

-- R1 23-3-1 Multi-TRP PUSCH repetition (type A) -codebook based

mTRP-PUSCH-TypeA-CB-r17 ENUMERATED {n1,n2,n4} OPTIONAL,

-- R1 23-3-1-2 Multi-TRP PUSCH repetition (type A) - non-codebook based

mTRP-PUSCH-RepetitionTypeA-r17 ENUMERATED {n1,n2,n3,n4} OPTIONAL,

-- R1 23-3-3 Multi-TRP PUCCH repetition-intra-slot

mTRP-PUCCH-IntraSlot-r17 ENUMERATED {pf0-2, pf1-3-4, pf0-4} OPTIONAL,

-- R1 23-8-4 Maximum 2 SP and 1 periodic SRS sets for antenna switching

srs-AntennaSwitching2SP-1Periodic-r17 ENUMERATED {supported} OPTIONAL,

-- R1 23-8-9 Extension of aperiodic SRS configuration for 1T4R, 1T2R and 2T4R

srs-ExtensionAperiodicSRS-r17 ENUMERATED {supported} OPTIONAL,

-- R1 23-8-10 1 aperiodic SRS resource set for 1T4R

srs-OneAP-SRS-r17 ENUMERATED {supported} OPTIONAL,

-- R4 16-8 UE power class per band per band combination

ue-PowerClassPerBandPerBC-r17 ENUMERATED {pc1dot5, pc2, pc3} OPTIONAL,

-- R4 17-8 UL transmission in FR2 bands within an UL gap when the UL gap is activated

tx-Support-UL-GapFR2-r17 ENUMERATED {supported} OPTIONAL

}

SubSlot-Config-r16 ::= SEQUENCE {

sub-SlotConfig-NCP-r16 ENUMERATED {n4,n5,n6,n7} OPTIONAL,

sub-SlotConfig-ECP-r16 ENUMERATED {n4,n5,n6} OPTIONAL

}

SRS-AllPosResources-r16 ::= SEQUENCE {

srs-PosResources-r16 SRS-PosResources-r16,

srs-PosResourceAP-r16 SRS-PosResourceAP-r16 OPTIONAL,

srs-PosResourceSP-r16 SRS-PosResourceSP-r16 OPTIONAL

}

SRS-PosResources-r16 ::= SEQUENCE {

maxNumberSRS-PosResourceSetPerBWP-r16 ENUMERATED {n1, n2, n4, n8, n12, n16},

maxNumberSRS-PosResourcesPerBWP-r16 ENUMERATED {n1, n2, n4, n8, n16, n32, n64},

maxNumberSRS-ResourcesPerBWP-PerSlot-r16 ENUMERATED {n1, n2, n3, n4, n5, n6, n8, n10, n12, n14},

maxNumberPeriodicSRS-PosResourcesPerBWP-r16 ENUMERATED {n1, n2, n4, n8, n16, n32, n64},

maxNumberPeriodicSRS-PosResourcesPerBWP-PerSlot-r16 ENUMERATED {n1, n2, n3, n4, n5, n6, n8, n10, n12, n14}

}

SRS-PosResourceAP-r16 ::= SEQUENCE {

maxNumberAP-SRS-PosResourcesPerBWP-r16 ENUMERATED {n1, n2, n4, n8, n16, n32, n64},

maxNumberAP-SRS-PosResourcesPerBWP-PerSlot-r16 ENUMERATED {n1, n2, n3, n4, n5, n6, n8, n10, n12, n14}

}

SRS-PosResourceSP-r16 ::= SEQUENCE {

maxNumberSP-SRS-PosResourcesPerBWP-r16 ENUMERATED {n1, n2, n4, n8, n16, n32, n64},

maxNumberSP-SRS-PosResourcesPerBWP-PerSlot-r16 ENUMERATED {n1, n2, n3, n4, n5, n6, n8, n10, n12, n14}

}

SRS-Resources ::= SEQUENCE {

maxNumberAperiodicSRS-PerBWP ENUMERATED {n1, n2, n4, n8, n16},

maxNumberAperiodicSRS-PerBWP-PerSlot INTEGER (1..6),

maxNumberPeriodicSRS-PerBWP ENUMERATED {n1, n2, n4, n8, n16},

maxNumberPeriodicSRS-PerBWP-PerSlot INTEGER (1..6),

maxNumberSemiPersistentSRS-PerBWP ENUMERATED {n1, n2, n4, n8, n16},

maxNumberSemiPersistentSRS-PerBWP-PerSlot INTEGER (1..6),

maxNumberSRS-Ports-PerResource ENUMERATED {n1, n2, n4}

}

DummyF ::= SEQUENCE {

maxNumberPeriodicCSI-ReportPerBWP INTEGER (1..4),

maxNumberAperiodicCSI-ReportPerBWP INTEGER (1..4),

maxNumberSemiPersistentCSI-ReportPerBWP INTEGER (0..4),

simultaneousCSI-ReportsAllCC INTEGER (5..32)

}

-- TAG-FEATURESETUPLINK-STOP

-- ASN1STOP

|  |
| --- |
| *FeatureSetUplink* field descriptions |
| ***featureSetListPerUplinkCC***  Indicates which features the UE supports on the individual UL carriers of the feature set (and hence of a band entry that refers to the feature set). The UE shall hence include at least as many *FeatureSetUplinkPerCC-Id* in this list as the number of carriers it supports according to the *ca-BandwidthClassUL*, except if indicating additional functionality by reducing the number of *FeatureSetUplinkPerCC-Id* in the feature set (see NOTE 1 in *FeatureSetCombination* IE description). The order of the elements in this list is not relevant, i.e., the network may configure any of the carriers in accordance with any of the *FeatureSetUplinkPerCC-Id* in this list. |

#### – *FeatureSetUplinkId*

The IE *FeatureSetUplinkId* identifies an uplink feature set. The *FeatureSetUplinkId* of a *FeatureSetUplink* is the index position of the *FeatureSetUplink* in the *featureSetsUplink* list in the *FeatureSets* IE. The first element in the list is referred to by *FeatureSetUplinkId* = 1, and so on. The *FeatureSetUplinkId =0* is not used by an actual *FeatureSetUplink* but means that the UE does not support a carrier in this band of a band combination.

*FeatureSetUplinkId* information element

-- ASN1START

-- TAG-FEATURESETUPLINKID-START

FeatureSetUplinkId ::= INTEGER (0..maxUplinkFeatureSets)

-- TAG-FEATURESETUPLINKID-STOP

-- ASN1STOP

#### – *FeatureSetUplinkPerCC*

The IE *FeatureSetUplinkPerCC* indicates a set of features that the UE supports on the corresponding carrier of one band entry of a band combination.

*FeatureSetUplinkPerCC* information element

-- ASN1START

-- TAG-FEATURESETUPLINKPERCC-START

FeatureSetUplinkPerCC ::= SEQUENCE {

supportedSubcarrierSpacingUL SubcarrierSpacing,

supportedBandwidthUL SupportedBandwidth,

channelBW-90mhz ENUMERATED {supported} OPTIONAL,

mimo-CB-PUSCH SEQUENCE {

maxNumberMIMO-LayersCB-PUSCH MIMO-LayersUL OPTIONAL,

maxNumberSRS-ResourcePerSet INTEGER (1..2)

} OPTIONAL,

maxNumberMIMO-LayersNonCB-PUSCH MIMO-LayersUL OPTIONAL,

supportedModulationOrderUL ModulationOrder OPTIONAL

}

FeatureSetUplinkPerCC-v1540 ::= SEQUENCE {

mimo-NonCB-PUSCH SEQUENCE {

maxNumberSRS-ResourcePerSet INTEGER (1..4),

maxNumberSimultaneousSRS-ResourceTx INTEGER (1..4)

} OPTIONAL

}

FeatureSetUplinkPerCC-v1700 ::= SEQUENCE {

supportedMinBandwidthUL-r17 SupportedBandwidth-v1700 OPTIONAL,

-- R1 23-3-1-3 FeMIMO: Multi-TRP PUSCH repetition (type B) – non-codebook based

mTRP-PUSCH-RepetitionTypeB-r17 ENUMERATED {n1,n2,n3,n4} OPTIONAL,

-- R1 23-3-1-1 -codebook based Multi-TRP PUSCH repetition (type B)

mTRP-PUSCH-TypeB-CB-r17 ENUMERATED {n1,n2,n4} OPTIONAL,

supportedBandwidthUL-v1710 SupportedBandwidth-v1700 OPTIONAL

}

-- TAG-FEATURESETUPLINKPERCC-STOP

-- ASN1STOP

#### – *FeatureSetUplinkPerCC-Id*

The IE *FeatureSetUplinkPerCC-Id* identifies a set of features applicable to one carrier of a feature set. The *FeatureSetUplinkPerCC-Id* of a *FeatureSetUplinkPerCC* is the index position of the *FeatureSetUplinkPerCC* in the *featureSetsUplinkPerCC*. The first element in the list is referred to by *FeatureSetUplinkPerCC-Id* = 1, and so on.

*FeatureSetUplinkPerCC-Id* information element

-- ASN1START

-- TAG-FEATURESETUPLINKPERCC-ID-START

FeatureSetUplinkPerCC-Id ::= INTEGER (1..maxPerCC-FeatureSets)

-- TAG-FEATURESETUPLINKPERCC-ID-STOP

-- ASN1STOP

#### – *FreqBandIndicatorEUTRA*

-- ASN1START

-- TAG-FREQBANDINDICATOREUTRA-START

FreqBandIndicatorEUTRA ::= INTEGER (1..maxBandsEUTRA)

-- TAG-FREQBANDINDICATOREUTRA-STOP

-- ASN1STOP

#### – *FreqBandList*

The IE *FreqBandList* is used by the network to request NR CA, NR non-CA and/or MR-DC band combinations for specific NR and/or E-UTRA frequency bands and/or up to a specific number of carriers and/or up to specific aggregated bandwidth. This is also used to request feature sets (for NR) and feature set combinations (for NR and MR-DC). For NR sidelink communication, this is used by the initiating UE to request sidelink UE radio access capabilities from the peer UE.

*FreqBandList* information element

-- ASN1START

-- TAG-FREQBANDLIST-START

FreqBandList ::= SEQUENCE (SIZE (1..maxBandsMRDC)) OF FreqBandInformation

FreqBandInformation ::= CHOICE {

bandInformationEUTRA FreqBandInformationEUTRA,

bandInformationNR FreqBandInformationNR

}

FreqBandInformationEUTRA ::= SEQUENCE {

bandEUTRA FreqBandIndicatorEUTRA,

ca-BandwidthClassDL-EUTRA CA-BandwidthClassEUTRA OPTIONAL, -- Need N

ca-BandwidthClassUL-EUTRA CA-BandwidthClassEUTRA OPTIONAL -- Need N

}

FreqBandInformationNR ::= SEQUENCE {

bandNR FreqBandIndicatorNR,

maxBandwidthRequestedDL AggregatedBandwidth OPTIONAL, -- Need N

maxBandwidthRequestedUL AggregatedBandwidth OPTIONAL, -- Need N

maxCarriersRequestedDL INTEGER (1..maxNrofServingCells) OPTIONAL, -- Need N

maxCarriersRequestedUL INTEGER (1..maxNrofServingCells) OPTIONAL -- Need N

}

AggregatedBandwidth ::= ENUMERATED {mhz50, mhz100, mhz150, mhz200, mhz250, mhz300, mhz350,

mhz400, mhz450, mhz500, mhz550, mhz600, mhz650, mhz700, mhz750, mhz800}

-- TAG-FREQBANDLIST-STOP

-- ASN1STOP

#### – *FreqSeparationClass*

The IE *FreqSeparationClas*s is used for an intra-band non-contiguous CA band combination to indicate frequency separation between lower edge of lowest CC and upper edge of highest CC in a frequency band.

*FreqSeparationClass* information element

-- ASN1START

-- TAG-FREQSEPARATIONCLASS-START

FreqSeparationClass ::= ENUMERATED { mhz800, mhz1200, mhz1400, ..., mhz400-v1650, mhz600-v1650}

FreqSeparationClassDL-v1620 ::= ENUMERATED {mhz1000, mhz1600, mhz1800, mhz2000, mhz2200, mhz2400}

FreqSeparationClassUL-v1620 ::= ENUMERATED {mhz1000}

-- TAG-FREQSEPARATIONCLASS-STOP

-- ASN1STOP

#### *– FreqSeparationClassDL-Only*

The IE *FreqSeparationClassDL-Only* is used to indicate the frequency separation between lower edge of lowest CC and upper edge of highest CC of DL only frequency spectrum in a frequency band.

*FreqSeparationClassDL-Only* information element

-- ASN1START

-- TAG-FREQSEPARATIONCLASSDL-Only-START

FreqSeparationClassDL-Only-r16 ::= ENUMERATED {mhz200, mhz400, mhz600, mhz800, mhz1000, mhz1200}

-- TAG-FREQSEPARATIONCLASSDL-Only-STOP

-- ASN1STOP

#### – FR2-2-AccessParamsPerBand

The IE *FR2-2-AccessParamsPerBand* is used to convey FR2-2 related parameters specific for a certain frequency band (not per feature set or band combination).

FR2-2-AccessParamsPerBand information element

-- ASN1START

-- TAG-FR2-2-ACCESSPARAMSPERBAND-START

FR2-2-AccessParamsPerBand-r17 ::= SEQUENCE {

-- R1 24-1: Basic FR2-2 DL support

dl-FR2-2-SCS-120kHz-r17 ENUMERATED {supported} OPTIONAL,

-- R1 24-1a: Basic FR2-2 UL support

ul-FR2-2-SCS-120kHz-r17 ENUMERATED {supported} OPTIONAL,

-- R1 24-2: 120KHz SSB support for initial access in FR2-2

initialAccessSSB-120kHz-r17 ENUMERATED {supported} OPTIONAL,

-- R1 24-1b: Wideband PRACH for 120 kHz in FR2-2

widebandPRACH-SCS-120kHz-r17 ENUMERATED {supported} OPTIONAL,

-- R1 24-1c: Multi-RB support PUCCH format 0/1/4 for 120 kHz in FR2-2

multiRB-PUCCH-SCS-120kHz-r17 ENUMERATED {supported} OPTIONAL,

-- R1 24-1d: Multiple PDSCH scheduling by single DCI for 120kHz in FR2-2

multiPDSCH-SingleDCI-FR2-2-SCS-120kHz-r17 ENUMERATED {supported} OPTIONAL,

-- R1 24-1e: Multiple PUSCH scheduling by single DCI for 120kHz in FR2-2

multiPUSCH-SingleDCI-FR2-2-SCS-120kHz-r17 ENUMERATED {supported} OPTIONAL,

-- R1 24-4: 480KHz SCS support for DL

dl-FR2-2-SCS-480kHz-r17 ENUMERATED {supported} OPTIONAL,

-- R1 24-4a: 480KHz SCS support for UL

ul-FR2-2-SCS-480kHz-r17 ENUMERATED {supported} OPTIONAL,

-- R1 24-3: 480KHz SSB support for initial access in FR2-2

initialAccessSSB-480kHz-r17 ENUMERATED {supported} OPTIONAL,

-- R1 24-4b: Wideband PRACH for 480 kHz in FR2-2

widebandPRACH-SCS-480kHz-r17 ENUMERATED {supported} OPTIONAL,

-- R1 24-4c: Multi-RB support PUCCH format 0/1/4 for 480 kHz in FR2-2

multiRB-PUCCH-SCS-480kHz-r17 ENUMERATED {supported} OPTIONAL,

-- R1 24-4f: Enhanced PDCCH monitoring for 480KHz in FR2-2

enhancedPDCCH-monitoringSCS-480kHz-r17 ENUMERATED {supported} OPTIONAL,

-- R1 24-5: 960KHz SCS support for DL

dl-FR2-2-SCS-960kHz-r17 ENUMERATED {supported} OPTIONAL,

-- R1 24-5a: 960KHz SCS support for UL

ul-FR2-2-SCS-960kHz-r17 ENUMERATED {supported} OPTIONAL,

-- R1 24-5c: Multi-RB support PUCCH format 0/1/4 for 960 kHz in FR2-2

multiRB-PUCCH-SCS-960kHz-r17 ENUMERATED {supported} OPTIONAL,

-- R1 24-5f: Enhanced PDCCH monitoring for 960KHz in FR2-2

enhancedPDCCH-monitoringSCS-960kHz-r17 SEQUENCE {

pdcch-monitoring4-1-r17 ENUMERATED {supported} OPTIONAL,

pdcch-monitoring4-2-r17 ENUMERATED {supported} OPTIONAL,

pdcch-monitoring8-4-r17 ENUMERATED {supported} OPTIONAL

} OPTIONAL,

-- R1 24-6: Type 1 channel access procedure in uplink for FR2-2 with shared spectrum channel access

type1-ChannelAccess-FR2-2-r17 ENUMERATED {supported} OPTIONAL,

-- R1 24-7: Type 2 channel access procedure in uplink for FR2-2 with shared spectrum channel access

type2-ChannelAccess-FR2-2-r17 ENUMERATED {supported} OPTIONAL,

-- R1 24-10: Reduced beam switching time delay

reduced-BeamSwitchTiming-FR2-2-r17 ENUMERATED {supported} OPTIONAL,

-- R1 24-8: 32 DL HARQ processes for FR 2-2

support32-DL-HARQ-ProcessPerSCS-r17 SEQUENCE {

scs-120kHz-r17 ENUMERATED {supported} OPTIONAL,

scs-480kHz-r17 ENUMERATED {supported} OPTIONAL,

scs-960kHz-r17 ENUMERATED {supported} OPTIONAL

} OPTIONAL,

-- R1 24-9: 32 UL HARQ processes for FR 2-2

support32-UL-HARQ-ProcessPerSCS-r17 SEQUENCE {

scs-120kHz-r17 ENUMERATED {supported} OPTIONAL,

scs-480kHz-r17 ENUMERATED {supported} OPTIONAL,

scs-960kHz-r17 ENUMERATED {supported} OPTIONAL

} OPTIONAL,

...

}

-- TAG-FR2-2-ACCESSPARAMSPERBAND-STOP

-- ASN1STOP

#### – *HighSpeedParameters*

The IE *HighSpeedParameters* is used to convey capabilities related to high speed scenarios.

*HighSpeedParameters* information element

-- ASN1START

-- TAG-HIGHSPEEDPARAMETERS-START

HighSpeedParameters-r16 ::= SEQUENCE {

measurementEnhancement-r16 ENUMERATED {supported} OPTIONAL,

demodulationEnhancement-r16 ENUMERATED {supported} OPTIONAL

}

HighSpeedParameters-v1650 ::= CHOICE {

intraNR-MeasurementEnhancement-r16 ENUMERATED {supported},

interRAT-MeasurementEnhancement-r16 ENUMERATED {supported}

}

HighSpeedParameters-v1700 ::= SEQUENCE {

-- R4 18-1: Enhanced RRM requirements specified for CA for FR1 HST

measurementEnhancementCA-r17 ENUMERATED {supported} OPTIONAL,

-- R4 18-2: Enhanced RRM requirements specified for inter-frequency measurement in connected mode for FR1 HST

measurementEnhancementInterFreq-r17 ENUMERATED {supported} OPTIONAL

}

-- TAG-HIGHSPEEDPARAMETERS-STOP

-- ASN1STOP

#### – *IMS-Parameters*

The IE *IMS-Parameters* is used to convey capabilities related to IMS.

*IMS-Parameters* information element

-- ASN1START

-- TAG-IMS-PARAMETERS-START

IMS-Parameters ::= SEQUENCE {

ims-ParametersCommon IMS-ParametersCommon OPTIONAL,

ims-ParametersFRX-Diff IMS-ParametersFRX-Diff OPTIONAL,

...

}

IMS-Parameters-v1700 ::= SEQUENCE {

ims-ParametersFR2-2-r17 IMS-ParametersFR2-2-r17 OPTIONAL

}

IMS-ParametersCommon ::= SEQUENCE {

voiceOverEUTRA-5GC ENUMERATED {supported} OPTIONAL,

...,

[[

voiceOverSCG-BearerEUTRA-5GC ENUMERATED {supported} OPTIONAL

]],

[[

voiceFallbackIndicationEPS-r16 ENUMERATED {supported} OPTIONAL

]]

}

IMS-ParametersFRX-Diff ::= SEQUENCE {

voiceOverNR ENUMERATED {supported} OPTIONAL,

...

}

IMS-ParametersFR2-2-r17 ::= SEQUENCE {

voiceOverNR-r17 ENUMERATED {supported} OPTIONAL,

...

}

-- TAG-IMS-PARAMETERS-STOP

-- ASN1STOP

#### – *InterRAT-Parameters*

The IE *InterRAT-Parameters* is used convey UE capabilities related to the other RATs.

*InterRAT-Parameters* information element

-- ASN1START

-- TAG-INTERRAT-PARAMETERS-START

InterRAT-Parameters ::= SEQUENCE {

eutra EUTRA-Parameters OPTIONAL,

...,

[[

utra-FDD-r16 UTRA-FDD-Parameters-r16 OPTIONAL

]]

}

EUTRA-Parameters ::= SEQUENCE {

supportedBandListEUTRA SEQUENCE (SIZE (1..maxBandsEUTRA)) OF FreqBandIndicatorEUTRA,

eutra-ParametersCommon EUTRA-ParametersCommon OPTIONAL,

eutra-ParametersXDD-Diff EUTRA-ParametersXDD-Diff OPTIONAL,

...

}

EUTRA-ParametersCommon ::= SEQUENCE {

mfbi-EUTRA ENUMERATED {supported} OPTIONAL,

modifiedMPR-BehaviorEUTRA BIT STRING (SIZE (32)) OPTIONAL,

multiNS-Pmax-EUTRA ENUMERATED {supported} OPTIONAL,

rs-SINR-MeasEUTRA ENUMERATED {supported} OPTIONAL,

...,

[[

ne-DC ENUMERATED {supported} OPTIONAL

]],

[[

nr-HO-ToEN-DC-r16 ENUMERATED {supported} OPTIONAL

]]

}

EUTRA-ParametersXDD-Diff ::= SEQUENCE {

rsrqMeasWidebandEUTRA ENUMERATED {supported} OPTIONAL,

...

}

UTRA-FDD-Parameters-r16 ::= SEQUENCE {

supportedBandListUTRA-FDD-r16 SEQUENCE (SIZE (1..maxBandsUTRA-FDD-r16)) OF SupportedBandUTRA-FDD-r16,

...

}

SupportedBandUTRA-FDD-r16 ::= ENUMERATED {

bandI, bandII, bandIII, bandIV, bandV, bandVI,

bandVII, bandVIII, bandIX, bandX, bandXI,

bandXII, bandXIII, bandXIV, bandXV, bandXVI,

bandXVII, bandXVIII, bandXIX, bandXX,

bandXXI, bandXXII, bandXXIII, bandXXIV,

bandXXV, bandXXVI, bandXXVII, bandXXVIII,

bandXXIX, bandXXX, bandXXXI, bandXXXII}

-- TAG-INTERRAT-PARAMETERS-STOP

-- ASN1STOP

#### – *MAC-Parameters*

The IE *MAC-Parameters* is used to convey capabilities related to MAC.

*MAC-Parameters* information element

-- ASN1START

-- TAG-MAC-PARAMETERS-START

MAC-Parameters ::= SEQUENCE {

mac-ParametersCommon MAC-ParametersCommon OPTIONAL,

mac-ParametersXDD-Diff MAC-ParametersXDD-Diff OPTIONAL

}

MAC-Parameters-v1610 ::= SEQUENCE {

mac-ParametersFRX-Diff-r16 MAC-ParametersFRX-Diff-r16 OPTIONAL

}

MAC-Parameters-v1700 ::= SEQUENCE {

mac-ParametersFR2-2-r17 MAC-ParametersFR2-2-r17 OPTIONAL

}

MAC-ParametersCommon ::= SEQUENCE {

lcp-Restriction ENUMERATED {supported} OPTIONAL,

dummy ENUMERATED {supported} OPTIONAL,

lch-ToSCellRestriction ENUMERATED {supported} OPTIONAL,

...,

[[

recommendedBitRate ENUMERATED {supported} OPTIONAL,

recommendedBitRateQuery ENUMERATED {supported} OPTIONAL

]],

[[

recommendedBitRateMultiplier-r16 ENUMERATED {supported} OPTIONAL,

preEmptiveBSR-r16 ENUMERATED {supported} OPTIONAL,

autonomousTransmission-r16 ENUMERATED {supported} OPTIONAL,

lch-PriorityBasedPrioritization-r16 ENUMERATED {supported} OPTIONAL,

lch-ToConfiguredGrantMapping-r16 ENUMERATED {supported} OPTIONAL,

lch-ToGrantPriorityRestriction-r16 ENUMERATED {supported} OPTIONAL,

singlePHR-P-r16 ENUMERATED {supported} OPTIONAL,

ul-LBT-FailureDetectionRecovery-r16 ENUMERATED {supported} OPTIONAL,

-- R4 8-1: MPE

tdd-MPE-P-MPR-Reporting-r16 ENUMERATED {supported} OPTIONAL,

lcid-ExtensionIAB-r16 ENUMERATED {supported} OPTIONAL

]],

[[

spCell-BFR-CBRA-r16 ENUMERATED {supported} OPTIONAL

]],

[[

srs-ResourceId-Ext-r16 ENUMERATED {supported} OPTIONAL

]],

[[

enhancedUuDRX-forSidelink-r17 ENUMERATED {supported} OPTIONAL,

--27-10: Support of UL MAC CE based MG activation request for PRS measurements

mg-ActivationRequestPRS-Meas-r17 ENUMERATED {supported} OPTIONAL,

--27-11: Support of DL MAC CE based MG activation request for PRS measurements

mg-ActivationCommPRS-Meas-r17 ENUMERATED {supported} OPTIONAL,

intraCG-Prioritization-r17 ENUMERATED {supported} OPTIONAL,

jointPrioritizationCG-Retx-Timer-r17 ENUMERATED {supported} OPTIONAL,

survivalTime-r17 ENUMERATED {supported} OPTIONAL,

lcg-ExtensionIAB-r17 ENUMERATED {supported} OPTIONAL,

maxNumberRNTIs-MBS-r17 INTEGER (1..ffsUpperLimit) OPTIONAL, -- FFS

harq-FeedbackDisabled-r17 ENUMERATED {supported} OPTIONAL,

uplink-Harq-ModeB-r17 ENUMERATED {supported} OPTIONAL,

sr-TriggeredBy-TA-Report-r17 ENUMERATED {supported} OPTIONAL,

extendedDRX-CycleInactive-r17 ENUMERATED {supported} OPTIONAL

]]

}

MAC-ParametersFRX-Diff-r16 ::= SEQUENCE {

directMCG-SCellActivation-r16 ENUMERATED {supported} OPTIONAL,

directMCG-SCellActivationResume-r16 ENUMERATED {supported} OPTIONAL,

directSCG-SCellActivation-r16 ENUMERATED {supported} OPTIONAL,

directSCG-SCellActivationResume-r16 ENUMERATED {supported} OPTIONAL,

-- R1 19-1: DRX Adaptation

drx-Adaptation-r16 SEQUENCE {

non-SharedSpectrumChAccess-r16 MinTimeGap-r16 OPTIONAL,

sharedSpectrumChAccess-r16 MinTimeGap-r16 OPTIONAL

} OPTIONAL,

...

}

MAC-ParametersFR2-2-r17 ::= SEQUENCE {

directMCG-SCellActivation-r17 ENUMERATED {supported} OPTIONAL,

directMCG-SCellActivationResume-r17 ENUMERATED {supported} OPTIONAL,

directSCG-SCellActivation-r17 ENUMERATED {supported} OPTIONAL,

directSCG-SCellActivationResume-r17 ENUMERATED {supported} OPTIONAL,

drx-Adaptation-r17 SEQUENCE {

non-SharedSpectrumChAccess-r17 MinTimeGapFR2-2-r17 OPTIONAL,

sharedSpectrumChAccess-r17 MinTimeGapFR2-2-r17 OPTIONAL

} OPTIONAL,

...

}

MAC-ParametersXDD-Diff ::= SEQUENCE {

skipUplinkTxDynamic ENUMERATED {supported} OPTIONAL,

logicalChannelSR-DelayTimer ENUMERATED {supported} OPTIONAL,

longDRX-Cycle ENUMERATED {supported} OPTIONAL,

shortDRX-Cycle ENUMERATED {supported} OPTIONAL,

multipleSR-Configurations ENUMERATED {supported} OPTIONAL,

multipleConfiguredGrants ENUMERATED {supported} OPTIONAL,

...,

[[

secondaryDRX-Group-r16 ENUMERATED {supported} OPTIONAL

]],

[[

enhancedSkipUplinkTxDynamic-r16 ENUMERATED {supported} OPTIONAL,

enhancedSkipUplinkTxConfigured-r16 ENUMERATED {supported} OPTIONAL

]]

}

MinTimeGap-r16 ::= SEQUENCE {

scs-15kHz-r16 ENUMERATED {sl1, sl3} OPTIONAL,

scs-30kHz-r16 ENUMERATED {sl1, sl6} OPTIONAL,

scs-60kHz-r16 ENUMERATED {sl1, sl12} OPTIONAL,

scs-120kHz-r16 ENUMERATED {sl2, sl24} OPTIONAL

}

MinTimeGapFR2-2-r17 ::= SEQUENCE {

scs-120kHz-r17 ENUMERATED {sl2, sl24} OPTIONAL,

scs-480kHz-r17 ENUMERATED {sl8, sl96} OPTIONAL,

scs-960kHz-r17 ENUMERATED {sl16, sl192} OPTIONAL

}

-- TAG-MAC-PARAMETERS-STOP

-- ASN1STOP

#### – *MeasAndMobParameters*

The IE *MeasAndMobParameters* is used to convey UE capabilities related to measurements for radio resource management (RRM), radio link monitoring (RLM) and mobility (e.g. handover).

*MeasAndMobParameters* information element

-- ASN1START

-- TAG-MEASANDMOBPARAMETERS-START

MeasAndMobParameters ::= SEQUENCE {

measAndMobParametersCommon MeasAndMobParametersCommon OPTIONAL,

measAndMobParametersXDD-Diff MeasAndMobParametersXDD-Diff OPTIONAL,

measAndMobParametersFRX-Diff MeasAndMobParametersFRX-Diff OPTIONAL

}

MeasAndMobParameters-v1700 ::= SEQUENCE {

measAndMobParametersFR2-2-r17 MeasAndMobParametersFR2-2-r17 OPTIONAL

}

MeasAndMobParametersCommon ::= SEQUENCE {

supportedGapPattern BIT STRING (SIZE (22)) OPTIONAL,

ssb-RLM ENUMERATED {supported} OPTIONAL,

ssb-AndCSI-RS-RLM ENUMERATED {supported} OPTIONAL,

...,

[[

eventB-MeasAndReport ENUMERATED {supported} OPTIONAL,

handoverFDD-TDD ENUMERATED {supported} OPTIONAL,

eutra-CGI-Reporting ENUMERATED {supported} OPTIONAL,

nr-CGI-Reporting ENUMERATED {supported} OPTIONAL

]],

[[

independentGapConfig ENUMERATED {supported} OPTIONAL,

periodicEUTRA-MeasAndReport ENUMERATED {supported} OPTIONAL,

handoverFR1-FR2 ENUMERATED {supported} OPTIONAL,

maxNumberCSI-RS-RRM-RS-SINR ENUMERATED {n4, n8, n16, n32, n64, n96} OPTIONAL

]],

[[

nr-CGI-Reporting-ENDC ENUMERATED {supported} OPTIONAL

]],

[[

eutra-CGI-Reporting-NEDC ENUMERATED {supported} OPTIONAL,

eutra-CGI-Reporting-NRDC ENUMERATED {supported} OPTIONAL,

nr-CGI-Reporting-NEDC ENUMERATED {supported} OPTIONAL,

nr-CGI-Reporting-NRDC ENUMERATED {supported} OPTIONAL

]],

[[

reportAddNeighMeasForPeriodic-r16 ENUMERATED {supported} OPTIONAL,

condHandoverParametersCommon-r16 SEQUENCE {

condHandoverFDD-TDD-r16 ENUMERATED {supported} OPTIONAL,

condHandoverFR1-FR2-r16 ENUMERATED {supported} OPTIONAL

} OPTIONAL,

nr-NeedForGap-Reporting-r16 ENUMERATED {supported} OPTIONAL,

supportedGapPattern-NRonly-r16 BIT STRING (SIZE (10)) OPTIONAL,

supportedGapPattern-NRonly-NEDC-r16 ENUMERATED {supported} OPTIONAL,

maxNumberCLI-RSSI-r16 ENUMERATED {n8, n16, n32, n64} OPTIONAL,

maxNumberCLI-SRS-RSRP-r16 ENUMERATED {n4, n8, n16, n32} OPTIONAL,

maxNumberPerSlotCLI-SRS-RSRP-r16 ENUMERATED {n2, n4, n8} OPTIONAL,

mfbi-IAB-r16 ENUMERATED {supported} OPTIONAL,

dummy ENUMERATED {supported} OPTIONAL,

nr-CGI-Reporting-NPN-r16 ENUMERATED {supported} OPTIONAL,

idleInactiveEUTRA-MeasReport-r16 ENUMERATED {supported} OPTIONAL,

idleInactive-ValidityArea-r16 ENUMERATED {supported} OPTIONAL,

eutra-AutonomousGaps-r16 ENUMERATED {supported} OPTIONAL,

eutra-AutonomousGaps-NEDC-r16 ENUMERATED {supported} OPTIONAL,

eutra-AutonomousGaps-NRDC-r16 ENUMERATED {supported} OPTIONAL,

pcellT312-r16 ENUMERATED {supported} OPTIONAL,

supportedGapPattern-r16 BIT STRING (SIZE (2)) OPTIONAL

]],

[[

-- R4 19-2 Concurrent measurement gaps

concurrentMeasGap-r17 CHOICE {

concurrentPerUE-OnlyMeasGap-r17 ENUMERATED {supported},

concurrentPerUE-PerFRCombMeasGap-r17 ENUMERATED {supported}

} OPTIONAL,

-- R4 19-1 Network controlled small gap (NCSG)

nr-NeedForGapNCSG-reporting ENUMERATED {supported} OPTIONAL,

eutra-NeedForGapNCSG-reporting ENUMERATED {supported} OPTIONAL,

-- R4 19-1-1 per FR Network controlled small gap (NCSG)

ncsg-MeasGapPerFR-r17 ENUMERATED {supported} OPTIONAL,

-- R4 19-1-2 Network controlled small gap (NCSG) supported patterns

ncsg-MeasGapPatterns-r17 BIT STRING (SIZE(24)) OPTIONAL,

-- R4 19-1-3 Network controlled small gap (NCSG) supported NR-only patterns

ncsg-MeasGapNR-Patterns-r17 BIT STRING (SIZE(24)) OPTIONAL,

-- R4 19-3-2 pre-configured measurement gap

preconfiguredUE-AutonomousMeasGap-r17 ENUMERATED {supported} OPTIONAL,

-- R4 19-3-1 pre-configured measurement gap

preconfiguredNW-ControlledMeasGap-r17 ENUMERATED {supported} OPTIONAL,

handoverFR1-FR2-2-r17 ENUMERATED {supported} OPTIONAL,

handoverFR2-1-FR2-2-r17 ENUMERATED {supported} OPTIONAL,

-- RAN4 14-1: per-FR MG for PRS measurement

independentGapConfigPRS-r17 ENUMERATED {supported} OPTIONAL,

rrm-RelaxationRRC-ConnectedRedCap-r17 ENUMERATED {supported} OPTIONAL,

-- R4 25-3: Parallel measurements with multiple measurement gaps

parallelMeasurementGap-r17 ENUMERATED {n2} OPTIONAL,

condHandoverWithSCG-NRDC-r17 ENUMERATED {supported} OPTIONAL,

gNB-ID-Length-Reporting-r17 ENUMERATED {supported} OPTIONAL,

gNB-ID-Length-Reporting-ENDC-r17 ENUMERATED {supported} OPTIONAL,

gNB-ID-Length-Reporting-NEDC-r17 ENUMERATED {supported} OPTIONAL,

gNB-ID-Length-Reporting-NRDC-r17 ENUMERATED {supported} OPTIONAL,

gNB-ID-Length-Reporting-NPN-r17 ENUMERATED {supported} OPTIONAL

]]

}

MeasAndMobParametersXDD-Diff ::= SEQUENCE {

intraAndInterF-MeasAndReport ENUMERATED {supported} OPTIONAL,

eventA-MeasAndReport ENUMERATED {supported} OPTIONAL,

...,

[[

handoverInterF ENUMERATED {supported} OPTIONAL,

handoverLTE-EPC ENUMERATED {supported} OPTIONAL,

handoverLTE-5GC ENUMERATED {supported} OPTIONAL

]],

[[

sftd-MeasNR-Neigh ENUMERATED {supported} OPTIONAL,

sftd-MeasNR-Neigh-DRX ENUMERATED {supported} OPTIONAL

]],

[[

dummy ENUMERATED {supported} OPTIONAL

]]

}

MeasAndMobParametersFRX-Diff ::= SEQUENCE {

ss-SINR-Meas ENUMERATED {supported} OPTIONAL,

csi-RSRP-AndRSRQ-MeasWithSSB ENUMERATED {supported} OPTIONAL,

csi-RSRP-AndRSRQ-MeasWithoutSSB ENUMERATED {supported} OPTIONAL,

csi-SINR-Meas ENUMERATED {supported} OPTIONAL,

csi-RS-RLM ENUMERATED {supported} OPTIONAL,

...,

[[

handoverInterF ENUMERATED {supported} OPTIONAL,

handoverLTE-EPC ENUMERATED {supported} OPTIONAL,

handoverLTE-5GC ENUMERATED {supported} OPTIONAL

]],

[[

maxNumberResource-CSI-RS-RLM ENUMERATED {n2, n4, n6, n8} OPTIONAL

]],

[[

simultaneousRxDataSSB-DiffNumerology ENUMERATED {supported} OPTIONAL

]],

[[

nr-AutonomousGaps-r16 ENUMERATED {supported} OPTIONAL,

nr-AutonomousGaps-ENDC-r16 ENUMERATED {supported} OPTIONAL,

nr-AutonomousGaps-NEDC-r16 ENUMERATED {supported} OPTIONAL,

nr-AutonomousGaps-NRDC-r16 ENUMERATED {supported} OPTIONAL,

dummy ENUMERATED {supported} OPTIONAL,

cli-RSSI-Meas-r16 ENUMERATED {supported} OPTIONAL,

cli-SRS-RSRP-Meas-r16 ENUMERATED {supported} OPTIONAL,

interFrequencyMeas-NoGap-r16 ENUMERATED {supported} OPTIONAL,

simultaneousRxDataSSB-DiffNumerology-Inter-r16 ENUMERATED {supported} OPTIONAL,

idleInactiveNR-MeasReport-r16 ENUMERATED {supported} OPTIONAL,

-- R4 6-2: Support of beam level Early Measurement Reporting

idleInactiveNR-MeasBeamReport-r16 ENUMERATED {supported} OPTIONAL

]],

[[

increasedNumberofCSIRSPerMO-r16 ENUMERATED {supported} OPTIONAL

]]

}

MeasAndMobParametersFR2-2-r17 ::= SEQUENCE {

handoverInterF-r17 ENUMERATED {supported} OPTIONAL,

handoverLTE-EPC-r17 ENUMERATED {supported} OPTIONAL,

handoverLTE-5GC-r17 ENUMERATED {supported} OPTIONAL,

idleInactiveNR-MeasReport-r17 ENUMERATED {supported} OPTIONAL,

...

}

-- TAG-MEASANDMOBPARAMETERS-STOP

-- ASN1STOP

#### – *MeasAndMobParametersMRDC*

The IE *MeasAndMobParametersMRDC* is used to convey capability parameters related to RRM measurements and RRC mobility.

*MeasAndMobParametersMRDC* information element

-- ASN1START

-- TAG-MEASANDMOBPARAMETERSMRDC-START

MeasAndMobParametersMRDC ::= SEQUENCE {

measAndMobParametersMRDC-Common MeasAndMobParametersMRDC-Common OPTIONAL,

measAndMobParametersMRDC-XDD-Diff MeasAndMobParametersMRDC-XDD-Diff OPTIONAL,

measAndMobParametersMRDC-FRX-Diff MeasAndMobParametersMRDC-FRX-Diff OPTIONAL

}

MeasAndMobParametersMRDC-v1560 ::= SEQUENCE {

measAndMobParametersMRDC-XDD-Diff-v1560 MeasAndMobParametersMRDC-XDD-Diff-v1560 OPTIONAL

}

MeasAndMobParametersMRDC-v1610 ::= SEQUENCE {

measAndMobParametersMRDC-Common-v1610 MeasAndMobParametersMRDC-Common-v1610 OPTIONAL,

interNR-MeasEUTRA-IAB-r16 ENUMERATED {supported} OPTIONAL

}

MeasAndMobParametersMRDC-v1700 ::= SEQUENCE {

measAndMobParametersMRDC-Common-v1700 MeasAndMobParametersMRDC-Common-v1700 OPTIONAL

}

MeasAndMobParametersMRDC-Common ::= SEQUENCE {

independentGapConfig ENUMERATED {supported} OPTIONAL

}

MeasAndMobParametersMRDC-Common-v1610 ::= SEQUENCE {

condPSCellChangeParametersCommon-r16 SEQUENCE {

condPSCellChangeFDD-TDD-r16 ENUMERATED {supported} OPTIONAL,

condPSCellChangeFR1-FR2-r16 ENUMERATED {supported} OPTIONAL

} OPTIONAL,

pscellT312-r16 ENUMERATED {supported} OPTIONAL

}

MeasAndMobParametersMRDC-Common-v1700 ::= SEQUENCE {

condPSCellChangeParameters-r17 SEQUENCE {

inter-SN-condPSCellChangeFDD-TDD-NRDC-r17 ENUMERATED {supported} OPTIONAL,

inter-SN-condPSCellChangeFR1-FR2-NRDC-r17 ENUMERATED {supported} OPTIONAL,

inter-SN-condPSCellChangeFDD-TDD-ENDC-r17 ENUMERATED {supported} OPTIONAL,

inter-SN-condPSCellChangeFR1-FR2-ENDC-r17 ENUMERATED {supported} OPTIONAL,

mn-InitiatedCondPSCellChange-FR1FDD-ENDC-r17 ENUMERATED {supported} OPTIONAL,

mn-InitiatedCondPSCellChange-FR1TDD-ENDC-r17 ENUMERATED {supported} OPTIONAL,

mn-InitiatedCondPSCellChange-FR2TDD-ENDC-r17 ENUMERATED {supported} OPTIONAL,

sn-InitiatedCondPSCellChange-FR1FDD-ENDC-r17 ENUMERATED {supported} OPTIONAL,

sn-InitiatedCondPSCellChange-FR1TDD-ENDC-r17 ENUMERATED {supported} OPTIONAL,

sn-InitiatedCondPSCellChange-FR2TDD-ENDC-r17 ENUMERATED {supported} OPTIONAL

} OPTIONAL,

condHandoverWithSCG-ENDC-r17 ENUMERATED {supported} OPTIONAL,

condHandoverWithSCG-NEDC-r17 ENUMERATED {supported} OPTIONAL

}

MeasAndMobParametersMRDC-XDD-Diff ::= SEQUENCE {

sftd-MeasPSCell ENUMERATED {supported} OPTIONAL,

sftd-MeasNR-Cell ENUMERATED {supported} OPTIONAL

}

MeasAndMobParametersMRDC-XDD-Diff-v1560 ::= SEQUENCE {

sftd-MeasPSCell-NEDC ENUMERATED {supported} OPTIONAL

}

MeasAndMobParametersMRDC-FRX-Diff ::= SEQUENCE {

simultaneousRxDataSSB-DiffNumerology ENUMERATED {supported} OPTIONAL

}

-- TAG-MEASANDMOBPARAMETERSMRDC-STOP

-- ASN1STOP

#### – *MIMO-Layers*

The IE *MIMO-Layers* is used to convey the number of supported MIMO layers.

*MIMO-Layers* information element

-- ASN1START

-- TAG-MIMO-LAYERS-START

MIMO-LayersDL ::= ENUMERATED {twoLayers, fourLayers, eightLayers}

MIMO-LayersUL ::= ENUMERATED {oneLayer, twoLayers, fourLayers}

-- TAG-MIMO-LAYERS-STOP

-- ASN1STOP

#### – *MIMO-ParametersPerBand*

The IE *MIMO-ParametersPerBand* is used to convey MIMO related parameters specific for a certain band (not per feature set or band combination).

*MIMO-ParametersPerBand* information element

-- ASN1START

-- TAG-MIMO-PARAMETERSPERBAND-START

MIMO-ParametersPerBand ::= SEQUENCE {

tci-StatePDSCH SEQUENCE {

maxNumberConfiguredTCIstatesPerCC ENUMERATED {n4, n8, n16, n32, n64, n128} OPTIONAL,

maxNumberActiveTCI-PerBWP ENUMERATED {n1, n2, n4, n8} OPTIONAL

} OPTIONAL,

additionalActiveTCI-StatePDCCH ENUMERATED {supported} OPTIONAL,

pusch-TransCoherence ENUMERATED {nonCoherent, partialCoherent, fullCoherent} OPTIONAL,

beamCorrespondenceWithoutUL-BeamSweeping ENUMERATED {supported} OPTIONAL,

periodicBeamReport ENUMERATED {supported} OPTIONAL,

aperiodicBeamReport ENUMERATED {supported} OPTIONAL,

sp-BeamReportPUCCH ENUMERATED {supported} OPTIONAL,

sp-BeamReportPUSCH ENUMERATED {supported} OPTIONAL,

dummy1 DummyG OPTIONAL,

maxNumberRxBeam INTEGER (2..8) OPTIONAL,

maxNumberRxTxBeamSwitchDL SEQUENCE {

scs-15kHz ENUMERATED {n4, n7, n14} OPTIONAL,

scs-30kHz ENUMERATED {n4, n7, n14} OPTIONAL,

scs-60kHz ENUMERATED {n4, n7, n14} OPTIONAL,

scs-120kHz ENUMERATED {n4, n7, n14} OPTIONAL,

scs-240kHz ENUMERATED {n4, n7, n14} OPTIONAL

} OPTIONAL,

maxNumberNonGroupBeamReporting ENUMERATED {n1, n2, n4} OPTIONAL,

groupBeamReporting ENUMERATED {supported} OPTIONAL,

uplinkBeamManagement SEQUENCE {

maxNumberSRS-ResourcePerSet-BM ENUMERATED {n2, n4, n8, n16},

maxNumberSRS-ResourceSet INTEGER (1..8)

} OPTIONAL,

maxNumberCSI-RS-BFD INTEGER (1..64) OPTIONAL,

maxNumberSSB-BFD INTEGER (1..64) OPTIONAL,

maxNumberCSI-RS-SSB-CBD INTEGER (1..256) OPTIONAL,

dummy2 ENUMERATED {supported} OPTIONAL,

twoPortsPTRS-UL ENUMERATED {supported} OPTIONAL,

dummy5 SRS-Resources OPTIONAL,

dummy3 INTEGER (1..4) OPTIONAL,

beamReportTiming SEQUENCE {

scs-15kHz ENUMERATED {sym2, sym4, sym8} OPTIONAL,

scs-30kHz ENUMERATED {sym4, sym8, sym14, sym28} OPTIONAL,

scs-60kHz ENUMERATED {sym8, sym14, sym28} OPTIONAL,

scs-120kHz ENUMERATED {sym14, sym28, sym56} OPTIONAL

} OPTIONAL,

ptrs-DensityRecommendationSetDL SEQUENCE {

scs-15kHz PTRS-DensityRecommendationDL OPTIONAL,

scs-30kHz PTRS-DensityRecommendationDL OPTIONAL,

scs-60kHz PTRS-DensityRecommendationDL OPTIONAL,

scs-120kHz PTRS-DensityRecommendationDL OPTIONAL

} OPTIONAL,

ptrs-DensityRecommendationSetUL SEQUENCE {

scs-15kHz PTRS-DensityRecommendationUL OPTIONAL,

scs-30kHz PTRS-DensityRecommendationUL OPTIONAL,

scs-60kHz PTRS-DensityRecommendationUL OPTIONAL,

scs-120kHz PTRS-DensityRecommendationUL OPTIONAL

} OPTIONAL,

dummy4 DummyH OPTIONAL,

aperiodicTRS ENUMERATED {supported} OPTIONAL,

...,

[[

dummy6 ENUMERATED {true} OPTIONAL,

beamManagementSSB-CSI-RS BeamManagementSSB-CSI-RS OPTIONAL,

beamSwitchTiming SEQUENCE {

scs-60kHz ENUMERATED {sym14, sym28, sym48, sym224, sym336} OPTIONAL,

scs-120kHz ENUMERATED {sym14, sym28, sym48, sym224, sym336} OPTIONAL

} OPTIONAL,

codebookParameters CodebookParameters OPTIONAL,

csi-RS-IM-ReceptionForFeedback CSI-RS-IM-ReceptionForFeedback OPTIONAL,

csi-RS-ProcFrameworkForSRS CSI-RS-ProcFrameworkForSRS OPTIONAL,

csi-ReportFramework CSI-ReportFramework OPTIONAL,

csi-RS-ForTracking CSI-RS-ForTracking OPTIONAL,

srs-AssocCSI-RS SEQUENCE (SIZE (1.. maxNrofCSI-RS-Resources)) OF SupportedCSI-RS-Resource OPTIONAL,

spatialRelations SpatialRelations OPTIONAL

]],

[[

-- R1 16-2b-0: Support of default QCL assumption with two TCI states

defaultQCL-TwoTCI-r16 ENUMERATED {supported} OPTIONAL,

codebookParametersPerBand-r16 CodebookParameters-v1610 OPTIONAL,

-- R1 16-1b-3: Support of PUCCH resource groups per BWP for simultaneous spatial relation update

simul-SpatialRelationUpdatePUCCHResGroup-r16 ENUMERATED {supported} OPTIONAL,

-- R1 16-1f: Maximum number of SCells configured for SCell beam failure recovery simultaneously

maxNumberSCellBFR-r16 ENUMERATED {n1,n2,n4,n8} OPTIONAL,

-- R1 16-2c: Supports simultaneous reception with different Type-D for FR2 only

simultaneousReceptionDiffTypeD-r16 ENUMERATED {supported} OPTIONAL,

-- R1 16-1a-1: SSB/CSI-RS for L1-SINR measurement

ssb-csirs-SINR-measurement-r16 SEQUENCE {

maxNumberSSB-CSIRS-OneTx-CMR-r16 ENUMERATED {n8, n16, n32, n64},

maxNumberCSI-IM-NZP-IMR-res-r16 ENUMERATED {n8, n16, n32, n64},

maxNumberCSIRS-2Tx-res-r16 ENUMERATED {n0, n4, n8, n16, n32, n64},

maxNumberSSB-CSIRS-res-r16 ENUMERATED {n8, n16, n32, n64, n128},

maxNumberCSI-IM-NZP-IMR-res-mem-r16 ENUMERATED {n8, n16, n32, n64, n128},

supportedCSI-RS-Density-CMR-r16 ENUMERATED {one, three, oneAndThree},

maxNumberAperiodicCSI-RS-Res-r16 ENUMERATED {n2, n4, n8, n16, n32, n64},

supportedSINR-meas-r16 ENUMERATED {ssbWithCSI-IM, ssbWithNZP-IMR, csirsWithNZP-IMR, csi-RSWithoutIMR} OPTIONAL

} OPTIONAL,

-- R1 16-1a-2: Non-group based L1-SINR reporting

nonGroupSINR-reporting-r16 ENUMERATED {n1, n2, n4} OPTIONAL,

-- R1 16-1a-3: Non-group based L1-SINR reporting

groupSINR-reporting-r16 ENUMERATED {supported} OPTIONAL,

multiDCI-multiTRP-Parameters-r16 SEQUENCE {

-- R1 16-2a-0: Overlapping PDSCHs in time and fully overlapping in frequency and time

overlapPDSCHsFullyFreqTime-r16 INTEGER (1..2) OPTIONAL,

-- R1 16-2a-1: Overlapping PDSCHs in time and partially overlapping in frequency and time

overlapPDSCHsInTimePartiallyFreq-r16 ENUMERATED {supported} OPTIONAL,

-- R1 16-2a-2: Out of order operation for DL

outOfOrderOperationDL-r16 SEQUENCE {

supportPDCCH-ToPDSCH-r16 ENUMERATED {supported} OPTIONAL,

supportPDSCH-ToHARQ-ACK-r16 ENUMERATED {supported} OPTIONAL

} OPTIONAL,

-- R1 16-2a-3: Out of order operation for UL

outOfOrderOperationUL-r16 ENUMERATED {supported} OPTIONAL,

-- R1 16-2a-5: Separate CRS rate matching

separateCRS-RateMatching-r16 ENUMERATED {supported} OPTIONAL,

-- R1 16-2a-6: Default QCL enhancement for multi-DCI based multi-TRP

defaultQCL-PerCORESETPoolIndex-r16 ENUMERATED {supported} OPTIONAL,

-- R1 16-2a-7: Maximum number of activated TCI states

maxNumberActivatedTCI-States-r16 SEQUENCE {

maxNumberPerCORESET-Pool-r16 ENUMERATED {n1, n2, n4, n8},

maxTotalNumberAcrossCORESET-Pool-r16 ENUMERATED {n2, n4, n8, n16}

} OPTIONAL

} OPTIONAL,

singleDCI-SDM-scheme-Parameters-r16 SEQUENCE {

-- R1 16-2b-1b: Single-DCI based SDM scheme – Support of new DMRS port entry

supportNewDMRS-Port-r16 ENUMERATED {supported1, supported2, supported3} OPTIONAL,

-- R1 16-2b-1a: Support of s-port DL PTRS

supportTwoPortDL-PTRS-r16 ENUMERATED {supported} OPTIONAL

} OPTIONAL,

-- R1 16-2b-2: Support of single-DCI based FDMSchemeA

supportFDM-SchemeA-r16 ENUMERATED {supported} OPTIONAL,

-- R1 16-2b-3a: Single-DCI based FDMSchemeB CW soft combining

supportCodeWordSoftCombining-r16 ENUMERATED {supported} OPTIONAL,

-- R1 16-2b-4: Single-DCI based TDMSchemeA

supportTDM-SchemeA-r16 ENUMERATED {kb3, kb5, kb10, kb20, noRestriction} OPTIONAL,

-- R1 16-2b-5: Single-DCI based inter-slot TDM

supportInter-slotTDM-r16 SEQUENCE {

supportRepNumPDSCH-TDRA-r16 ENUMERATED {n2, n3, n4, n5, n6, n7, n8, n16},

maxTBS-Size-r16 ENUMERATED {kb3, kb5, kb10, kb20, noRestriction},

maxNumberTCI-states-r16 INTEGER (1..2)

} OPTIONAL,

-- R1 16-4: Low PAPR DMRS for PDSCH

lowPAPR-DMRS-PDSCH-r16 ENUMERATED {supported} OPTIONAL,

-- R1 16-6a: Low PAPR DMRS for PUSCH without transform precoding

lowPAPR-DMRS-PUSCHwithoutPrecoding-r16 ENUMERATED {supported} OPTIONAL,

-- R1 16-6b: Low PAPR DMRS for PUCCH

lowPAPR-DMRS-PUCCH-r16 ENUMERATED {supported} OPTIONAL,

-- R1 16-6c: Low PAPR DMRS for PUSCH with transform precoding & pi/2 BPSK

lowPAPR-DMRS-PUSCHwithPrecoding-r16 ENUMERATED {supported} OPTIONAL,

-- R1 16-7: Extension of the maximum number of configured aperiodic CSI report settings

csi-ReportFrameworkExt-r16 CSI-ReportFrameworkExt-r16 OPTIONAL,

-- R1 16-3a, 16-3a-1, 16-3b, 16-3b-1, 16-8: Individual new codebook types

codebookParametersAddition-r16 CodebookParametersAddition-r16 OPTIONAL,

-- R1 16-8: Mixed codebook types

codebookComboParametersAddition-r16 CodebookComboParametersAddition-r16 OPTIONAL,

-- R4 8-2: SSB based beam correspondence

beamCorrespondenceSSB-based-r16 ENUMERATED {supported} OPTIONAL,

-- R4 8-3: CSI-RS based beam correspondence

beamCorrespondenceCSI-RS-based-r16 ENUMERATED {supported} OPTIONAL,

beamSwitchTiming-r16 SEQUENCE {

scs-60kHz-r16 ENUMERATED {sym224, sym336} OPTIONAL,

scs-120kHz-r16 ENUMERATED {sym224, sym336} OPTIONAL

} OPTIONAL

]],

[[

-- R1 16-1a-4: Semi-persistent L1-SINR report on PUCCH

semi-PersistentL1-SINR-Report-PUCCH-r16 SEQUENCE {

supportReportFormat1-2OFDM-syms-r16 ENUMERATED {supported} OPTIONAL,

supportReportFormat4-14OFDM-syms-r16 ENUMERATED {supported} OPTIONAL

} OPTIONAL,

-- R1 16-1a-5: Semi-persistent L1-SINR report on PUSCH

semi-PersistentL1-SINR-Report-PUSCH-r16 ENUMERATED {supported} OPTIONAL

]],

[[

-- R1 16-1h: Support of 64 configured PUCCH spatial relations

spatialRelations-v1640 SEQUENCE {

maxNumberConfiguredSpatialRelations-v1640 ENUMERATED {n96, n128, n160, n192, n224, n256, n288, n320}

} OPTIONAL,

-- R1 16-1i: Support of 64 configured candidate beam RSs for BFR

support64CandidateBeamRS-BFR-r16 ENUMERATED {supported} OPTIONAL

]],

[[

-- R1 16-2a-9: Interpretation of maxNumberMIMO-LayersPDSCH for multi-DCI based mTRP

maxMIMO-LayersForMulti-DCI-mTRP-r16 ENUMERATED {supported} OPTIONAL

]],

[[

supportedSINR-meas-v1670 BIT STRING (SIZE (4)) OPTIONAL

]],

[[

-- R1 23-8-5 Increased repetition for SRS

srs-increasedRepetition-r17 ENUMERATED {supported} OPTIONAL,

-- R1 23-8-6 Partial frequency sounding of SRS

srs-partialFrequencySounding-r17 ENUMERATED {supported} OPTIONAL,

-- R1 23-8-7 Start RB location hopping for partial frequency SRS

srs-startRB-locationHoppingPartial-r17 ENUMERATED {supported} OPTIONAL,

-- R1 23-8-8 Comb-8 SRS

srs-combEight-r17 ENUMERATED {supported} OPTIONAL,

-- R1 23-9-1 Basic Features of Further Enhanced Port-Selection Type II Codebook (FeType-II) per band information

codebookParametersfetype2-r17 CodebookParametersfetype2-r17 OPTIONAL,

-- R1 23-3-1-2a Two associated CSI-RS resources

mTRP-PUSCH-twoCSI-RS-r17 ENUMERATED {supported} OPTIONAL,

-- R1 23-3-2 Multi-TRP PUCCH repetition scheme 1 (inter-slot)

mTRP-PUCCH-InterSlot-r17 ENUMERATED {pf0-2, pf1-3-4, pf0-4} OPTIONAL,

-- R1 23-3-2b Cyclic mapping for multi-TRP PUCCH repetition

mTRP-PUCCH-CyclicMapping-r17 ENUMERATED {supported} OPTIONAL,

-- R1 23-3-2c Second TPC field for multi-TRP PUCCH repetition

mTRP-PUCCH-SecondTPC-r17 ENUMERATED {supported} OPTIONAL,

-- R1 23-5-2 MTRP BFR based on two BFD-RS set

mTRP-BFR-twoBFD-RS-Set-r17 SEQUENCE {

maxBFD-RS-resourcesPerSetPerBWP-r17 ENUMERATED {n1, n2},

maxBFR-r17 INTEGER (1..9),

maxBFD-RS-resourcesAcrossSetsPerBWP-r17 ENUMERATED {n2, n3, n4}

} OPTIONAL,

-- R1 23-5-2a PUCCH-SR resources for MTRP BFRQ - Max number of PUCCH-SR resources for MTRP BFRQ per cell group

mTRP-BFR-PUCCH-SR-perCG-r17 ENUMERATED{n1, n2} OPTIONAL,

-- R1 23-5-2b Association between a BFD-RS resource set on SpCell and a PUCCH SR resource

mTRP-BFR-association-PUCCH-SR-r17 ENUMERATED {supported} OPTIONAL,

-- R1 23-6-3 Simultaneous activation of two TCI states for PDCCH across multiple CCs (HST/URLLC)

sfn-SimulTwoTCI-AcrossMultiCC-r17 ENUMERATED {supported} OPTIONAL,

-- R1 23-6-4 Default DL beam setup for SFN

sfn-DefaultDL-BeamSetup-r17 ENUMERATED {supported} OPTIONAL,

-- R1 23-6-4a Default UL beam setup for SFN PDCCH(FR2 only)

sfn-DefaultUL-BeamSetup-r17 ENUMERATED {supported} OPTIONAL,

-- R1 23-8-1 SRS triggering offset enhancement

srs-TriggeringOffset-r17 ENUMERATED {n1, n2, n4} OPTIONAL,

-- R1 23-8-2 Triggering SRS only in DCI 0\_1/0\_2

srs-TriggeringDCI-r17 ENUMERATED {supported} OPTIONAL,

-- R1 23-9-5 Active CSI-RS resources and ports for mixed codebook types in any slot per band information

codebookComboParameterMixedType-r17 CodebookComboParameterMixedType-r17 OPTIONAL,

-- R1 23-1-1 Unified TCI [with joint DL/UL TCI update] for intra-cell beam management

unifiedJointTCI-r17 SEQUENCE{

maxConfiguredJointTCI-r17 ENUMERATED {n8, n12, n16, n24, n32, n48, n64, n128},

maxActivatedTCIAcrossCC-r17 ENUMERATED {n1, n2, n4, n8, n16}

} OPTIONAL,

-- R1 23-1-1b Unified TCI with joint DL/UL TCI update for intra- and inter-cell beam management with more than one MAC-CE

unifiedJointTCI-multiMAC-CE-r17 SEQUENCE{

minBeamApplicationTime-r17 ENUMERATED {n1, n2, n4, n7, n14, n28, n42, n56, n70, n84, n98, n112, n224, n336}

OPTIONAL,

maxNumMAC-CE-PerCC ENUMERATED {n2, n3, n4, n5, n6, n7, n8}

} OPTIONAL,

-- R1 23-1-1d Per BWP TCI state pool configuration for CA mode

unifiedJointTCI-perBWP-CA-r17 ENUMERATED {supported} OPTIONAL,

-- R1 23-1-1e TCI state pool configuration with TCI pool sharing for CA mode

unifiedJointTCI-ListSharingCA-r17 ENUMERATED {n1,n2,n4,n8} OPTIONAL,

-- R1 23-1-1f Common multi-CC TCI state ID update and activation

unifiedJointTCI-commonMultiCC-r17 ENUMERATED {supported} OPTIONAL,

-- R1 23-1-1g Beam misalignment between the DL source RS in the TCI state

unifiedJointTCI-BeamAlignDLRS-r17 ENUMERATED {supported} OPTIONAL,

-- R1 23-1-1h Association between TCI state and UL PC settings for PUCCH, PUSCH, and SRS

unifiedJointTCI-PC-association-r17 ENUMERATED {supported} OPTIONAL,

-- R1 23-1-1i Indication/configuration of R17 TCI states for aperiodic CSI-RS, PDCCH, PDSCH

unifiedJointTCI-Legacy-r17 ENUMERATED {supported} OPTIONAL,

-- 23-1-1m Indication/configuration of R17 TCI states for SRS

unifiedJointTCI-Legacy-SRS-r17 ENUMERATED {supported} OPTIONAL,

-- R1 23-1-1j Indication/configuration of R17 TCI states for CORESET #0

unifiedJointTCI-Legacy-CORESET0-r17 ENUMERATED {supported} OPTIONAL,

-- R1 23-1-1c SCell BFR with unified TCI framework (NOTE; pre-requisite is empty)

unifiedJointTCI-SCellBFR-r17 ENUMERATED {supported} OPTIONAL,

-- R1 23-1-1a Unified TCI with joint DL/UL TCI update for inter-cell beam management

unifiedJointTCI-InterCell-r17 SEQUENCE{

additionalMAC-CE-PerCC-r17 ENUMERATED {n0, n1, n2, n4},

additionalMAC-CE-AcrossCC-r17 ENUMERATED {n0, n1, n2, n4}

} OPTIONAL,

-- R1 23-10-1 Unified TCI with separate DL/UL TCI update for intra-cell beam management

unifiedSeparateTCI-r17 SEQUENCE{

maxConfiguredDL-TCI-r17 ENUMERATED {n4, n8, n12, n16, n24, n32, n48, n64, n128},

maxConfiguredUL-TCI-r17 ENUMERATED {n4, n8, n12, n16, n24, n32, n48, n64},

maxActivatedDL-TCIAcrossCC-r17 ENUMERATED {n1, n2, n4, n8, n16},

maxActivatedUL-TCIAcrossCC-r17 ENUMERATED {n1, n2, n4, n8, n16}

} OPTIONAL,

-- R1 23-10-1b Unified TCI with separate DL/UL TCI update for intra-cell beam management with more than one MAC-CE

unifiedSeparateTCI-multiMAC-CE-r17 SEQUENCE{

minBeamApplicationTime-r17 ENUMERATED {n1, n2, n4, n7, n14, n28, n42, n56, n70, n84, n98, n112, n224, n336},

maxActivatedDL-TCIPerCC-r17 INTEGER (2..8),

maxActivatedUL-TCIPerCC-r17 INTEGER (2..8)

} OPTIONAL,

-- R1 23-10-1d Per BWP DL/UL-TCI state pool configuration for CA mode

unifiedSeparateTCI-perBWP-CA-r17 ENUMERATED {supported} OPTIONAL,

-- R1 23-10-1e TCI state pool configuration with DL/UL-TCI pool sharing for CA mode

unifiedSeparateTCI-ListSharingCA-r17 SEQUENCE {

maxNumListDL-TCI-r17 ENUMERATED {n1,n2,n4,n8} OPTIONAL,

maxNumListUL-TCI-r17 ENUMERATED {n1,n2,n4,n8} OPTIONAL

} OPTIONAL,

-- R1 23-10-1f Common multi-CC DL/UL-TCI state ID update and activation with separate DL/UL TCI update

unifiedSeparateTCI-commonMultiCC-r17 ENUMERATED {supported} OPTIONAL,

-- 23-10-1m Unified TCI with separate DL/UL TCI update for inter-cell beam management with more than one MAC-CE

unifiedSeparateTCI-InterCell-r17 SEQUENCE {

k-DL-PerCC-r17 ENUMERATED {n0, n1, n2, n4},

k-UL-PerCC-r17 ENUMERATED {n0, n1, n2, n4},

k-DL-AcrossCC-r17 ENUMERATED {n0, n1, n2, n4},

k-UL-AcrossCC-r17 ENUMERATED {n0, n1, n2, n4}

} OPTIONAL,

-- R1 23-1-2 Inter-cell beam measurement and reporting (for inter-cell BM and mTRP)

unifiedJointTCI-mTRP-InterCell-BM-r17 SEQUENCE {

maxNumAdditionalPCI-L1-RSRP-r17 INTEGER (1..7),

maxNumSSB-ResourceL1-RSRP-AcrossCC-r17 ENUMERATED {n1,n2,n4,n8}

} OPTIONAL,

-- R1 23-1-3 MPE mitigation

mpe-Mitigation-r17 SEQUENCE {

maxNumP-MPR-RI-pairs-r17 INTEGER (1..4),

maxNumConfRS-r17 ENUMERATED {n1, n2, n4, n8, n12, n16, n28, n32, n48, n64}

} OPTIONAL,

-- R1 23-1-4 UE capability value reporting

srs-PortReport-r17 SEQUENCE {

capVal1-r17 ENUMERATED {n1, n2, n4} OPTIONAL,

capVal2-r17 ENUMERATED {n1, n2, n4} OPTIONAL,

capVal3-r17 ENUMERATED {n1, n2, n4} OPTIONAL,

capVal4-r17 ENUMERATED {n1, n2, n4} OPTIONAL

} OPTIONAL,

-- R1 23-2-1a Monitoring of individual candidates

mTRP-PDCCH-individual-r17 ENUMERATED {supported} OPTIONAL,

-- R1 23-2-1b PDCCH repetition with PDCCH monitoring on any span of up to 3 consecutive OFDM symbols of a slot

mTRP-PDCCH-anySpan-3Symbols-r17 ENUMERATED {supported} OPTIONAL,

-- R1 23-2-2 Two QCL TypeD for CORESET monitoring in PDCCH repetition

mTRP-PDCCH-TwoQCL-TypeD-r17 ENUMERATED {supported} OPTIONAL,

-- R1 23-3-1-2b CSI-RS processing framework for SRS with two associated CSI-RS resources

mTRP-PUSCH-CSI-RS-r17 SEQUENCE {

maxNumPeriodicSRS-r17 INTEGER (1..8),

maxNumAperiodicSRS-r17 INTEGER (1..8),

maxNumSP-SRS-r17 INTEGER (0..8),

numSRS-ResourcePerCC-r17 INTEGER (1..16),

numSRS-ResourceNonCodebook-r17 INTEGER (1..2)

} OPTIONAL,

-- R1 23-3-1a Cyclic mapping for Multi-TRP PUSCH repetition

mTRP-PUSCH-cyclicMapping-r17 ENUMERATED {typeA,typeB,both} OPTIONAL,

-- R1 23-3-1b Second TPC field for Multi-TRP PUSCH repetition

mTRP-PUSCH-secondTPC-r17 ENUMERATED {supported} OPTIONAL,

-- R1 23-3-1c Two PHR reporting

mTRP-PUSCH-twoPHR-Reporting-r17 ENUMERATED {supported} OPTIONAL,

-- R1 23-3-1e A-CSI report

mTRP-PUSCH-A-CSI-r17 ENUMERATED {supported} OPTIONAL,

-- R1 23-3-1f SP-CSI report

mTRP-PUSCH-SP-CSI-r17 ENUMERATED {supported} OPTIONAL,

-- R1 23-3-1g CG PUSCH transmission

mTRP-PUSCH-CG-r17 ENUMERATED {supported} OPTIONAL,

-- R1 23-3-2d Updating two Spatial relation or two sets of power control parameters for PUCCH group

mTRP-PUCCH-MAC-CE-r17 ENUMERATED {supported} OPTIONAL,

-- R1 23-3-2e Maximum number of power control parameter sets configured for multi-TRP PUCCH repetition in FR1

mTRP-PUCCH-maxNum-PC-FR1-r17 INTEGER (3..8) OPTIONAL,

-- R1 23-4 IntCell-mTRP

mTRP-inter-Cell-r17 SEQUENCE {

maxNumAdditionalPCI-Case1-r17 INTEGER (1..7),

maxNumAdditionalPCI-Case2-r17 INTEGER (0..7)

} OPTIONAL,

-- R1 23-5-1 Group based L1-RSRP reporting enhancements

mTRP-GroupBasedL1-RSRP-r17 SEQUENCE {

maxNumBeamGroups-r17 INTEGER (1..4),

maxNumRS-WithinSlot-r17 ENUMERATED {n2,n3,n4,n8,n16,n32,n64},

maxNumRS-AcrossSlot-r17 ENUMERATED {n8, n16, n32, n64, n128}

} OPTIONAL,

-- R1 23-5-2c MAC-CE based update of explicit BFD-RS mTRP-PUCCH-IntraSlot-r17 => per band

mTRP-BFD-RS-MAC-CE-r17 ENUMERATED {n4, n8, n12, n16, n32, n48, n64 } OPTIONAL,

-- R1 23-7-1 Basic Features of CSI Enhancement for Multi-TRP

mTRP-CSI-EnhancementPerBand-r17 SEQUENCE {

maxNumNZP-CSI-RS-r17 INTEGER (2..8),

cSI-Report-mode-r17 ENUMERATED {mode1, mode2, both},

supportedComboAcrossCCs-r17 SEQUENCE (SIZE (1..16)) OF CSI-MultiTRP-SupportedCombinations-r17,

codebookModeNCJT-r17 ENUMERATED{mode1,mode1And2}

} OPTIONAL,

-- R1 23-7-1b Active CSI-RS resources and ports in the presence of multi-TRP CSI

codebookComboParameterMultiTRP-r17 CodebookComboParameterMultiTRP-r17 OPTIONAL,

-- R1 23-7-1a Additional CSI report mode 1

mTRP-CSI-additionalCSI-r17 ENUMERATED{x1,x2} OPTIONAL,

-- R1 23-7-4 Support of Nmax=2 for Multi-TRP CSI

mTRP-CSI-N-Max2-r17 ENUMERATED {supported} OPTIONAL,

-- R1 23-7-5 CMR sharing

mTRP-CSI-CMR-r17 ENUMERATED {supported} OPTIONAL,

-- R1 23-8-11 Partial frequency sounding of SRS for non-frequency hopping case

srs-partialFreqSounding-r17 ENUMERATED {supported} OPTIONAL,

-- R1-24 feature: Extend beamSwitchTiming for FR2-2

beamSwitchTiming-v1710 SEQUENCE {

scs-480kHz ENUMERATED {sym56, sym112, sym192, sym896, sym1344} OPTIONAL,

scs-960kHz ENUMERATED {sym112, sym224, sym384, sym1792, sym2688} OPTIONAL

} OPTIONAL,

-- R1-24 feature: Extend beamSwitchTiming-r16 for FR2-2

beamSwitchTiming-r17 SEQUENCE {

scs-480kHz-r17 ENUMERATED {sym896, sym1344} OPTIONAL,

scs-960kHz-r17 ENUMERATED {sym1792, sym2688} OPTIONAL

} OPTIONAL,

-- R1-24 feature: Extend beamReportTiming for FR2-2

beamReportTiming-v1710 SEQUENCE {

scs-480kHz-r17 ENUMERATED {sym56, sym112, sym224} OPTIONAL,

scs-960kHz-r17 ENUMERATED {sym112, sym224, sym448} OPTIONAL

} OPTIONAL,

-- R1-24 feature: Extend maximum number of RX/TX beam switch DL for FR2-2

maxNumberRxTxBeamSwitchDL-v1710 SEQUENCE {

scs-480kHz-r17 ENUMERATED {n2, n4, n7} OPTIONAL,

scs-960kHz-r17 ENUMERATED {n1, n2, n4, n7} OPTIONAL

} OPTIONAL

]]

}

DummyG ::= SEQUENCE {

maxNumberSSB-CSI-RS-ResourceOneTx ENUMERATED {n8, n16, n32, n64},

maxNumberSSB-CSI-RS-ResourceTwoTx ENUMERATED {n0, n4, n8, n16, n32, n64},

supportedCSI-RS-Density ENUMERATED {one, three, oneAndThree}

}

BeamManagementSSB-CSI-RS ::= SEQUENCE {

maxNumberSSB-CSI-RS-ResourceOneTx ENUMERATED {n0, n8, n16, n32, n64},

maxNumberCSI-RS-Resource ENUMERATED {n0, n4, n8, n16, n32, n64},

maxNumberCSI-RS-ResourceTwoTx ENUMERATED {n0, n4, n8, n16, n32, n64},

supportedCSI-RS-Density ENUMERATED {one, three, oneAndThree} OPTIONAL,

maxNumberAperiodicCSI-RS-Resource ENUMERATED {n0, n1, n4, n8, n16, n32, n64}

}

DummyH ::= SEQUENCE {

burstLength INTEGER (1..2),

maxSimultaneousResourceSetsPerCC INTEGER (1..8),

maxConfiguredResourceSetsPerCC INTEGER (1..64),

maxConfiguredResourceSetsAllCC INTEGER (1..128)

}

CSI-RS-ForTracking ::= SEQUENCE {

maxBurstLength INTEGER (1..2),

maxSimultaneousResourceSetsPerCC INTEGER (1..8),

maxConfiguredResourceSetsPerCC INTEGER (1..64),

maxConfiguredResourceSetsAllCC INTEGER (1..256)

}

CSI-RS-IM-ReceptionForFeedback ::= SEQUENCE {

maxConfigNumberNZP-CSI-RS-PerCC INTEGER (1..64),

maxConfigNumberPortsAcrossNZP-CSI-RS-PerCC INTEGER (2..256),

maxConfigNumberCSI-IM-PerCC ENUMERATED {n1, n2, n4, n8, n16, n32},

maxNumberSimultaneousNZP-CSI-RS-PerCC INTEGER (1..64),

totalNumberPortsSimultaneousNZP-CSI-RS-PerCC INTEGER (2..256)

}

CSI-RS-ProcFrameworkForSRS ::= SEQUENCE {

maxNumberPeriodicSRS-AssocCSI-RS-PerBWP INTEGER (1..4),

maxNumberAperiodicSRS-AssocCSI-RS-PerBWP INTEGER (1..4),

maxNumberSP-SRS-AssocCSI-RS-PerBWP INTEGER (0..4),

simultaneousSRS-AssocCSI-RS-PerCC INTEGER (1..8)

}

CSI-ReportFramework ::= SEQUENCE {

maxNumberPeriodicCSI-PerBWP-ForCSI-Report INTEGER (1..4),

maxNumberAperiodicCSI-PerBWP-ForCSI-Report INTEGER (1..4),

maxNumberSemiPersistentCSI-PerBWP-ForCSI-Report INTEGER (0..4),

maxNumberPeriodicCSI-PerBWP-ForBeamReport INTEGER (1..4),

maxNumberAperiodicCSI-PerBWP-ForBeamReport INTEGER (1..4),

maxNumberAperiodicCSI-triggeringStatePerCC ENUMERATED {n3, n7, n15, n31, n63, n128},

maxNumberSemiPersistentCSI-PerBWP-ForBeamReport INTEGER (0..4),

simultaneousCSI-ReportsPerCC INTEGER (1..8)

}

CSI-ReportFrameworkExt-r16 ::= SEQUENCE {

maxNumberAperiodicCSI-PerBWP-ForCSI-ReportExt-r16 INTEGER (5..8)

}

PTRS-DensityRecommendationDL ::= SEQUENCE {

frequencyDensity1 INTEGER (1..276),

frequencyDensity2 INTEGER (1..276),

timeDensity1 INTEGER (0..29),

timeDensity2 INTEGER (0..29),

timeDensity3 INTEGER (0..29)

}

PTRS-DensityRecommendationUL ::= SEQUENCE {

frequencyDensity1 INTEGER (1..276),

frequencyDensity2 INTEGER (1..276),

timeDensity1 INTEGER (0..29),

timeDensity2 INTEGER (0..29),

timeDensity3 INTEGER (0..29),

sampleDensity1 INTEGER (1..276),

sampleDensity2 INTEGER (1..276),

sampleDensity3 INTEGER (1..276),

sampleDensity4 INTEGER (1..276),

sampleDensity5 INTEGER (1..276)

}

SpatialRelations ::= SEQUENCE {

maxNumberConfiguredSpatialRelations ENUMERATED {n4, n8, n16, n32, n64, n96},

maxNumberActiveSpatialRelations ENUMERATED {n1, n2, n4, n8, n14},

additionalActiveSpatialRelationPUCCH ENUMERATED {supported} OPTIONAL,

maxNumberDL-RS-QCL-TypeD ENUMERATED {n1, n2, n4, n8, n14}

}

DummyI ::= SEQUENCE {

supportedSRS-TxPortSwitch ENUMERATED {t1r2, t1r4, t2r4, t1r4-t2r4, tr-equal},

txSwitchImpactToRx ENUMERATED {true} OPTIONAL

}

CSI-MultiTRP-SupportedCombinations-r17 ::= SEQUENCE {

maxNumTx-Ports-r17 ENUMERATED {n2, n4, n8, n12, n16, n24, n32},

maxTotalNumCMR-r17 INTEGER (2..64),

maxTotalNumTx-PortsNZP-CSI-RS-r17 INTEGER (2..256)

}

-- TAG-MIMO-PARAMETERSPERBAND-STOP

-- ASN1STOP

|  |
| --- |
| *MIMO-ParametersPerBand* field descriptions |
| ***codebookParametersPerBand***  For a given frequency band, this field this field indicates the alternative list of *SupportedCSI-RS-Resource* supported for each codebook type. The supported CSI-RS resources indicated by this field are referred by *codebookParametersperBC* in *CA-ParametersNR* to indicate the supported CSI-RS resource per band combination. |
| ***csi-RS-IM-ReceptionForFeedback/ csi-RS-ProcFrameworkForSRS/ csi-ReportFramework***  CSI related capabilities which the UE supports on each of the carriers operated on this band. If the network configures the UE with serving cells on both FR1 and FR2 bands these values may be further limited by the corresponding fields in *fr1-fr2-Add-UE-NR-Capabilities*. |
| ***supportNewDMRS-Port***  Presence of this field set to *supported1*, *supported2* or *supported3* indicates that the UE supports the new DMRS port entry {0,2,3}. |

#### – *ModulationOrder*

The IE *ModulationOrder* is used to convey the maximum supported modulation order.

*ModulationOrder* information element

-- ASN1START

-- TAG-MODULATIONORDER-START

ModulationOrder ::= ENUMERATED {bpsk-halfpi, bpsk, qpsk, qam16, qam64, qam256}

-- TAG-MODULATIONORDER-STOP

-- ASN1STOP

#### – *MRDC-Parameters*

The IE *MRDC-Parameters* contains the band combination parameters specific to MR-DC for a given MR-DC band combination.

*MRDC-Parameters* information element

-- ASN1START

-- TAG-MRDC-PARAMETERS-START

MRDC-Parameters ::= SEQUENCE {

singleUL-Transmission ENUMERATED {supported} OPTIONAL,

dynamicPowerSharingENDC ENUMERATED {supported} OPTIONAL,

tdm-Pattern ENUMERATED {supported} OPTIONAL,

ul-SharingEUTRA-NR ENUMERATED {tdm, fdm, both} OPTIONAL,

ul-SwitchingTimeEUTRA-NR ENUMERATED {type1, type2} OPTIONAL,

simultaneousRxTxInterBandENDC ENUMERATED {supported} OPTIONAL,

asyncIntraBandENDC ENUMERATED {supported} OPTIONAL,

...,

[[

dualPA-Architecture ENUMERATED {supported} OPTIONAL,

intraBandENDC-Support ENUMERATED {non-contiguous, both} OPTIONAL,

ul-TimingAlignmentEUTRA-NR ENUMERATED {required} OPTIONAL

]]

}

MRDC-Parameters-v1580 ::= SEQUENCE {

dynamicPowerSharingNEDC ENUMERATED {supported} OPTIONAL

}

MRDC-Parameters-v1590 ::= SEQUENCE {

interBandContiguousMRDC ENUMERATED {supported} OPTIONAL

}

MRDC-Parameters-v15g0 ::= SEQUENCE {

simultaneousRxTxInterBandENDCPerBandPair SimultaneousRxTxPerBandPair OPTIONAL

}

MRDC-Parameters-v1620 ::= SEQUENCE {

maxUplinkDutyCycle-interBandENDC-TDD-PC2-r16 SEQUENCE{

eutra-TDD-Config0-r16 ENUMERATED {n20, n40, n50, n60, n70, n80, n90, n100} OPTIONAL,

eutra-TDD-Config1-r16 ENUMERATED {n20, n40, n50, n60, n70, n80, n90, n100} OPTIONAL,

eutra-TDD-Config2-r16 ENUMERATED {n20, n40, n50, n60, n70, n80, n90, n100} OPTIONAL,

eutra-TDD-Config3-r16 ENUMERATED {n20, n40, n50, n60, n70, n80, n90, n100} OPTIONAL,

eutra-TDD-Config4-r16 ENUMERATED {n20, n40, n50, n60, n70, n80, n90, n100} OPTIONAL,

eutra-TDD-Config5-r16 ENUMERATED {n20, n40, n50, n60, n70, n80, n90, n100} OPTIONAL,

eutra-TDD-Config6-r16 ENUMERATED {n20, n40, n50, n60, n70, n80, n90, n100} OPTIONAL

} OPTIONAL,

-- R1 18-2 Single UL TX operation for TDD PCell in EN-DC

tdm-restrictionTDD-endc-r16 ENUMERATED {supported} OPTIONAL,

-- R1 18-2a Single UL TX operation for FDD PCell in EN-DC

tdm-restrictionFDD-endc-r16 ENUMERATED {supported} OPTIONAL,

-- R1 18-2b Support of HARQ-offset for SUO case1 in EN-DC with LTE TDD PCell for type 1 UE

singleUL-HARQ-offsetTDD-PCell-r16 ENUMERATED {supported} OPTIONAL,

-- R1 18-3 Dual Tx transmission for EN-DC with FDD PCell(TDM pattern for dual Tx UE)

tdm-restrictionDualTX-FDD-endc-r16 ENUMERATED {supported} OPTIONAL

}

MRDC-Parameters-v1630 ::= SEQUENCE {

-- R4 2-20 Maximum uplink duty cycle for FDD+TDD EN-DC power class 2

maxUplinkDutyCycle-interBandENDC-FDD-TDD-PC2-r16 SEQUENCE {

maxUplinkDutyCycle-FDD-TDD-EN-DC1-r16 ENUMERATED {n30, n40, n50, n60, n70, n80, n90, n100} OPTIONAL,

maxUplinkDutyCycle-FDD-TDD-EN-DC2-r16 ENUMERATED {n30, n40, n50, n60, n70, n80, n90, n100} OPTIONAL

} OPTIONAL,

-- R4 2-19 FDD-FDD or TDD-TDD inter-band MR-DC with overlapping or partially overlapping DL spectrum

interBandMRDC-WithOverlapDL-Bands-r16 ENUMERATED {supported} OPTIONAL

}

MRDC-Parameters-v1700 ::= SEQUENCE {

condPSCellAdditionENDC-r17 ENUMERATED {supported} OPTIONAL,

scg-ActivationDeactivationENDC-r17 ENUMERATED {supported} OPTIONAL,

scg-ActivationDeactivationResumeENDC-r17 ENUMERATED {supported} OPTIONAL

}

-- TAG-MRDC-PARAMETERS-STOP

-- ASN1STOP

#### – *NRDC-Parameters*

The IE *NRDC-Parameters* contains parameters specific to NR-DC, i.e., which are not applicable to NR SA.

*NRDC-Parameters* information element

-- ASN1START

-- TAG-NRDC-PARAMETERS-START

NRDC-Parameters ::= SEQUENCE {

measAndMobParametersNRDC MeasAndMobParametersMRDC OPTIONAL,

generalParametersNRDC GeneralParametersMRDC-XDD-Diff OPTIONAL,

fdd-Add-UE-NRDC-Capabilities UE-MRDC-CapabilityAddXDD-Mode OPTIONAL,

tdd-Add-UE-NRDC-Capabilities UE-MRDC-CapabilityAddXDD-Mode OPTIONAL,

fr1-Add-UE-NRDC-Capabilities UE-MRDC-CapabilityAddFRX-Mode OPTIONAL,

fr2-Add-UE-NRDC-Capabilities UE-MRDC-CapabilityAddFRX-Mode OPTIONAL,

dummy2 OCTET STRING OPTIONAL,

dummy SEQUENCE {} OPTIONAL

}

NRDC-Parameters-v1570 ::= SEQUENCE {

sfn-SyncNRDC ENUMERATED {supported} OPTIONAL

}

NRDC-Parameters-v15c0 ::= SEQUENCE {

pdcp-DuplicationSplitSRB ENUMERATED {supported} OPTIONAL,

pdcp-DuplicationSplitDRB ENUMERATED {supported} OPTIONAL

}

NRDC-Parameters-v1610 ::= SEQUENCE {

measAndMobParametersNRDC-v1610 MeasAndMobParametersMRDC-v1610 OPTIONAL

}

NRDC-Parameters-v1700 ::= SEQUENCE {

f1c-OverNR-RRC-r17 ENUMERATED {supported} OPTIONAL,

measAndMobParametersNRDC-v1700 MeasAndMobParametersMRDC-v1700

}

-- TAG-NRDC-PARAMETERS-STOP

-- ASN1STOP

#### – NTN-Parameters

The IE *NTN-Parameters* is used to convey the subset of UE Radio Access Capability Parameters that apply to NTN access when there is a difference compared to TN access.

*NTN-Parameters* information element

-- ASN1START

-- TAG-NTN-PARAMETERS-START

NTN-Parameters-r17 ::= SEQUENCE {

inactiveStateNTN-r17 ENUMERATED {supported} OPTIONAL,

ra-SDT-NTN-r17 ENUMERATED {supported} OPTIONAL,

srb-SDT-NTN-r17 ENUMERATED {supported} OPTIONAL,

measAndMobParametersNTN-r17 MeasAndMobParameters OPTIONAL,

mac-ParametersNTN-r17 MAC-Parameters OPTIONAL,

phy-ParametersNTN-r17 Phy-Parameters OPTIONAL,

fdd-Add-UE-NR-CapabilitiesNTN-r17 UE-NR-CapabilityAddXDD-Mode OPTIONAL,

fr1-Add-UE-NR-CapabilitiesNTN-r17 UE-NR-CapabilityAddFRX-Mode OPTIONAL,

ue-BasedPerfMeas-ParametersNTN-r17 UE-BasedPerfMeas-Parameters-r16 OPTIONAL,

son-ParametersNTN-r17 SON-Parameters-r16 OPTIONAL

}

-- TAG-NTN-PARAMETERS-STOP

-- ASN1STOP

|  |
| --- |
| *NTN-Parameters* field descriptions |
| ***fdd-Add-UE-NR-CapabilitiesNTN***  NTN related capabilities which the UE supports in NTN differently than in TN. If absent, *fdd-Add-UE-NR-Capabilities* applies to NTN. |
| ***fr1-Add-UE-NR-CapabilitiesNTN***  NTN related capabilities which the UE supports in NTN differently than in TN. If absent, *fr1-Add-UE-NR-Capabilities* applies to NTN. |
| ***inactiveStateNTN***  The field indicates whether the RRC INACTIVE state is supported in NTN. If absent, *inactiveState* doesn't apply to NTN. |
| ***mac-ParametersNTN***  NTN related capabilities which the UE supports in NTN differently than in TN. If absent, *mac-Parameters* applies to NTN. |
| ***measAndMobParametersNTN***  NTN related capabilities which the UE supports in NTN differently than in TN. If absent, *measAndMobParameters* applies to NTN. |
| ***phy-ParametersNTN***  NTN related capabilities which the UE supports in NTN differently than in TN. If absent, *phy-Parameters* applies to NTN. |
| ***ra-SDT-NTN***  The field indicates whether the RA-SDT is supported in NTN. If absent, *ra-SDT-r17* doesn't apply to NTN. |
| ***son-ParametersNTN***  NTN related capabilities which the UE supports in NTN differently than in TN. If absent, *son-Parameters-r16* applies to NTN. |
| ***srb-SDT-NTN***  The field indicates whether the SRB-SDT is supported in NTN. If absent, *srb-SDT-r17* doesn't apply to NTN. |
| ***ue-BasedPerfMeas-ParametersNTN***  NTN related capabilities which the UE supports in NTN differently than in TN. If absent, *ue-BasedPerfMeas-Parameters-r16* applies to NTN. |

#### – *OLPC-SRS-Pos*

The IE *OLPC-SRS-Pos* is used to convey OLPC SRS positioning related parameters specific for a certain band.

*OLPC-SRS-Pos* information element

-- ASN1START

-- TAG-OLPC-SRS-POS-START

OLPC-SRS-Pos-r16 ::= SEQUENCE {

olpc-SRS-PosBasedOnPRS-Serving-r16 ENUMERATED {supported} OPTIONAL,

olpc-SRS-PosBasedOnSSB-Neigh-r16 ENUMERATED {supported} OPTIONAL,

olpc-SRS-PosBasedOnPRS-Neigh-r16 ENUMERATED {supported} OPTIONAL,

maxNumberPathLossEstimatePerServing-r16 ENUMERATED {n1, n4, n8, n16} OPTIONAL

}

--TAG-OLPC-SRS-POS-STOP

-- ASN1STOP

#### – *PDCP-Parameters*

The IE *PDCP-Parameters* is used to convey capabilities related to PDCP.

*PDCP-Parameters* information element

-- ASN1START

-- TAG-PDCP-PARAMETERS-START

PDCP-Parameters ::= SEQUENCE {

supportedROHC-Profiles SEQUENCE {

profile0x0000 BOOLEAN,

profile0x0001 BOOLEAN,

profile0x0002 BOOLEAN,

profile0x0003 BOOLEAN,

profile0x0004 BOOLEAN,

profile0x0006 BOOLEAN,

profile0x0101 BOOLEAN,

profile0x0102 BOOLEAN,

profile0x0103 BOOLEAN,

profile0x0104 BOOLEAN

},

maxNumberROHC-ContextSessions ENUMERATED {cs2, cs4, cs8, cs12, cs16, cs24, cs32, cs48, cs64,

cs128, cs256, cs512, cs1024, cs16384, spare2, spare1},

uplinkOnlyROHC-Profiles ENUMERATED {supported} OPTIONAL,

continueROHC-Context ENUMERATED {supported} OPTIONAL,

outOfOrderDelivery ENUMERATED {supported} OPTIONAL,

shortSN ENUMERATED {supported} OPTIONAL,

pdcp-DuplicationSRB ENUMERATED {supported} OPTIONAL,

pdcp-DuplicationMCG-OrSCG-DRB ENUMERATED {supported} OPTIONAL,

...,

[[

drb-IAB-r16 ENUMERATED {supported} OPTIONAL,

non-DRB-IAB-r16 ENUMERATED {supported} OPTIONAL,

extendedDiscardTimer-r16 ENUMERATED {supported} OPTIONAL,

continueEHC-Context-r16 ENUMERATED {supported} OPTIONAL,

ehc-r16 ENUMERATED {supported} OPTIONAL,

maxNumberEHC-Contexts-r16 ENUMERATED {cs2, cs4, cs8, cs16, cs32, cs64, cs128, cs256, cs512,

cs1024, cs2048, cs4096, cs8192, cs16384, cs32768, cs65536} OPTIONAL,

jointEHC-ROHC-Config-r16 ENUMERATED {supported} OPTIONAL,

pdcp-DuplicationMoreThanTwoRLC-r16 ENUMERATED {supported} OPTIONAL

]],

[[

longSN-RedCap-r17 ENUMERATED {supported} OPTIONAL,

udc-r17 SEQUENCE {

standardDictionary-r17 ENUMERATED {supported} OPTIONAL,

operatorDictionary-r17 SEQUENCE {

versionOfDictionary-r17 INTEGER (0..15),

associatedPLMN-ID-r17 PLMN-Identity

} OPTIONAL,

continueUDC-r17 ENUMERATED {supported} OPTIONAL,

supportOfBufferSize-r17 ENUMERATED {kbyte4, kbyte8} OPTIONAL

} OPTIONAL

]]

}

-- TAG-PDCP-PARAMETERS-STOP

-- ASN1STOP

#### – *PDCP-ParametersMRDC*

The IE *PDCP-ParametersMRDC* is used to convey PDCP related capabilities for MR-DC.

*PDCP-ParametersMRDC* information element

-- ASN1START

-- TAG-PDCP-PARAMETERSMRDC-START

PDCP-ParametersMRDC ::= SEQUENCE {

pdcp-DuplicationSplitSRB ENUMERATED {supported} OPTIONAL,

pdcp-DuplicationSplitDRB ENUMERATED {supported} OPTIONAL

}

PDCP-ParametersMRDC-v1610 ::= SEQUENCE {

scg-DRB-NR-IAB-r16 ENUMERATED {supported} OPTIONAL

}

-- TAG-PDCP-PARAMETERSMRDC-STOP

-- ASN1STOP

#### – *Phy-Parameters*

The IE *Phy-Parameters* is used to convey the physical layer capabilities.

*Phy-Parameters* information element

-- ASN1START

-- TAG-PHY-PARAMETERS-START

Phy-Parameters ::= SEQUENCE {

phy-ParametersCommon Phy-ParametersCommon OPTIONAL,

phy-ParametersXDD-Diff Phy-ParametersXDD-Diff OPTIONAL,

phy-ParametersFRX-Diff Phy-ParametersFRX-Diff OPTIONAL,

phy-ParametersFR1 Phy-ParametersFR1 OPTIONAL,

phy-ParametersFR2 Phy-ParametersFR2 OPTIONAL

}

Phy-ParametersCommon ::= SEQUENCE {

csi-RS-CFRA-ForHO ENUMERATED {supported} OPTIONAL,

dynamicPRB-BundlingDL ENUMERATED {supported} OPTIONAL,

sp-CSI-ReportPUCCH ENUMERATED {supported} OPTIONAL,

sp-CSI-ReportPUSCH ENUMERATED {supported} OPTIONAL,

nzp-CSI-RS-IntefMgmt ENUMERATED {supported} OPTIONAL,

type2-SP-CSI-Feedback-LongPUCCH ENUMERATED {supported} OPTIONAL,

precoderGranularityCORESET ENUMERATED {supported} OPTIONAL,

dynamicHARQ-ACK-Codebook ENUMERATED {supported} OPTIONAL,

semiStaticHARQ-ACK-Codebook ENUMERATED {supported} OPTIONAL,

spatialBundlingHARQ-ACK ENUMERATED {supported} OPTIONAL,

dynamicBetaOffsetInd-HARQ-ACK-CSI ENUMERATED {supported} OPTIONAL,

pucch-Repetition-F1-3-4 ENUMERATED {supported} OPTIONAL,

ra-Type0-PUSCH ENUMERATED {supported} OPTIONAL,

dynamicSwitchRA-Type0-1-PDSCH ENUMERATED {supported} OPTIONAL,

dynamicSwitchRA-Type0-1-PUSCH ENUMERATED {supported} OPTIONAL,

pdsch-MappingTypeA ENUMERATED {supported} OPTIONAL,

pdsch-MappingTypeB ENUMERATED {supported} OPTIONAL,

interleavingVRB-ToPRB-PDSCH ENUMERATED {supported} OPTIONAL,

interSlotFreqHopping-PUSCH ENUMERATED {supported} OPTIONAL,

type1-PUSCH-RepetitionMultiSlots ENUMERATED {supported} OPTIONAL,

type2-PUSCH-RepetitionMultiSlots ENUMERATED {supported} OPTIONAL,

pusch-RepetitionMultiSlots ENUMERATED {supported} OPTIONAL,

pdsch-RepetitionMultiSlots ENUMERATED {supported} OPTIONAL,

downlinkSPS ENUMERATED {supported} OPTIONAL,

configuredUL-GrantType1 ENUMERATED {supported} OPTIONAL,

configuredUL-GrantType2 ENUMERATED {supported} OPTIONAL,

pre-EmptIndication-DL ENUMERATED {supported} OPTIONAL,

cbg-TransIndication-DL ENUMERATED {supported} OPTIONAL,

cbg-TransIndication-UL ENUMERATED {supported} OPTIONAL,

cbg-FlushIndication-DL ENUMERATED {supported} OPTIONAL,

dynamicHARQ-ACK-CodeB-CBG-Retx-DL ENUMERATED {supported} OPTIONAL,

rateMatchingResrcSetSemi-Static ENUMERATED {supported} OPTIONAL,

rateMatchingResrcSetDynamic ENUMERATED {supported} OPTIONAL,

bwp-SwitchingDelay ENUMERATED {type1, type2} OPTIONAL,

...,

[[

dummy ENUMERATED {supported} OPTIONAL

]],

[[

maxNumberSearchSpaces ENUMERATED {n10} OPTIONAL,

rateMatchingCtrlResrcSetDynamic ENUMERATED {supported} OPTIONAL,

maxLayersMIMO-Indication ENUMERATED {supported} OPTIONAL

]],

[[

spCellPlacement CarrierAggregationVariant OPTIONAL

]],

[[

-- R1 9-1: Basic channel structure and procedure of 2-step RACH

twoStepRACH-r16 ENUMERATED {supported} OPTIONAL,

-- R1 11-1: Monitoring DCI format 1\_2 and DCI format 0\_2

dci-Format1-2And0-2-r16 ENUMERATED {supported} OPTIONAL,

-- R1 11-1a: Monitoring both DCI format 0\_1/1\_1 and DCI format 0\_2/1\_2 in the same search space

monitoringDCI-SameSearchSpace-r16 ENUMERATED {supported} OPTIONAL,

-- R1 11-10: Type 2 configured grant release by DCI format 0\_1

type2-CG-ReleaseDCI-0-1-r16 ENUMERATED {supported} OPTIONAL,

-- R1 11-11: Type 2 configured grant release by DCI format 0\_2

type2-CG-ReleaseDCI-0-2-r16 ENUMERATED {supported} OPTIONAL,

-- R1 12-3: SPS release by DCI format 1\_1

sps-ReleaseDCI-1-1-r16 ENUMERATED {supported} OPTIONAL,

-- R1 12-3a: SPS release by DCI format 1\_2

sps-ReleaseDCI-1-2-r16 ENUMERATED {supported} OPTIONAL,

-- R1 14-8: CSI trigger states containing non-active BWP

csi-TriggerStateNon-ActiveBWP-r16 ENUMERATED {supported} OPTIONAL,

-- R1 20-2: Support up to 4 SMTCs configured for an IAB node MT per frequency location, including IAB-specific SMTC window periodicities

separateSMTC-InterIAB-Support-r16 ENUMERATED {supported} OPTIONAL,

-- R1 20-3: Support RACH configuration separately from the RACH configuration for UE access, including new IAB-specific offset and scaling factors

separateRACH-IAB-Support-r16 ENUMERATED {supported} OPTIONAL,

-- R1 20-5a: Support semi-static configuration/indication of UL-Flexible-DL slot formats for IAB-MT resources

ul-flexibleDL-SlotFormatSemiStatic-IAB-r16 ENUMERATED {supported} OPTIONAL,

-- R1 20-5b: Support dynamic indication of UL-Flexible-DL slot formats for IAB-MT resources

ul-flexibleDL-SlotFormatDynamics-IAB-r16 ENUMERATED {supported} OPTIONAL,

dft-S-OFDM-WaveformUL-IAB-r16 ENUMERATED {supported} OPTIONAL,

-- R1 20-6: Support DCI Format 2\_5 based indication of soft resource availability to an IAB node

dci-25-AI-RNTI-Support-IAB-r16 ENUMERATED {supported} OPTIONAL,

-- R1 20-7: Support T\_delta reception.

t-DeltaReceptionSupport-IAB-r16 ENUMERATED {supported} OPTIONAL,

-- R1 20-8: Support of Desired guard symbol reporting and provided guard symbok reception.

guardSymbolReportReception-IAB-r16 ENUMERATED {supported} OPTIONAL,

-- R1 18-8 HARQ-ACK codebook type and spatial bundling per PUCCH group

harqACK-CB-SpatialBundlingPUCCH-Group-r16 ENUMERATED {supported} OPTIONAL,

-- R1 19-2: Cross Slot Scheduling

crossSlotScheduling-r16 SEQUENCE {

non-SharedSpectrumChAccess-r16 ENUMERATED {supported} OPTIONAL,

sharedSpectrumChAccess-r16 ENUMERATED {supported} OPTIONAL

} OPTIONAL,

maxNumberSRS-PosPathLossEstimateAllServingCells-r16 ENUMERATED {n1, n4, n8, n16} OPTIONAL,

extendedCG-Periodicities-r16 ENUMERATED {supported} OPTIONAL,

extendedSPS-Periodicities-r16 ENUMERATED {supported} OPTIONAL,

codebookVariantsList-r16 CodebookVariantsList-r16 OPTIONAL,

-- R1 11-6: PUSCH repetition Type A

pusch-RepetitionTypeA-r16 SEQUENCE {

sharedSpectrumChAccess-r16 ENUMERATED {supported} OPTIONAL,

non-SharedSpectrumChAccess-r16 ENUMERATED {supported} OPTIONAL

} OPTIONAL,

-- R1 11-4b: DL priority indication in DCI with mixed DCI formats

dci-DL-PriorityIndicator-r16 ENUMERATED {supported} OPTIONAL,

-- R1 12-1a: UL priority indication in DCI with mixed DCI formats

dci-UL-PriorityIndicator-r16 ENUMERATED {supported} OPTIONAL,

-- R1 16-1e: Maximum number of configured pathloss reference RSs for PUSCH/PUCCH/SRS by RRC for MAC-CE based pathloss reference RS update

maxNumberPathlossRS-Update-r16 ENUMERATED {n4, n8, n16, n32, n64} OPTIONAL,

-- R1 18-9: Usage of the PDSCH starting time for HARQ-ACK type 2 codebook

type2-HARQ-ACK-Codebook-r16 ENUMERATED {supported} OPTIONAL,

-- R1 16-1g-1: Resources for beam management, pathloss measurement, BFD, RLM and new beam identification across frequency ranges

maxTotalResourcesForAcrossFreqRanges-r16 SEQUENCE {

maxNumberResWithinSlotAcrossCC-AcrossFR-r16 ENUMERATED {n2, n4, n8, n12, n16, n32, n64, n128} OPTIONAL,

maxNumberResAcrossCC-AcrossFR-r16 ENUMERATED {n2, n4, n8, n12, n16, n32, n40, n48, n64, n72, n80, n96, n128, n256}

OPTIONAL

} OPTIONAL,

-- R1 16-2a-4: HARQ-ACK for multi-DCI based multi-TRP – separate

harqACK-separateMultiDCI-MultiTRP-r16 SEQUENCE {

maxNumberLongPUCCHs-r16 ENUMERATED {longAndLong, longAndShort, shortAndShort} OPTIONAL

} OPTIONAL,

-- R1 16-2a-4: HARQ-ACK for multi-DCI based multi-TRP – joint

harqACK-jointMultiDCI-MultiTRP-r16 ENUMERATED {supported} OPTIONAL,

-- R4 9-1: BWP switching on multiple CCs RRM requirements

bwp-SwitchingMultiCCs-r16 CHOICE {

type1-r16 ENUMERATED {us100, us200},

type2-r16 ENUMERATED {us200, us400, us800, us1000}

} OPTIONAL

]],

[[

targetSMTC-SCG-r16 ENUMERATED {supported} OPTIONAL,

supportRepetitionZeroOffsetRV-r16 ENUMERATED {supported} OPTIONAL,

-- R1 11-12: in-order CBG-based re-transmission

cbg-TransInOrderPUSCH-UL-r16 ENUMERATED {supported} OPTIONAL

]],

[[

-- R4 6-3: Dormant BWP switching on multiple CCs RRM requirements

bwp-SwitchingMultiDormancyCCs-r16 CHOICE {

type1-r16 ENUMERATED {us100, us200},

type2-r16 ENUMERATED {us200, us400, us800, us1000}

} OPTIONAL,

-- R1 16-2a-8: Indicates that retransmission scheduled by a different CORESETPoolIndex for multi-DCI multi-TRP is not supported.

supportRetx-Diff-CoresetPool-Multi-DCI-TRP-r16 ENUMERATED {notSupported} OPTIONAL,

-- R1 22-10: Support of pdcch-MonitoringAnyOccasionsWithSpanGap in case of cross-carrier scheduling with different SCSs

pdcch-MonitoringAnyOccasionsWithSpanGapCrossCarrierSch-r16 ENUMERATED {mode2, mode3} OPTIONAL

]],

[[

-- R1 16-1j-1: Support of 2 port CSI-RS for new beam identification

newBeamIdentifications2PortCSI-RS-r16 ENUMERATED {supported} OPTIONAL,

-- R1 16-1j-2: Support of 2 port CSI-RS for pathloss estimation

pathlossEstimation2PortCSI-RS-r16 ENUMERATED {supported} OPTIONAL

]],

[[

mux-HARQ-ACK-withoutPUCCH-onPUSCH-r16 ENUMERATED {supported} OPTIONAL

]],

[[

-- R1 31-1: Support of Desired Guard Symbol reporting and provided guard symbol reception.

guardSymbolReportReception-IAB-r17 ENUMERATED {supported} OPTIONAL,

-- R1 31-2: support of restricted IAB-DU beam reception

restricted-IAB-DU-BeamReception-r17 ENUMERATED {supported} OPTIONAL,

-- R1 31-3: support of recommended IAB-MT beam transmission for DL and UL beam

recommended-IAB-MT-BeamTransmission-r17 ENUMERATED {supported} OPTIONAL,

-- R1 31-4: support of case 6 timing alignment indication reception

case6-TimingAlignmentReception-IAB-r17 ENUMERATED {supported} OPTIONAL,

-- R1 31-5: support of case 7 timing offset indication reception and case 7 timing at parent-node indication reception

case7-TimingAlignmentReception-IAB-r17 ENUMERATED {supported} OPTIONAL,

-- R1 31-6: support of desired DL Tx power adjustment reporting and DL Tx power adjustment reception

dl-tx-PowerAdjustment-IAB-r17 ENUMERATED {supported} OPTIONAL,

-- R1 31-7: support of desired IAB-MT PSD range reporting

desired-ul-tx-PowerAdjustment-r17 ENUMERATED {supported} OPTIONAL,

-- R1 31-8: support of monitoring DCI Format 2\_5 scrambled by AI-RNTI for indication of FDM soft resource availability to an IAB node

fdm-SoftResourceAvailability-DynamicIndication-r17 ENUMERATED{supported} OPTIONAL,

-- R1 31-10: Support of updated T\_delta range reception

updated-T-DeltaRangeRecption-r17 ENUMERATED{supported} OPTIONAL,

-- R1 30-5: Support slot based dynamic PUCCH repetition indication for PUCCH formats 0/1/2/3/4

slotBasedDynamicPUCCH-Rep-r17 ENUMERATED {supported} OPTIONAL,

-- R1 25-1: Support of HARQ-ACK deferral in case of TDD collision

sps-HARQ-ACK-Deferral-r17 SEQUENCE {

non-SharedSpectrumChAccess-r17 ENUMERATED {supported} OPTIONAL,

sharedSpectrumChAccess-r17 ENUMERATED {supported} OPTIONAL

} OPTIONAL,

-- R1 23-1-1k Maximum number of configured CC lists (per UE)

unifiedJointTCI-commonUpdate-r17 INTEGER (1..4) OPTIONAL,

-- R1 23-2-1c PDCCH repetition with a single span of three contiguous OFDM symbols that is within the first four OFDM symbols in a slot

mTRP-PDCCH-singleSpan-r17 ENUMERATED {supported} OPTIONAL,

-- R1 27-23: Support of more than one activated PRS processing windows across all active DL BWPs

supportedActivatedPRS-ProcessingWindow-r17 ENUMERATED {n2, n3, n4} OPTIONAL,

cg-TimeDomainAllocationExtension-r17 ENUMERATED {supported} OPTIONAL

]]

}

Phy-ParametersXDD-Diff ::= SEQUENCE {

dynamicSFI ENUMERATED {supported} OPTIONAL,

twoPUCCH-F0-2-ConsecSymbols ENUMERATED {supported} OPTIONAL,

twoDifferentTPC-Loop-PUSCH ENUMERATED {supported} OPTIONAL,

twoDifferentTPC-Loop-PUCCH ENUMERATED {supported} OPTIONAL,

...,

[[

dl-SchedulingOffset-PDSCH-TypeA ENUMERATED {supported} OPTIONAL,

dl-SchedulingOffset-PDSCH-TypeB ENUMERATED {supported} OPTIONAL,

ul-SchedulingOffset ENUMERATED {supported} OPTIONAL

]]

}

Phy-ParametersFRX-Diff ::= SEQUENCE {

dynamicSFI ENUMERATED {supported} OPTIONAL,

dummy1 BIT STRING (SIZE (2)) OPTIONAL,

twoFL-DMRS BIT STRING (SIZE (2)) OPTIONAL,

dummy2 BIT STRING (SIZE (2)) OPTIONAL,

dummy3 BIT STRING (SIZE (2)) OPTIONAL,

supportedDMRS-TypeDL ENUMERATED {type1, type1And2} OPTIONAL,

supportedDMRS-TypeUL ENUMERATED {type1, type1And2} OPTIONAL,

semiOpenLoopCSI ENUMERATED {supported} OPTIONAL,

csi-ReportWithoutPMI ENUMERATED {supported} OPTIONAL,

csi-ReportWithoutCQI ENUMERATED {supported} OPTIONAL,

onePortsPTRS BIT STRING (SIZE (2)) OPTIONAL,

twoPUCCH-F0-2-ConsecSymbols ENUMERATED {supported} OPTIONAL,

pucch-F2-WithFH ENUMERATED {supported} OPTIONAL,

pucch-F3-WithFH ENUMERATED {supported} OPTIONAL,

pucch-F4-WithFH ENUMERATED {supported} OPTIONAL,

pucch-F0-2WithoutFH ENUMERATED {notSupported} OPTIONAL,

pucch-F1-3-4WithoutFH ENUMERATED {notSupported} OPTIONAL,

mux-SR-HARQ-ACK-CSI-PUCCH-MultiPerSlot ENUMERATED {supported} OPTIONAL,

uci-CodeBlockSegmentation ENUMERATED {supported} OPTIONAL,

onePUCCH-LongAndShortFormat ENUMERATED {supported} OPTIONAL,

twoPUCCH-AnyOthersInSlot ENUMERATED {supported} OPTIONAL,

intraSlotFreqHopping-PUSCH ENUMERATED {supported} OPTIONAL,

pusch-LBRM ENUMERATED {supported} OPTIONAL,

pdcch-BlindDetectionCA INTEGER (4..16) OPTIONAL,

tpc-PUSCH-RNTI ENUMERATED {supported} OPTIONAL,

tpc-PUCCH-RNTI ENUMERATED {supported} OPTIONAL,

tpc-SRS-RNTI ENUMERATED {supported} OPTIONAL,

absoluteTPC-Command ENUMERATED {supported} OPTIONAL,

twoDifferentTPC-Loop-PUSCH ENUMERATED {supported} OPTIONAL,

twoDifferentTPC-Loop-PUCCH ENUMERATED {supported} OPTIONAL,

pusch-HalfPi-BPSK ENUMERATED {supported} OPTIONAL,

pucch-F3-4-HalfPi-BPSK ENUMERATED {supported} OPTIONAL,

almostContiguousCP-OFDM-UL ENUMERATED {supported} OPTIONAL,

sp-CSI-RS ENUMERATED {supported} OPTIONAL,

sp-CSI-IM ENUMERATED {supported} OPTIONAL,

tdd-MultiDL-UL-SwitchPerSlot ENUMERATED {supported} OPTIONAL,

multipleCORESET ENUMERATED {supported} OPTIONAL,

...,

[[

csi-RS-IM-ReceptionForFeedback CSI-RS-IM-ReceptionForFeedback OPTIONAL,

csi-RS-ProcFrameworkForSRS CSI-RS-ProcFrameworkForSRS OPTIONAL,

csi-ReportFramework CSI-ReportFramework OPTIONAL,

mux-SR-HARQ-ACK-CSI-PUCCH-OncePerSlot SEQUENCE {

sameSymbol ENUMERATED {supported} OPTIONAL,

diffSymbol ENUMERATED {supported} OPTIONAL

} OPTIONAL,

mux-SR-HARQ-ACK-PUCCH ENUMERATED {supported} OPTIONAL,

mux-MultipleGroupCtrlCH-Overlap ENUMERATED {supported} OPTIONAL,

dl-SchedulingOffset-PDSCH-TypeA ENUMERATED {supported} OPTIONAL,

dl-SchedulingOffset-PDSCH-TypeB ENUMERATED {supported} OPTIONAL,

ul-SchedulingOffset ENUMERATED {supported} OPTIONAL,

dl-64QAM-MCS-TableAlt ENUMERATED {supported} OPTIONAL,

ul-64QAM-MCS-TableAlt ENUMERATED {supported} OPTIONAL,

cqi-TableAlt ENUMERATED {supported} OPTIONAL,

oneFL-DMRS-TwoAdditionalDMRS-UL ENUMERATED {supported} OPTIONAL,

twoFL-DMRS-TwoAdditionalDMRS-UL ENUMERATED {supported} OPTIONAL,

oneFL-DMRS-ThreeAdditionalDMRS-UL ENUMERATED {supported} OPTIONAL

]],

[[

pdcch-BlindDetectionNRDC SEQUENCE {

pdcch-BlindDetectionMCG-UE INTEGER (1..15),

pdcch-BlindDetectionSCG-UE INTEGER (1..15)

} OPTIONAL,

mux-HARQ-ACK-PUSCH-DiffSymbol ENUMERATED {supported} OPTIONAL

]],

[[

-- R1 11-1b: Type 1 HARQ-ACK codebook support for relative TDRA for DL

type1-HARQ-ACK-Codebook-r16 ENUMERATED {supported} OPTIONAL,

-- R1 11-8: Enhanced UL power control scheme

enhancedPowerControl-r16 ENUMERATED {supported} OPTIONAL,

-- R1 16-1b-1: TCI state activation across multiple CCs

simultaneousTCI-ActMultipleCC-r16 ENUMERATED {supported} OPTIONAL,

-- R1 16-1b-2: Spatial relation update across multiple CCs

simultaneousSpatialRelationMultipleCC-r16 ENUMERATED {supported} OPTIONAL,

cli-RSSI-FDM-DL-r16 ENUMERATED {supported} OPTIONAL,

cli-SRS-RSRP-FDM-DL-r16 ENUMERATED {supported} OPTIONAL,

-- R1 19-3: Maximum MIMO Layer Adaptation

maxLayersMIMO-Adaptation-r16 ENUMERATED {supported} OPTIONAL,

-- R1 12-5: Configuration of aggregation factor per SPS configuration

aggregationFactorSPS-DL-r16 ENUMERATED {supported} OPTIONAL,

-- R1 16-1g: Resources for beam management, pathloss measurement, BFD, RLM and new beam identification

maxTotalResourcesForOneFreqRange-r16 SEQUENCE {

maxNumberResWithinSlotAcrossCC-OneFR-r16 ENUMERATED {n2, n4, n8, n12, n16, n32, n64, n128} OPTIONAL,

maxNumberResAcrossCC-OneFR-r16 ENUMERATED {n2, n4, n8, n12, n16, n32, n40, n48, n64, n72, n80, n96, n128, n256}

OPTIONAL

} OPTIONAL,

-- R1 16-7: Extension of the maximum number of configured aperiodic CSI report settings

csi-ReportFrameworkExt-r16 CSI-ReportFrameworkExt-r16 OPTIONAL

]],

[[

twoTCI-Act-servingCellInCC-List-r16 ENUMERATED {supported} OPTIONAL

]],

[[

-- R1 22-11: Support of 'cri-RI-CQI' report without non-PMI-PortIndication

cri-RI-CQI-WithoutNon-PMI-PortInd-r16 ENUMERATED {supported} OPTIONAL

]]

}

Phy-ParametersFR1 ::= SEQUENCE {

pdcch-MonitoringSingleOccasion ENUMERATED {supported} OPTIONAL,

scs-60kHz ENUMERATED {supported} OPTIONAL,

pdsch-256QAM-FR1 ENUMERATED {supported} OPTIONAL,

pdsch-RE-MappingFR1-PerSymbol ENUMERATED {n10, n20} OPTIONAL,

...,

[[

pdsch-RE-MappingFR1-PerSlot ENUMERATED {n16, n32, n48, n64, n80, n96, n112, n128,

n144, n160, n176, n192, n208, n224, n240, n256} OPTIONAL

]],

[[

-- R1 22-12: PDCCH monitoring with a single span of three contiguous OFDM symbols that is within the first four OFDM symbols in a

-- slot

pdcch-MonitoringSingleSpanFirst4Sym-r16 ENUMERATED {supported} OPTIONAL

]]

}

Phy-ParametersFR2 ::= SEQUENCE {

dummy ENUMERATED {supported} OPTIONAL,

pdsch-RE-MappingFR2-PerSymbol ENUMERATED {n6, n20} OPTIONAL,

...,

[[

pCell-FR2 ENUMERATED {supported} OPTIONAL,

pdsch-RE-MappingFR2-PerSlot ENUMERATED {n16, n32, n48, n64, n80, n96, n112, n128,

n144, n160, n176, n192, n208, n224, n240, n256} OPTIONAL

]],

[[

-- R1 16-1c: Support of default spatial relation and pathloss reference RS for dedicated-PUCCH/SRS and PUSCH

defaultSpatialRelationPathlossRS-r16 ENUMERATED {supported} OPTIONAL,

-- R1 16-1d: Support of spatial relation update for AP-SRS via MAC CE

spatialRelationUpdateAP-SRS-r16 ENUMERATED {supported} OPTIONAL,

maxNumberSRS-PosSpatialRelationsAllServingCells-r16 ENUMERATED {n0, n1, n2, n4, n8, n16} OPTIONAL

]]

}

-- TAG-PHY-PARAMETERS-STOP

-- ASN1STOP

|  |
| --- |
| *Phy-ParametersFRX-Diff* field descriptions |
| ***csi-RS-IM-ReceptionForFeedback/ csi-RS-ProcFrameworkForSRS/ csi-ReportFramework***  These fields are optionally present in *fr1-fr2-Add-UE-NR-Capabilities* in *UE-NR-Capability*. They shall not be set in any other instance of the IE *Phy-ParametersFRX-Diff*. If the network configures the UE with serving cells on both FR1 and FR2 bands, these parameters, if present, limit the corresponding parameters in *MIMO-ParametersPerBand*. |

#### – *Phy-ParametersMRDC*

The IE *Phy-ParametersMRDC* is used to convey physical layer capabilities for MR-DC.

*Phy-ParametersMRDC* information element

-- ASN1START

-- TAG-PHY-PARAMETERSMRDC-START

Phy-ParametersMRDC ::= SEQUENCE {

naics-Capability-List SEQUENCE (SIZE (1..maxNrofNAICS-Entries)) OF NAICS-Capability-Entry OPTIONAL,

...,

[[

spCellPlacement CarrierAggregationVariant OPTIONAL

]],

[[

-- R1 18-3b: Semi-statically configured LTE UL transmissions in all UL subframes not limited to tdm-pattern in case of TDD PCell

tdd-PCellUL-TX-AllUL-Subframe-r16 ENUMERATED {supported} OPTIONAL,

-- R1 18-3a: Semi-statically configured LTE UL transmissions in all UL subframes not limited to tdm-pattern in case of FDD PCell

fdd-PCellUL-TX-AllUL-Subframe-r16 ENUMERATED {supported} OPTIONAL

]]

}

NAICS-Capability-Entry ::= SEQUENCE {

numberOfNAICS-CapableCC INTEGER(1..5),

numberOfAggregatedPRB ENUMERATED {n50, n75, n100, n125, n150, n175, n200, n225,

n250, n275, n300, n350, n400, n450, n500, spare},

...

}

-- TAG-PHY-PARAMETERSMRDC-STOP

-- ASN1STOP

|  |
| --- |
| *PHY-ParametersMRDC* field descriptions |
| ***naics-Capability-List***  Indicates that UE in MR-DC supports NAICS as defined in TS 36.331 [10]. |

#### – *Phy-ParametersSharedSpectrumChAccess*

The IE *Phy-ParametersSharedSpectrumChAccess* is used to convey the physical layer capabilities specific for shared spectrum channel access.

*Phy-ParametersSharedSpectrumChAccess* information element

-- ASN1START

-- TAG-PHY-PARAMETERSSHAREDSPECTRUMCHACCESS-START

Phy-ParametersSharedSpectrumChAccess-r16 ::= SEQUENCE {

-- 10-32 (1-2): SS block based SINR measurement (SS-SINR) for unlicensed spectrum

ss-SINR-Meas-r16 ENUMERATED {supported} OPTIONAL,

-- 10-33 (2-32a): Semi-persistent CSI report on PUCCH for unlicensed spectrum

sp-CSI-ReportPUCCH-r16 ENUMERATED {supported} OPTIONAL,

-- 10-33a (2-32b): Semi-persistent CSI report on PUSCH for unlicensed spectrum

sp-CSI-ReportPUSCH-r16 ENUMERATED {supported} OPTIONAL,

-- 10-34 (3-6): Dynamic SFI monitoring for unlicensed spectrum

dynamicSFI-r16 ENUMERATED {supported} OPTIONAL,

-- 10-35c (4-19c): SR/HARQ-ACK/CSI multiplexing once per slot using a PUCCH (or HARQ-ACK/CSI piggybacked on a PUSCH) when SR/HARQ-

-- ACK/CSI are supposed to be sent with different starting symbols in a slot for unlicensed spectrum

-- 10-35 (4-19): SR/HARQ-ACK/CSI multiplexing once per slot using a PUCCH (or HARQ-ACK/CSI piggybacked on a PUSCH) when SR/HARQ-

-- ACK/CSI are supposed to be sent with the same starting symbol on the PUCCH resources in a slot for unlicensed spectrum

mux-SR-HARQ-ACK-CSI-PUCCH-OncePerSlot-r16 SEQUENCE {

sameSymbol-r16 ENUMERATED {supported} OPTIONAL,

diffSymbol-r16 ENUMERATED {supported} OPTIONAL

} OPTIONAL,

-- 10-35a (4-19a): Overlapping PUCCH resources have different starting symbols in a slot for unlicensed spectrum

mux-SR-HARQ-ACK-PUCCH-r16 ENUMERATED {supported} OPTIONAL,

-- 10-35b (4-19b): SR/HARQ-ACK/CSI multiplexing more than once per slot using a PUCCH (or HARQ-ACK/CSI piggybacked on a PUSCH) when

-- SR/HARQ ACK/CSI are supposed to be sent with the same or different starting symbol in a slot for unlicensed spectrum

mux-SR-HARQ-ACK-CSI-PUCCH-MultiPerSlot-r16 ENUMERATED {supported} OPTIONAL,

-- 10-36 (4-28): HARQ-ACK multiplexing on PUSCH with different PUCCH/PUSCH starting OFDM symbols for unlicensed spectrum

mux-HARQ-ACK-PUSCH-DiffSymbol-r16 ENUMERATED {supported} OPTIONAL,

-- 10-37 (4-23): Repetitions for PUCCH format 1, 3, and 4 over multiple slots with K = 2, 4, 8 for unlicensed spectrum

pucch-Repetition-F1-3-4-r16 ENUMERATED {supported} OPTIONAL,

-- 10-38 (5-14): Type 1 configured PUSCH repetitions over multiple slots for unlicensed spectrum

type1-PUSCH-RepetitionMultiSlots-r16 ENUMERATED {supported} OPTIONAL,

-- 10-39 (5-16): Type 2 configured PUSCH repetitions over multiple slots for unlicensed spectrum

type2-PUSCH-RepetitionMultiSlots-r16 ENUMERATED {supported} OPTIONAL,

-- 10-40 (5-17): PUSCH repetitions over multiple slots for unlicensed spectrum

pusch-RepetitionMultiSlots-r16 ENUMERATED {supported} OPTIONAL,

-- 10-40a (5-17a): PDSCH repetitions over multiple slots for unlicensed spectrum

pdsch-RepetitionMultiSlots-r16 ENUMERATED {supported} OPTIONAL,

-- 10-41 (5-18): DL SPS

downlinkSPS-r16 ENUMERATED {supported} OPTIONAL,

-- 10-42 (5-19): Type 1 Configured UL grant

configuredUL-GrantType1-r16 ENUMERATED {supported} OPTIONAL,

-- 10-43 (5-20): Type 2 Configured UL grant

configuredUL-GrantType2-r16 ENUMERATED {supported} OPTIONAL,

-- 10-44 (5-21): Pre-emption indication for DL

pre-EmptIndication-DL-r16 ENUMERATED {supported} OPTIONAL,

...

}

-- TAG-PHY-PARAMETERSSHAREDSPECTRUMCHACCESS-STOP

-- ASN1STOP

#### – PosSRS-RRC-Inactive-OutsideInitialUL-BWP-r17

The IE *PosSRS-RRC-Inactive-OutsideInitialUL-BWP-r17* is used to convey the capabilities supported by the UE for Positioning SRS transmission in RRC\_INACTIVE state configured outside initial UL BWP.

*PosSRS-RRC-Inactive-OutsideInitialUL-BWP* information element

-- ASN1START

-- TAG-POSSRS-RRC-INACTIVE-OUTSIDEINITIALUL-BWP-START

PosSRS-RRC-Inactive-OutsideInitialUL-BWP-r17::= SEQUENCE {

-- R1 27-15b: Positioning SRS transmission in RRC\_INACTIVE state configured outside initial UL BWP

maxSRSposBandwidthForEachSCS-withinCC-FR1-r17 ENUMERATED {bw5, bw10, bw15, bw20, bw25, bw30, bw35, bw40,

bw45, bw50, bw60, bw70, bw80, bw90, bw100} OPTIONAL,

maxSRSposBandwidthForEachSCS-withinCC-FR2-r17 ENUMERATED {bw50, bw100, bw200, bw400} OPTIONAL,

maxNumOfSRSposResourceSets-r17 ENUMERATED {n1, n2, n4, n8, n12, n16} OPTIONAL,

maxNumOfPeriodicSRSposResources-r17 ENUMERATED {n1, n2, n4, n8, n16, n32, n64} OPTIONAL,

maxNumOfPeriodicSRSposResourcesPerSlot-r17 ENUMERATED {n1, n2, n3, n4, n5, n6, n8, n10, n12, n14} OPTIONAL,

differentNumerologyBetweenSRSposAndInitialBWP-r17 ENUMERATED {supported} OPTIONAL,

srsPosWithoutRestrictionOnBWP-r17 ENUMERATED {supported} OPTIONAL,

maxNumOfPeriodicAndSemipersistentSRSposResources-r17 ENUMERATED {n1, n2, n4, n8, n16, n32, n64} OPTIONAL,

maxNumOfPeriodicAndSemipersistentSRSposResourcesPerSlot-r17 ENUMERATED {n1, n2, n3, n4, n5, n6, n8, n10, n12, n14} OPTIONAL,

differentCenterFreqBetweenSRSposAndInitialBWP-r17 ENUMERATED {supported} OPTIONAL,

switchingTimeSRS-TX-OtherTX-r17 ENUMERATED {us100, us140, us200, us300, us500} OPTIONAL,

-- R1 27-15c: Support of positioning SRS transmission in RRC\_INACTIVE state outside initial BWP with semi-persistent SRS

maxNumOfSemiPersistentSRSposResources-r17 ENUMERATED {n1, n2, n4, n8, n16, n32, n64} OPTIONAL,

maxNumOfSemiPersistentSRSposResourcesPerSlot-r17 ENUMERATED {n1, n2, n3, n4, n5, n6, n8, n10, n12, n14} OPTIONAL,

...

}

-- TAG-POSSRS-RRC-INACTIVE-OUTSIDEINITIALUL-BWP-STOP

-- ASN1STOP

#### *– PowSav-Parameters*

The IE *PowSav-Parameters* is used to convey the capabilities supported by the UE for the power saving preferences.

*PowSav-Parameters* information element

-- ASN1START

-- TAG-POWSAV-PARAMETERS-START

PowSav-Parameters-r16 ::= SEQUENCE {

powSav-ParametersCommon-r16 PowSav-ParametersCommon-r16 OPTIONAL,

powSav-ParametersFRX-Diff-r16 PowSav-ParametersFRX-Diff-r16 OPTIONAL,

...

}

PowSav-Parameters-v1700 ::= SEQUENCE {

powSav-ParametersFR2-2-r17 PowSav-ParametersFR2-2-r17 OPTIONAL,

...

}

PowSav-ParametersCommon-r16 ::= SEQUENCE {

drx-Preference-r16 ENUMERATED {supported} OPTIONAL,

maxCC-Preference-r16 ENUMERATED {supported} OPTIONAL,

releasePreference-r16 ENUMERATED {supported} OPTIONAL,

-- R1 19-4a: UE assistance information

minSchedulingOffsetPreference-r16 ENUMERATED {supported} OPTIONAL,

...

}

PowSav-ParametersFRX-Diff-r16 ::= SEQUENCE {

maxBW-Preference-r16 ENUMERATED {supported} OPTIONAL,

maxMIMO-LayerPreference-r16 ENUMERATED {supported} OPTIONAL,

...

}

PowSav-ParametersFR2-2-r17 ::= SEQUENCE {

maxBW-Preference-r17 ENUMERATED {supported} OPTIONAL,

maxMIMO-LayerPreference-r17 ENUMERATED {supported} OPTIONAL,

...

}

-- TAG-POWSAV-PARAMETERS-STOP

-- ASN1STOP

#### – *ProcessingParameters*

The IE *ProcessingParameters* is used to indicate PDSCH/PUSCH processing capabilities supported by the UE.

*ProcessingParameters* information element

-- ASN1START

-- TAG-PROCESSINGPARAMETERS-START

ProcessingParameters ::= SEQUENCE {

fallback ENUMERATED {sc, cap1-only},

differentTB-PerSlot SEQUENCE {

upto1 NumberOfCarriers OPTIONAL,

upto2 NumberOfCarriers OPTIONAL,

upto4 NumberOfCarriers OPTIONAL,

upto7 NumberOfCarriers OPTIONAL

} OPTIONAL

}

NumberOfCarriers ::= INTEGER (1..16)

-- TAG-PROCESSINGPARAMETERS-STOP

-- ASN1STOP

#### – *RAT-Type*

The IE *RAT-Type* is used to indicate the radio access technology (RAT), including NR, of the requested/transferred UE capabilities.

*RAT-Type* information element

-- ASN1START

-- TAG-RAT-TYPE-START

RAT-Type ::= ENUMERATED {nr, eutra-nr, eutra, utra-fdd-v1610, ...}

-- TAG-RAT-TYPE-STOP

-- ASN1STOP

#### – *RedCapParameters*

The IE *RedCapParameters* is used to indicate the UE capabilities supported by RedCap UEs.

*RedCapParameters* information element

-- ASN1START

-- TAG-REDCAPPARAMETERS-START

RedCapParameters-r17::= SEQUENCE {

-- R1 28-1: RedCap UE

supportOfRedCap-r17 ENUMERATED {supported} OPTIONAL,

supportOf16DRB-RedCap-r17 ENUMERATED {supported} OPTIONAL

}

-- TAG-REDCAPPARAMETERS-STOP

-- ASN1STOP

#### – *RF-Parameters*

The IE *RF-Parameters* is used to convey RF-related capabilities for NR operation.

*RF-Parameters* information element

-- ASN1START

-- TAG-RF-PARAMETERS-START

RF-Parameters ::= SEQUENCE {

supportedBandListNR SEQUENCE (SIZE (1..maxBands)) OF BandNR,

supportedBandCombinationList BandCombinationList OPTIONAL,

appliedFreqBandListFilter FreqBandList OPTIONAL,

...,

[[

supportedBandCombinationList-v1540 BandCombinationList-v1540 OPTIONAL,

srs-SwitchingTimeRequested ENUMERATED {true} OPTIONAL

]],

[[

supportedBandCombinationList-v1550 BandCombinationList-v1550 OPTIONAL

]],

[[

supportedBandCombinationList-v1560 BandCombinationList-v1560 OPTIONAL

]],

[[

supportedBandCombinationList-v1610 BandCombinationList-v1610 OPTIONAL,

supportedBandCombinationListSidelinkEUTRA-NR-r16 BandCombinationListSidelinkEUTRA-NR-r16 OPTIONAL,

supportedBandCombinationList-UplinkTxSwitch-r16 BandCombinationList-UplinkTxSwitch-r16 OPTIONAL

]],

[[

supportedBandCombinationList-v1630 BandCombinationList-v1630 OPTIONAL,

supportedBandCombinationListSidelinkEUTRA-NR-v1630 BandCombinationListSidelinkEUTRA-NR-v1630 OPTIONAL,

supportedBandCombinationList-UplinkTxSwitch-v1630 BandCombinationList-UplinkTxSwitch-v1630 OPTIONAL

]],

[[

supportedBandCombinationList-v1640 BandCombinationList-v1640 OPTIONAL,

supportedBandCombinationList-UplinkTxSwitch-v1640 BandCombinationList-UplinkTxSwitch-v1640 OPTIONAL

]],

[[

supportedBandCombinationList-v1650 BandCombinationList-v1650 OPTIONAL,

supportedBandCombinationList-UplinkTxSwitch-v1650 BandCombinationList-UplinkTxSwitch-v1650 OPTIONAL

]],

[[

extendedBand-n77-r16 ENUMERATED {supported} OPTIONAL

]],

[[

supportedBandCombinationList-UplinkTxSwitch-v1670 BandCombinationList-UplinkTxSwitch-v1670 OPTIONAL

]],

[[

supportedBandCombinationList-v1680 BandCombinationList-v1680 OPTIONAL

]],

[[

supportedBandCombinationList-v1690 BandCombinationList-v1690 OPTIONAL,

supportedBandCombinationList-UplinkTxSwitch-v1690 BandCombinationList-UplinkTxSwitch-v1690 OPTIONAL

]],

[[

supportedBandCombinationList-v1700 BandCombinationList-v1700 OPTIONAL,

supportedBandCombinationList-UplinkTxSwitch-v1700 BandCombinationList-UplinkTxSwitch-v1700 OPTIONAL,

supportedBandCombinationListSL-RelayDiscovery-r17 OCTET STRING OPTIONAL, -- Contains PC5 BandCombinationListSidelinkNR-r16

supportedBandCombinationListSL-NonRelayDiscovery-r17 OCTET STRING OPTIONAL, -- Contains PC5 BandCombinationListSidelinkNR-r16

supportedBandCombinationListSidelinkEUTRA-NR-v1710 BandCombinationListSidelinkEUTRA-NR-v1710 OPTIONAL,

sidelinkRequested-r17 ENUMERATED {true} OPTIONAL,

extendedBand-n77-2-r17 ENUMERATED {supported} OPTIONAL

]]

}

RF-Parameters-v15g0 ::= SEQUENCE {

supportedBandCombinationList-v15g0 BandCombinationList-v15g0 OPTIONAL

}

BandNR ::= SEQUENCE {

bandNR FreqBandIndicatorNR,

modifiedMPR-Behaviour BIT STRING (SIZE (8)) OPTIONAL,

mimo-ParametersPerBand MIMO-ParametersPerBand OPTIONAL,

extendedCP ENUMERATED {supported} OPTIONAL,

multipleTCI ENUMERATED {supported} OPTIONAL,

bwp-WithoutRestriction ENUMERATED {supported} OPTIONAL,

bwp-SameNumerology ENUMERATED {upto2, upto4} OPTIONAL,

bwp-DiffNumerology ENUMERATED {upto4} OPTIONAL,

crossCarrierScheduling-SameSCS ENUMERATED {supported} OPTIONAL,

pdsch-256QAM-FR2 ENUMERATED {supported} OPTIONAL,

pusch-256QAM ENUMERATED {supported} OPTIONAL,

ue-PowerClass ENUMERATED {pc1, pc2, pc3, pc4} OPTIONAL,

rateMatchingLTE-CRS ENUMERATED {supported} OPTIONAL,

channelBWs-DL CHOICE {

fr1 SEQUENCE {

scs-15kHz BIT STRING (SIZE (10)) OPTIONAL,

scs-30kHz BIT STRING (SIZE (10)) OPTIONAL,

scs-60kHz BIT STRING (SIZE (10)) OPTIONAL

},

fr2 SEQUENCE {

scs-60kHz BIT STRING (SIZE (3)) OPTIONAL,

scs-120kHz BIT STRING (SIZE (3)) OPTIONAL

}

} OPTIONAL,

channelBWs-UL CHOICE {

fr1 SEQUENCE {

scs-15kHz BIT STRING (SIZE (10)) OPTIONAL,

scs-30kHz BIT STRING (SIZE (10)) OPTIONAL,

scs-60kHz BIT STRING (SIZE (10)) OPTIONAL

},

fr2 SEQUENCE {

scs-60kHz BIT STRING (SIZE (3)) OPTIONAL,

scs-120kHz BIT STRING (SIZE (3)) OPTIONAL

}

} OPTIONAL,

...,

[[

maxUplinkDutyCycle-PC2-FR1 ENUMERATED {n60, n70, n80, n90, n100} OPTIONAL

]],

[[

pucch-SpatialRelInfoMAC-CE ENUMERATED {supported} OPTIONAL,

powerBoosting-pi2BPSK ENUMERATED {supported} OPTIONAL

]],

[[

maxUplinkDutyCycle-FR2 ENUMERATED {n15, n20, n25, n30, n40, n50, n60, n70, n80, n90, n100} OPTIONAL

]],

[[

channelBWs-DL-v1590 CHOICE {

fr1 SEQUENCE {

scs-15kHz BIT STRING (SIZE (16)) OPTIONAL,

scs-30kHz BIT STRING (SIZE (16)) OPTIONAL,

scs-60kHz BIT STRING (SIZE (16)) OPTIONAL

},

fr2 SEQUENCE {

scs-60kHz BIT STRING (SIZE (8)) OPTIONAL,

scs-120kHz BIT STRING (SIZE (8)) OPTIONAL

}

} OPTIONAL,

channelBWs-UL-v1590 CHOICE {

fr1 SEQUENCE {

scs-15kHz BIT STRING (SIZE (16)) OPTIONAL,

scs-30kHz BIT STRING (SIZE (16)) OPTIONAL,

scs-60kHz BIT STRING (SIZE (16)) OPTIONAL

},

fr2 SEQUENCE {

scs-60kHz BIT STRING (SIZE (8)) OPTIONAL,

scs-120kHz BIT STRING (SIZE (8)) OPTIONAL

}

} OPTIONAL

]],

[[

asymmetricBandwidthCombinationSet BIT STRING (SIZE (1..32)) OPTIONAL

]],

[[

-- R1 10: NR-unlicensed

sharedSpectrumChAccessParamsPerBand-r16 SharedSpectrumChAccessParamsPerBand-r16 OPTIONAL,

-- R1 11-7b: Independent cancellation of the overlapping PUSCHs in an intra-band UL CA

cancelOverlappingPUSCH-r16 ENUMERATED {supported} OPTIONAL,

-- R1 14-1: Multiple LTE-CRS rate matching patterns

multipleRateMatchingEUTRA-CRS-r16 SEQUENCE {

maxNumberPatterns-r16 INTEGER (2..6),

maxNumberNon-OverlapPatterns-r16 INTEGER (1..3)

} OPTIONAL,

-- R1 14-1a: Two LTE-CRS overlapping rate matching patterns within a part of NR carrier using 15 kHz overlapping with a LTE carrier

overlapRateMatchingEUTRA-CRS-r16 ENUMERATED {supported} OPTIONAL,

-- R1 14-2: PDSCH Type B mapping of length 9 and 10 OFDM symbols

pdsch-MappingTypeB-Alt-r16 ENUMERATED {supported} OPTIONAL,

-- R1 14-3: One slot periodic TRS configuration for FR1

oneSlotPeriodicTRS-r16 ENUMERATED {supported} OPTIONAL,

olpc-SRS-Pos-r16 OLPC-SRS-Pos-r16 OPTIONAL,

spatialRelationsSRS-Pos-r16 SpatialRelationsSRS-Pos-r16 OPTIONAL,

simulSRS-MIMO-TransWithinBand-r16 ENUMERATED {n2} OPTIONAL,

channelBW-DL-IAB-r16 CHOICE {

fr1-100mhz SEQUENCE {

scs-15kHz ENUMERATED {supported} OPTIONAL,

scs-30kHz ENUMERATED {supported} OPTIONAL,

scs-60kHz ENUMERATED {supported} OPTIONAL

},

fr2-200mhz SEQUENCE {

scs-60kHz ENUMERATED {supported} OPTIONAL,

scs-120kHz ENUMERATED {supported} OPTIONAL

}

} OPTIONAL,

channelBW-UL-IAB-r16 CHOICE {

fr1-100mhz SEQUENCE {

scs-15kHz ENUMERATED {supported} OPTIONAL,

scs-30kHz ENUMERATED {supported} OPTIONAL,

scs-60kHz ENUMERATED {supported} OPTIONAL

},

fr2-200mhz SEQUENCE {

scs-60kHz ENUMERATED {supported} OPTIONAL,

scs-120kHz ENUMERATED {supported} OPTIONAL

}

} OPTIONAL,

rasterShift7dot5-IAB-r16 ENUMERATED {supported} OPTIONAL,

ue-PowerClass-v1610 ENUMERATED {pc1dot5} OPTIONAL,

condHandover-r16 ENUMERATED {supported} OPTIONAL,

condHandoverFailure-r16 ENUMERATED {supported} OPTIONAL,

condHandoverTwoTriggerEvents-r16 ENUMERATED {supported} OPTIONAL,

condPSCellChange-r16 ENUMERATED {supported} OPTIONAL,

condPSCellChangeTwoTriggerEvents-r16 ENUMERATED {supported} OPTIONAL,

mpr-PowerBoost-FR2-r16 ENUMERATED {supported} OPTIONAL,

-- R1 11-9: Multiple active configured grant configurations for a BWP of a serving cell

activeConfiguredGrant-r16 SEQUENCE {

maxNumberConfigsPerBWP-r16 ENUMERATED {n1, n2, n4, n8, n12},

maxNumberConfigsAllCC-r16 INTEGER (2..32)

} OPTIONAL,

-- R1 11-9a: Joint release in a DCI for two or more configured grant Type 2 configurations for a given BWP of a serving cell

jointReleaseConfiguredGrantType2-r16 ENUMERATED {supported} OPTIONAL,

-- R1 12-2: Multiple SPS configurations

sps-r16 SEQUENCE {

maxNumberConfigsPerBWP-r16 INTEGER (1..8),

maxNumberConfigsAllCC-r16 INTEGER (2..32)

} OPTIONAL,

-- R1 12-2a: Joint release in a DCI for two or more SPS configurations for a given BWP of a serving cell

jointReleaseSPS-r16 ENUMERATED {supported} OPTIONAL,

-- R1 13-19: Simultaneous positioning SRS and MIMO SRS transmission within a band across multiple CCs

simulSRS-TransWithinBand-r16 ENUMERATED {n2} OPTIONAL,

trs-AdditionalBandwidth-r16 ENUMERATED {trs-AddBW-Set1, trs-AddBW-Set2} OPTIONAL,

handoverIntraF-IAB-r16 ENUMERATED {supported} OPTIONAL

]],

[[

-- R1 22-5a: Simultaneous transmission of SRS for antenna switching and SRS for CB/NCB /BM for intra-band UL CA

-- R1 22-5c: Simultaneous transmission of SRS for antenna switching and SRS for antenna switching for intra-band UL CA

simulTX-SRS-AntSwitchingIntraBandUL-CA-r16 SimulSRS-ForAntennaSwitching-r16 OPTIONAL,

-- R1 10: NR-unlicensed

sharedSpectrumChAccessParamsPerBand-v1630 SharedSpectrumChAccessParamsPerBand-v1630 OPTIONAL

]],

[[

handoverUTRA-FDD-r16 ENUMERATED {supported} OPTIONAL,

-- R4 7-4: Report the shorter transient capability supported by the UE: 2, 4 or 7us

enhancedUL-TransientPeriod-r16 ENUMERATED {us2, us4, us7} OPTIONAL,

sharedSpectrumChAccessParamsPerBand-v1640 SharedSpectrumChAccessParamsPerBand-v1640 OPTIONAL

]],

[[

type1-PUSCH-RepetitionMultiSlots-v1650 ENUMERATED {supported} OPTIONAL,

type2-PUSCH-RepetitionMultiSlots-v1650 ENUMERATED {supported} OPTIONAL,

pusch-RepetitionMultiSlots-v1650 ENUMERATED {supported} OPTIONAL,

configuredUL-GrantType1-v1650 ENUMERATED {supported} OPTIONAL,

configuredUL-GrantType2-v1650 ENUMERATED {supported} OPTIONAL,

sharedSpectrumChAccessParamsPerBand-v1650 SharedSpectrumChAccessParamsPerBand-v1650 OPTIONAL

]],

[[

enhancedSkipUplinkTxConfigured-v1660 ENUMERATED {supported} OPTIONAL,

enhancedSkipUplinkTxDynamic-v1660 ENUMERATED {supported} OPTIONAL

]],

[[

maxUplinkDutyCycle-PC1dot5-MPE-FR1-r16 ENUMERATED {n10, n15, n20, n25, n30, n40, n50, n60, n70, n80, n90, n100} OPTIONAL,

txDiversity-r16 ENUMERATED {supported} OPTIONAL

]],

[[

-- R1 36-1: Support of 1024QAM for PDSCH for FR1

pdsch-1024QAM-FR1-r17 ENUMERATED {supported} OPTIONAL,

-- R4 22-1 support of FR2 HST operation

ue-PowerClass-v1700 ENUMERATED {pc5, pc6, pc7} OPTIONAL,

-- R1 24: NR extension to 71GHz (FR2-2)

fr2-2-AccessParamsPerBand-r17 FR2-2-AccessParamsPerBand-r17 OPTIONAL,

rlm-Relaxation-r17 ENUMERATED {supported} OPTIONAL,

bfd-Relaxation-r17 ENUMERATED {supported} OPTIONAL,

cg-SDT-r17 ENUMERATED {supported} OPTIONAL,

locationBasedCondHandover-r17 ENUMERATED {supported} OPTIONAL,

timeBasedCondHandover-r17 ENUMERATED {supported} OPTIONAL,

eventA4BasedCondHandover-r17 ENUMERATED {supported} OPTIONAL,

mn-InitiatedCondPSCellChangeNRDC-r17 ENUMERATED {supported} OPTIONAL,

sn-InitiatedCondPSCellChangeNRDC-r17 ENUMERATED {supported} OPTIONAL,

-- R1 29-3a: PDCCH skipping

pdcch-SkippingWithoutSSSG-r17 ENUMERATED {supported} OPTIONAL,

-- R1 29-3b: 2 search space sets group switching

sssg-Switching-1BitInd-r17 ENUMERATED {supported} OPTIONAL,

-- R1 29-3c: 3 search space sets group switching

sssg-Switching-2BitInd-r17 ENUMERATED {supported} OPTIONAL,

-- R1 29-3d: 2 search space sets group switching with PDCCH skipping

pdcch-SkippingWithSSSG-r17 ENUMERATED {supported} OPTIONAL,

-- R1 29-3e: Support Search space set group switching capability 2 for FR1

searchSpaceSetGrp-switchCap2-r17 ENUMERATED {supported} OPTIONAL,

-- R1 26-1: Uplink Time and Frequency pre-compensation and timing relationship enhancements

uplinkPreCompensation-r17 ENUMERATED {supported} OPTIONAL,

-- R1 26-4: UE reporting of information related to TA pre-compensation

uplink-TA-Reporting-r17 ENUMERATED {supported} OPTIONAL,

-- R1 26-5: Increasing the number of HARQ processes

max-HARQ-ProcessNumber-r17 ENUMERATED {u16d32, u32d16, u32d32} OPTIONAL,

-- R1 26-6: Type-2 HARQ codebook enhancement

type2-HARQ-Codebook-r17 ENUMERATED {supported} OPTIONAL,

-- R1 26-6a: Type-1 HARQ codebook enhancement

type1-HARQ-Codebook-r17 ENUMERATED {supported} OPTIONAL,

-- R1 26-6b: Type-3 HARQ codebook enhancement

type3-HARQ-Codebook-r17 ENUMERATED {supported} OPTIONAL,

-- R1 26-9: UE-specific K\_offset

ue-specific-K-Offset-r17 ENUMERATED {supported} OPTIONAL,

-- R1 24-1f: Multiple PDSCH scheduling by single DCI for 120kHz in FR2-1

multiPDSCH-SingleDCI-FR2-1-SCS-120kHz-r17 ENUMERATED {supported} OPTIONAL,

-- R1 24-1g: Multiple PUSCH scheduling by single DCI for 120kHz in FR2-1

multiPUSCH-SingleDCI-FR2-1-SCS-120kHz-r17 ENUMERATED {supported} OPTIONAL,

-- R4 14-4: Parallel PRS measurements in RRC\_INACTIVE state, FR1/FR2 diff

parrallelPRS-MeasRRC-Inactive-r17 ENUMERATED {supported} OPTIONAL,

-- R1 27-1-2: Support of UE-TxTEGs for UL TDOA

nr-UE-TxTEG-ID-MaxSupport-r17 ENUMERATED {n1, n2, n3, n4, n6, n8} OPTIONAL,

-- R1 27-17: PRS processing in RRC\_INACTIVE

prs-ProcessingRRC-Inactive-r17 ENUMERATED {supported} OPTIONAL,

-- R1 27-3-2: DL PRS measurement outside MG and in a PRS processing window

prs-ProcessingWindowType1A-r17 ENUMERATED {option1, option2, option3} OPTIONAL,

prs-ProcessingWindowType1B-r17 ENUMERATED {option1, option2, option3} OPTIONAL,

prs-ProcessingWindowType2-r17 ENUMERATED {option1, option2, option3} OPTIONAL,

-- R1 27-15: Positioning SRS transmission in RRC\_INACTIVE state for initial UL BWP

srs-AllPosResourcesRRC-Inactive-r17 SRS-AllPosResourcesRRC-Inactive-r17 OPTIONAL,

-- R1 27-16: OLPC for positioning SRS in RRC\_INACTIVE state - gNB

olpc-SRS-PosRRC-Inactive-r17 OLPC-SRS-Pos-r16 OPTIONAL,

-- R1 27-19: Spatial relation for positioning SRS in RRC\_INACTIVE state - gNB

spatialRelationsSRS-PosRRC-Inactive-r17 SpatialRelationsSRS-Pos-r16 OPTIONAL,

-- R1 30-1: Increased maximum number of PUSCH Type A repetitions

maxNumberPUSCH-TypeA-Repetition-r17 ENUMERATED {supported} OPTIONAL,

-- R1 30-2: PUSCH Type A repetitions based on available slots

puschTypeA-RepetitionsAvailSlot-r17 ENUMERATED {supported} OPTIONAL,

-- R1 30-3: TB processing over multi-slot PUSCH

tb-ProcessingMultiSlotPUSCH-r17 ENUMERATED {supported} OPTIONAL,

-- R1 30-3a: Repetition of TB processing over multi-slot PUSCH

tb-ProcessingRepMultiSlotPUSCH-r17 ENUMERATED {supported} OPTIONAL,

-- R1 30-4: The maximum duration for DM-RS bundling

maxDurationDMRS-Bundling-r17 SEQUENCE {

fdd-r17 ENUMERATED {n4, n8, n16, n32} OPTIONAL,

tdd-r17 ENUMERATED {n2, n4, n8, n16} OPTIONAL

} OPTIONAL,

-- R1 30-6: Repetition of PUSCH transmission scheduled by RAR UL grant and DCI format 0\_0 with CRC scrambled by TC-RNTI

pusch-RepetitionCRC-r17 ENUMERATED {supported} OPTIONAL,

sharedSpectrumChAccessParamsPerBand-v1710 SharedSpectrumChAccessParamsPerBand-v1710 OPTIONAL,

-- R4 25-2: Parallel measurements on cells belonging to a different NGSO satellite than a serving satellite without scheduling restrictions

-- on normal operations with the serving cell

parallelMeasurementWithoutRestriction-r17 ENUMERATED {supported} OPTIONAL,

-- R4 25-5: Parallel measurements on multiple NGSO satellites within a SMTC

maxNumber-NGSO-SatellitesWithinOneSMTC-r17 ENUMERATED {n1, n2, n3, n4} OPTIONAL,

-- R1 26-10: K1 range extension

k1-RangeExtension-r17 ENUMERATED {supported} OPTIONAL,

-- R1 35-1: Aperiodic CSI-RS for tracking for fast SCell activation

aperiodicCSI-RS-FastScellActivation-r17 SEQUENCE {

maxNumberAperiodicCSI-RS-PerCC-r17 ENUMERATED {n8, n16, n32, n48, n64, n128, n255},

maxNumberAperiodicCSI-RS-AcrossCCs-r17 ENUMERATED {n8, n16, n32, n64, n128, n256, n512, n1024}

} OPTIONAL,

-- R1 35-2: Aperiodic CSI-RS bandwidth for tracking for fast SCell activation for 10MHz UE channel bandwidth

aperiodicCSI-RS-AdditionalBandwidth-r17 ENUMERATED {addBW-Set1, addBW-Set2} OPTIONAL,

-- R1 28-1a: RRC-configured DL BWP without CD-SSB or NCD-SSB

bwp-WithoutCD-SSB-OrNCD-SSB-RedCap-r17 ENUMERATED {supported} OPTIONAL,

-- R1 28-3: Half-duplex FDD operation type A for RedCap UE

halfDuplexFDD-TypeA-RedCap-r17 ENUMERATED {supported} OPTIONAL,

-- R1 27-15b: Positioning SRS transmission in RRC\_INACTIVE state configured outside initial UL BWP

posSRS-RRC-Inactive-OutsideInitialUL-BWP-r17 PosSRS-RRC-Inactive-OutsideInitialUL-BWP-r17 OPTIONAL,

-- R4 15-3 UE support of CBW for 480kHz SCS

channelBWs-DL-SCS-480kHz-FR2-2-r17 BIT STRING (SIZE (8)) OPTIONAL,

channelBWs-UL-SCS-480kHz-FR2-2-r17 BIT STRING (SIZE (8)) OPTIONAL,

-- R4 15-4 UE support of CBW for 960kHz SCS

channelBWs-DL-SCS-960kHz-FR2-2-r17 BIT STRING (SIZE (8)) OPTIONAL,

channelBWs-UL-SCS-960kHz-FR2-2-r17 BIT STRING (SIZE (8)) OPTIONAL,

-- R4 17-1 UL gap for Tx power management

ul-GapFR2-r17 ENUMERATED {supported} OPTIONAL,

-- R1 25-4: One-shot HARQ ACK feedback triggered by DCI format 1\_2

oneShotHARQ-feedbackTriggeredByDCI-1-2-r17 ENUMERATED {supported} OPTIONAL,

-- R1 25-5: PHY priority handling for one-shot HARQ ACK feedback

oneShotHARQ-feedbackPhy-Priority-r17 ENUMERATED {supported} OPTIONAL,

-- R1 25-6: Enhanced type 3 HARQ-ACK codebook feedback

enhancedType3-HARQ-CodebookFeedback-r17 SEQUENCE {

enhancedType3-HARQ-Codebooks-r17 ENUMERATED {n1, n2, n4, n8},

maxNumberPUCCH-Transmissions-r17 ENUMERATED {n1, n2, n3, n4, n5, n6, n7}

} OPTIONAL,

-- R1 25-7: Triggered HARQ-ACK codebook re-transmission

triggeredHARQ-CodebookRetx-r17 SEQUENCE {

minHARQ-Retx-Offset-r17 ENUMERATED {n-7, n-5, n-3, n-1, n1},

maxHARQ-Retx-Offset-r17 ENUMERATED {n4, n6, n8, n10, n12, n14, n16, n18, n20, n22, n24}

} OPTIONAL

]]

}

-- TAG-RF-PARAMETERS-STOP

-- ASN1STOP

|  |
| --- |
| *RF-Parameters* field descriptions |
| ***appliedFreqBandListFilter***  In this field the UE mirrors the *FreqBandList* that the NW provided in the capability enquiry, if any. The UE filtered the band combinations in the *supportedBandCombinationList* in accordance with this *appliedFreqBandListFilter*. The UE does not include this field if the UE capability is requested by E-UTRAN and the network request includes the field *eutra-nr-only* [10]. |
| ***supportedBandCombinationList***  A list of band combinations that the UE supports for NR (and NR-DC, if requested). The *FeatureSetCombinationId*:s in this list refer to the *FeatureSetCombination* entries in the *featureSetCombinations* list in the *UE-NR-Capability* IE. The UE does not include this field if the UE capability is requested by E-UTRAN and the network request includes the field *eutra-nr-only* [10]. |
| ***supportedBandCombinationListSidelinkEUTRA-NR***  A list of band combinations that the UE supports for NR sidelink communication only, for joint NR sidelink communication and V2X sidelink communication, or for V2X sidelink communication only. The UE does not include this field if the UE capability is requested by E-UTRAN (see TS 36.331[10]) and the network request includes the field *eutra-nr-only*. |
| ***supportedBandCombinationListSL-NonRelayDiscovery***  A list of band combinations that the UE supports for NR sidelink non-relay discovery. The encoding is defined in PC5 *BandCombinationListSidelinkNR-r16.* |
| ***supportedBandCombinationListSL-RelayDiscovery***  A list of band combinations that the UE supports for NR sidelink relay discovery. The encoding is defined in PC5 *BandCombinationListSidelinkNR-r16.* |
| ***supportedBandCombinationList-UplinkTxSwitch***  A list of band combinations that the UE supports dynamic uplink Tx switching for NR UL CA and SUL. The *FeatureSetCombinationId*:s in this list refer to the *FeatureSetCombination* entries in the *featureSetCombinations* list in the *UE-NR-Capability* IE. The UE does not include this field if the UE capability is requested by E-UTRAN and the network request includes the field *eutra-nr-only* [10]. |

#### – *RF-ParametersMRDC*

The IE *RF-ParametersMRDC* is used to convey RF related capabilities for MR-DC.

*RF-ParametersMRDC* information element

-- ASN1START

-- TAG-RF-PARAMETERSMRDC-START

RF-ParametersMRDC ::= SEQUENCE {

supportedBandCombinationList BandCombinationList OPTIONAL,

appliedFreqBandListFilter FreqBandList OPTIONAL,

...,

[[

srs-SwitchingTimeRequested ENUMERATED {true} OPTIONAL,

supportedBandCombinationList-v1540 BandCombinationList-v1540 OPTIONAL

]],

[[

supportedBandCombinationList-v1550 BandCombinationList-v1550 OPTIONAL

]],

[[

supportedBandCombinationList-v1560 BandCombinationList-v1560 OPTIONAL,

supportedBandCombinationListNEDC-Only BandCombinationList OPTIONAL

]],

[[

supportedBandCombinationList-v1570 BandCombinationList-v1570 OPTIONAL

]],

[[

supportedBandCombinationList-v1580 BandCombinationList-v1580 OPTIONAL

]],

[[

supportedBandCombinationList-v1590 BandCombinationList-v1590 OPTIONAL

]],

[[

supportedBandCombinationListNEDC-Only-v15a0 SEQUENCE {

supportedBandCombinationList-v1540 BandCombinationList-v1540 OPTIONAL,

supportedBandCombinationList-v1560 BandCombinationList-v1560 OPTIONAL,

supportedBandCombinationList-v1570 BandCombinationList-v1570 OPTIONAL,

supportedBandCombinationList-v1580 BandCombinationList-v1580 OPTIONAL,

supportedBandCombinationList-v1590 BandCombinationList-v1590 OPTIONAL

} OPTIONAL

]],

[[

supportedBandCombinationList-v1610 BandCombinationList-v1610 OPTIONAL,

supportedBandCombinationListNEDC-Only-v1610 BandCombinationList-v1610 OPTIONAL,

supportedBandCombinationList-UplinkTxSwitch-r16 BandCombinationList-UplinkTxSwitch-r16 OPTIONAL

]],

[[

supportedBandCombinationList-v1630 BandCombinationList-v1630 OPTIONAL,

supportedBandCombinationListNEDC-Only-v1630 BandCombinationList-v1630 OPTIONAL,

supportedBandCombinationList-UplinkTxSwitch-v1630 BandCombinationList-UplinkTxSwitch-v1630 OPTIONAL

]],

[[

supportedBandCombinationList-v1640 BandCombinationList-v1640 OPTIONAL,

supportedBandCombinationListNEDC-Only-v1640 BandCombinationList-v1640 OPTIONAL,

supportedBandCombinationList-UplinkTxSwitch-v1640 BandCombinationList-UplinkTxSwitch-v1640 OPTIONAL

]],

[[

supportedBandCombinationList-UplinkTxSwitch-v1670 BandCombinationList-UplinkTxSwitch-v1670 OPTIONAL

]],

[[

supportedBandCombinationList-v1700 BandCombinationList-v1700 OPTIONAL,

supportedBandCombinationList-UplinkTxSwitch-v1700 BandCombinationList-UplinkTxSwitch-v1700 OPTIONAL

]]

}

RF-ParametersMRDC-v15g0 ::= SEQUENCE {

supportedBandCombinationList-v15g0 BandCombinationList-v15g0 OPTIONAL,

supportedBandCombinationListNEDC-Only-v15g0 BandCombinationList-v15g0 OPTIONAL

}

-- TAG-RF-PARAMETERSMRDC-STOP

-- ASN1STOP

|  |
| --- |
| *RF-ParametersMRDC* field descriptions |
| ***appliedFreqBandListFilter***  In this field the UE mirrors the *FreqBandList* that the NW provided in the capability enquiry, if any. The UE filtered the band combinations in the *supportedBandCombinationList* in accordance with this *appliedFreqBandListFilter*. |
| ***supportedBandCombinationList***  A list of band combinations that the UE supports for (NG)EN-DC, or both (NG)EN-DC and NE-DC. The *FeatureSetCombinationId*:s in this list refer to the *FeatureSetCombination* entries in the *featureSetCombinations* list in the *UE-MRDC-Capability* IE. |
| ***supportedBandCombinationListNEDC-Only, supportedBandCombinationListNEDC-Only-v1610***  A list of band combinations that the UE supports only for NE-DC. The *FeatureSetCombinationId*:s in this list refer to the *FeatureSetCombination* entries in the *featureSetCombinations* list in the *UE-MRDC-Capability* IE. |
| ***supportedBandCombinationList-UplinkTxSwitch***  A list of band combinations that the UE supports dynamic UL Tx switching for (NG)EN-DC. The *FeatureSetCombinationId*:s in this list refer to the *FeatureSetCombination* entries in the *featureSetCombinations* list in the *UE-MRDC-Capability* IE. |

#### – *RLC-Parameters*

The IE *RLC-Parameters* is used to convey capabilities related to RLC.

*RLC-Parameters* information element

-- ASN1START

-- TAG-RLC-PARAMETERS-START

RLC-Parameters ::= SEQUENCE {

am-WithShortSN ENUMERATED {supported} OPTIONAL,

um-WithShortSN ENUMERATED {supported} OPTIONAL,

um-WithLongSN ENUMERATED {supported} OPTIONAL,

...,

[[

extendedT-PollRetransmit-r16 ENUMERATED {supported} OPTIONAL,

extendedT-StatusProhibit-r16 ENUMERATED {supported} OPTIONAL

]],

[[

am-WithLongSN-RedCap-r17 ENUMERATED {supported} OPTIONAL

]]

}

-- TAG-RLC-PARAMETERS-STOP

-- ASN1STOP

#### – *SDAP-Parameters*

The IE *SDAP-Parameters* is used to convey capabilities related to SDAP.

*SDAP-Parameters* information element

-- ASN1START

-- TAG-SDAP-PARAMETERS-START

SDAP-Parameters ::= SEQUENCE {

as-ReflectiveQoS ENUMERATED {true} OPTIONAL,

...,

[[

sdap-QOS-IAB-r16 ENUMERATED {supported} OPTIONAL,

sdapHeaderIAB-r16 ENUMERATED {supported} OPTIONAL

]]

}

-- TAG-SDAP-PARAMETERS-STOP

-- ASN1STOP

#### – *SidelinkParameters*

The IE *SidelinkParameters* is used to convey capabilities related to NR and V2X sidelink communications.

*SidelinkParameters* information element

-- ASN1START

-- TAG-SIDELINKPARAMETERS-START

SidelinkParameters-r16 ::= SEQUENCE {

sidelinkParametersNR-r16 SidelinkParametersNR-r16 OPTIONAL,

sidelinkParametersEUTRA-r16 SidelinkParametersEUTRA-r16 OPTIONAL

}

SidelinkParametersNR-r16 ::= SEQUENCE {

rlc-ParametersSidelink-r16 RLC-ParametersSidelink-r16 OPTIONAL,

mac-ParametersSidelink-r16 MAC-ParametersSidelink-r16 OPTIONAL,

fdd-Add-UE-Sidelink-Capabilities-r16 UE-SidelinkCapabilityAddXDD-Mode-r16 OPTIONAL,

tdd-Add-UE-Sidelink-Capabilities-r16 UE-SidelinkCapabilityAddXDD-Mode-r16 OPTIONAL,

supportedBandListSidelink-r16 SEQUENCE (SIZE (1..maxBands)) OF BandSidelink-r16 OPTIONAL,

...,

[[

relayParameters-r17 RelayParameters-r17 OPTIONAL

]]

}

SidelinkParametersEUTRA-r16 ::= SEQUENCE {

sl-ParametersEUTRA1-r16 OCTET STRING OPTIONAL,

sl-ParametersEUTRA2-r16 OCTET STRING OPTIONAL,

sl-ParametersEUTRA3-r16 OCTET STRING OPTIONAL,

supportedBandListSidelinkEUTRA-r16 SEQUENCE (SIZE (1..maxBandsEUTRA)) OF BandSidelinkEUTRA-r16 OPTIONAL,

...

}

RLC-ParametersSidelink-r16 ::= SEQUENCE {

am-WithLongSN-Sidelink-r16 ENUMERATED {supported} OPTIONAL,

um-WithLongSN-Sidelink-r16 ENUMERATED {supported} OPTIONAL,

...

}

MAC-ParametersSidelink-r16 ::= SEQUENCE {

mac-ParametersSidelinkCommon-r16 MAC-ParametersSidelinkCommon-r16 OPTIONAL,

mac-ParametersSidelinkXDD-Diff-r16 MAC-ParametersSidelinkXDD-Diff-r16 OPTIONAL,

...

}

UE-SidelinkCapabilityAddXDD-Mode-r16 ::= SEQUENCE {

mac-ParametersSidelinkXDD-Diff-r16 MAC-ParametersSidelinkXDD-Diff-r16 OPTIONAL

}

MAC-ParametersSidelinkCommon-r16 ::= SEQUENCE {

lcp-RestrictionSidelink-r16 ENUMERATED {supported} OPTIONAL,

multipleConfiguredGrantsSidelink-r16 ENUMERATED {supported} OPTIONAL,

...,

[[

drx-OnSidelink-r17 ENUMERATED {supported} OPTIONAL

]]

}

MAC-ParametersSidelinkXDD-Diff-r16 ::= SEQUENCE {

multipleSR-ConfigurationsSidelink-r16 ENUMERATED {supported} OPTIONAL,

logicalChannelSR-DelayTimerSidelink-r16 ENUMERATED {supported} OPTIONAL,

...

}

BandSidelinkEUTRA-r16 ::= SEQUENCE {

freqBandSidelinkEUTRA-r16 FreqBandIndicatorEUTRA,

-- R1 15-7: Transmitting LTE sidelink mode 3 scheduled by NR Uu

gnb-ScheduledMode3SidelinkEUTRA-r16 SEQUENCE {

gnb-ScheduledMode3DelaySidelinkEUTRA-r16 ENUMERATED {ms0, ms0dot25, ms0dot5, ms0dot625, ms0dot75, ms1,

ms1dot25, ms1dot5, ms1dot75, ms2, ms2dot5, ms3, ms4,

ms5, ms6, ms8, ms10, ms20}

} OPTIONAL,

-- R1 15-9: Transmitting LTE sidelink mode 4 configured by NR Uu

gnb-ScheduledMode4SidelinkEUTRA-r16 ENUMERATED {supported} OPTIONAL

}

BandSidelink-r16 ::= SEQUENCE {

freqBandSidelink-r16 FreqBandIndicatorNR,

--15-1

sl-Reception-r16 SEQUENCE {

harq-RxProcessSidelink-r16 ENUMERATED {n16, n24, n32, n48, n64},

pscch-RxSidelink-r16 ENUMERATED {value1, value2},

scs-CP-PatternRxSidelink-r16 CHOICE {

fr1-r16 SEQUENCE {

scs-15kHz-r16 BIT STRING (SIZE (16)) OPTIONAL,

scs-30kHz-r16 BIT STRING (SIZE (16)) OPTIONAL,

scs-60kHz-r16 BIT STRING (SIZE (16)) OPTIONAL

},

fr2-r16 SEQUENCE {

scs-60kHz-r16 BIT STRING (SIZE (16)) OPTIONAL,

scs-120kHz-r16 BIT STRING (SIZE (16)) OPTIONAL

}

} OPTIONAL,

extendedCP-RxSidelink-r16 ENUMERATED {supported} OPTIONAL

} OPTIONAL,

--15-2

sl-TransmissionMode1-r16 SEQUENCE {

harq-TxProcessModeOneSidelink-r16 ENUMERATED {n8, n16},

scs-CP-PatternTxSidelinkModeOne-r16 CHOICE {

fr1-r16 SEQUENCE {

scs-15kHz-r16 BIT STRING (SIZE (16)) OPTIONAL,

scs-30kHz-r16 BIT STRING (SIZE (16)) OPTIONAL,

scs-60kHz-r16 BIT STRING (SIZE (16)) OPTIONAL

},

fr2-r16 SEQUENCE {

scs-60kHz-r16 BIT STRING (SIZE (16)) OPTIONAL,

scs-120kHz-r16 BIT STRING (SIZE (16)) OPTIONAL

}

},

extendedCP-TxSidelink-r16 ENUMERATED {supported} OPTIONAL,

harq-ReportOnPUCCH-r16 ENUMERATED {supported} OPTIONAL

} OPTIONAL,

--15-4

sync-Sidelink-r16 SEQUENCE {

gNB-Sync-r16 ENUMERATED {supported} OPTIONAL,

gNB-GNSS-UE-SyncWithPriorityOnGNB-ENB-r16 ENUMERATED {supported} OPTIONAL,

gNB-GNSS-UE-SyncWithPriorityOnGNSS-r16 ENUMERATED {supported} OPTIONAL

} OPTIONAL,

--15-10

sl-Tx-256QAM-r16 ENUMERATED {supported} OPTIONAL,

--15-11

psfch-FormatZeroSidelink-r16 SEQUENCE {

psfch-RxNumber ENUMERATED {n5, n15, n25, n32, n35, n45, n50, n64},

psfch-TxNumber ENUMERATED {n4, n8, n16}

} OPTIONAL,

--15-12

lowSE-64QAM-MCS-TableSidelink-r16 ENUMERATED {supported} OPTIONAL,

--15-15

enb-sync-Sidelink-r16 ENUMERATED {supported} OPTIONAL,

...,

[[

--15-3

sl-TransmissionMode2-r16 SEQUENCE {

harq-TxProcessModeTwoSidelink-r16 ENUMERATED {n8, n16},

scs-CP-PatternTxSidelinkModeTwo-r16 ENUMERATED {supported} OPTIONAL,

dl-openLoopPC-Sidelink-r16 ENUMERATED {supported} OPTIONAL

} OPTIONAL,

--15-5

congestionControlSidelink-r16 SEQUENCE {

cbr-ReportSidelink-r16 ENUMERATED {supported} OPTIONAL,

cbr-CR-TimeLimitSidelink-r16 ENUMERATED {time1, time2}

} OPTIONAL,

--15-22

fewerSymbolSlotSidelink-r16 ENUMERATED {supported} OPTIONAL,

--15-23

sl-openLoopPC-RSRP-ReportSidelink-r16 ENUMERATED {supported} OPTIONAL,

--13-1

sl-Rx-256QAM-r16 ENUMERATED {supported} OPTIONAL

]],

[[

ue-PowerClassSidelink-r16 ENUMERATED {pc2, pc3, spare6, spare5, spare4, spare3, spare2, spare1}

OPTIONAL

]],

[[

--32-4a

sl-TransmissionMode2-RandomResourceSelection-r17 SEQUENCE {

harq-TxProcessModeTwoSidelink-r17 ENUMERATED {n8, n16},

scs-CP-PatternTxSidelinkModeTwo-r17 CHOICE {

fr1-r17 SEQUENCE {

scs-15kHz-r17 BIT STRING (SIZE (16)) OPTIONAL,

scs-30kHz-r17 BIT STRING (SIZE (16)) OPTIONAL,

scs-60kHz-r17 BIT STRING (SIZE (16)) OPTIONAL

},

fr2-r17 SEQUENCE {

scs-60kHz-r17 BIT STRING (SIZE (16)) OPTIONAL,

scs-120kHz-r17 BIT STRING (SIZE (16)) OPTIONAL

}

} OPTIONAL,

extendedCP-Mode2Random-r17 ENUMERATED {supported} OPTIONAL,

dl-openLoopPC-Sidelink-r17 ENUMERATED {supported} OPTIONAL

} OPTIONAL,

--32-4b

sync-Sidelink-v1710 SEQUENCE {

sync-GNSS-r17 ENUMERATED {supported} OPTIONAL,

gNB-Sync-r17 ENUMERATED {supported} OPTIONAL,

gNB-GNSS-UE-SyncWithPriorityOnGNB-ENB-r17 ENUMERATED {supported} OPTIONAL,

gNB-GNSS-UE-SyncWithPriorityOnGNSS-r17 ENUMERATED {supported} OPTIONAL

} OPTIONAL,

--32-4c

enb-sync-Sidelink-v1710 ENUMERATED {supported} OPTIONAL,

--32-5a-2

rx-IUC-Scheme1-PreferredMode2Sidelink-r17 ENUMERATED {supported} OPTIONAL,

--32-5a-3

rx-IUC-Scheme1-NonPreferredMode2Sidelink-r17 ENUMERATED {supported} OPTIONAL,

--32-5b-2

rx-IUC-Scheme2-Mode2Sidelink-r17 ENUMERATED {n5, n15, n25, n32, n35, n45, n50, n64} OPTIONAL,

--32-6-1

rx-IUC-Scheme1-SCI-r17 ENUMERATED {supported} OPTIONAL,

--32-6-2

rx-IUC-Scheme1-SCI-ExplicitReq-r17 ENUMERATED {supported} OPTIONAL

]]

}

RelayParameters-r17 ::= SEQUENCE {

relayUE-Operation-L2-r17 ENUMERATED {supported} OPTIONAL,

remoteUE-Operation-L2-r17 ENUMERATED {supported} OPTIONAL,

remoteUE-PathSwitchToIdleInactiveRelay-r17 ENUMERATED {supported} OPTIONAL,

...

}

-- TAG-SIDELINKPARAMETERS-STOP

-- ASN1STOP

|  |
| --- |
| *SidelinkParametersEUTRA* field descriptions |
| ***sl-ParametersEUTRA1, sl-ParametersEUTRA2, sl-ParametersEUTRA3***  This field includes IE of *SL-Parameters-v1430* (where *v2x-eNB-Scheduled-r14* and *V2X-SupportedBandCombination-r14* shall not be included), *SL-Parameters-v1530* (where *V2X-SupportedBandCombination-r1530* shall not be included) and *SL-Parameters-v1540* respectively defined in 36.331 [10]. It is used for reporting the per-UE capability for V2X sidelink communication. |

#### – *SimultaneousRxTxPerBandPair*

The IE *SimultaneousRxTxPerBandPair* contains the simultaneous Rx/Tx UE capability for each band pair in a band combination.

***SimultaneousRxTxPerBandPair* information element**

-- ASN1START

-- TAG-SIMULTANEOUSRXTXPERBANDPAIR-START

SimultaneousRxTxPerBandPair ::= BIT STRING (SIZE (3..496))

-- TAG-SIMULTANEOUSRXTXPERBANDPAIR-STOP

-- ASN1STOP

#### – *SON-Parameters*

The IE *SON-Parameters* contains SON related parameters.

*SON-Parameters* information element

-- ASN1START

-- TAG-SON-PARAMETERS-START

SON-Parameters-r16 ::= SEQUENCE {

rach-Report-r16 ENUMERATED {supported} OPTIONAL,

...,

[[

rlfReportCHO-r17 ENUMERATED {supported} OPTIONAL,

rlfReportDAPS-r17 ENUMERATED {supported} OPTIONAL,

success-HO-Report-r17 ENUMERATED {supported} OPTIONAL,

twoStepRACH-Report-r17 ENUMERATED {supported} OPTIONAL,

pscell-MHI-Report-r17 ENUMERATED {supported} OPTIONAL,

onDemandSI-Report-r17 ENUMERATED {supported} OPTIONAL

]]

}

-- TAG-SON-PARAMETERS-STOP

-- ASN1STOP

#### – *SpatialRelationsSRS-Pos*

The IE *SpatialRelationsSRS-Pos* is used to convey spatial relation for SRS for positioning related parameters.

*SpatialRelationsSRS-Pos* information element

-- ASN1START

-- TAG-SPATIALRELATIONSSRS-POS-START

SpatialRelationsSRS-Pos-r16 ::= SEQUENCE {

spatialRelation-SRS-PosBasedOnSSB-Serving-r16 ENUMERATED {supported} OPTIONAL,

spatialRelation-SRS-PosBasedOnCSI-RS-Serving-r16 ENUMERATED {supported} OPTIONAL,

spatialRelation-SRS-PosBasedOnPRS-Serving-r16 ENUMERATED {supported} OPTIONAL,

spatialRelation-SRS-PosBasedOnSRS-r16 ENUMERATED {supported} OPTIONAL,

spatialRelation-SRS-PosBasedOnSSB-Neigh-r16 ENUMERATED {supported} OPTIONAL,

spatialRelation-SRS-PosBasedOnPRS-Neigh-r16 ENUMERATED {supported} OPTIONAL

}

--TAG-SPATIALRELATIONSSRS-POS-STOP

-- ASN1STOP

#### – SRS-AllPosResourcesRRC-Inactive

The IE *SRS-AllPosResourcesRRC-Inactive* is used to convey SRS positioning related parameters specific for a certain band.

*SRS-AllPosResourcesRRC-Inactive* information element

-- ASN1START

-- TAG-SRS-ALLPOSRESOURCESRRC-INACTIVE-START

SRS-AllPosResourcesRRC-Inactive-r17 ::= SEQUENCE {

srs-PosResourcesRRC-Inactive-r17 SEQUENCE {

-- R1 27-15: Positioning SRS transmission in RRC\_INACTIVE state for initial UL BWP

maxNumberSRS-PosResourceSetPerBWP-r17 ENUMERATED {n1, n2, n4, n8, n12, n16},

maxNumberSRS-PosResourcesPerBWP-r17 ENUMERATED {n1, n2, n4, n8, n16, n32, n64},

maxNumberSRS-ResourcesPerBWP-PerSlot-r17 ENUMERATED {n1, n2, n3, n4, n5, n6, n8, n10, n12, n14},

maxNumberPeriodicSRS-PosResourcesPerBWP-r17 ENUMERATED {n1, n2, n4, n8, n16, n32, n64},

maxNumberPeriodicSRS-PosResourcesPerBWP-PerSlot-r17 ENUMERATED {n1, n2, n3, n4, n5, n6, n8, n10, n12, n14},

-- R1 27-15a: Support of positioning SRS transmission in RRC\_INACTIVE state for initial BWP with semi-persistent SRS

maxNumOfSemiPersistentSRSposResources-r17 ENUMERATED {n1, n2, n4, n8, n16, n32, n64 },

maxNumOfSemiPersistentSRSposResourcesPerSlot-r17 ENUMERATED {n1, n2, n3, n4, n5, n6, n8, n10, n12, n14}

}

}

-- TAG-SRS-ALLPOSRESOURCESRRC-INACTIVE-STOP

-- ASN1STOP

#### – *SRS-SwitchingTimeNR*

The IE *SRS-SwitchingTimeNR* is used to indicate the SRS carrier switching time supported by the UE for one NR band pair.

*SRS-SwitchingTimeNR information element*

-- ASN1START

-- TAG-SRS-SWITCHINGTIMENR-START

SRS-SwitchingTimeNR ::= SEQUENCE {

switchingTimeDL ENUMERATED {n0us, n30us, n100us, n140us, n200us, n300us, n500us, n900us} OPTIONAL,

switchingTimeUL ENUMERATED {n0us, n30us, n100us, n140us, n200us, n300us, n500us, n900us} OPTIONAL

}

-- TAG-SRS-SWITCHINGTIMENR-STOP

-- ASN1STOP

#### – *SRS-SwitchingTimeEUTRA*

The IE *SRS-SwitchingTimeEUTRA* is used to indicate the SRS carrier switching time supported by the UE for one E-UTRA band pair.

*SRS-SwitchingTimeEUTRA information element*

-- ASN1START

-- TAG-SRS-SWITCHINGTIMEEUTRA-START

SRS-SwitchingTimeEUTRA ::= SEQUENCE {

switchingTimeDL ENUMERATED {n0, n0dot5, n1, n1dot5, n2, n2dot5, n3, n3dot5, n4, n4dot5, n5, n5dot5, n6, n6dot5, n7}

OPTIONAL,

switchingTimeUL ENUMERATED {n0, n0dot5, n1, n1dot5, n2, n2dot5, n3, n3dot5, n4, n4dot5, n5, n5dot5, n6, n6dot5, n7}

OPTIONAL

}

-- TAG-SRS-SWITCHINGTIMEEUTRA-STOP

-- ASN1STOP

#### – *SupportedBandwidth*

The IE *SupportedBandwidth* is used to indicate the channel bandwidth supported by the UE on one carrier of a band of a band combination.

*SupportedBandwidth* information element

-- ASN1START

-- TAG-SUPPORTEDBANDWIDTH-START

SupportedBandwidth ::= CHOICE {

fr1 ENUMERATED {mhz5, mhz10, mhz15, mhz20, mhz25, mhz30, mhz40, mhz50, mhz60, mhz80, mhz100},

fr2 ENUMERATED {mhz50, mhz100, mhz200, mhz400}

}

SupportedBandwidth-v1700 ::= CHOICE {

fr1-r17 ENUMERATED {mhz5, mhz10, mhz15, mhz20, mhz25, mhz30, mhz35, mhz40, mhz45, mhz50, mhz60, mhz70, mhz80, mhz90, mhz100},

fr2-r17 ENUMERATED {mhz50, mhz100, mhz200, mhz400, mhz800, mhz1600, mhz2000}

}

-- TAG-SUPPORTEDBANDWIDTH-STOP

-- ASN1STOP

#### – *UE-BasedPerfMeas-Parameters*

The IE *UE-BasedPerfMeas-Parameters* contains UE-based performance measurement parameters.

*UE-BasedPerfMeas-Parameters* information element

-- ASN1START

-- TAG-UE-BASEDPERFMEAS-PARAMETERS-START

UE-BasedPerfMeas-Parameters-r16 ::= SEQUENCE {

barometerMeasReport-r16 ENUMERATED {supported} OPTIONAL,

immMeasBT-r16 ENUMERATED {supported} OPTIONAL,

immMeasWLAN-r16 ENUMERATED {supported} OPTIONAL,

loggedMeasBT-r16 ENUMERATED {supported} OPTIONAL,

loggedMeasurements-r16 ENUMERATED {supported} OPTIONAL,

loggedMeasWLAN-r16 ENUMERATED {supported} OPTIONAL,

orientationMeasReport-r16 ENUMERATED {supported} OPTIONAL,

speedMeasReport-r16 ENUMERATED {supported} OPTIONAL,

gnss-Location-r16 ENUMERATED {supported} OPTIONAL,

ulPDCP-Delay-r16 ENUMERATED {supported} OPTIONAL,

...,

[[

sigBasedLogMDT-OverrideProtect-r17 ENUMERATED {supported} OPTIONAL,

multipleCEF-Report-r17 ENUMERATED {supported} OPTIONAL,

excessPacketDelay-r17 ENUMERATED {supported} OPTIONAL,

earlyMeasLog-r17 ENUMERATED {supported} OPTIONAL

]]

}

-- TAG-UE-BASEDPERFMEAS-PARAMETERS-STOP

-- ASN1STOP

#### – *UE-CapabilityRAT-ContainerList*

The IE *UE-CapabilityRAT-ContainerList* contains a list of radio access technology specific capability containers.

*UE-CapabilityRAT-ContainerList* information element

-- ASN1START

-- TAG-UE-CAPABILITYRAT-CONTAINERLIST-START

UE-CapabilityRAT-ContainerList ::= SEQUENCE (SIZE (0..maxRAT-CapabilityContainers)) OF UE-CapabilityRAT-Container

UE-CapabilityRAT-Container ::= SEQUENCE {

rat-Type RAT-Type,

ue-CapabilityRAT-Container OCTET STRING

}

-- TAG-UE-CAPABILITYRAT-CONTAINERLIST-STOP

-- ASN1STOP

|  |
| --- |
| *UE-CapabilityRAT-ContainerList* field descriptions |
| ***ue-CapabilityRAT-Container***  Container for the UE capabilities of the indicated RAT. The encoding is defined in the specification of each RAT:  For *rat-Type* set to *nr*: the encoding of UE capabilities is defined in *UE-NR-Capability*.  For *rat-Type* set to *eutra-nr*: the encoding of UE capabilities is defined in *UE-MRDC-Capability*.  For *rat-Type* set to *eutra*: the encoding of UE capabilities is defined in *UE-EUTRA-Capability* specified in TS 36.331 [10].  For *rat-Type* set to *utra-fdd*: the octet string contains the INTER RAT HANDOVER INFO message defined in TS 25.331 [45]. |

#### – *UE-CapabilityRAT-RequestList*

The IE *UE-CapabilityRAT-RequestList* is used to request UE capabilities for one or more RATs from the UE.

*UE-CapabilityRAT-RequestList* information element

-- ASN1START

-- TAG-UE-CAPABILITYRAT-REQUESTLIST-START

UE-CapabilityRAT-RequestList ::= SEQUENCE (SIZE (1..maxRAT-CapabilityContainers)) OF UE-CapabilityRAT-Request

UE-CapabilityRAT-Request ::= SEQUENCE {

rat-Type RAT-Type,

capabilityRequestFilter OCTET STRING OPTIONAL, -- Need N

...

}

-- TAG-UE-CAPABILITYRAT-REQUESTLIST-STOP

-- ASN1STOP

|  |
| --- |
| *UE-CapabilityRAT-Request* field descriptions |
| ***capabilityRequestFilter***  Information by which the network requests the UE to filter the UE capabilities.  For *rat-Type* set to *nr* or *eutra-nr*: the encoding of the *capabilityRequestFilter* is defined in *UE-CapabilityRequestFilterNR*.  For *rat-Type* set to *eutra*: the encoding of the *capabilityRequestFilter* is defined by *UECapabilityEnquiry* message defined in TS36.331 [10], in which *RAT-Type* in *UE-CapabilityRequest* includes only '*eutra'*. |
| ***rat-Type***  The RAT type for which the NW requests UE capabilities. |

#### – *UE-CapabilityRequestFilterCommon*

The IE *UE-CapabilityRequestFilterCommon* is used to request filtered UE capabilities. The filter is common for all capability containers that are requested.

*UE-CapabilityRequestFilterCommon* information element

-- ASN1START

-- TAG-UE-CAPABILITYREQUESTFILTERCOMMON-START

UE-CapabilityRequestFilterCommon ::= SEQUENCE {

mrdc-Request SEQUENCE {

omitEN-DC ENUMERATED {true} OPTIONAL, -- Need N

includeNR-DC ENUMERATED {true} OPTIONAL, -- Need N

includeNE-DC ENUMERATED {true} OPTIONAL -- Need N

} OPTIONAL, -- Need N

...,

[[

codebookTypeRequest-r16 SEQUENCE {

type1-SinglePanel-r16 ENUMERATED {true} OPTIONAL, -- Need N

type1-MultiPanel-r16 ENUMERATED {true} OPTIONAL, -- Need N

type2-r16 ENUMERATED {true} OPTIONAL, -- Need N

type2-PortSelection-r16 ENUMERATED {true} OPTIONAL -- Need N

} OPTIONAL, -- Need N

uplinkTxSwitchRequest-r16 ENUMERATED {true} OPTIONAL -- Need N

]],

[[

requestedCellGrouping-r16 SEQUENCE (SIZE (1..maxCellGroupings-r16)) OF CellGrouping-r16 OPTIONAL -- Cond NRDC

]]

}

CellGrouping-r16 ::= SEQUENCE {

mcg-r16 SEQUENCE (SIZE (1..maxBands)) OF FreqBandIndicatorNR,

scg-r16 SEQUENCE (SIZE (1..maxBands)) OF FreqBandIndicatorNR,

mode-r16 ENUMERATED {sync, async}

}

-- TAG-UE-CAPABILITYREQUESTFILTERCOMMON-STOP

-- ASN1STOP

|  |
| --- |
| *UE-CapabilityRequestFilterCommon field descriptions* |
| ***codebookTypeRequest***  Only if this field is present, the UE includes *SupportedCSI-RS-Resource* supported for the codebook type(s) requested within this field (i.e. type I single/multi-panel, type II and type II port selection) into *codebookVariantsList*, *codebookParametersPerBand* and *codebookParametersPerBC*. If this field is present and none of the codebook types is requested within this field (i.e. empty field), the UE includes *SupportedCSI-RS-Resource* supported for all codebook types into *codebookVariantsList*, *codebookParametersPerBand* and *codebookParametersPerBC*. |
| ***includeNE-DC***  Only if this field is present, the UE supporting NE-DC shall indicate support for NE-DC in band combinations and include feature set combinations which are applicable to NE-DC. Band combinations supporting both NE-DC and (NG)EN-DC shall be included in *supportedBandCombinationList*, band combinations supporting only NE-DC shall be included in *supportedBandCombinationListNEDC-Only*. |
| ***includeNR-DC***  Only if this field is present, the UE supporting NR-DC shall indicate support for NR-DC in band combinations and include feature set combinations which are applicable to NR-DC. |
| ***mode***  The mode of NR-DC operation that the NW is interested in for this cell grouping. The value *sync* means that the UE only indicates NR-DC support for band combinations for which it supports synchronous NR-DC with the requested cell grouping. The value *async* means that the UE only indicates NR-DC support for band combinations for which it supports asynchronous NR-DC with the requested cell grouping. |
| ***omitEN-DC***  Only if this field is present, the UE shall omit band combinations and feature set combinations which are only applicable to (NG)EN-DC. |
| ***requestedCellGrouping***  The NR-DC cell groupings that the NW is interested in, i.e., the bands that it might use in an MCG and the bands that it might use in an SCG. Only if this field is present, the UE indicates NR-DC support for band combinations for which it supports the requested cell grouping, i.e., in which it supports at least one of the *mcg* bands on MCG and at least one of the *scg* bands on the SCG. In its *supportedBandCombinationList*, the UE indicates which of its NR-DC band combinations supports which of the requested cell groupings. The first element in this list is referred to by ID#0, the second by ID#1 and so on. If this field is absent, the UE only includes band combinations for which it supports NR-DC with only FR1 bands in MCG and only FR2 bands in SCG.  Example 1: *requestedCellGrouping* is set to *mcg*=[n1, n7, n41, n66] and *scg*=[n78, n261]. This assumes that the NW would always use CA among n1, n7, n41 and n66 (depending on which are deployed on a given site) whereas with n78 and/or n261 the NW may need to use DC. With this filter a UE may report a band combination n1A-n7A-n78A for NR-DC only if it supports that serving cells for n1 and n7 are in the MCG and a serving cell for n78 is in the SCG. The UE may also report a band combination n41C-n261M for NR-DC provided that it supports a serving cell for n41 in the MCG and a serving cell for n261 in the SCG.  Example 2: One *requestedCellGrouping* is set to *mcg*=[n1, n7, n41, n66] and s*cg*=[n78, n261] and another *requestedCellGrouping* is set to *mcg*=[n1, n7, n66] and s*cg*=[ n41, n78, n261]. This assumes that the NW uses sometimes CA among n1, n7, n41 and n66 (as in example 1) and sometimes CA among n1, n7 and n66 but DC towards one or several of n41, n78, n261. If a UE supports n1A-n41A-n78A only if n41A and n78A are in the same cell group, this UE may only indicate cell grouping ID#1 (not #0) in its BC. |
| ***uplinkTxSwitchRequest***  Only if this field is present, the UE supporting dynamic UL Tx switching shall indicate support for UL Tx switching in band combinations which are applicable to inter-band UL CA, SUL and (NG)EN-DC. |

|  |  |
| --- | --- |
| Conditional Presence | Explanation |
| *NRDC* | The field is optionally present, Need N, if *includeNR-DC* is included. It is absent otherwise. |

#### – *UE-CapabilityRequestFilterNR*

The IE *UE-CapabilityRequestFilterNR* is used to request filtered UE capabilities.

*UE-CapabilityRequestFilterNR* information element

-- ASN1START

-- TAG-UE-CAPABILITYREQUESTFILTERNR-START

UE-CapabilityRequestFilterNR ::= SEQUENCE {

frequencyBandListFilter FreqBandList OPTIONAL, -- Need N

nonCriticalExtension UE-CapabilityRequestFilterNR-v1540 OPTIONAL

}

UE-CapabilityRequestFilterNR-v1540 ::= SEQUENCE {

srs-SwitchingTimeRequest ENUMERATED {true} OPTIONAL, -- Need N

nonCriticalExtension UE-CapabilityRequestFilterNR-v1710 OPTIONAL

}

UE-CapabilityRequestFilterNR-v1710 ::= SEQUENCE {

sidelinkRequest-r17 ENUMERATED {true} OPTIONAL, -- Need N

nonCriticalExtension SEQUENCE {} OPTIONAL

}

-- TAG-UE-CAPABILITYREQUESTFILTERNR-STOP

-- ASN1STOP

#### – *UE-MRDC-Capability*

The IE *UE-MRDC-Capability* is used to convey the UE Radio Access Capability Parameters for MR-DC, see TS 38.306 [26].

*UE-MRDC-Capability* information element

-- ASN1START

-- TAG-UE-MRDC-CAPABILITY-START

UE-MRDC-Capability ::= SEQUENCE {

measAndMobParametersMRDC MeasAndMobParametersMRDC OPTIONAL,

phy-ParametersMRDC-v1530 Phy-ParametersMRDC OPTIONAL,

rf-ParametersMRDC RF-ParametersMRDC,

generalParametersMRDC GeneralParametersMRDC-XDD-Diff OPTIONAL,

fdd-Add-UE-MRDC-Capabilities UE-MRDC-CapabilityAddXDD-Mode OPTIONAL,

tdd-Add-UE-MRDC-Capabilities UE-MRDC-CapabilityAddXDD-Mode OPTIONAL,

fr1-Add-UE-MRDC-Capabilities UE-MRDC-CapabilityAddFRX-Mode OPTIONAL,

fr2-Add-UE-MRDC-Capabilities UE-MRDC-CapabilityAddFRX-Mode OPTIONAL,

featureSetCombinations SEQUENCE (SIZE (1..maxFeatureSetCombinations)) OF FeatureSetCombination OPTIONAL,

pdcp-ParametersMRDC-v1530 PDCP-ParametersMRDC OPTIONAL,

lateNonCriticalExtension OCTET STRING (CONTAINING UE-MRDC-Capability-v15g0) OPTIONAL,

nonCriticalExtension UE-MRDC-Capability-v1560 OPTIONAL

}

-- Regular non-critical extensions:

UE-MRDC-Capability-v1560 ::= SEQUENCE {

receivedFilters OCTET STRING (CONTAINING UECapabilityEnquiry-v1560-IEs) OPTIONAL,

measAndMobParametersMRDC-v1560 MeasAndMobParametersMRDC-v1560 OPTIONAL,

fdd-Add-UE-MRDC-Capabilities-v1560 UE-MRDC-CapabilityAddXDD-Mode-v1560 OPTIONAL,

tdd-Add-UE-MRDC-Capabilities-v1560 UE-MRDC-CapabilityAddXDD-Mode-v1560 OPTIONAL,

nonCriticalExtension UE-MRDC-Capability-v1610 OPTIONAL

}

UE-MRDC-Capability-v1610 ::= SEQUENCE {

measAndMobParametersMRDC-v1610 MeasAndMobParametersMRDC-v1610 OPTIONAL,

generalParametersMRDC-v1610 GeneralParametersMRDC-v1610 OPTIONAL,

pdcp-ParametersMRDC-v1610 PDCP-ParametersMRDC-v1610 OPTIONAL,

nonCriticalExtension UE-MRDC-Capability-v1700 OPTIONAL

}

UE-MRDC-Capability-v1700 ::= SEQUENCE {

measAndMobParametersMRDC-v1700 MeasAndMobParametersMRDC-v1700,

nonCriticalExtension SEQUENCE {} OPTIONAL

}

-- Late non-critical extensions:

UE-MRDC-Capability-v15g0 ::= SEQUENCE {

rf-ParametersMRDC-v15g0 RF-ParametersMRDC-v15g0 OPTIONAL,

nonCriticalExtension SEQUENCE {} OPTIONAL

}

UE-MRDC-CapabilityAddXDD-Mode ::= SEQUENCE {

measAndMobParametersMRDC-XDD-Diff MeasAndMobParametersMRDC-XDD-Diff OPTIONAL,

generalParametersMRDC-XDD-Diff GeneralParametersMRDC-XDD-Diff OPTIONAL

}

UE-MRDC-CapabilityAddXDD-Mode-v1560 ::= SEQUENCE {

measAndMobParametersMRDC-XDD-Diff-v1560 MeasAndMobParametersMRDC-XDD-Diff-v1560 OPTIONAL

}

UE-MRDC-CapabilityAddFRX-Mode ::= SEQUENCE {

measAndMobParametersMRDC-FRX-Diff MeasAndMobParametersMRDC-FRX-Diff

}

GeneralParametersMRDC-XDD-Diff ::= SEQUENCE {

splitSRB-WithOneUL-Path ENUMERATED {supported} OPTIONAL,

splitDRB-withUL-Both-MCG-SCG ENUMERATED {supported} OPTIONAL,

srb3 ENUMERATED {supported} OPTIONAL,

dummy ENUMERATED {supported} OPTIONAL,

...

}

GeneralParametersMRDC-v1610 ::= SEQUENCE {

f1c-OverEUTRA-r16 ENUMERATED {supported} OPTIONAL

}

-- TAG-UE-MRDC-CAPABILITY-STOP

-- ASN1STOP

|  |
| --- |
| *UE-MRDC-Capability* field descriptions |
| ***featureSetCombinations***  A list of *FeatureSetCombination*:s for *supportedBandCombinationList* and *supportedBandCombinationListNEDC-Only* in *UE-MRDC-Capability*. The *FeatureSetDownlink*:s and *FeatureSetUplink*:s referred to from these *FeatureSetCombination*:s are defined in the *featureSets* list in *UE-NR-Capability*. |

#### – *UE-NR-Capability*

The IE *UE-NR-Capability* is used to convey the NR UE Radio Access Capability Parameters, see TS 38.306 [26].

*UE-NR-Capability* information element

-- ASN1START

-- TAG-UE-NR-CAPABILITY-START

UE-NR-Capability ::= SEQUENCE {

accessStratumRelease AccessStratumRelease,

pdcp-Parameters PDCP-Parameters,

rlc-Parameters RLC-Parameters OPTIONAL,

mac-Parameters MAC-Parameters OPTIONAL,

phy-Parameters Phy-Parameters,

rf-Parameters RF-Parameters,

measAndMobParameters MeasAndMobParameters OPTIONAL,

fdd-Add-UE-NR-Capabilities UE-NR-CapabilityAddXDD-Mode OPTIONAL,

tdd-Add-UE-NR-Capabilities UE-NR-CapabilityAddXDD-Mode OPTIONAL,

fr1-Add-UE-NR-Capabilities UE-NR-CapabilityAddFRX-Mode OPTIONAL,

fr2-Add-UE-NR-Capabilities UE-NR-CapabilityAddFRX-Mode OPTIONAL,

featureSets FeatureSets OPTIONAL,

featureSetCombinations SEQUENCE (SIZE (1..maxFeatureSetCombinations)) OF FeatureSetCombination OPTIONAL,

lateNonCriticalExtension OCTET STRING (CONTAINING UE-NR-Capability-v15c0) OPTIONAL,

nonCriticalExtension UE-NR-Capability-v1530 OPTIONAL

}

-- Regular non-critical extensions:

UE-NR-Capability-v1530 ::= SEQUENCE {

fdd-Add-UE-NR-Capabilities-v1530 UE-NR-CapabilityAddXDD-Mode-v1530 OPTIONAL,

tdd-Add-UE-NR-Capabilities-v1530 UE-NR-CapabilityAddXDD-Mode-v1530 OPTIONAL,

dummy ENUMERATED {supported} OPTIONAL,

interRAT-Parameters InterRAT-Parameters OPTIONAL,

inactiveState ENUMERATED {supported} OPTIONAL,

delayBudgetReporting ENUMERATED {supported} OPTIONAL,

nonCriticalExtension UE-NR-Capability-v1540 OPTIONAL

}

UE-NR-Capability-v1540 ::= SEQUENCE {

sdap-Parameters SDAP-Parameters OPTIONAL,

overheatingInd ENUMERATED {supported} OPTIONAL,

ims-Parameters IMS-Parameters OPTIONAL,

fr1-Add-UE-NR-Capabilities-v1540 UE-NR-CapabilityAddFRX-Mode-v1540 OPTIONAL,

fr2-Add-UE-NR-Capabilities-v1540 UE-NR-CapabilityAddFRX-Mode-v1540 OPTIONAL,

fr1-fr2-Add-UE-NR-Capabilities UE-NR-CapabilityAddFRX-Mode OPTIONAL,

nonCriticalExtension UE-NR-Capability-v1550 OPTIONAL

}

UE-NR-Capability-v1550 ::= SEQUENCE {

reducedCP-Latency ENUMERATED {supported} OPTIONAL,

nonCriticalExtension UE-NR-Capability-v1560 OPTIONAL

}

UE-NR-Capability-v1560 ::= SEQUENCE {

nrdc-Parameters NRDC-Parameters OPTIONAL,

receivedFilters OCTET STRING (CONTAINING UECapabilityEnquiry-v1560-IEs) OPTIONAL,

nonCriticalExtension UE-NR-Capability-v1570 OPTIONAL

}

UE-NR-Capability-v1570 ::= SEQUENCE {

nrdc-Parameters-v1570 NRDC-Parameters-v1570 OPTIONAL,

nonCriticalExtension UE-NR-Capability-v1610 OPTIONAL

}

-- Late non-critical extensions:

UE-NR-Capability-v15c0 ::= SEQUENCE {

nrdc-Parameters-v15c0 NRDC-Parameters-v15c0 OPTIONAL,

partialFR2-FallbackRX-Req ENUMERATED {true} OPTIONAL,

nonCriticalExtension UE-NR-Capability-v15g0 OPTIONAL

}

UE-NR-Capability-v15g0 ::= SEQUENCE {

rf-Parameters-v15g0 RF-Parameters-v15g0 OPTIONAL,

nonCriticalExtension SEQUENCE {} OPTIONAL

}

-- Regular non-critical extensions:

UE-NR-Capability-v1610 ::= SEQUENCE {

inDeviceCoexInd-r16 ENUMERATED {supported} OPTIONAL,

dl-DedicatedMessageSegmentation-r16 ENUMERATED {supported} OPTIONAL,

nrdc-Parameters-v1610 NRDC-Parameters-v1610 OPTIONAL,

powSav-Parameters-r16 PowSav-Parameters-r16 OPTIONAL,

fr1-Add-UE-NR-Capabilities-v1610 UE-NR-CapabilityAddFRX-Mode-v1610 OPTIONAL,

fr2-Add-UE-NR-Capabilities-v1610 UE-NR-CapabilityAddFRX-Mode-v1610 OPTIONAL,

bh-RLF-Indication-r16 ENUMERATED {supported} OPTIONAL,

directSN-AdditionFirstRRC-IAB-r16 ENUMERATED {supported} OPTIONAL,

bap-Parameters-r16 BAP-Parameters-r16 OPTIONAL,

referenceTimeProvision-r16 ENUMERATED {supported} OPTIONAL,

sidelinkParameters-r16 SidelinkParameters-r16 OPTIONAL,

highSpeedParameters-r16 HighSpeedParameters-r16 OPTIONAL,

mac-Parameters-v1610 MAC-Parameters-v1610 OPTIONAL,

mcgRLF-RecoveryViaSCG-r16 ENUMERATED {supported} OPTIONAL,

resumeWithStoredMCG-SCells-r16 ENUMERATED {supported} OPTIONAL,

resumeWithStoredSCG-r16 ENUMERATED {supported} OPTIONAL,

resumeWithSCG-Config-r16 ENUMERATED {supported} OPTIONAL,

ue-BasedPerfMeas-Parameters-r16 UE-BasedPerfMeas-Parameters-r16 OPTIONAL,

son-Parameters-r16 SON-Parameters-r16 OPTIONAL,

onDemandSIB-Connected-r16 ENUMERATED {supported} OPTIONAL,

nonCriticalExtension UE-NR-Capability-v1640 OPTIONAL

}

UE-NR-Capability-v1640 ::= SEQUENCE {

redirectAtResumeByNAS-r16 ENUMERATED {supported} OPTIONAL,

phy-ParametersSharedSpectrumChAccess-r16 Phy-ParametersSharedSpectrumChAccess-r16 OPTIONAL,

nonCriticalExtension UE-NR-Capability-v1650 OPTIONAL

}

UE-NR-Capability-v1650 ::= SEQUENCE {

mpsPriorityIndication-r16 ENUMERATED {supported} OPTIONAL,

highSpeedParameters-v1650 HighSpeedParameters-v1650 OPTIONAL,

nonCriticalExtension UE-NR-Capability-v1690 OPTIONAL

}

UE-NR-Capability-v1690 ::= SEQUENCE {

ul-RRC-Segmentation-r16 ENUMERATED {supported} OPTIONAL,

nonCriticalExtension UE-NR-Capability-v1700 OPTIONAL

}

UE-NR-Capability-v1700 ::= SEQUENCE {

inactiveStatePO-Determination-r17 ENUMERATED {supported} OPTIONAL,

highSpeedParameters-v1700 HighSpeedParameters-v1700 OPTIONAL,

powSav-Parameters-v1700 PowSav-Parameters-v1700 OPTIONAL,

mac-Parameters-v1700 MAC-Parameters-v1700 OPTIONAL,

ims-Parameters-v1700 IMS-Parameters-v1700 OPTIONAL,

measAndMobParameters-v1700 MeasAndMobParameters-v1700,

appLayerMeasParameters-r17 AppLayerMeasParameters-r17 OPTIONAL,

redCapParameters-r17 RedCapParameters-r17 OPTIONAL,

ra-SDT-r17 ENUMERATED {supported} OPTIONAL,

srb-SDT-r17 ENUMERATED {supported} OPTIONAL,

gNB-SideRTT-BasedPDC-r17 ENUMERATED {supported} OPTIONAL,

bh-RLF-DetectionRecovery-Indication-r17 ENUMERATED {supported} OPTIONAL,

nrdc-Parameters-v1700 NRDC-Parameters-v1700 OPTIONAL,

bap-Parameters-v1700 BAP-Parameters-v1700 OPTIONAL,

musim-GapPreference-r17 ENUMERATED {supported} OPTIONAL,

musimLeaveConnected-r17 ENUMERATED {supported} OPTIONAL,

mbs-Parameters-r17 MBS-Parameters-r17,

nonTerrestrialNetwork-r17 ENUMERATED {supported} OPTIONAL,

ntn-ScenarioSupport-r17 ENUMERATED {gso, ngso} OPTIONAL,

sliceInfoforCellReselection-r17 ENUMERATED {supported} OPTIONAL,

ue-RadioPagingInfo-r17 UE-RadioPagingInfo-r17 OPTIONAL,

-- R4 17-2 UL gap pattern for Tx power management

ul-GapFR2-Pattern-r17 BIT STRING (SIZE (4)) OPTIONAL,

ntn-Parameters-r17 NTN-Parameters-r17 OPTIONAL,

nonCriticalExtension SEQUENCE {} OPTIONAL

}

UE-NR-CapabilityAddXDD-Mode ::= SEQUENCE {

phy-ParametersXDD-Diff Phy-ParametersXDD-Diff OPTIONAL,

mac-ParametersXDD-Diff MAC-ParametersXDD-Diff OPTIONAL,

measAndMobParametersXDD-Diff MeasAndMobParametersXDD-Diff OPTIONAL

}

UE-NR-CapabilityAddXDD-Mode-v1530 ::= SEQUENCE {

eutra-ParametersXDD-Diff EUTRA-ParametersXDD-Diff

}

UE-NR-CapabilityAddFRX-Mode ::= SEQUENCE {

phy-ParametersFRX-Diff Phy-ParametersFRX-Diff OPTIONAL,

measAndMobParametersFRX-Diff MeasAndMobParametersFRX-Diff OPTIONAL

}

UE-NR-CapabilityAddFRX-Mode-v1540 ::= SEQUENCE {

ims-ParametersFRX-Diff IMS-ParametersFRX-Diff OPTIONAL

}

UE-NR-CapabilityAddFRX-Mode-v1610 ::= SEQUENCE {

powSav-ParametersFRX-Diff-r16 PowSav-ParametersFRX-Diff-r16 OPTIONAL,

mac-ParametersFRX-Diff-r16 MAC-ParametersFRX-Diff-r16 OPTIONAL

}

BAP-Parameters-r16 ::= SEQUENCE {

flowControlBH-RLC-ChannelBased-r16 ENUMERATED {supported} OPTIONAL,

flowControlRouting-ID-Based-r16 ENUMERATED {supported} OPTIONAL

}

BAP-Parameters-v1700 ::= SEQUENCE {

bapHeaderRewriting-Rerouting-r17 ENUMERATED {supported} OPTIONAL,

bapHeaderRewriting-Routing-r17 ENUMERATED {supported} OPTIONAL

}

MBS-Parameters-r17 ::= SEQUENCE {

maxMRB-Add-r17 INTEGER (1..16) OPTIONAL

}

-- TAG-UE-NR-CAPABILITY-STOP

-- ASN1STOP

|  |
| --- |
| *UE-NR-Capability* field descriptions |
| ***featureSetCombinations***  A list of *FeatureSetCombination:s* for *supportedBandCombinationList* in *UE-NR-Capability*. The *FeatureSetDownlink:s* and *FeatureSetUplink:s* referred to from these *FeatureSetCombination:s* are defined in the *featureSets* list in *UE-NR-Capability*. |

|  |
| --- |
| *UE-NR-Capability-v1540 field descriptions* |
| ***fr1-fr2-Add-UE-NR-Capabilities***  This instance of *UE-NR-CapabilityAddFRX-Mode* does not include any other fields than *csi-RS-IM-ReceptionForFeedback*/ *csi-RS-ProcFrameworkForSRS*/ *csi-ReportFramework*. |

#### – UE-RadioPagingInfo

The *UE-RadioPagingInfo* IE contains UE capability information needed for paging.

*UE-RadioPagingInfo* information element

-- ASN1START

-- TAG-UE-RADIOPAGINGINFO-START

UE-RadioPagingInfo-r17 ::= SEQUENCE {

-- R1 29-1: Paging enhancement

pei-SubgroupingSupportBandList-r17 SEQUENCE (SIZE (1..maxBands)) OF FreqBandIndicatorNR OPTIONAL,

...

}

-- TAG- UE-RADIOPAGINGINFO-STOP

-- ASN1STOP

#### – *SharedSpectrumChAccessParamsPerBand*

The IE *SharedSpectrumChAccessParamsPerBand* is used to convey shared channel access related parameters specific for a certain frequency band (not per feature set or band combination).

*SharedSpectrumChAccessParamsPerBand* information element

-- ASN1START

-- TAG-SHAREDSPECTRUMCHACCESSPARAMSPERBAND-START

SharedSpectrumChAccessParamsPerBand-r16 ::= SEQUENCE {

-- R1 10-1: UL channel access for dynamic channel access mode

ul-DynamicChAccess-r16 ENUMERATED {supported} OPTIONAL,

-- R1 10-1a: UL channel access for semi-static channel access mode

ul-Semi-StaticChAccess-r16 ENUMERATED {supported} OPTIONAL,

-- R1 10-2: SSB-based RRM for dynamic channel access mode

ssb-RRM-DynamicChAccess-r16 ENUMERATED {supported} OPTIONAL,

-- R1 10-2a: SSB-based RRM for semi-static channel access mode

ssb-RRM-Semi-StaticChAccess-r16 ENUMERATED {supported} OPTIONAL,

-- R1 10-2b: MIB reading on unlicensed cell

mib-Acquisition-r16 ENUMERATED {supported} OPTIONAL,

-- R1 10-2c: SSB-based RLM for dynamic channel access mode

ssb-RLM-DynamicChAccess-r16 ENUMERATED {supported} OPTIONAL,

-- R1 10-2d: SSB-based RLM for semi-static channel access mode

ssb-RLM-Semi-StaticChAccess-r16 ENUMERATED {supported} OPTIONAL,

-- R1 10-2e: SIB1 reception on unlicensed cell

sib1-Acquisition-r16 ENUMERATED {supported} OPTIONAL,

-- R1 10-2f: Support monitoring of extended RAR window

extRA-ResponseWindow-r16 ENUMERATED {supported} OPTIONAL,

-- R1 10-2g: SSB-based BFD/CBD for dynamic channel access mode

ssb-BFD-CBD-dynamicChannelAccess-r16 ENUMERATED {supported} OPTIONAL,

-- R1 10-2h: SSB-based BFD/CBD for semi-static channel access mode

ssb-BFD-CBD-semi-staticChannelAccess-r16 ENUMERATED {supported} OPTIONAL,

-- R1 10-2i: CSI-RS-based BFD/CBD for NR-U

csi-RS-BFD-CBD-r16 ENUMERATED {supported} OPTIONAL,

-- R1 10-7: UL channel access for 10 MHz SCell

ul-ChannelBW-SCell-10mhz-r16 ENUMERATED {supported} OPTIONAL,

-- R1 10-10: RSSI and channel occupancy measurement and reporting

rssi-ChannelOccupancyReporting-r16 ENUMERATED {supported} OPTIONAL,

-- R1 10-11:SRS starting position at any OFDM symbol in a slot

srs-StartAnyOFDM-Symbol-r16 ENUMERATED {supported} OPTIONAL,

-- R1 10-20: Support search space set configuration with freqMonitorLocation-r16

searchSpaceFreqMonitorLocation-r16 INTEGER (1..5) OPTIONAL,

-- R1 10-20a: Support coreset configuration with rb-Offset

coreset-RB-Offset-r16 ENUMERATED {supported} OPTIONAL,

-- R1 10-23:CGI reading on unlicensed cell for ANR functionality

cgi-Acquisition-r16 ENUMERATED {supported} OPTIONAL,

-- R1 10-25: Enable configured UL transmissions when DCI 2\_0 is configured but not detected

configuredUL-Tx-r16 ENUMERATED {supported} OPTIONAL,

-- R1 10-27: Wideband PRACH

prach-Wideband-r16 ENUMERATED {supported} OPTIONAL,

-- R1 10-29: Support available RB set indicator field in DCI 2\_0

dci-AvailableRB-Set-r16 ENUMERATED {supported} OPTIONAL,

-- R1 10-30: Support channel occupancy duration indicator field in DCI 2\_0

dci-ChOccupancyDuration-r16 ENUMERATED {supported} OPTIONAL,

-- R1 10-8: Type B PDSCH length {3, 5, 6, 8, 9, 10, 11, 12, 13} without DMRS shift due to CRS collision

typeB-PDSCH-length-r16 ENUMERATED {supported} OPTIONAL,

-- R1 10-9: Search space set group switching with explicit DCI 2\_0 bit field trigger or with implicit PDCCH decoding with DCI 2\_0 monitoring

searchSpaceSwitchWithDCI-r16 ENUMERATED {supported} OPTIONAL,

-- R1 10-9b: Search space set group switching with implicit PDCCH decoding without DCI 2\_0 monitoring

searchSpaceSwitchWithoutDCI-r16 ENUMERATED {supported} OPTIONAL,

-- R1 10-9d: Support Search space set group switching capability 2

searchSpaceSwitchCapability2-r16 ENUMERATED {supported} OPTIONAL,

-- R1 10-14: Non-numerical PDSCH to HARQ-ACK timing

non-numericalPDSCH-HARQ-timing-r16 ENUMERATED {supported} OPTIONAL,

-- R1 10-15: Enhanced dynamic HARQ codebook

enhancedDynamicHARQ-codebook-r16 ENUMERATED {supported} OPTIONAL,

-- R1 10-16: One-shot HARQ ACK feedback

oneShotHARQ-feedback-r16 ENUMERATED {supported} OPTIONAL,

-- R1 10-17: Multi-PUSCH UL grant

multiPUSCH-UL-grant-r16 ENUMERATED {supported} OPTIONAL,

-- R1 10-26: CSI-RS based RLM for NR-U

csi-RS-RLM-r16 ENUMERATED {supported} OPTIONAL,

dummy ENUMERATED {supported} OPTIONAL,

-- R1 10-31: Support of P/SP-CSI-RS reception with CSI-RS-ValidationWith-DCI-r16 configured

periodicAndSemi-PersistentCSI-RS-r16 ENUMERATED {supported} OPTIONAL,

-- R1 10-3: PRB interlace mapping for PUSCH

pusch-PRB-interlace-r16 ENUMERATED {supported} OPTIONAL,

-- R1 10-3a: PRB interlace mapping for PUCCH

pucch-F0-F1-PRB-Interlace-r16 ENUMERATED {supported} OPTIONAL,

-- R1 10-12: OCC for PRB interlace mapping for PF2 and PF3

occ-PRB-PF2-PF3-r16 ENUMERATED {supported} OPTIONAL,

-- R1 10-13a: Extended CP range of more than one symbol for CG-PUSCH

extCP-rangeCG-PUSCH-r16 ENUMERATED {supported} OPTIONAL,

-- R1 10-18: Configured grant with retransmission in CG resources

configuredGrantWithReTx-r16 ENUMERATED {supported} OPTIONAL,

-- R1 10-21a: Support using ED threshold given by gNB for UL to DL COT sharing

ed-Threshold-r16 ENUMERATED {supported} OPTIONAL,

-- R1 10-21b: Support UL to DL COT sharing

ul-DL-COT-Sharing-r16 ENUMERATED {supported} OPTIONAL,

-- R1 10-24: CG-UCI multiplexing with HARQ ACK

mux-CG-UCI-HARQ-ACK-r16 ENUMERATED {supported} OPTIONAL,

-- R1 10-28: Configured grant with Rel-16 enhanced resource configuration

cg-resourceConfig-r16 ENUMERATED {supported} OPTIONAL

}

SharedSpectrumChAccessParamsPerBand-v1630 ::= SEQUENCE {

-- R4 4-1: DL reception in intra-carrier guardband

dl-ReceptionIntraCellGuardband-r16 ENUMERATED {supported} OPTIONAL,

-- R4 4-2: DL reception when gNB does not transmit on all RB sets of a carrier as a result of LBT

dl-ReceptionLBT-subsetRB-r16 ENUMERATED {supported} OPTIONAL

}

SharedSpectrumChAccessParamsPerBand-v1640 ::= SEQUENCE {

-- 10-26b(1-4): CSI-RS based RRM measurement with associated SS-block

csi-RSRP-AndRSRQ-MeasWithSSB-r16 ENUMERATED {supported} OPTIONAL,

-- 10-26c(1-5): CSI-RS based RRM measurement without associated SS-block

csi-RSRP-AndRSRQ-MeasWithoutSSB-r16 ENUMERATED {supported} OPTIONAL,

-- 10-26d(1-6): CSI-RS based RS-SINR measurement

csi-SINR-Meas-r16 ENUMERATED {supported} OPTIONAL,

-- 10-26e(1-8): RLM based on a mix of SS block and CSI-RS signals within active BWP

ssb-AndCSI-RS-RLM-r16 ENUMERATED {supported} OPTIONAL,

-- 10-26f(1-9): CSI-RS based contention free RA for HO

csi-RS-CFRA-ForHO-r16 ENUMERATED {supported} OPTIONAL

}

SharedSpectrumChAccessParamsPerBand-v1650 ::= SEQUENCE {

-- Extension of R1 10-9 capability to configure up to 16 instead of 4 cells or cell groups, respectively

extendedSearchSpaceSwitchWithDCI-r16 ENUMERATED {supported} OPTIONAL

}

SharedSpectrumChAccessParamsPerBand-v1710 ::= SEQUENCE {

-- R1 25-12: UE initiated semi-static channel occupancy with dependent configurations

ul-Semi-StaticChAccessDependentConfig-r17 ENUMERATED {supported} OPTIONAL,

-- R1 25-13: UE initiated semi-static channel occupancy with independent configurations

ul-Semi-StaticChAccessIndependentConfig-r17 ENUMERATED {supported} OPTIONAL

}

-- TAG-SHAREDSPECTRUMCHACCESSPARAMSPERBAND-STOP

-- ASN1STOP

### 6.3.4 Other information elements

#### – *AbsoluteTimeInfo*

The IE *AbsoluteTimeInfo* indicates an absolute time in a format YY-MM-DD HH:MM:SS and using BCD encoding. The first/ leftmost bit of the bit string contains the most significant bit of the most significant digit of the year and so on.

*AbsoluteTimeInfo* information element

-- ASN1START

-- TAG-ABSOLUTETIMEINFO-START

AbsoluteTimeInfo-r16 ::= BIT STRING (SIZE (48))

-- TAG-ABSOLUTETIMEINFO-STOP

-- ASN1STOP

– *AppLayerMeasConfig*

The IE *AppLayerMeasConfig* indicates configuration of application layer measurements.

***AppLayerMeasConfig* information element**

-- ASN1START

-- TAG-APPLAYERMEASCONFIG-START

AppLayerMeasConfig-r17 ::= SEQUENCE {

measConfigAppLayerToAddModList-r17 SEQUENCE (SIZE (1..maxNrofAppLayerMeas-r17)) OF MeasConfigAppLayer-r17 OPTIONAL, -- Need N

measConfigAppLayerToReleaseList-r17 SEQUENCE (SIZE (1..maxNrofAppLayerMeas-r17)) OF MeasConfigAppLayerId-r17 OPTIONAL, -- Need N

rrc-SegAllowed-r17 ENUMERATED {enabled} OPTIONAL, -- Need R

...

}

MeasConfigAppLayer-r17 ::= SEQUENCE {

measConfigAppLayerId-r17 MeasConfigAppLayerId-r17,

measConfigAppLayerContainer-r17 OCTET STRING (SIZE (1..8000)) OPTIONAL, -- Need N

serviceType-r17 ENUMERATED {streaming, mtsi, vr, spare5, spare4, spare3, spare2, spare1} OPTIONAL, -- Need M

pauseReporting BOOLEAN OPTIONAL, -- Need M

transmissionOfSessionStartStop BOOLEAN OPTIONAL, -- Need M

ran-VisibleParameters-r17 SetupRelease {RAN-VisibleParameters-r17} OPTIONAL, -- Need M

...

}

RAN-VisibleParameters-r17 ::= SEQUENCE {

ran-VisiblePeriodicity-r17 ENUMERATED {ms120, ms240, ms480, ms640, ms1024} OPTIONAL, -- Need S

numberOfBufferLevelEntries-r17 INTEGER (1..8) OPTIONAL, -- Need R

reportPlayoutDelayForMediaStartup-r17 BOOLEAN OPTIONAL, -- Need M

...

}

-- TAG-APPLAYERMEASCONFIG-STOP

-- ASN1STOP

|  |
| --- |
| *AppLayerMeasConfig* field descriptions |
| ***measConfigAppLayerContainer***  The field contains configuration of application layer measurements, see Annex L (normative) in TS 26.247 [68], clause 16.5 in TS 26.114 [69] and TS 26.118 [70]. |
| ***pauseReporting***  The field indicates whether the transmission of *measReportAppLayerContainer* is paused or not. |
| ***ran-VisibleParameters***  The field indicates whether RAN visible application layer measurements shall be reported or not. The field is optionally present when *serviceType* is set to *streaming* or *vr*. Otherwise, it is absent. |
| ***rrc-SegAllowed***  This field indicates that RRC segmentation of *MeasurementReportAppLayer* is allowed. It may be present only if the UE supports RRC segmentation of the *MeasurementReportAppLayer* message in UL***.*** |
| ***serviceType***  Indicates the type of application layer measurement. Value streaming indicates Quality of Experience Measurement Collection for streaming services (see TS 26.247 [68]), value mtsi indicates Quality of Experience Measurement Collection for MTSI (see TS 26.114 [69]). value vr indicates Quality of Experience Measurement Collection for VR service (see TS 26.118 [70]). The network always configures *serviceType* when application layer measurements are initially configured and at *fullConfig*. |
| ***transmissionOfSessionStartStop***  The field indicates whether the UE shall transmit indications when sessions in the application layer start and stop. The UE transmits a session start indication upon configuration of this field if a session already has started in the application layer. |

|  |
| --- |
| *RAN-VisibleParameters* field descriptions |
| ***numberOfBufferLevelEntries***  The field contains the maximum number of buffer level entries that can be reported for RAN visible application layer measurements. |
| ***ran-VisiblePeriodicity***  The field indicates the periodicity of RAN visible reporting. Value ms120 indicates 120 ms, value ms240 indicates 240 ms and so on. |
| ***reportPlayoutDelayForMediaStartup***  The field indicates whether the UE shall report Playout Delay for Media Startup for RAN visible application layer measurements. |

#### – *AreaConfiguration*

The *AreaConfiguration* indicates area for which UE is requested to perform measurement logging. If not configured, measurement logging is not restricted to specific cells or tracking areas but applies as long as the RPLMN is contained in *plmn-IdentityList* stored in *VarLogMeasReport*.

*AreaConfiguration* information element

-- ASN1START

-- TAG-AREACONFIGURATION-START

AreaConfiguration-r16 ::= SEQUENCE {

areaConfig-r16 AreaConfig-r16,

interFreqTargetList-r16 SEQUENCE(SIZE (1..maxFreq)) OF InterFreqTargetInfo-r16 OPTIONAL -- Need R

}

AreaConfiguration-v1700 ::= SEQUENCE {

areaConfig-r17 AreaConfig-r16 OPTIONAL, -- Need R

interFreqTargetList-r17 SEQUENCE(SIZE (1..maxFreq)) OF InterFreqTargetInfo-r16 OPTIONAL -- Need R

}

AreaConfig-r16 ::= CHOICE {

cellGlobalIdList-r16 CellGlobalIdList-r16,

trackingAreaCodeList-r16 TrackingAreaCodeList-r16,

trackingAreaIdentityList-r16 TrackingAreaIdentityList-r16

}

InterFreqTargetInfo-r16 ::= SEQUENCE {

dl-CarrierFreq-r16 ARFCN-ValueNR,

cellList-r16 SEQUENCE (SIZE (1..32)) OF PhysCellId OPTIONAL -- Need R

}

CellGlobalIdList-r16 ::= SEQUENCE (SIZE (1..32)) OF CGI-Info-Logging-r16

TrackingAreaCodeList-r16 ::= SEQUENCE (SIZE (1..8)) OF TrackingAreaCode

TrackingAreaIdentityList-r16 ::= SEQUENCE (SIZE (1..8)) OF TrackingAreaIdentity-r16

TrackingAreaIdentity-r16 ::= SEQUENCE {

plmn-Identity-r16 PLMN-Identity,

trackingAreaCode-r16 TrackingAreaCode

}

-- TAG-AREACONFIGURATION-STOP

-- ASN1STOP

| *AreaConfiguration* field descriptions |
| --- |
| ***InterFreqTargetInfo***  If configured, it indicates the neighbouring frequency and cells for which UE is requested to perform measurement logging. It can include sync raster or non-sync raster frequencies. |

#### – *BT-NameList*

The IE *BT-NameList* is used to indicate the names of the Bluetooth beacon which the UE is configured to measure.

*BT-NameList* information element

-- ASN1START

-- TAG-BTNAMELIST-START

BT-NameList-r16 ::= SEQUENCE (SIZE (1..maxBT-Name-r16)) OF BT-Name-r16

BT-Name-r16 ::= OCTET STRING (SIZE (1..248))

-- TAG-BTNAMELIST-STOP

-- ASN1STOP

| *BT-NameList* field descriptions |
| --- |
| ***bt-Name***  If configured, the UE only performs Bluetooth measurements according to the names identified. For each name, it refers to LOCAL NAME defined in Bluetooth specification [51]. |

#### – *DedicatedInfoF1c*

The IE *DedicatedInfoF1c* is used to transfer IAB-DU specific F1-C related information between the network and the IAB node. The carried information consists of F1AP message encapsulated in SCTP/IP or F1-C related (SCTP)/IP packet, see TS 38.472 [64]. The RRC layer is transparent for this information.

*DedicatedInfoF1c* information element

-- ASN1START

-- TAG-DEDICATEDINFOF1C-START

DedicatedInfoF1c-r17 ::= OCTET STRING

-- TAG-DEDICATEDINFOF1C-STOP

-- ASN1STOP

#### – *EUTRA-AllowedMeasBandwidth*

The IE *EUTRA-AllowedMeasBandwidth* is used to indicate the maximum allowed measurement bandwidth on a carrier frequency as defined by the parameter Transmission Bandwidth Configuration "NRB" in TS 36.104 [33]. The values *mbw6*, *mbw15*, *mbw25*, *mbw50*, *mbw75*, *mbw100* indicate 6, 15, 25, 50, 75 and 100 resource blocks, respectively.

*EUTRA-AllowedMeasBandwidth* information element

-- ASN1START

-- TAG-EUTRA-ALLOWEDMEASBANDWIDTH-START

EUTRA-AllowedMeasBandwidth ::= ENUMERATED {mbw6, mbw15, mbw25, mbw50, mbw75, mbw100}

-- TAG-EUTRA-ALLOWEDMEASBANDWIDTH-STOP

-- ASN1STOP

#### – *EUTRA-MBSFN-SubframeConfigList*

The IE *EUTRA-MBSFN-SubframeConfigList* is used to define an E-UTRA MBSFN subframe pattern (for the purpose of NR rate matching).

*EUTRA-MBSFN-SubframeConfigList* information element

-- ASN1START

-- TAG-EUTRA-MBSFN-SUBFRAMECONFIGLIST-START

EUTRA-MBSFN-SubframeConfigList ::= SEQUENCE (SIZE (1..maxMBSFN-Allocations)) OF EUTRA-MBSFN-SubframeConfig

EUTRA-MBSFN-SubframeConfig ::= SEQUENCE {

radioframeAllocationPeriod ENUMERATED {n1, n2, n4, n8, n16, n32},

radioframeAllocationOffset INTEGER (0..7),

subframeAllocation1 CHOICE {

oneFrame BIT STRING (SIZE(6)),

fourFrames BIT STRING (SIZE(24))

},

subframeAllocation2 CHOICE {

oneFrame BIT STRING (SIZE(2)),

fourFrames BIT STRING (SIZE(8))

} OPTIONAL, -- Need R

...

}

-- TAG-EUTRA-MBSFN-SUBFRAMECONFIGLIST-STOP

-- ASN1STOP

|  |
| --- |
| *EUTRA-MBSFN-SubframeConfig* field descriptions |
| ***radioframeAllocationOffset***  Field as defined in *MBSFN-SubframeConfig* in TS 36.331 [10]. |
| ***radioframeAllocationPeriod***  Field as defined in *MBSFN-SubframeConfig* in TS 36.331 [10], where *SFN* refers to the SFN of the NR serving cell. |
| ***subframeAllocation1***  Field as defined in *MBSFN-SubframeConfig* in TS 36.331 [10], where the UE assumes the duplex mode (FDD or TDD) of the NR cell for which the *E-UTRA-MBSFN-SubframeConfig* is provided. |
| ***subframeAllocation2***  Field as defined in *MBSFN-SubframeConfig-v1430* in TS 36.331 [10], where the UE assumes the duplex mode (FDD or TDD) of the NR cell for which the *E-UTRA-MBSFN-SubframeConfig* is provided. |

#### – *EUTRA-MultiBandInfoList*

The IE *EUTRA-MultiBandInfoList* indicates the list of frequency bands in addition to the band represented by *CarrierFreq* for which cell reselection parameters are common, and a list of *additionalPmax* and *additionalSpectrumEmission*.

*EUTRA-MultiBandInfoList* information element

-- ASN1START

-- TAG-EUTRA-MULTIBANDINFOLIST-START

EUTRA-MultiBandInfoList ::= SEQUENCE (SIZE (1..maxMultiBands)) OF EUTRA-MultiBandInfo

EUTRA-MultiBandInfo ::= SEQUENCE {

eutra-FreqBandIndicator FreqBandIndicatorEUTRA,

eutra-NS-PmaxList EUTRA-NS-PmaxList OPTIONAL -- Need R

}

-- TAG-EUTRA-MULTIBANDINFOLIST-STOP

-- ASN1STOP

#### – *EUTRA-NS-PmaxList*

The IE *EUTRA-NS-PmaxList* concerns a list of *additionalPmax* and *additionalSpectrumEmission*, as defined in TS 36.101 [22], table 6.2.4-1 for UEs neither in CE nor BL UEs and TS 36.101 [22], table 6.2.4E-1 for UEs in CE or BL UEs, for a given frequency band.

*EUTRA-NS-PmaxList* information element

-- ASN1START

-- TAG-EUTRA-NS-PMAXLIST-START

EUTRA-NS-PmaxList ::= SEQUENCE (SIZE (1..maxEUTRA-NS-Pmax)) OF EUTRA-NS-PmaxValue

EUTRA-NS-PmaxValue ::= SEQUENCE {

additionalPmax INTEGER (-30..33) OPTIONAL, -- Need R

additionalSpectrumEmission INTEGER (1..288) OPTIONAL -- Need R

}

-- TAG-EUTRA-NS-PMAXLIST-STOP

-- ASN1STOP

#### – *EUTRA-PhysCellId*

The IE *EUTRA-PhysCellId* is used to indicate the physical layer identity of the cell, as defined in TS 36.211 [31].

*EUTRA-PhysCellId* information element

-- ASN1START

-- TAG-EUTRA-PHYSCELLID-START

EUTRA-PhysCellId ::= INTEGER (0..503)

-- TAG-EUTRA-PHYSCELLID-STOP

-- ASN1STOP

#### – *EUTRA-PhysCellIdRange*

The IE *EUTRA-PhysCellIdRange* is used to encode either a single or a range of physical cell identities. The range is encoded by using a *start* value and by indicating the number of consecutive physical cell identities (including *start*) in the range. For fields comprising multiple occurrences of *EUTRA-PhysCellIdRange*, NW may configure overlapping ranges of physical cell identities.

*EUTRA-PhysCellIdRange* information element

-- ASN1START

-- TAG-EUTRA-PHYSCELLIDRANGE-START

EUTRA-PhysCellIdRange ::= SEQUENCE {

start EUTRA-PhysCellId,

range ENUMERATED {n4, n8, n12, n16, n24, n32, n48, n64, n84, n96,

n128, n168, n252, n504, spare2, spare1} OPTIONAL -- Need N

}

-- TAG-EUTRA-PHYSCELLIDRANGE-STOP

-- ASN1STOP

#### – *EUTRA-PresenceAntennaPort1*

The IE *EUTRA-PresenceAntennaPort1* is used to indicate whether all the neighbouring cells use Antenna Port 1. When set to *true*, the UE may assume that at least two cell-specific antenna ports are used in all neighbouring cells.

*EUTRA-PresenceAntennaPort1* information element

-- ASN1START

-- TAG-EUTRA-PRESENCEANTENNAPORT1-START

EUTRA-PresenceAntennaPort1 ::= BOOLEAN

-- TAG-EUTRA-PRESENCEANTENNAPORT1-STOP

-- ASN1STOP

#### – *EUTRA-Q-OffsetRange*

The IE *EUTRA-Q-OffsetRange* is used to indicate a cell, or frequency specific offset to be applied when evaluating triggering conditions for measurement reporting. The value in dB. Value *dB-24* corresponds to -24 dB, value *dB-22* corresponds to -22 dB and so on.

*EUTRA-Q-OffsetRange* information element

-- ASN1START

-- TAG-EUTRA-Q-OFFSETRANGE-START

EUTRA-Q-OffsetRange ::= ENUMERATED {

dB-24, dB-22, dB-20, dB-18, dB-16, dB-14,

dB-12, dB-10, dB-8, dB-6, dB-5, dB-4, dB-3,

dB-2, dB-1, dB0, dB1, dB2, dB3, dB4, dB5,

dB6, dB8, dB10, dB12, dB14, dB16, dB18,

dB20, dB22, dB24}

-- TAG-EUTRA-Q-OFFSETRANGE-STOP

-- ASN1STOP

#### – *IAB-IP-Address*

The IE *IAB-IP-Address* is used to indicate the IP address/prefix.

*IAB-IP-Address* information element

-- ASN1START

-- TAG-IABIPADDRESS-START

IAB-IP-Address-r16 ::= CHOICE {

iPv4-Address-r16 BIT STRING (SIZE(32)),

iPv6-Address-r16 BIT STRING (SIZE(128)),

iPv6-Prefix-r16 BIT STRING (SIZE(64)),

...

}

-- TAG-IABIPADDRESS-STOP

-- ASN1STOP

|  |
| --- |
| *IAB-IP-Address* field descriptions |
| ***iPv4-Address***  This field is used to provide the allocated IPv4 address. |
| ***iPv6-Address***  This field is used to provide the allocated IPv6 address. |
| ***iPv6-Prefix***  This field is used to provide the allocated IPv6 prefix. |

#### – *IAB-IP-AddressIndex*

The IE *IAB-IP-AddressIndex* is used to identify a configuration of an IP address.

*IAB-IP-AddressIndex* information element

-- ASN1START

-- TAG-IABIPADDRESSINDEX-START

IAB-IP-AddressIndex-r16 ::= INTEGER (1..maxIAB-IP-Address-r16)

-- TAG-IABIPADDRESSINDEX-STOP

-- ASN1STOP

#### – *IAB-IP-Usage*

The IE *IAB-IP-Usage* is used to indicate the usage of the assigned IP address/prefix.

*IAB-IP-Usage* information element

-- ASN1START

-- TAG-IAB-IP-USAGE-START

IAB-IP-Usage-r16 ::= ENUMERATED {f1-C, f1-U, non-F1, spare}

-- TAG-IAB-IP-USAGE-STOP

-- ASN1STOP

#### – *LoggingDuration*

The *LoggingDuration* indicates the duration for which UE is requested to perform measurement logging. Value min10 corresponds to 10 minutes, value min20 corresponds to 20 minutes and so on.

*LoggingDuration* information element

-- ASN1START

-- TAG-LOGGINGDURATION-START

LoggingDuration-r16 ::= ENUMERATED {

min10, min20, min40, min60, min90, min120, spare2, spare1}

-- TAG-LOGGINGDURATION-STOP

-- ASN1STOP

#### – *LoggingInterval*

The *LoggingInterval* indicates the periodicity for logging measurement results. Value ms1280 corresponds to 1.28s, value ms2560 corresponds to 2.56s and so on. Value infinity means it is equal to the configured value of the *LoggingDuration* IE.

*LoggingInterval* information element

-- ASN1START

-- TAG-LOGGINGINTERVAL-START

LoggingInterval-r16 ::= ENUMERATED {

ms320, ms640, ms1280, ms2560, ms5120, ms10240, ms20480,

ms30720, ms40960, ms61440 , infinity}

-- TAG-LOGGINGINTERVAL-STOP

-- ASN1STOP

#### – *LogMeasResultListBT*

The IE *LogMeasResultListBT* covers measured results for Bluetooth.

*LogMeasResultListBT* information element

-- ASN1START

-- TAG-LOGMEASRESULTLISTBT-START

LogMeasResultListBT-r16 ::= SEQUENCE (SIZE (1..maxBT-IdReport-r16)) OF LogMeasResultBT-r16

LogMeasResultBT-r16 ::= SEQUENCE {

bt-Addr-r16 BIT STRING (SIZE (48)),

rssi-BT-r16 INTEGER (-128..127) OPTIONAL,

...

}

-- TAG-LOGMEASRESULTLISTBT-STOP

-- ASN1STOP

| *LogMeasResultListBT* field descriptions |
| --- |
| ***bt-Addr***  This field indicates the Bluetooth public address of the Bluetooth beacon as defined in TS 37.355 [49]. |
| ***rssi-BT***  This field provides the beacon received signal strength indicator (RSSI) in dBm as defined in TS 37.355 [49]. |

#### – *LogMeasResultListWLAN*

The IE *LogMeasResultListWLAN* covers measured results for WLAN.

*LogMeasResultListWLAN* information element

-- ASN1START

-- TAG-LOGMEASRESULTLISTWLAN-START

LogMeasResultListWLAN-r16 ::= SEQUENCE (SIZE (1..maxWLAN-Id-Report-r16)) OF LogMeasResultWLAN-r16

LogMeasResultWLAN-r16 ::= SEQUENCE {

wlan-Identifiers-r16 WLAN-Identifiers-r16,

rssiWLAN-r16 WLAN-RSSI-Range-r16 OPTIONAL,

rtt-WLAN-r16 WLAN-RTT-r16 OPTIONAL,

...

}

WLAN-Identifiers-r16 ::= SEQUENCE {

ssid-r16 OCTET STRING (SIZE (1..32)) OPTIONAL,

bssid-r16 OCTET STRING (SIZE (6)) OPTIONAL,

hessid-r16 OCTET STRING (SIZE (6)) OPTIONAL,

...

}

WLAN-RSSI-Range-r16 ::= INTEGER(0..141)

WLAN-RTT-r16 ::= SEQUENCE {

rttValue-r16 INTEGER (0..16777215),

rttUnits-r16 ENUMERATED {

microseconds,

hundredsofnanoseconds,

tensofnanoseconds,

nanoseconds,

tenthsofnanoseconds,

...},

rttAccuracy-r16 INTEGER (0..255) OPTIONAL,

...

}

-- TAG-LOGMEASRESULTLISTWLAN-STOP

-- ASN1STOP

| *LogMeasResultListWLAN* field descriptions |
| --- |
| ***Bssid***  Basic Service Set Identifier (BSSID) defined in IEEE 802.11-2012 [50]. |
| ***Hessid***  Homogenous Extended Service Set Identifier (HESSID) defined in IEEE 802.11-2012 [50]. |
| ***rssiWLAN***  Measured WLAN RSSI result in dBm. The IE WLAN-RSSI-Range specifies the value range used in WLAN RSSI measurements and thresholds. Integer value for WLAN RSSI measurements is according to mapping table in TS 36.133 [40]. Value 0 corresponds to –infinity, value 1 to -100dBm, value 2 to -99dBm, and so on (i.e. in steps of 1dBm) until value 140, which corresponds to 39dBm, while value 141 corresponds to +infinity. |
| ***rtt-WLAN***  This field provides the measured roundtrip time between the target device and WLAN AP and optionally the accuracy expressed as the standard deviation of the delay. Units for each of these are 1000ns, 100ns, 10ns, 1ns, and 0.1ns as defined in TS 37.355 [49]. |
| ***rttValue***  This field specifies the Round Trip Time (RTT) measurement between the target device and WLAN AP in units given by the field rttUnits as defined in TS 37.355 [49]. |
| ***rttUnits***  This field specifies the Units for the fields rttValue and rttAccuracy. The available Units are 1000ns, 100ns, 10ns, 1ns, and 0.1ns as defined in TS 37.355 [49]. |
| ***rttAccuracy***  This field provides the estimated accuracy of the provided rttValue expressed as the standard deviation in units given by the field rttUnits as defined in TS 37.355 [49]. |
| ***Ssid***  Service Set Identifier (SSID) defined in IEEE 802.11-2012 [50]. |
| ***Wlan-Identifiers***  Indicates the WLAN parameters used for identification of the WLAN for which the measurement results are applicable. |

#### – *MeasConfigAppLayerId*

The *MeasConfigAppLayerId* identifies the application layer measurement.

*MeasConfigAppLayerId* information element

-- ASN1START

-- TAG-MEASCONFIGAPPLAYERID-START

MeasConfigAppLayerId-r17 ::= INTEGER (0..maxNrofAppLayerMeas-1-r17)

-- TAG-MEASCONFIGAPPLAYERID-STOP

-- ASN1STOP

#### – *OtherConfig*

The IE *OtherConfig* contains configuration related to miscellaneous other configurations.

*OtherConfig* information element

-- ASN1START

-- TAG-OTHERCONFIG-START

OtherConfig ::= SEQUENCE {

delayBudgetReportingConfig CHOICE{

release NULL,

setup SEQUENCE{

delayBudgetReportingProhibitTimer ENUMERATED {s0, s0dot4, s0dot8, s1dot6, s3, s6, s12, s30}

}

} OPTIONAL -- Need M

}

OtherConfig-v1540 ::= SEQUENCE {

overheatingAssistanceConfig SetupRelease {OverheatingAssistanceConfig} OPTIONAL, -- Need M

...

}

CandidateServingFreqListNR-r16 ::= SEQUENCE (SIZE (1..maxFreqIDC-r16)) OF ARFCN-ValueNR

OtherConfig-v1610 ::= SEQUENCE {

idc-AssistanceConfig-r16 SetupRelease {IDC-AssistanceConfig-r16} OPTIONAL, -- Need M

drx-PreferenceConfig-r16 SetupRelease {DRX-PreferenceConfig-r16} OPTIONAL, -- Need M

maxBW-PreferenceConfig-r16 SetupRelease {MaxBW-PreferenceConfig-r16} OPTIONAL, -- Need M

maxCC-PreferenceConfig-r16 SetupRelease {MaxCC-PreferenceConfig-r16} OPTIONAL, -- Need M

maxMIMO-LayerPreferenceConfig-r16 SetupRelease {MaxMIMO-LayerPreferenceConfig-r16} OPTIONAL, -- Need M

minSchedulingOffsetPreferenceConfig-r16 SetupRelease {MinSchedulingOffsetPreferenceConfig-r16} OPTIONAL, -- Need M

releasePreferenceConfig-r16 SetupRelease {ReleasePreferenceConfig-r16} OPTIONAL, -- Need M

referenceTimePreferenceReporting-r16 ENUMERATED {true} OPTIONAL, -- Need R

btNameList-r16 SetupRelease {BT-NameList-r16} OPTIONAL, -- Need M

wlanNameList-r16 SetupRelease {WLAN-NameList-r16} OPTIONAL, -- Need M

sensorNameList-r16 SetupRelease {Sensor-NameList-r16} OPTIONAL, -- Need M

obtainCommonLocation-r16 ENUMERATED {true} OPTIONAL, -- Need R

sl-AssistanceConfigNR-r16 ENUMERATED{true} OPTIONAL -- Need R

}

OtherConfig-v1700 ::= SEQUENCE {

ul-GapFR2-PreferenceConfig-r17 ENUMERATED {true} OPTIONAL, -- Need R

musim-GapAssistanceConfig-r17 SetupRelease {MUSIM-GapAssistanceConfig-r17} OPTIONAL, -- Need M

musim-LeaveAssistanceConfig-r17 SetupRelease {MUSIM-LeaveAssistanceConfig-r17} OPTIONAL, -- Need M

successHO-Config-r17 SetupRelease {SuccessHO-Config-r17} OPTIONAL, -- Need M

maxBW-PreferenceConfigFR2-2-r17 ENUMERATED {true} OPTIONAL, -- Cond maxBW

maxMIMO-LayerPreferenceConfigFR2-2-r17 ENUMERATED {true} OPTIONAL, -- Cond maxMIMO

minSchedulingOffsetPreferenceConfigExt-r17 ENUMERATED {true} OPTIONAL, -- Cond minOffset

rlm-RelaxationReportingConfig-r17 SetupRelease {RLM-RelaxationReportingConfig-r17} OPTIONAL, -- Need M

bfd-RelaxationReportingConfig-r17 SetupRelease {BFD-RelaxationReportingConfig-r17} OPTIONAL, -- Need M

scg-DeactivationPreferenceConfig-r17 SetupRelease {SCG-DeactivationPreferenceConfig-r17} OPTIONAL, -- Need M

rrm-MeasRelaxationReportingConfig-r17 SetupRelease {RRM-MeasRelaxationReportingConfig-r17} OPTIONAL, -- Need M

propDelayDiffReportConfig-r17 SetupRelease {PropDelayDiffReportConfig-r17} OPTIONAL -- Need M

}

MUSIM-GapAssistanceConfig-r17 ::= SEQUENCE {

musim-GapProhibitTimer-r17 ENUMERATED {s0, s0dot1, s0dot2, s0dot3, s0dot4, s0dot5, s1, s2, s3, s4, s5, s6, s7, s8, s9, s10}

}

MUSIM-LeaveAssistanceConfig-r17 ::= SEQUENCE {

musim-LeaveWithoutResponseTimer-r17 ENUMERATED {ms10, ms20, ms40, ms60, ms80, ms100, spare2, spare1}

}

SuccessHO-Config-r17 ::= SEQUENCE {

thresholdPercentageT304-r17 ENUMERATED {p40, p60, p80, spare5, spare4, spare3, spare2, spare1} OPTIONAL, --Need R

thresholdPercentageT310-r17 ENUMERATED {p40, p60, p80, spare5, spare4, spare3, spare2, spare1} OPTIONAL, --Need R

thresholdPercentageT312-r17 ENUMERATED {p20, p40, p60, p80, spare4, spare3, spare2, spare1} OPTIONAL, --Need R

sourceDAPS-FailureReporting-r17 ENUMERATED {true} OPTIONAL, --Need R

...

}

OverheatingAssistanceConfig ::= SEQUENCE {

overheatingIndicationProhibitTimer ENUMERATED {s0, s0dot5, s1, s2, s5, s10, s20, s30,

s60, s90, s120, s300, s600, spare3, spare2, spare1}

}

IDC-AssistanceConfig-r16 ::= SEQUENCE {

candidateServingFreqListNR-r16 CandidateServingFreqListNR-r16 OPTIONAL, -- Need R

...

}

DRX-PreferenceConfig-r16 ::= SEQUENCE {

drx-PreferenceProhibitTimer-r16 ENUMERATED {

s0, s0dot5, s1, s2, s3, s4, s5, s6, s7,

s8, s9, s10, s20, s30, spare2, spare1}

}

MaxBW-PreferenceConfig-r16 ::= SEQUENCE {

maxBW-PreferenceProhibitTimer-r16 ENUMERATED {

s0, s0dot5, s1, s2, s3, s4, s5, s6, s7,

s8, s9, s10, s20, s30, spare2, spare1}

}

MaxCC-PreferenceConfig-r16 ::= SEQUENCE {

maxCC-PreferenceProhibitTimer-r16 ENUMERATED {

s0, s0dot5, s1, s2, s3, s4, s5, s6, s7,

s8, s9, s10, s20, s30, spare2, spare1}

}

MaxMIMO-LayerPreferenceConfig-r16 ::= SEQUENCE {

maxMIMO-LayerPreferenceProhibitTimer-r16 ENUMERATED {

s0, s0dot5, s1, s2, s3, s4, s5, s6, s7,

s8, s9, s10, s20, s30, spare2, spare1}

}

MinSchedulingOffsetPreferenceConfig-r16 ::= SEQUENCE {

minSchedulingOffsetPreferenceProhibitTimer-r16 ENUMERATED {

s0, s0dot5, s1, s2, s3, s4, s5, s6, s7,

s8, s9, s10, s20, s30, spare2, spare1}

}

ReleasePreferenceConfig-r16 ::= SEQUENCE {

releasePreferenceProhibitTimer-r16 ENUMERATED {

s0, s0dot5, s1, s2, s3, s4, s5, s6, s7,

s8, s9, s10, s20, s30, infinity, spare1},

connectedReporting ENUMERATED {true} OPTIONAL -- Need R

}

RLM-RelaxationReportingConfig-r17 ::= SEQUENCE {

rlm-RelaxtionReportingProhibitTimer ENUMERATED {s0, s0dot5, s1, s2, s5, s10, s20, s30,

s60, s90, s120, s300, s600, infinity, spare2, spare1}

}

BFD-RelaxationReportingConfig-r17 ::= SEQUENCE {

bfd-RelaxtionReportingProhibitTimer ENUMERATED {s0, s0dot5, s1, s2, s5, s10, s20, s30,

s60, s90, s120, s300, s600, infinity, spare2, spare1}

}

SCG-DeactivationPreferenceConfig-r17 ::= SEQUENCE {

scg-DeactivationPreferenceProhibitTimer-r17 ENUMERATED {

s0, s1, s2, s4, s8, s10, s15, s30,

s60, s120, s180, s240, s300, s600, s900, s1800}

}

RRM-MeasRelaxationReportingConfig-r17 ::= SEQUENCE {

s-SearchDeltaP-Stationary-r17 ENUMERATED {dB2, dB3, dB6, dB9, dB12, dB15, spare2, spare1},

t-SearchDeltaP-Stationary-r17 ENUMERATED {s5, s10, s20, s30, s60, s120, s180, s240, s300, spare7, spare6, spare5,

spare4, spare3, spare2, spare1}

}

PropDelayDiffReportConfig-r17 ::= SEQUENCE {

threshPropDelayDiff ENUMERATED {ms0dot5, ms1, ms2, ms3, ms4, ms5, ms6 ,ms7, ms8, ms9, ms10, spare5,

spare4, spare3, spare2, spare1} OPTIONAL, -- Need M

neighCellInfoList-r17 SEQUENCE (SIZE (1..maxCellNTN-r17)) OF NeighbourCellInfo-r17 OPTIONAL -- Need M

}

NeighbourCellInfo-r17 ::= SEQUENCE {

epochTime-r17 EpochTime-r17,

ephemerisInfo-r17 EphemerisInfo-r17

}

-- TAG-OTHERCONFIG-STOP

-- ASN1STOP

| *OtherConfig* field descriptions |
| --- |
| ***bfd-RelaxationReportingConfig***  Configuration for the UE to report the relaxation state of BFD measurements. |
| ***candidateServingFreqListNR***  Indicates for each candidate NR serving cells, the center frequency around which UE is requested to report IDC issues. |
| ***connectedReporting***  Indicates that the UE can report a preference to remain in RRC\_CONNECTED state following a report to leave RRC\_CONNECTED state. If absent, the UE cannot report a preference to stay in RRC\_CONNECTED state. |
| ***delayBudgetReportingProhibitTimer***  Prohibit timer for delay budget reporting. Value in seconds. Value *s0* means prohibit timer is set to 0 seconds, value *s0dot4* means prohibit timer is set to 0.4 seconds, and so on. |
| ***drx-PreferenceConfig***  Configuration for the UE to report assistance information to inform the gNB about the UE's DRX preferences for power saving. |
| ***drx-PreferenceProhibitTimer***  Prohibit timer for DRX preferences assistance information reporting. Value in seconds. Value *s0* means prohibit timer is set to 0 seconds, value *s0dot5* means prohibit timer is set to 0.5 seconds, value *s1* means prohibit timer is set to 1 second and so on. |
| ***idc-AssistanceConfig***  Configuration for the UE to report assistance information to inform the gNB about UE detected IDC problem. |
| ***maxBW-PreferenceConfig***  Configuration for the UE to report assistance information to inform the gNB about the UE's preferred bandwidth for power saving. |
| ***maxBW-PreferenceProhibitTimer***  Prohibit timer for preferred bandwidth assistance information reporting. Value in seconds. Value *s0* means prohibit timer is set to 0 seconds, value *s0dot5* means prohibit timer is set to 0.5 seconds, value *s1* means prohibit timer is set to 1 second and so on. |
| ***maxCC-PreferenceConfig***  Configuration for the UE to report assistance information to inform the gNB about the UE's preferred number of carriers for power saving. |
| ***maxBW-PreferenceConfigFR2-2***  Configuration for the UE to report assistance information to inform the gNB about the UE's preferred bandwidth for power saving for FR2-2. |
| ***maxCC-PreferenceProhibitTimer***  Prohibit timer for preferred number of carriers assistance information reporting. Value in seconds. Value *s0* means prohibit timer is set to 0 seconds, value *s0dot5* means prohibit timer is set to 0.5 seconds, value *s1* means prohibit timer is set to 1 second and so on. |
| ***maxMIMO-LayerPreferenceConfig***  Configuration for the UE to report assistance information to inform the gNB about the UE's preferred number of MIMO layers for power saving. |
| ***maxMIMO-LayerPreferenceConfigFR2-2***  Configuration for the UE to report assistance information to inform the gNB about the UE's preferred number of MIMO layers for power saving for FR2-2. |
| ***maxMIMO-LayerPreferenceProhibitTimer***  Prohibit timer for preferred number of number of MIMO layers assistance information reporting. Value in seconds. Value *s0* means prohibit timer is set to 0 seconds, value *s0dot5* means prohibit timer is set to 0.5 seconds, value *s1* means prohibit timer is set to 1 second and so on. |
| ***minSchedulingOffsetPreferenceConfig***  Configuration for the UE to report assistance information to inform the gNB about the UE's preferred *minimumSchedulingOffset* value for cross-slot scheduling for power saving. |
| ***minSchedulingOffsetPreferenceConfigExt***  Configuration for the UE to report assistance information to inform the gNB about the UE's preferred *minimumSchedulingOffset* value for cross-slot scheduling for power saving for SCS 480 kHz and/or 960 kHz. |
| ***minSchedulingOffsetPreferenceProhibitTimer***  Prohibit timer for preferred *minimumSchedulingOffset* assistance information reporting. Value in seconds. Value *s0* means prohibit timer is set to 0 seconds, value *s0dot5* means prohibit timer is set to 0.5 seconds, value *s1* means prohibit timer is set to 1 second and so on. |
| ***musim-GapAssistanceConfig***  Configuration for the UE to report assistance information for gap preference. |
| ***musim-GapProhibitTimer***  Prohibit timer for MUSIM assistance information reporting for gap preference. |
| ***musim-LeaveAssistanceConfig***  Configuration for the UE to report assistance information for leaving RRC\_CONNECTED for MUSIM purpose. |
| ***musim-LeaveWithoutResponseTimer***  Indicates the timer for the UE to enter RRC\_IDLE for MUSIM purpose as defined in clause 5.3.8.6. |
| ***obtainCommonLocation***  Requests the UE to attempt to have detailed location information available using GNSS. NR configures the field if *includeCommonLocationInfo* is configured for one or more measurements. |
| ***overheatingAssistanceConfig***  Configuration for the UE to report assistance information to inform the gNB about UE detected internal overheating. |
| ***overheatingIndicationProhibitTimer***  Prohibit timer for overheating assistance information reporting. Value in seconds. Value *s0* means prohibit timer is set to 0 seconds, value *s0dot5* means prohibit timer is set to 0.5 seconds, value *s1* means prohibit timer is set to 1 second and so on. |
| ***propDelayDiffReportConfig***  Configuration for the UE to report service link propagation delay difference between serving cell and neighbour cell(s). |
| ***referenceTimePreferenceReporting***  If present, the field indicates the UE is configured to provide reference time assistance information. |
| ***releasePreferenceConfig***  Configuration for the UE to report assistance information to inform the gNB about the UE's preference to leave RRC\_CONNECTED state. |
| ***rlm-RelaxationReportingConfig***  Configuration for the UE to report the relaxation state of RLM measurements. |
| ***releasePreferenceProhibitTimer***  Prohibit timer for release preference assistance information reporting. Value in seconds. Value *s0* means prohibit timer is set to 0 seconds, value *s0dot5* means prohibit timer is set to 0.5 seconds, value *s1* means prohibit timer is set to 1 second and so on. Value *infinity* means that once a UE has reported a release preference, the UE cannot report a release preference again during the RRC connection. |
| ***s-SearchDeltaP-Stationary***  Parameter "SSearchDeltaP-StationaryConnected" in 5.7.4.4. Value dB2 corresponds to 2 dB, dB3 corresponds to 3 dB and so on. |
| ***scg-DeactivationPreferenceConfig***  Configuration of the UE to indicate its preference for SCG deactivation. |
| ***scg -StatePreferenceProhibitTimer***  Prohibit timer for UE indication of its preference for SCG deactivation. Value in seconds. Value *s0* means prohibit timer is set to 0 seconds, value *s1* means prohibit timer is set to 1 second and so on. |
| ***sensorNameList***  Configuration for the UE to report measurements from specific sensors. |
| ***sl-AssistanceConfigNR***  Indicate whether UE is configured to provide configured grant assistance information for NR sidelink communication. |
| ***sourceDAPS-FailureReporting***  This field indicates whether the UE shall generate the SHR upon successfully completing the DAPS handover to the target cell and if a radio link failure was experienced in the source PCell while executing the DAPS handover. This field is set in the *otherConfig* configured by the source cell of the DAPS handover. |
| ***successHO-Config***  Configuration for the UE to report the successful handover information to the network. |
| ***t-SearchDeltaP-Stationary***  Parameter "TSearchDeltaP-StationaryConnected" in 5.7.4.4. Value in seconds. Value s5 means 5 seconds, value s10 means 10 seconds and so on. |
| ***thresholdPercentageT304***  This field indicates the threshold for the ratio in percentage between the elapsed T304 timer and the configured value of the T304 timer. Value *p40* corresponds to 40%, value *p60* corresponds to 60% and so on. This field is set in the *otherConfig* configured by the target cell of the handover. |
| ***thresholdPercentageT310***  This field indicates the threshold for the ratio in percentage between the elapsed T310 timer and the configured value of the T310 timer. Value *p40* corresponds to 40%, value *p60* corresponds to 60% and so on. This field is set in the *otherConfig* configured by the source cell of the handover. |
| ***thresholdPercentageT312***  This field indicates the threshold for the ratio in percentage between the elapsed T312 timer and the configured value(s) of the T312 timer. Value *p20* corresponds to 20%, value *p40* corresponds to 40% and so on. This field is set in the *otherConfig* configured by the source cell of the handover. |
| ***threshPropDelayDiff***  Threshold for service link propagation delay difference report as specified in 5.7.4.2. |
| ***ul-GapFR2-PreferenceConfig***  Indicates whether UE is configured to request for FR2 UL gap activation/deactivation and preferred FR2 UL gap pattern. |

|  |  |
| --- | --- |
| Conditional Presence | Explanation |
| *maxBW* | This field is optionally present, need R, if *maxBW-PreferenceConfig-r16* is setup; otherwise it is absent, need R. |
| *maxMIMO* | This field is optionally present, need R, if *maxMIMO-LayerPreferenceConfig-r16* is setup; otherwise it is absent, need R. |
| *minOffset* | This field is optionally present, need R, if *minSchedulingOffsetPreferenceConfig-r16* is setup; otherwise it is absent, need R. |

#### – *PhysCellIdUTRA-FDD*

The IE *PhysCellIdUTRA-FDD* is used to indicate the physical layer identity of the cell, i.e. the primary scrambling code, as defined in TS 25.331 [45].

*PhysCellIdUTRA-FDD* information element

-- ASN1START

-- TAG-PHYSCELLIDUTRA-FDD-START

PhysCellIdUTRA-FDD-r16 ::= INTEGER (0..511)

-- TAG-PHYSCELLIDUTRA-FDD-STOP

-- ASN1STOP

#### – *RRC-TransactionIdentifier*

The IE *RRC-TransactionIdentifier* is used, together with the message type, for the identification of an RRC procedure (transaction).

*RRC-TransactionIdentifier* information element

-- ASN1START

-- TAG-RRC-TRANSACTIONIDENTIFIER-START

RRC-TransactionIdentifier ::= INTEGER (0..3)

-- TAG-RRC-TRANSACTIONIDENTIFIER-STOP

-- ASN1STOP

#### – *Sensor-NameList*

The IE *Sensor-NameList* is used to indicate the names of the sensors which the UE is configured to measure.

*Sensor-NameList* information element

-- ASN1START

-- TAG-SENSORNAMELIST-START

Sensor-NameList-r16 ::= SEQUENCE {

measUncomBarPre-r16 ENUMERATED {true} OPTIONAL, -- Need R

measUeSpeed ENUMERATED {true} OPTIONAL, -- Need R

measUeOrientation ENUMERATED {true} OPTIONAL -- Need R

}

-- TAG-SENSORNAMELIST-STOP

-- ASN1STOP

|  |
| --- |
| *Sensor-NameList* field descriptions |
| ***measUncomBarPre***  If configured, the UE reports the uncompensated Barometeric pressure measurement as defined in TS 37.355 [49]. |
| ***measUeSpeed***  If configured, the UE reports the UE speed measurement as defined in TS 37.355 [49]. |
| ***measUeOrientation***  If configured, the UE reports the UE orientation information as defined in TS 37.355 [49]. |

#### – *TraceReference*

The *TraceReference* contains parameter Trace Reference as defined in TS 32.422 [52].

*TraceReference* information element

-- ASN1START

-- TAG-TRACEREFERENCE-START

TraceReference-r16 ::= SEQUENCE {

plmn-Identity-r16 PLMN-Identity,

traceId-r16 OCTET STRING (SIZE (3))

}

-- TAG-TRACEREFERENCE-STOP

-- ASN1STOP

#### – *UE-MeasurementsAvailable*

The IE *UE-MeasurementsAvailable* is used to indicate all relevant available indicators for UE measurements.

*UE-MeasurementsAvailable* information element

-- ASN1START

-- TAG-UE-MeasurementsAvailable-START

UE-MeasurementsAvailable-r16 ::= SEQUENCE {

logMeasAvailable-r16 ENUMERATED {true} OPTIONAL,

logMeasAvailableBT-r16 ENUMERATED {true} OPTIONAL,

logMeasAvailableWLAN-r16 ENUMERATED {true} OPTIONAL,

connEstFailInfoAvailable-r16 ENUMERATED {true} OPTIONAL,

rlf-InfoAvailable-r16 ENUMERATED {true} OPTIONAL,

...,

[[

successHO-InfoAvailable-r17 ENUMERATED {true} OPTIONAL,

sigLogMeasConfigAvailable-r17 BOOLEAN OPTIONAL

]]

}

-- TAG-UE-MeasurementsAvailable-STOP

-- ASN1STOP

#### – *UTRA-FDD-Q-OffsetRange*

The IE *UTRA-FDD-Q-OffsetRange* is used to indicate a frequency specific offset to be applied when evaluating triggering conditions for measurement reporting. The value is in dB. Value *dB-24* corresponds to -24 dB, value *dB-22* corresponds to -22 dB and so on.

*UTRA-FDD-Q-OffsetRange* information element

-- ASN1START

-- TAG-UTRA-FDD-Q-OFFSETRANGE-START

UTRA-FDD-Q-OffsetRange-r16 ::= ENUMERATED {

dB-24, dB-22, dB-20, dB-18, dB-16, dB-14,

dB-12, dB-10, dB-8, dB-6, dB-5, dB-4, dB-3,

dB-2, dB-1, dB0, dB1, dB2, dB3, dB4, dB5,

dB6, dB8, dB10, dB12, dB14, dB16, dB18,

dB20, dB22, dB24}

-- TAG-UTRA-FDD-Q-OFFSETRANGE-STOP

-- ASN1STOP

#### – *VisitedCellInfoList*

The IE *VisitedCellInfoList* includes the mobility history information of maximum of 16 most recently visited primary cells or time spent in any cell selection state and/or camped on any cell state in NR or E-UTRA and, in case of Dual Connectivity, the mobility history information of *maxPSCellHistory* most recently visited primary secondary cell group cells across all the primary cells included in the *VisitedCellInfoList*. The most recently visited cell is stored first in the list. The list includes cells visited in RRC\_IDLE, RRC\_INACTIVE and RRC\_CONNECTED states for NR and RRC\_IDLE and RRC\_CONNECTED for E-UTRA.

*VisitedCellInfoList* information element

-- ASN1START

-- TAG-VISITEDCELLINFOLIST-START

VisitedCellInfoList-r16 ::= SEQUENCE (SIZE (1..maxCellHistory-r16)) OF VisitedCellInfo-r16

VisitedCellInfo-r16 ::= SEQUENCE {

visitedCellId-r16 CHOICE {

nr-CellId-r16 CHOICE {

cgi-Info CGI-Info-Logging-r16,

pci-arfcn-r16 PCI-ARFCN-NR-r16

},

eutra-CellId-r16 CHOICE {

cellGlobalId-r16 CGI-InfoEUTRA,

pci-arfcn-r16 PCI-ARFCN-EUTRA-r16

}

} OPTIONAL,

timeSpent-r16 INTEGER (0..4095),

...,

[[

visitedPSCellInfoList-r17 VisitedPSCellInfoList-r17 OPTIONAL

]]

}

VisitedPSCellInfoList-r17 ::= SEQUENCE (SIZE (1..maxPSCellHistory-r17)) OF VisitedPSCellInfo-r17

VisitedPSCellInfo-r17 ::= SEQUENCE {

visitedCellId-r17 CHOICE {

nr-CellId-r17 CHOICE {

cgi-Info-r17 CGI-Info-Logging-r16,

pci-arfcn-r17 PCI-ARFCN-NR-r16

},

eutra-CellId-r17 CHOICE {

cellGlobalId-r17 CGI-InfoEUTRALogging,

pci-arfcn-r17 PCI-ARFCN-EUTRA-r16

}

} OPTIONAL,

timeSpent-r17 INTEGER (0..4095),

...

}

-- TAG-VISITEDCELLINFOLIST-STOP

-- ASN1STOP

| *VisitedCellInfoList* field descriptions |
| --- |
| ***timeSpent***  This field indicates the duration of stay in the cell or in any cell selection state and/or camped on any cell state in NR or E-UTRA approximated to the closest second. If included in *VisitedPSCellInfo*, it indicates the duration of stay in the PSCell or without any PSCell. If the duration of stay exceeds 4095s, the UE shall set it to 4095s. |
| ***visitedCellId***  This field indicates the visited cell id including NR and E-UTRA cells. |

#### – *WLAN-NameList*

The IE *WLAN-NameList* is used to indicate the names of the WLAN AP for which the UE is configured to measure.

*WLAN-NameList* information element

-- ASN1START

-- TAG-WLANNAMELIST-START

WLAN-NameList-r16 ::= SEQUENCE (SIZE (1..maxWLAN-Name-r16)) OF WLAN-Name-r16

WLAN-Name-r16 ::= OCTET STRING (SIZE (1..32))

-- ASN1STOP

-- TAG-WLANNAMELIST-STOP

| *WLAN-NameList* field descriptions |
| --- |
| ***WLAN-Name***  If configured, the UE only performs WLAN measurements according to the names identified. For each name, it refers to Service Set Identifier (SSID) defined in IEEE 802.11-2012 [50]. |

### 6.3.5 Sidelink information elements

#### – *SL-BWP-Config*

The IE *SL-BWP-Config* is used to configure the UE specific NR sidelink communication on one particular sidelink bandwidth part.

*SL-BWP-Config* information element

-- ASN1START

-- TAG-SL-BWP-CONFIG-START

SL-BWP-Config-r16 ::= SEQUENCE {

sl-BWP-Id BWP-Id,

sl-BWP-Generic-r16 SL-BWP-Generic-r16 OPTIONAL, -- Need M

sl-BWP-PoolConfig-r16 SL-BWP-PoolConfig-r16 OPTIONAL, -- Need M

...,

[[

sl-BWP-PoolConfigPS-r17 SetupRelease {SL-BWP-PoolConfig-r16} OPTIONAL, -- Need M

sl-BWP-DiscPoolConfig-r17 SetupRelease {SL-BWP-DiscPoolConfig-r17} OPTIONAL -- Need M

]]

}

SL-BWP-Generic-r16 ::= SEQUENCE {

sl-BWP-r16 BWP OPTIONAL, -- Need M

sl-LengthSymbols-r16 ENUMERATED {sym7, sym8, sym9, sym10, sym11, sym12, sym13, sym14} OPTIONAL, -- Need M

sl-StartSymbol-r16 ENUMERATED {sym0, sym1, sym2, sym3, sym4, sym5, sym6, sym7} OPTIONAL, -- Need M

sl-PSBCH-Config-r16 SetupRelease {SL-PSBCH-Config-r16} OPTIONAL, -- Need M

sl-TxDirectCurrentLocation-r16 INTEGER (0..3301) OPTIONAL, -- Need M

...

}

-- TAG-SL-BWP-CONFIG-STOP

-- ASN1STOP

|  |
| --- |
| *SL-BWP-Config* field descriptions |
| ***sl-BWP-DiscPoolConfig***  This field indicates the NR sidelink discovery dedicated resource pool configurations on the configured sidelink BWP. The total number of Rx/Tx resource pools configured for communication and discovery does not exceed the maximum number of Rx/Tx resource pool for NR sidelink communication (i.e. *maxNrofRXPool-r16/maxNrofTXPool-r16*). |
| ***sl-BWP-Generic***  This field indicates the generic parameters on the configured sidelink BWP. |
| ***sl-BWP-PoolConfig***  This field indicates the resource pool configurations on the configured sidelink BWP. |
| ***sl-BWP-Id***  An identifier for this sidelink bandwidth part. |
| ***sl-BWP-PoolConfigPS***  This field indicates the resource pool configurations for power saving on the configured sidelink BWP. This field does not include sl-TxPoolExceptional. |

|  |
| --- |
| *SL-BWP-Generic* field descriptions |
| ***sl-LengthSymbols***  This field indicates the number of symbols used for sidelink in a slot without SL-SSB. A single value can be (pre)configured per sidelink bandwidth part. |
| ***sl-StartSymbol***  This field indicates the starting symbol used for sidelink in a slot without SL-SSB. A single value can be (pre)configured per sidelink bandwidth part. |
| ***sl-TxDirectCurrentLocation***  The sidelink Tx/Rx Direct Current location for the carrier. Only values in the value range of this field between 0 and 3299, which indicate the subcarrier index within the carrier corresponding to the numerology of the corresponding sidelink BWP and value 3300, which indicates "Outside the carrier" and value 3301, which indicates "Undetermined position within the carrier" are used in this version of the specification. |

#### – *SL-BWP-ConfigCommon*

The IE *SL-BWP-ConfigCommon* is used to configure the cell-specific configuration information on one particular sidelink bandwidth part.

*SL-BWP-ConfigCommon* information element

-- ASN1START

-- TAG-SL-BWP-CONFIGCOMMON-START

SL-BWP-ConfigCommon-r16 ::= SEQUENCE {

sl-BWP-Generic-r16 SL-BWP-Generic-r16 OPTIONAL, -- Need R

sl-BWP-PoolConfigCommon-r16 SL-BWP-PoolConfigCommon-r16 OPTIONAL, -- Need R

...,

[[

sl-BWP-PoolConfigCommonPS-r17 SL-BWP-PoolConfigCommon-r16 OPTIONAL, -- Need R

sl-BWP-DiscPoolConfigCommon-r17 SL-BWP-DiscPoolConfigCommon-r17 OPTIONAL -- Need R

]]

}

-- TAG-SL-BWP-CONFIGCOMMON-STOP

-- ASN1STOP

|  |
| --- |
| *SL-BWP-ConfigCommon* field descriptions |
| ***sl-BWP-DiscPoolConfigCommon***  This field indicates the NR sidelink discovery dedicated resource pool configurations on the configured sidelink BWP. The total number of Rx/Tx resource pools configured for communication and discovery does not exceed the maximum number of Rx/Tx resource pool for NR sidelink communication (i.e. *maxNrofRXPool-r16/maxNrofTXPool-r16*). |
| ***sl-BWP-Generic***  This field indicates the generic parameters on the configured sidelink BWP. |
| ***sl-BWP-PoolConfigCommon***  This field indicates the resource pool configurations on the configured sidelink BWP. |
| ***sl-BWP-PoolConfigCommonPS***  This field indicates the resource pool configurations for power saving on the configured sidelink BWP. This field does not include sl-TxPoolExceptional. |

#### – *SL-BWP-DiscPoolConfig*

The IE *SL-BWP-DiscPoolConfig* is used to configure UE specific NR sidelink discovery dedicated resource pool.

*SL-BWP-DiscPoolConfig* information element

-- ASN1START

-- TAG-SL-BWP-DISCPOOLCONFIG-START

SL-BWP-DiscPoolConfig-r17 ::= SEQUENCE {

sl-DiscRxPool-r17 SEQUENCE (SIZE (1..maxNrofRXPool-r16)) OF SL-ResourcePool-r16 OPTIONAL, -- Cond HO

sl-DiscTxPoolSelected-r17 SL-TxPoolDedicated-r16 OPTIONAL, -- Need M

sl-DiscTxPoolScheduling-r17 SL-TxPoolDedicated-r16 OPTIONAL -- Need N

}

-- TAG-SL-BWP-DISCPOOLCONFIG-STOP

-- ASN1STOP

|  |  |
| --- | --- |
| Conditional Presence | Explanation |
| *HO* | This field is optionally present, need M, in an *RRCReconfiguration* message including *reconfigurationWithSync*; otherwise it is absent, need M. |

#### – *SL-BWP-DiscPoolConfigCommon*

The IE *SL-BWP-DiscPoolConfigCommon* is used to configure the cell-specific NR sidelink discovery dedicated resource pool.

*SL-BWP-DiscPoolConfigCommon* information element

-- ASN1START

-- TAG-SL-BWP-DISCPOOLCONFIGCOMMON-START

SL-BWP-DiscPoolConfigCommon-r17 ::= SEQUENCE {

sl-DiscRxPool-r17 SEQUENCE (SIZE (1..maxNrofRXPool-r16)) OF SL-ResourcePool-r16 OPTIONAL, -- Need R

sl-DiscTxPoolSelected-r17 SEQUENCE (SIZE (1..maxNrofTXPool-r16)) OF SL-ResourcePoolConfig-r16 OPTIONAL, -- Need R

...

}

-- TAG-SL-BWP-DISCPOOLCONFIGCOMMON-STOP

-- ASN1STOP

#### – *SL-BWP-PoolConfig*

The IE *SL-BWP-PoolConfig* is used to configure NR sidelink communication resource pool.

*SL-BWP-PoolConfig* information element

-- ASN1START

-- TAG-SL-BWP-POOLCONFIG-START

SL-BWP-PoolConfig-r16 ::= SEQUENCE {

sl-RxPool-r16 SEQUENCE (SIZE (1..maxNrofRXPool-r16)) OF SL-ResourcePool-r16 OPTIONAL, -- Cond HO

sl-TxPoolSelectedNormal-r16 SL-TxPoolDedicated-r16 OPTIONAL, -- Need M

sl-TxPoolScheduling-r16 SL-TxPoolDedicated-r16 OPTIONAL, -- Need N

sl-TxPoolExceptional-r16 SL-ResourcePoolConfig-r16 OPTIONAL -- Need M

}

SL-TxPoolDedicated-r16 ::= SEQUENCE {

sl-PoolToReleaseList-r16 SEQUENCE (SIZE (1..maxNrofTXPool-r16)) OF SL-ResourcePoolID-r16 OPTIONAL, -- Need N

sl-PoolToAddModList-r16 SEQUENCE (SIZE (1..maxNrofTXPool-r16)) OF SL-ResourcePoolConfig-r16 OPTIONAL -- Need N

}

SL-ResourcePoolConfig-r16 ::= SEQUENCE {

sl-ResourcePoolID-r16 SL-ResourcePoolID-r16,

sl-ResourcePool-r16 SL-ResourcePool-r16 OPTIONAL -- Need M

}

SL-ResourcePoolID-r16 ::= INTEGER (1..maxNrofPoolID-r16)

-- TAG-SL-BWP-POOLCONFIG-STOP

-- ASN1STOP

| *SL-BWP-PoolConfig* field descriptions |
| --- |
| ***sl-RxPool***  Indicates the receiving resource pool on the configured BWP. For the PSFCH related configuration, if configured, will be used for PSFCH transmission/reception. If the field is included, it replaces any previous list, i.e. all the entries of the list are replaced and each of the *SL-ResourcePool* entries is considered to be newly created. |
| ***sl-TxPoolExceptional***  Indicates the resources by which the UE is allowed to transmit NR sidelink communication in exceptional conditions on the configured BWP. For the PSFCH related configuration, if configured, will be used for PSFCH transmission/reception. |
| ***sl-TxPoolScheduling***  Indicates the resources by which the UE is allowed to transmit NR sidelink communication based on network scheduling on the configured BWP. For the PSFCH related configuration, if configured, will be used for PSFCH transmission/reception. |
| ***sl-TxPoolSelectedNormal***  Indicates the resources by which the UE is allowed to transmit NR sidelink communication by UE autonomous resource selection on the configured BWP. For the PSFCH related configuration, if configured, will be used for PSFCH transmission/reception. |

|  |  |
| --- | --- |
| Conditional Presence | Explanation |
| *HO* | This field is optionally present, need M, in an *RRCReconfiguration* message including *reconfigurationWithSync*; otherwise it is absent, Need M. |

#### – *SL-BWP-PoolConfigCommon*

The IE *SL-BWP-PoolConfigCommon* is used to configure the cell-specific NR sidelink communication resource pool.

*SL-BWP-PoolConfigCommon* information element

-- ASN1START

-- TAG-SL-BWP-POOLCONFIGCOMMON-START

SL-BWP-PoolConfigCommon-r16 ::= SEQUENCE {

sl-RxPool-r16 SEQUENCE (SIZE (1..maxNrofRXPool-r16)) OF SL-ResourcePool-r16 OPTIONAL, -- Need R

sl-TxPoolSelectedNormal-r16 SEQUENCE (SIZE (1..maxNrofTXPool-r16)) OF SL-ResourcePoolConfig-r16 OPTIONAL, -- Need R

sl-TxPoolExceptional-r16 SL-ResourcePoolConfig-r16 OPTIONAL -- Need R

}

-- TAG-SL-BWP-POOLCONFIGCOMMON-STOP

-- ASN1STOP

#### – *SL-CBR-PriorityTxConfigList*

The IE *SL-CBR-PriorityTxConfigList* indicates the mapping between PSSCH transmission parameter (such as MCS, PRB number, retransmission number, CR limit) sets by using the indexes of the configurations provided in *sl-CBR-PSSCH-TxConfigList*, CBR ranges by an index to the entry of the CBR range configuration in *sl-CBR-RangeConfigList*, and priority ranges. It also indicates the default PSSCH transmission parameters to be used when CBR measurement results are not available, and MCS range for the MCS tables used in the resource pool.

*SL-CBR-PriorityTxConfigList* information element

-- ASN1START

-- TAG-SL-CBR-PRIORITYTXCONFIGLIST-START

SL-CBR-PriorityTxConfigList-r16 ::= SEQUENCE (SIZE (1..8)) OF SL-PriorityTxConfigIndex-r16

SL-CBR-PriorityTxConfigList-v1650 ::= SEQUENCE (SIZE (1..8)) OF SL-PriorityTxConfigIndex-v1650

SL-PriorityTxConfigIndex-r16 ::= SEQUENCE {

sl-PriorityThreshold-r16 INTEGER (1..8) OPTIONAL, -- Need M

sl-DefaultTxConfigIndex-r16 INTEGER (0..maxCBR-Level-1-r16) OPTIONAL, -- Need M

sl-CBR-ConfigIndex-r16 INTEGER (0..maxCBR-Config-1-r16) OPTIONAL, -- Need M

sl-Tx-ConfigIndexList-r16 SEQUENCE (SIZE (1.. maxCBR-Level-r16)) OF SL-TxConfigIndex-r16 OPTIONAL -- Need M

}

SL-PriorityTxConfigIndex-v1650 ::= SEQUENCE {

sl-MCS-RangeList-r16 SEQUENCE (SIZE (1..maxCBR-Level-r16)) OF SL-MinMaxMCS-List-r16 OPTIONAL -- Need M

}

SL-TxConfigIndex-r16 ::= INTEGER (0..maxTxConfig-1-r16)

-- TAG-SL-CBR-PRIORITYTXCONFIGLIST-STOP

-- ASN1STOP

| *SL-CBR-PriorityTxConfigList* field descriptions |
| --- |
| ***sl-CBR-ConfigIndex***  Indicates the CBR ranges to be used by an index to the entry of the CBR range configuration in *sl-CBR-RangeConfigList*. |
| ***sl-DefaultTxConfigIndex***  Indicates the PSSCH transmission parameters to be used by the UEs which do not have available CBR measurement results, by means of an index to the corresponding entry in *sl-Tx-ConfigIndexList*. Value 0 indicates the first entry in *sl-Tx-ConfigIndexList*. The field is ignored if the UE has available CBR measurement results. |
| ***sl-MCS-RangeList***  Indicates the minimum MCS value and maximum MCS value for the associated MCS table(s). UE shall ignore the minimum MCS value and maximum MCS value used for table of 64QAM indicated in *SL-CBR-PriorityTxConfigList-r16* if *SL-CBR-PriorityTxConfigList-v1650* is present. |
| ***sl-PriorityThreshold***  Indicates the upper bound of priority range which is associated with the configurations in *sl-CBR-ConfigIndex* and in *sl-Tx-ConfigIndexList*. The upper bounds of the priority ranges are configured in ascending order for consecutive entries of *SL-PriorityTxConfigIndex* in *SL-CBR-PriorityTxConfigList*. For the first entry of S*L-PriorityTxConfigIndex*, the lower bound of the priority range is 1. |
| ***SL-CBR-PriorityTxConfigList-v1650***  If included, it includes the same number of entries, and listed in the same order, as in *SL-CBR-PriorityTxConfigList-r16*. |

#### – *SL-CBR-CommonTxConfigList*

The IE *SL-CBR-CommonTxConfigList* indicates the list of PSSCH transmission parameters (such as MCS, sub-channel number, retransmission number, CR limit) in *sl-CBR-PSSCH-TxConfigList*, and the list of CBR ranges in *sl-CBR-RangeConfigList*, to configure congestion control to the UE for sidelink communication.

*SL-CBR-CommonTxConfigList* information element

-- ASN1START

-- TAG-SL-CBR-COMMONTXCONFIGLIST-START

SL-CBR-CommonTxConfigList-r16 ::= SEQUENCE {

sl-CBR-RangeConfigList-r16 SEQUENCE (SIZE (1..maxCBR-Config-r16)) OF SL-CBR-LevelsConfig-r16 OPTIONAL, -- Need M

sl-CBR-PSSCH-TxConfigList-r16 SEQUENCE (SIZE (1.. maxTxConfig-r16)) OF SL-CBR-PSSCH-TxConfig-r16 OPTIONAL -- Need M

}

SL-CBR-LevelsConfig-r16 ::= SEQUENCE (SIZE (1..maxCBR-Level-r16)) OF SL-CBR-r16

SL-CBR-PSSCH-TxConfig-r16 ::= SEQUENCE {

sl-CR-Limit-r16 INTEGER(0..10000) OPTIONAL, -- Need M

sl-TxParameters-r16 SL-PSSCH-TxParameters-r16 OPTIONAL -- Need M

}

SL-CBR-r16 ::= INTEGER (0..100)

-- TAG-SL-CBR-COMMONTXCONFIGLIST-STOP

-- ASN1STOP

| *SL-CBR-CommonTxConfigList* field descriptions |
| --- |
| ***sl-CBR-RangeConfigList***  Indicates the list of CBR ranges. Each entry of the list indicates in *SL-CBR-LevelsConfig* the upper bound of the CBR range for the respective entry. The upper bounds of the CBR ranges are configured in ascending order for consecutive entries of *sl-CBR-RangeConfigList.* For the first entry of *sl-CBR-RangeConfigList* the lower bound of the CBR range is 0. Value 0 corresponds to 0, value 1 to 0.01, value 2 to 0.02, and so on. |
| ***sl-CR-Limit***  Indicates the maximum limit on the occupancy ratio. Value 0 corresponds to 0, value 1 to 0.0001, value 2 to 0.0002, and so on (i.e. in steps of 0.0001) until value 10000, which corresponds to 1. |
| ***sl-CBR-PSSCH-TxConfigList***  Indicates the list of available PSSCH transmission parameters (such as MCS, sub-channel number, retransmission number and CR limit) configurations. |
| ***sl-TxParameters***  Indicates PSSCH transmission parameters. |

#### – *SL-ConfigDedicatedNR*

The IE *SL-ConfigDedicatedNR* specifies the dedicated configuration information for NR sidelink communication.

*SL-ConfigDedicatedNR* information element

-- ASN1START

-- TAG-SL-CONFIGDEDICATEDNR-START

SL-ConfigDedicatedNR-r16 ::= SEQUENCE {

sl-PHY-MAC-RLC-Config-r16 SL-PHY-MAC-RLC-Config-r16 OPTIONAL, -- Need M

sl-RadioBearerToReleaseList-r16 SEQUENCE (SIZE (1..maxNrofSLRB-r16)) OF SLRB-Uu-ConfigIndex-r16 OPTIONAL, -- Need N

sl-RadioBearerToAddModList-r16 SEQUENCE (SIZE (1..maxNrofSLRB-r16)) OF SL-RadioBearerConfig-r16 OPTIONAL, -- Need N

sl-MeasConfigInfoToReleaseList-r16 SEQUENCE (SIZE (1..maxNrofSL-Dest-r16)) OF SL-DestinationIndex-r16 OPTIONAL, -- Need N

sl-MeasConfigInfoToAddModList-r16 SEQUENCE (SIZE (1..maxNrofSL-Dest-r16)) OF SL-MeasConfigInfo-r16 OPTIONAL, -- Need N

t400-r16 ENUMERATED {ms100, ms200, ms300, ms400, ms600, ms1000, ms1500, ms2000} OPTIONAL, -- Need M

...,

[[

sl-PHY-MAC-RLC-Config-v1700 SetupRelease { SL-PHY-MAC-RLC-Config-v1700 } OPTIONAL, -- Need M

sl-DiscConfig-r17 SetupRelease { SL-DiscConfig-r17} OPTIONAL -- Need M

]]

}

SL-DestinationIndex-r16 ::= INTEGER (0..maxNrofSL-Dest-1-r16)

SL-PHY-MAC-RLC-Config-r16::= SEQUENCE {

sl-ScheduledConfig-r16 SetupRelease { SL-ScheduledConfig-r16 } OPTIONAL, -- Need M

sl-UE-SelectedConfig-r16 SetupRelease { SL-UE-SelectedConfig-r16 } OPTIONAL, -- Need M

sl-FreqInfoToReleaseList-r16 SEQUENCE (SIZE (1..maxNrofFreqSL-r16)) OF SL-Freq-Id-r16 OPTIONAL, -- Need N

sl-FreqInfoToAddModList-r16 SEQUENCE (SIZE (1..maxNrofFreqSL-r16)) OF SL-FreqConfig-r16 OPTIONAL, -- Need N

sl-RLC-BearerToReleaseList-r16 SEQUENCE (SIZE (1..maxSL-LCID-r16)) OF SL-RLC-BearerConfigIndex-r16 OPTIONAL, -- Need N

sl-RLC-BearerToAddModList-r16 SEQUENCE (SIZE (1..maxSL-LCID-r16)) OF SL-RLC-BearerConfig-r16 OPTIONAL, -- Need N

sl-MaxNumConsecutiveDTX-r16 ENUMERATED {n1, n2, n3, n4, n6, n8, n16, n32} OPTIONAL, -- Need M

sl-CSI-Acquisition-r16 ENUMERATED {enabled} OPTIONAL, -- Need R

sl-CSI-SchedulingRequestId-r16 SetupRelease {SchedulingRequestId} OPTIONAL, -- Need M

sl-SSB-PriorityNR-r16 INTEGER (1..8) OPTIONAL, -- Need R

networkControlledSyncTx-r16 ENUMERATED {on, off} OPTIONAL -- Need M

}

SL-PHY-MAC-RLC-Config-v1700 ::= SEQUENCE {

sl-DRX-Config-r17 SL-DRX-Config-r17 OPTIONAL, -- Need M

sl-RLC-ChannelToReleaseList-r17 SEQUENCE (SIZE (1..maxSL-LCID-r16)) OF SL-RLC-ChannelID-r17 OPTIONAL, -- Cond L2U2N

sl-RLC-ChannelToAddModList-r17 SEQUENCE (SIZE (1..maxSL-LCID-r16)) OF SL-RLC-ChannelConfig-r17 OPTIONAL, -- Cond L2U2N

...

}

SL-DiscConfig-r17::= SEQUENCE {

sl-RelayUE-Config-r17 SetupRelease { SL-RelayUE-Config-r17} OPTIONAL, -- Cond L2RelayUE

sl-RemoteUE-Config-r17 SetupRelease { SL-RemoteUE-Config-r17} OPTIONAL -- Cond L2RemoteUE

}

-- TAG-SL-CONFIGDEDICATEDNR-STOP

-- ASN1STOP

| *SL-ConfigDedicatedNR* field descriptions |
| --- |
| ***sl-MeasConfigInfoToAddModList***  This field indicates the RSRP measurement configurations for unicast destinations to add and/or modify. |
| ***sl-MeasConfigInfoToReleaseList***  This field indicates the RSRP measurement configurations for unicast destinations to remove. |
| ***sl-PHY-MAC-RLC-Config***  This field indicates the lower layer sidelink radio bearer configurations. |
| ***sl-RadioBearerToAddModList***  This field indicates one or multiple sidelink radio bearer configurations to add and/or modify. This field is not configured to the PC5 connection used for L2 U2N relay operation. |
| ***sl-RadioBearerToReleaseList***  This field indicates one or multiple sidelink radio bearer configurations to remove. This field is not configured to the PC5 connection used for L2 U2N relay operation. |

| *SL-PHY-MAC-RLC-Config* field descriptions |
| --- |
| ***networkControlledSyncTx***  This field indicates whether the UE shall transmit synchronisation information (i.e. become synchronisation source). Value *on* indicates the UE to transmit synchronisation information while value *off* indicates the UE to not transmit such information. |
| ***sl-DRX-Config***  This field indicates the sidelink DRX configuration(s) for unicast, groupcast and/or broadcast communication, as specified in TS 38.321 [3]. |
| ***sl-MaxNumConsecutiveDTX***  This field indicates the maximum number of consecutive HARQ DTX before triggering sidelink RLF. Value n1 corresponds to 1, value n2 corresponds to 2, and so on. |
| ***sl-FreqInfoToAddModList***  This field indicates the NR sidelink communication configuration on some carrier frequency (ies) to add and/or modify. In this release, only one entry can be configured in the list. |
| ***sl-FreqInfoToReleaseList***  This field indicates the NR sidelink communication configuration on some carrier frequency (ies) to remove. In this release, only one entry can be configured in the list. |
| ***sl-RLC-BearerToAddModList***  This field indicates one or multiple sidelink RLC bearer configurations to add and/or modify. |
| ***sl-RLC-BearerToReleaseList***  This field indicates one or multiple sidelink RLC bearer configurations to remove. |
| ***sl-ScheduledConfig***  Indicates the configuration for UE to transmit NR sidelink communication based on network scheduling. This field is not configured simultaneously with sl-UE-SelectedConfig. This field is not configured to a L2 U2N Remote UE. |
| ***sl-UE-SelectedConfig***  Indicates the configuration used for UE autonomous resource selection. This field is not configured simultaneously with *sl-ScheduledConfig*. |
| ***sl-CSI-Acquisition***  Indicates whether CSI reporting is enabled in sidelink unicast. If the field is absent, sidelink CSI reporting is disabled. |
| ***sl-CSI-SchedulingRequestId***  If present, it indicates the scheduling request configuration applicable for sidelink CSI report MAC CE, as specified in TS 38.321 [3]. |
| ***sl-SSB-PriorityNR***  This field indicates the priority of NR sidelink SSB transmission and reception. |

|  |  |
| --- | --- |
| Conditional Presence | Explanation |
| *L2RelayUE* | For L2 U2N Relay UE, the field is optionally present, Need M. Otherwise, it is absent. |
| *L2RemoteUE* | For L2 U2N Remote UE, the field is optionally present, Need M. Otherwise, it is absent. |
| *L2U2N* | The field is optional present for L2 U2N Relay UE and L2 U2N Remote UE, need N. Otherwise, it is absent. |

#### – *SL-ConfiguredGrantConfig*

The IE *SL-ConfiguredGrantConfig* specifies the configured grant configuration information for NR sidelink communication.

*SL-ConfiguredGrantConfig* information element

-- ASN1START

-- TAG-SL-CONFIGUREDGRANTCONFIG-START

SL-ConfiguredGrantConfig-r16 ::= SEQUENCE {

sl-ConfigIndexCG-r16 SL-ConfigIndexCG-r16,

sl-PeriodCG-r16 SL-PeriodCG-r16 OPTIONAL, -- Need M

sl-NrOfHARQ-Processes-r16 INTEGER (1..16) OPTIONAL, -- Need M

sl-HARQ-ProcID-offset-r16 INTEGER (0..15) OPTIONAL, -- Need M

sl-CG-MaxTransNumList-r16 SL-CG-MaxTransNumList-r16 OPTIONAL, -- Need M

rrc-ConfiguredSidelinkGrant-r16 SEQUENCE {

sl-TimeResourceCG-Type1-r16 INTEGER (0..496) OPTIONAL, -- Need M

sl-StartSubchannelCG-Type1-r16 INTEGER (0..26) OPTIONAL, -- Need M

sl-FreqResourceCG-Type1-r16 INTEGER (0..6929) OPTIONAL, -- Need M

sl-TimeOffsetCG-Type1-r16 INTEGER (0..7999) OPTIONAL, -- Need R

sl-N1PUCCH-AN-r16 PUCCH-ResourceId OPTIONAL, -- Need M

sl-PSFCH-ToPUCCH-CG-Type1-r16 INTEGER (0..15) OPTIONAL, -- Need M

sl-ResourcePoolID-r16 SL-ResourcePoolID-r16 OPTIONAL, -- Need M

sl-TimeReferenceSFN-Type1-r16 ENUMERATED {sfn512} OPTIONAL -- Need S

} OPTIONAL, -- Need M

...,

[[

sl-N1PUCCH-AN-Type2-r16 PUCCH-ResourceId OPTIONAL -- Need M

]]

}

SL-ConfigIndexCG-r16 ::= INTEGER (0..maxNrofCG-SL-1-r16)

SL-CG-MaxTransNumList-r16 ::= SEQUENCE (SIZE (1..8)) OF SL-CG-MaxTransNum-r16

SL-CG-MaxTransNum-r16 ::= SEQUENCE {

sl-Priority-r16 INTEGER (1..8),

sl-MaxTransNum-r16 INTEGER (1..32)

}

SL-PeriodCG-r16 ::= CHOICE{

sl-PeriodCG1-r16 ENUMERATED {ms100, ms200, ms300, ms400, ms500, ms600, ms700, ms800, ms900, ms1000, spare6,

spare5, spare4, spare3, spare2, spare1},

sl-PeriodCG2-r16 INTEGER (1..99)

}

-- TAG-SL-CONFIGUREDGRANTCONFIG-STOP

-- ASN1STOP

| *SL-ConfiguredGrantConfig* field descriptions |
| --- |
| ***sl-ConfigIndexCG***  This field indicates the ID to identify configured grant for sidelink. |
| ***sl-CG-MaxTransNumList***  This field indicates the maximum number of times that a TB can be transmitted using the resources provided by the configured grant. *sl-Priority* corresponds to the logical channel priority. |
| ***sl-FreqResourceCG-Type1***  Indicates the frequency resource location of sidelink configured grant type 1. An index giving valid combinations of one or two starting sub-channel and length (jointly encoded) as resource indicator (RIV), as defined in TS 38.214 [19]. |
| ***sl-HARQ-ProcID-Offset***  Indicates the offset used in deriving the HARQ process IDs for SL configured grant type 1 or SL configured type 2, see TS 38.321 [3], clause 5.8.3. |
| ***sl-N1PUCCH-AN***  This field indicates the HARQ resource for PUCCH for sidelink configured grant type 1. The actual PUCCH-Resource is configured in *sl-PUCCH-Config* and referred to by its ID. |
| ***sl-N1PUCCH-AN-Type2***  This field indicates the HARQ resource for PUCCH for PSCCH/PSSCH transmissions without a corresponding PDCCH on sidelink configured grant type 2. The actual PUCCH-Resource is configured in *sl-PUCCH-Config* and referred to by its ID. |
| ***sl-NrOfHARQ-Processes***  This field indicates the number of HARQ processes configured for a specific configured grant. It applies for both Type 1 and Type 2. |
| ***sl-PeriodCG***  This field indicates the period of sidelink configured grant in the unit of ms. |
| ***sl-PSFCH-ToPUCCH-CG-Type1***  This field, for configured grant type 1, indicates slot offset between the PSFCH associated with the last PSSCH resource of each period and the PUCCH occasion used for reporting sidelink HARQ. |
| ***sl-ResourcePoolID***  Indicates the resource pool in which the configured sidelink grant Type 1 is applied. |
| ***sl-StartSubchannelCG-Type1***  This field indicates the starting sub-channel of sidelink configured grant Type 1. An index giving valid sub-channel index. |
| ***sl-TimeOffsetCG-Type1***  This field indicates the slot offset with respect to logical slot defined by *sl-TimeReferenceSFN-Type1*, as specified in TS 38.321 [3]. |
| ***sl-TimeReferenceSFN-Type1***  Indicates SFN used for determination of the offset of a resource in time domain. If it is present, the UE uses the 1st logical slot of associated resource pool after the starting time of the closest SFN with the indicated number preceding the reception of the sidelink configured grant configuration Type 1 as reference logical slot, see TS 38.321 [3], clause 5.8.3. If it is not present, the reference SFN is 0. |
| ***sl-TimeResourceCG-Type1***  This field indicates the time resource location of sidelink configured grant Type 1. An index giving valid combinations of up to two slot positions (jointly encoded) as time resource indicator (TRIV), as defined in TS 38.212 [17]. |

#### – *SL-DestinationIdentity*

The IE *SL-DestinationIdentity* is used to identify a destination of a NR sidelink communication.

*SL-DestinationIdentity* information element

-- ASN1START

-- TAG-SL-DESTINATIONIDENTITY-START

SL-DestinationIdentity-r16 ::= BIT STRING (SIZE (24))

-- TAG-SL-DESTINATIONIDENTITY-STOP

-- ASN1STOP

#### *– SL-DRX-Config*

The IE *SL-DRX-Config* is used to configure DRX related parameters for NR sidelink communication. The SL DRX timers should be calculated in the unit of physical slot.

*SL-DRX-Config information element*

-- ASN1START

-- TAG-SL-DRX-CONFIG-START

SL-DRX-Config-r17 ::= SEQUENCE {

sl-DRX-ConfigGC-BC-r17 SL-DRX-ConfigGC-BC-r17 OPTIONAL, -- Cond HO

sl-DRX-ConfigUC-ToReleaseList-r17 SEQUENCE (SIZE (1..maxNrofSL-Dest-r16)) OF SL-DestinationIndex-r16 OPTIONAL, -- Need N

sl-DRX-ConfigUC-ToAddModList-r17 SEQUENCE (SIZE (1..maxNrofSL-Dest-r16)) OF SL-DRX-ConfigUC-Info-r17 OPTIONAL, -- Need N

...

}

SL-DRX-ConfigUC-Info-r17 ::= SEQUENCE {

sl-DestinationIndex-r17 SL-DestinationIndex-r16 OPTIONAL, -- Need N

sl-DRX-ConfigUC-r17 SL-DRX-ConfigUC-r17 OPTIONAL, -- Need N

...

}

-- TAG-SL-DRX-CONFIG-STOP

-- ASN1STOP

|  |
| --- |
| *SL-DRX-Config* field descriptions |
| ***sl-DRX-ConfigGC-BC***  This field indicates the sidelink DRX configurations for groupcast and broadcast communication, as specified in TS 38.321 [3]. |
| ***sl-DRX-ConfigUC-ToReleaseList***  This field indicates the sidelink DRX configurations for corresponding unicast destinations to remove. |
| ***sl-DRX-ConfigUC-ToAddModList***  This field indicates the sidelink DRX configurations for corresponding unicast destinations to add and/or modify. |

|  |  |
| --- | --- |
| Conditional Presence | Explanation |
| *HO* | This field is optionally present, need M, in an *RRCReconfiguration* message including *reconfigurationWithSync*; otherwise it is absent, Need M. |

#### *– SL-DRX-ConfigGC-BC*

The IE *SL-DRX-ConfigGC-BC* is used to configure DRX related parameters for NR sidelink groupcast and broadcast communication and unicast/broadcast based communication of Direct Link Establishment Request (TS 24.587 [57]).

*SL-DRX-ConfigGC-BC* information element

-- ASN1START

-- TAG-SL-DRX-CONFIGGC-BC-START

SL-DRX-ConfigGC-BC-r17 ::= SEQUENCE {

sl-DRX-GC-BC-PerQoS-List-r17 SEQUENCE (SIZE (1..maxSL-GC-BC-DRX-QoS-r17)) OF SL-DRX-GC-BC-QoS-r17 OPTIONAL, -- Need M

sl-DRX-GC-generic-r17 SL-DRX-GC-Generic-r17 OPTIONAL, -- Need M

sl-DefaultDRX-GC-BC-r17 SL-DRX-GC-BC-QoS-r17 OPTIONAL, -- Need M

...

}

SL-DRX-GC-BC-QoS-r17 ::= SEQUENCE {

sl-DRX-GC-BC-MappedQoS-FlowList-r17 SEQUENCE (SIZE (1..maxNrofSL-QFIs-r16)) OF SL-QoS-Profile-r16 OPTIONAL, -- Need M

sl-DRX-GC-BC-OnDurationTimer-r17 CHOICE {

subMilliSeconds INTEGER (1..31),

milliSeconds ENUMERATED {

ms1, ms2, ms3, ms4, ms5,ms6, ms8, ms10, ms20, ms30, ms40, ms50, ms60,

ms80, ms100, ms200, ms300, ms400, ms500, ms600, ms800, ms1000, ms1200,

ms1600, spare8, spare7, spare6, spare5, spare4, spare3, spare2, spare1}

},

sl-DRX-GC-InactivityTimer-r17 ENUMERATED {

ms0, ms1, ms2, ms3, ms4, ms5, ms6, ms8, ms10, ms20, ms30, ms40, ms50, ms60, ms80,

ms100, ms200, ms300, ms500, ms750, ms1280, ms1920, ms2560, spare9, spare8,

spare7, spare6, spare5, spare4, spare3, spare2, spare1},

sl-DRX-GC-BC-Cycle-r17 ENUMERATED {

ms10, ms20, ms32, ms40, ms60, ms64, ms70, ms80, ms128, ms160, ms256, ms320, ms512,

ms640, ms1024, ms1280, ms2048, ms2560, ms5120, ms10240, spare12, spare11, spare10,

spare9, spare8, spare7, spare6, spare5, spare4, spare3, spare2, spare1},

...

}

SL-DRX-GC-Generic-r17 ::= SEQUENCE {

sl-DRX-GC-HARQ-RTT-Timer1-r17 ENUMERATED {sl0, sl1, sl2, sl4, spare4, spare3, spare2, spare1} OPTIONAL, -- Need M

sl-DRX-GC-HARQ-RTT-Timer2-r17 ENUMERATED {sl0, sl1, sl2, sl4, spare4, spare3, spare2, spare1} OPTIONAL, -- Need M

sl-DRX-GC-RetransmissionTimer-r17 ENUMERATED {

sl0, sl1, sl2, sl4, sl6, sl8, sl16, sl24, sl33, sl40, sl64, sl80, sl96, sl112, sl128,

sl160, sl320, spare15, spare14, spare13, spare12, spare11, spare10, spare9, spare8,

spare7, spare6, spare5, spare4, spare3, spare2, spare1}

}

-- TAG-SL-DRX-CONFIGGC-BC-STOP

-- ASN1STOP

|  |
| --- |
| *SL-DRX-ConfigGC-BC field descriptions* |
| ***sl-DefaultDRX-GC-BC-r17***  Indicates the default sidelink DRX configuration for groupcast and broadcast communications, which is used for QoS profile(s) that cannot be mapped into DRX configuration(s) configured for dedicated QoS profile(s). This field can be applied for the broadcast based or unicast based communication of Direct Link Establishment Request as described in TS 24.587 [57]. |
| ***sl-DRX-GC-BC-PerQoS-List***  List of one or multiple sidelink DRX configurations for groupcast and broadcast communication, which are mapped from QoS profile(s). |
| ***sl-DRX-GC-BC-Cycle***  Value in ms, ms10 corresponds to 10ms, ms20 corresponds to 20 ms, ms32 corresponds to 32 ms, and so on. |
| ***sl-DRX-GC-BC-MappedQoS-FlowsList***  List of QoS profiles of the NR sidelink communication, which are mapped to a sidelink DRX configuration. |
| ***sl-DRX-GC-BC-OnDurationTimer***  Value in multiples of 1/32 ms (subMilliSeconds) or in ms (milliSecond). For the latter, value ms1 corresponds to 1 ms, value ms2 corresponds to 2 ms, and so on. |
| ***sl-DRX-GC-HARQ-RTT-Timer1, sl-DRX-GC-HARQ-RTT-Timer2***  Value in number of slot lengths of the BWP where the transport block was received. Value sl0 corresponds to 0 slots, sl1 corresponds to 1 slot, sl2 corresponds to 2 slots, and so on. *sl-DRX-GC-HARQ-RTT-Timer1* is used for feedback enabled sidelink HARQ transmission if SCI does not indicate retransmission resource(s). *sl-DRX-GC-HARQ-RTT-Timer2* is used for feedback disabled sidelink HARQ transmission in resource pool configured with PSFCH if SCI does not indicate retransmission resource(s). |
| ***sl-DRX-GC-Generic***  Indicates a sidelink DRX configuration, which is applicable to any QoS profile or any Destination Layer-2 ID. |
| ***sl-DRX-GC-InactivityTimer***  Value in multiple integers of 1 ms, ms0 corresponds to 0, ms1 corresponds to 1 ms, ms2 corresponds to 2 ms, and so on. This field is only valid for groupcast communication. |
| ***sl-DRX-GC-RetransmissionTimer***  Value in number of slot lengths of the BWP where the transport block was received. Value sl0 corresponds to 0 slots, sl1 corresponds to 1 slot, sl2 corresponds to 2 slots, and so on. |

#### *– SL-DRX-ConfigUC*

The IE SL-*DRX-ConfigUC* is used to configure sidelink DRX related parameters for unicast communication.

*SL-DRX-ConfigUC* information element

-- ASN1START

-- TAG-DRX-CONFIGUC-START

SL-DRX-ConfigUC-r17 ::= SEQUENCE {

sl-drx-onDurationTimer-r17 CHOICE {

subMilliSeconds INTEGER (1..31),

milliSeconds ENUMERATED {

ms1, ms2, ms3, ms4, ms5, ms6, ms8, ms10, ms20, ms30, ms40, ms50, ms60,

ms80, ms100, ms200, ms300, ms400, ms500, ms600, ms800, ms1000, ms1200,

ms1600, spare8, spare7, spare6, spare5, spare4, spare3, spare2, spare1}

},

sl-drx-InactivityTimer-r17 ENUMERATED {

ms0, ms1, ms2, ms3, ms4, ms5, ms6, ms8, ms10, ms20, ms30, ms40, ms50, ms60, ms80,

ms100, ms200, ms300, ms500, ms750, ms1280, ms1920, ms2560, spare9, spare8,

spare7, spare6, spare5, spare4, spare3, spare2, spare1},

sl-drx-HARQ-RTT-Timer1-r17 ENUMERATED {sl0, sl1, sl2, sl4, spare4, spare3, spare2, spare1} OPTIONAL, -- Need M

sl-drx-HARQ-RTT-Timer2-r17 ENUMERATED {sl0, sl1, sl2, sl4, spare4, spare3, spare2, spare1} OPTIONAL, -- Need M

sl-drx-RetransmissionTimer-r17 ENUMERATED {

sl0, sl1, sl2, sl4, sl6, sl8, sl16, sl24, sl33, sl40, sl64, sl80, sl96, sl112, sl128,

sl160, sl320, spare15, spare14, spare13, spare12, spare11, spare10, spare9,

spare8, spare7, spare6, spare5, spare4, spare3, spare2, spare1},

sl-drx-CycleStartOffset-r17 CHOICE {

ms10 INTEGER(0..9),

ms20 INTEGER(0..19),

ms32 INTEGER(0..31),

ms40 INTEGER(0..39),

ms60 INTEGER(0..59),

ms64 INTEGER(0..63),

ms70 INTEGER(0..69),

ms80 INTEGER(0..79),

ms128 INTEGER(0..127),

ms160 INTEGER(0..159),

ms256 INTEGER(0..255),

ms320 INTEGER(0..319),

ms512 INTEGER(0..511),

ms640 INTEGER(0..639),

ms1024 INTEGER(0..1023),

ms1280 INTEGER(0..1279),

ms2048 INTEGER(0..2047),

ms2560 INTEGER(0..2559),

ms5120 INTEGER(0..5119),

ms10240 INTEGER(0..10239)

},

sl-drx-SlotOffset INTEGER (0..31)

}

-- TAG-SL-DRX-CONFIGUC-STOP

-- ASN1STOP

|  |
| --- |
| *SL-DRX-ConfigUC* field descriptions |
| ***sl-drx-CycleStartOffset***  *drx-Cycle* in ms and *drx-StartOffset* in multiples of 1 ms. |
| ***sl-drx-HARQ-RTT-Timer1, sl-drx-HARQ-RTT-Timer2***  Value in number of slot lengths of the BWP where the transport block was received. Value sl0 corresponds to 0 slots, sl1 corresponds to 1 slot, sl2 corresponds to 2 slots, and so on. *sl-drx-HARQ-RTT-Timer1* is used for HARQ enabled sidelink transmission if SCI does not indicate retransmission resource(s). *sl-drx-HARQ-RTT-Timer2* is used for HARQ disabled sidelink transmission in resource pool configured with PSFCH if SCI does not indicate retransmission resource(s). |
| ***sl-drx-InactivityTimer***  Value in number of slot lengths of the BWP where the transport block was received, sl0 corresponds to 0, sl1 corresponds to 1 slot, sl2 corresponds to 2 slots, and so on. |
| ***sl-drx-onDurationTimer***  Value in multiples of 1/32 ms (subMilliSeconds) or in ms (milliSecond). For the latter, value ms1 corresponds to 1 ms, value ms2 corresponds to 2 ms, and so on. |
| ***sl-drx-RetransmissionTimer***  Value in number of slot lengths of the BWP where the transport block was received. Value sl0 corresponds to 0 slots, sl1 corresponds to 1 slot, sl2 corresponds to 2 slots, and so on. |
| ***sl-drx-SlotOffset***  Value in 1/32 ms. Value 0 corresponds to 0 ms, value 1 corresponds to 1/32 ms, value 2 corresponds to 2/32 ms, and so on. |

#### *– SL-DRX-ConfigUC-SemiStatic*

The IE SL-*DRX-ConfigUC-SemiStatic* is used to indicate the semi-static sidelink DRX related parameters for unicast communication.

*SL-DRX-ConfigUC*-SemiStatic information element

-- ASN1START

-- TAG-DRX-CONFIGUCSEMISTATIC-START

SL-DRX-ConfigUC-SemiStatic-r17 ::= SEQUENCE {

sl-drx-onDurationTimer-r17 CHOICE {

subMilliSeconds INTEGER (1..31),

milliSeconds ENUMERATED {

ms1, ms2, ms3, ms4, ms5, ms6, ms8, ms10, ms20, ms30, ms40, ms50, ms60,

ms80, ms100, ms200, ms300, ms400, ms500, ms600, ms800, ms1000, ms1200,

ms1600, spare8, spare7, spare6, spare5, spare4, spare3, spare2, spare1}

},

sl-drx-CycleStartOffset-r17 CHOICE {

ms10 INTEGER(0..9),

ms20 INTEGER(0..19),

ms32 INTEGER(0..31),

ms40 INTEGER(0..39),

ms60 INTEGER(0..59),

ms64 INTEGER(0..63),

ms70 INTEGER(0..69),

ms80 INTEGER(0..79),

ms128 INTEGER(0..127),

ms160 INTEGER(0..159),

ms256 INTEGER(0..255),

ms320 INTEGER(0..319),

ms512 INTEGER(0..511),

ms640 INTEGER(0..639),

ms1024 INTEGER(0..1023),

ms1280 INTEGER(0..1279),

ms2048 INTEGER(0..2047),

ms2560 INTEGER(0..2559),

ms5120 INTEGER(0..5119),

ms10240 INTEGER(0..10239)

},

sl-drx-SlotOffset-r17 INTEGER (0..31)

}

-- TAG-SL-DRX-CONFIGUCSEMISTATIC-STOP

-- ASN1STOP

#### – *SL-FreqConfig*

The IE *SL-FreqConfig* specifies the dedicated configuration information on one particular carrier frequency for NR sidelink communication.

*SL-FreqConfig* information element

-- ASN1START

-- TAG-SL-FREQCONFIG-START

SL-FreqConfig-r16 ::= SEQUENCE {

sl-Freq-Id-r16 SL-Freq-Id-r16,

sl-SCS-SpecificCarrierList-r16 SEQUENCE (SIZE (1..maxSCSs)) OF SCS-SpecificCarrier,

sl-AbsoluteFrequencyPointA-r16 ARFCN-ValueNR OPTIONAL, -- Need M

sl-AbsoluteFrequencySSB-r16 ARFCN-ValueNR OPTIONAL, -- Need R

frequencyShift7p5khzSL-r16 ENUMERATED {true} OPTIONAL, -- Cond V2X-SL-Shared

valueN-r16 INTEGER (-1..1),

sl-BWP-ToReleaseList-r16 SEQUENCE (SIZE (1..maxNrofSL-BWPs-r16)) OF BWP-Id OPTIONAL, -- Need N

sl-BWP-ToAddModList-r16 SEQUENCE (SIZE (1..maxNrofSL-BWPs-r16)) OF SL-BWP-Config-r16 OPTIONAL, -- Need N

sl-SyncConfigList-r16 SL-SyncConfigList-r16 OPTIONAL, -- Need M

sl-SyncPriority-r16 ENUMERATED {gnss, gnbEnb} OPTIONAL -- Need M

}

SL-Freq-Id-r16 ::= INTEGER (1.. maxNrofFreqSL-r16)

-- TAG-SL-FREQCONFIG-STOP

-- ASN1STOP

| *SL-FreqConfig* field descriptions |
| --- |
| ***frequencyShift7p5khzSL***  Enable the NR SL transmission with a 7.5 kHz shift to the LTE raster. If the field is absent, the frequency shift is disabled. |
| ***sl-AbsoluteFrequencyPointA***  Absolute frequency of the reference resource block (Common RB 0). Its lowest subcarrier is also known as Point A. |
| ***sl-AbsoluteFrequencySSB***  Indicates the frequency location of sidelink SSB. The transmission bandwidth for sidelink SSB is within the bandwidth of this sidelink BWP. |
| ***sl-BWP-ToAddModList***  This field indicates the list of sidelink BWP(s) on which the NR sidelink communication configuration is to be added or reconfigured. In this release, only one BWP is allowed to be configured for NR sidelink communication. |
| ***sl-BWP-ToReleaseList***  This field indicates the list of sidelink BWP(s) on which the NR sidelink communication configuration is to be released. |
| ***sl-Freq-Id***  This field indicates the identity of the dedicated configuration information on the carrier frequency for NR sidelink communication. |
| ***sl-SCS-SpecificCarrierList***  A set of UE specific channel bandwidth and location configurations for different subcarrier spacings (numerologies). Defined in relation to Point A. The UE uses the configuration provided in this field only for the purpose of channel bandwidth and location determination. In this release, only one *SCS-SpecificCarrier* is allowed to be configured for NR sidelink communication. |
| ***sl-SyncPriority***  This field indicates synchronization priority order, as specified in clause 5.8.6. |
| ***valueN***  Indicate the NR SL transmission with a valueN \*5kHz shift to the LTE raster. (see TS 38.101-1 [15], clause 5.4E.2). |

|  |  |
| --- | --- |
| Conditional Presence | Explanation |
| *V2X-SL-Shared* | This field is mandatory present if the carrier frequency configured for NR sidelink communication is shared by V2X sidelink communication. It is absent, Need R, otherwise. |

#### – *SL-FreqConfigCommon*

The IE *FreqConfigCommon* specifies the cell-specific configuration information on one particular carrier frequency for NR sidelink communication.

*SL-FreqConfigCommon* information element

-- ASN1START

-- TAG-SL-FREQCONFIGCOMMON-START

SL-FreqConfigCommon-r16 ::= SEQUENCE {

sl-SCS-SpecificCarrierList-r16 SEQUENCE (SIZE (1..maxSCSs)) OF SCS-SpecificCarrier,

sl-AbsoluteFrequencyPointA-r16 ARFCN-ValueNR,

sl-AbsoluteFrequencySSB-r16 ARFCN-ValueNR OPTIONAL, -- Need R

frequencyShift7p5khzSL-r16 ENUMERATED {true} OPTIONAL, -- Cond V2X-SL-Shared

valueN-r16 INTEGER (-1..1),

sl-BWP-List-r16 SEQUENCE (SIZE (1..maxNrofSL-BWPs-r16)) OF SL-BWP-ConfigCommon-r16 OPTIONAL, -- Need R

sl-SyncPriority-r16 ENUMERATED {gnss, gnbEnb} OPTIONAL, -- Need R

sl-NbAsSync-r16 BOOLEAN OPTIONAL, -- Need R

sl-SyncConfigList-r16 SL-SyncConfigList-r16 OPTIONAL, -- Need R

...

}

-- TAG-SL-FREQCONFIGCOMMON-STOP

-- ASN1STOP

| *SL-FreqConfigCommon* field descriptions |
| --- |
| ***frequencyShift7p5khzSL***  Enable the NR SL transmission with a 7.5 kHz shift to the LTE raster. If the field is absent, the frequency shift is disabled. |
| ***sl-AbsoluteFrequencyPointA***  Absolute frequency of the reference resource block (Common RB 0). Its lowest subcarrier is also known as Point A. |
| ***sl-AbsoluteFrequencySSB***  Indicates the frequency location of sidelink SSB. The transmission bandwidth for sidelink SSB is within the bandwidth of this sidelink BWP. |
| ***sl-BWP-List***  This field indicates the list of sidelink BWP(s) on which the NR sidelink communication configuration. In this release, only one BWP is allowed to be configured for NR sidelink communication. |
| ***sl-NbAsSync***  This field indicates whether the network can be selected as synchronization reference directly/indirectly only, if *sl-SyncPriority* is set to gnss. If this field is set to TRUE, the network is enabled to be selected as synchronization reference directly/indirectly. The field is only present in *SidelinkPreconfigNR*. Otherwise it is absent. |
| ***sl-SyncPriority***  This field indicates synchronization priority order, as specified in clause 5.8.6.. |
| ***sl-SyncConfigList***  This field indicates the configuration by which the UE is allowed to receive and transmit synchronisation information for NR sidelink communication. Network configures *sl-SyncConfig* including *txParameters* when configuring UEs to transmit synchronisation information. If this field is configured in *SL-PreconfigurationNR-r16*, only one entry is configured in *sl-SyncConfigList*. |
| ***valueN***  Indicate the NR SL transmission with a valueN \*5kHz shift to the LTE raster (see TS 38.101-1 [15], clause 5.4E.2). |

|  |  |
| --- | --- |
| Conditional Presence | Explanation |
| *V2X-SL-Shared* | This field is mandatory present if the carrier frequency configured for NR sidelink communication is shared by V2X sidelink communication. It is absent, Need R, otherwise. |

#### – *SL-InterUE-CoordinationConfig*

The IE *SL*-*InterUE-CoordinationConfig* is used to configure the sidelink inter-UE coordination parameters.

*SL-InterUE-CoordinationConfig* information element

-- ASN1START

-- TAG-SL-INTERUE-COORDINATIONCONFIG-START

SL-InterUE-CoordinationConfig-r17 ::= SEQUENCE {

sl-InterUE-CoordinationScheme1-r17 SL-InterUE-CoordinationScheme1-r17 OPTIONAL, -- Need M

sl-InterUE-CoordinationScheme2-r17 SL-InterUE-CoordinationScheme2-r17 OPTIONAL, -- Need M

...

}

SL-InterUE-CoordinationScheme1-r17 ::= SEQUENCE {

sl-IUC-Explicit-r17 ENUMERATED {enabled, disabled} OPTIONAL, -- Need M

sl-IUC-Condition-r17 ENUMERATED {enabled, disabled} OPTIONAL, -- Need M

sl-Condition1-A-2-r17 ENUMERATED {disabled} OPTIONAL, -- Need M

sl-ThresholdRSRP-Condition1-B-1-Option1List-r17 SEQUENCE (SIZE (1..8)) OF SL-ThresholdRSRP-Condition1-B-1-r17 OPTIONAL, -- Need M

sl-ThresholdRSRP-Condition1-B-1-Option2List-r17 SEQUENCE (SIZE (1..8)) OF SL-ThresholdRSRP-Condition1-B-1-r17 OPTIONAL, -- Need M

sl-ContainerCoordInfo-r17 ENUMERATED {enabled, disabled} OPTIONAL, -- Need M

sl-ContainerRequest-r17 ENUMERATED {enabled, disabled} OPTIONAL, -- Need M

sl-TriggerConditionCoordInfo-r17 INTEGER (0..1) OPTIONAL, -- Need M

sl-TriggerConditionRequest-r17 INTEGER (0..1) OPTIONAL, -- Need M

sl-PriorityCoordInfoExplicit-r17 INTEGER (1..8) OPTIONAL, -- Need M

sl-PriorityCoordInfoCondition-r17 INTEGER (1..8) OPTIONAL, -- Need M

sl-PriorityRequest-r17 INTEGER (1..8) OPTIONAL, -- Need M

sl-PriorityPreferredResourceSet-r17 INTEGER (1..8) OPTIONAL, -- Need M

sl-MaxSlotOffsetTRIV-r17 INTEGER (1..8000) OPTIONAL, -- Need M

sl-NumSubCH-PreferredResourceSet-r17 INTEGER (1..27) OPTIONAL, -- Need M

sl-ReservedPeriodPreferredResourceSet-r17 INTEGER (1..16) OPTIONAL, -- Need M

sl-DetermineResourceType-r17 ENUMERATED {uea, ueb} OPTIONAL, -- Need M

...

}

SL-InterUE-CoordinationScheme2-r17 ::= SEQUENCE {

sl-IUC-Scheme2-r17 ENUMERATED {enabled} OPTIONAL, -- Need R

sl-RB-SetPSFCH-r17 BIT STRING (SIZE (10..275)) OPTIONAL, -- Need M

sl-TypeUE-A-r17 ENUMERATED {enabled} OPTIONAL, -- Need R

sl-PSFCH-Occasion-r17 INTEGER (0..1) OPTIONAL, -- Need M

sl-SlotLevelResourceExclusion-r17 ENUMERATED {enabled} OPTIONAL, -- Need R

sl-OptionForCondition2-A-1-r17 INTEGER (0..1) OPTIONAL, -- Need M

sl-IndicationUE-B-r17 ENUMERATED {enabled, disabled} OPTIONAL, -- Need M

...,

[[

sl-DeltaRSRP-Thresh-v17xy INTEGER (-30..30) OPTIONAL -- Need M

]]

}

SL-ThresholdRSRP-Condition1-B-1-r17 ::= SEQUENCE {

sl-Priority-r17 INTEGER (1..8),

sl-ThresholdRSRP-Condition1-B-1-r17 INTEGER (0..66)

}

-- TAG-SL-INTERUE-COORDINATIONCONFIG-STOP

-- ASN1STOP

| *SL-InterUE-CoordinationScheme1* field descriptions |
| --- |
| ***sl-Condition1-A-2***  Indicates disabling the use of condition of excluding from preferred resource set resource(s) in slot(s) where UE-A, when it is intended receiver of UE-B, does not expect to perform SL reception from UE-B due to half duplex operation. |
| ***sl-ContainerCoordInfo***  Indicates whether a SCI format 2-C can be used as the container of inter-UE coordination information transmission from UE-A to UE-B in Scheme 1 in addition to using MAC CE. |
| ***sl-ContainerRequest***  Indicates whether a SCI format 2-C can be used as the container of an explicit request for inter-UE coordination information transmission form UE-B to UE-A in Scheme 1 in addition to using MAC CE. |
| ***sl-DetermineResourceType***  Indicates how to determine the resource set type to be provided by inter-UE coordination information transmission. Value "*uea*" means the resource set type is determined by UE-A's implementation. Value "*ueb*" means the resource set type is determined by UE-B's request. |
| ***sl-IUC-Condition***  Indicates whether inter-UE coordination information triggered by a condition is enabled or not other than explicit request reception. |
| ***sl-IUC-Explicit***  Indicates whether inter-UE coordination information triggered by an explicit request is enabled or not. |
| ***sl-MaxSlotOffsetTRIV***  Indicates the maximum value of logical slot offset with respect to a reference slot that is used for representing the first resource location of each TRIV to indicate the set of resources in Scheme 1 as specified in TS 38.214 [19]. |
| ***sl-NumSubCH-PreferredResousrceSet***  Indicates the number of sub-channels used for determining the preferred resource set in Scheme 1 when the inter-UE coordination information transmission is triggered by a condition other than explicit request reception. |
| ***sl-PriorityCoordInfoCondition***  Parameter used to determine the the priority value for sensing and candidate resource (re-)selection for transmitting the TB carrying the IUC MAC CE and the priority value in the SCI Format 1-A corresponding to the TB carrying the IUC MAC CE, triggered by a condition other than explicit request reception in Scheme 1. The priority value of IUC MAC CE used in LCP procedure (see TS 38.321 [3]) is fixed as "1". |
| ***sl-PriorityCoordInfoExplicit***  Parameter used to determine the the priority value for sensing and candidate resource (re-)selection for transmitting the TB carrying the IUC MAC CE and the priority value in the SCI Format 1-A corresponding to the TB carrying the IUC MAC CE , triggered by an explicit request in Scheme 1. |
| ***sl-PriorityPreferredResourceSet***  Indicates the priority value used for determining the preferred resource set in Scheme 1 when the inter-UE coordination information transmission is triggered by a condition other than explicit request reception. |
| ***sl-PriorityRequest***  Parameter used to determine the priority value for sensing and candidate resource (re-)selection for transmitting the TB carrying the IUC request MAC CE and the priority value in the SCI Format 1-A corresponding to the TB carrying the IUC request MAC CE, in an explicit request for inter-UE coordination information in Scheme 1. The priority value of IUC request MAC CE used in LCP procedure (see TS 38.321 [3]) is fixed as "1". |
| ***sl-ReservedPeriodPreferredResourceSet***  Indicates the resource reservation interval used for determining the preferred resource set in Scheme 1 when the inter-UE coordination information transmission is triggered by a condition, by means of an index to the corresponding entry of *sl-ResourceReservePeriodList-r16*. |
| ***sl-TriggerConditionCoordInfo***  Indicates the alternative trigger condition of inter-UE coordination informatiobstriggered by a condition rather than request reception in Scheme-1 from UE-A to UE-B. Value 0 means inter-UE coordination information is triggered by UE-A's implementation. Value 1 means inter-UE coordination information can be triggered only when UE-A has data to be transmitted together with the inter-UE coordination information to UE-B. |
| ***sl-TriggerConditionRequest***  Indicates the trigger condition of an explicit request from UE-B to UE-A. Value 0 means the explicit request is triggered by UE-B's implementation. Value 1 means the explicit request can be triggered only when UE-B has data to be transmitted to UE-A. |
| ***sl-ThresholdRSRP-Condition1-B-1-Option1List***  Indicates the RSRP threshold used to determine reserved resource(s) of other UE(s) whose RSRP measurement is larger than it as the set of resource(s) non-preferred for UE-B's transmission for Condition 1-B-1 of Scheme 1, as specified in TS 38.214 [19]. Value 0 corresponds to minus infinity dBm, value 1 corresponds to -128dBm, value 2 corresponds to -126dBm, value n corresponds to (-128 + (n-1)\*2) dBm and so on, value 66 corresponds to infinity dBm. |
| ***sl-ThresholdRSRP-Condition1-B-1-Option2List***  Indicates the RSRP threshold used to determine reserved resource(s) of other UE(s) whose RSRP measurement is smaller than it as the set of resource(s) non-preferred for UE-B's transmission for Condition 1-B-1 of Scheme 1, as specified in TS 38.214 [19]. Value 0 corresponds to minus infinity dBm, value 1 corresponds to -128dBm, value 2 corresponds to -126dBm, value n corresponds to (-128 + (n-1)\*2) dBm and so on, value 66 corresponds to infinity dBm. |

| *SL-InterUE-CoordinationScheme2* field descriptions |
| --- |
| ***sl-DeltaRSRP-Thresh***  Indicates the RSRP threshold delta value corresponding to *deltaRSRPThresh* specified in clause 16.3.0 of TS 38.213 [13] used to determine reserved resource(s) of other UE(s). Value in dB. Only even values (step size 2) allowed. |
| ***sl-IndicationUE-B***  Indicates whether to enable or disable the usage of 1 LSB of reserved bits of a SCI format 1-A to indicate of whether UE scheduling a conflict TB can be UE-B or not. |
| ***sl-IUC-Scheme2***  Indicates whether inter-UE coordination scheme 2 is enabled or not. |
| ***sl-OptionForCondition2-A-1***  Indicates the RSRP threshold used to consider additional criteria for condition 2-A-1. Value 0 corresponds to using the RSRP threshold according to the priorities included in the SCI, UE uses thresholds *sl-Thres-RSRP-List*, in its resource pool configuration *sl-UE-SelectedConfigRP*, corresponding to *ThresPSSCH-RSRP-List* specified in clause 16.3.0 of TS 38.213 [13]. Value 1 corresponds to using a (pre)configured RSRP threshold delta value *sl-DeltaRSRP-Thresh,* corresponding to *deltaRSRPThresh* specified in clause 16.3.0 of TS 38.213 [13]. |
| ***sl-PSFCH-Occasion***  Indicates the reference slot from which a PSFCH occasion for inter-UE coordination information transmission is derived. Value 0 corresponds to the slot where UE-B's SCI is transmitted and value 1 corresponds to the slot where expected/potential resource conflict occurs on PSSCH resource indicated by UE-B's SCI. |
| ***sl-RB-SetPSFCH***  Indicates the set of PRBs that are actually used for inter-UE coordination information transmission and reception in Scheme 2. The leftmost bit of the bitmap refers to the lowest RB index in the resource pool, and so on. |
| ***sl-SlotLevelResourceExclusion***  Indicates that physical layer of UE-B reports resources in a slot including the next reserved resource indicated by the corresponding UE-B's SCI for current TB transmission to higher layer. |
| ***sl-TypeUE-A***  Indicates that a non-destination UE of a TB transmitted by UE-B can be UE-A which sends inter-UE coordination information to UE-B, when UE-A is a destination UE of another TB conflicting with the TB transmitted by UE-B. |

#### – *SL-LogicalChannelConfig*

The IE *SL*-*LogicalChannelConfig* is used to configure the sidelink logical channel parameters.

*SL-LogicalChannelConfig* information element

-- ASN1START

-- TAG-SL-LOGICALCHANNELCONFIG-START

SL-LogicalChannelConfig-r16 ::= SEQUENCE {

sl-Priority-r16 INTEGER (1..8),

sl-PrioritisedBitRate-r16 ENUMERATED {kBps0, kBps8, kBps16, kBps32, kBps64, kBps128, kBps256, kBps512,

kBps1024, kBps2048, kBps4096, kBps8192, kBps16384, kBps32768, kBps65536, infinity},

sl-BucketSizeDuration-r16 ENUMERATED {ms5, ms10, ms20, ms50, ms100, ms150, ms300, ms500, ms1000,

spare7, spare6, spare5, spare4, spare3,spare2, spare1},

sl-ConfiguredGrantType1Allowed-r16 ENUMERATED {true} OPTIONAL, -- Need R

sl-HARQ-FeedbackEnabled-r16 ENUMERATED {enabled, disabled } OPTIONAL, -- Need R

sl-AllowedCG-List-r16 SEQUENCE (SIZE (0.. maxNrofCG-SL-1-r16)) OF SL-ConfigIndexCG-r16

OPTIONAL, -- Need R

sl-AllowedSCS-List-r16 SEQUENCE (SIZE (1..maxSCSs)) OF SubcarrierSpacing OPTIONAL, -- Need R

sl-MaxPUSCH-Duration-r16 ENUMERATED {ms0p02, ms0p04, ms0p0625, ms0p125, ms0p25, ms0p5, spare2, spare1}

OPTIONAL, -- Need R

sl-LogicalChannelGroup-r16 INTEGER (0..maxLCG-ID) OPTIONAL, -- Need R

sl-SchedulingRequestId-r16 SchedulingRequestId OPTIONAL, -- Need R

sl-LogicalChannelSR-DelayTimerApplied-r16 BOOLEAN OPTIONAL, -- Need R

...

}

-- TAG-SL-LOGICALCHANNELCONFIG-STOP

-- ASN1STOP

|  |
| --- |
| *SL-LogicalChannelConfig field* descriptions |
| ***sl-AllowedCG-List***  This restriction applies only when the SL grant is a configured grant. If present, SL MAC SDUs from this logical channel can only be mapped to the indicated configured grant configuration. If the size of the sequence is zero, then SL MAC SDUs from this logical channel cannot be mapped to any configured grant configurations. If the field is not present, SL MAC SDUs from this logical channel can be mapped to any configured grant configurations. If the field *sl-ConfiguredGrantType1Allowed* is present, only those sidelink configured grant type 1 configurations indicated in this sequence are allowed for use by this sidelink logical channel; otherwise, this sequence shall not include any sidelink configured grant type 1 configuration. Corresponds to "sl-AllowedCG-List" as specified in TS 38.321 [3]. |
| ***sl-AllowedSCS-List***  If present, indicate the numerology of UL-SCH resources that this sidelink logical channel is mapped to, when checking the SR trigger condition. Corresponds to ' sl-AllowedSCS-List' in TS 38.321 [3]. |
| ***sl-BucketSizeDuration***  Value in ms. *ms5* corresponds to 5 ms, value *ms10* corresponds to 10 ms, and so on. |
| ***sl-ConfiguredGrantType1Allowed***  If present and set to true, or if the capability *lcp-RestrictionSidelink* as specified in TS 38.306 [26] is not indicated, SL MAC SDUs from this sidelink logical channel can be transmitted on a sidelink configured grant type 1. Otherwise, SL MAC SDUs from this logical channel cannot be transmitted on a sidelink configured grant type 1. Corresponds to 'sl-configuredGrantType1Allowed' in TS 38.321 [3]. |
| ***sl-HARQ-FeedbackEnabled***  Network always includes this field. It indicates the HARQ feedback enabled/disabled restriction in LCP for this sidelink logical channel. If set to *enabled*, the sidelink logical channel will be multiplexed only with a logical channel which enabling the HARQ feedback. If set to *disabled*, the sidelink logical channel cannot be multiplexed with a logical channel which enabling the HARQ feedback. Corresponds to 'sl-HARQ-FeedbackEnabled' in TS 38.321 [3]. If this field of at least one sidelink logical channel for the UE is set to enabled, *sl-PSFCH-Config* should be mandatory present in at least one of the *SL-ResourcePool*. |
| ***sl-LogicalChannelGroup***  ID of the sidelink logical channel group, as specified in TS 38.321 [3], which the sidelink logical channel belongs to. |
| ***sl-LogicalChannelSR-DelayTimerApplied***  Indicates whether to apply the delay timer for SR transmission for this sidelink logical channel. Set to false if *logicalChannelSR-DelayTimer* is not included in *sl-BSR-Config*. |
| ***sl-MaxPUSCH-Duration***  If present, indicate the maximum PUSCH duration of UL-SCH resources that this sidelink logical channel is mapped to, when checking the SR trigger condition. Corresponds to "sl-MaxPUSCH-Duration" in TS 38.321 [3]. |
| ***sl-PrioritisedBitRate***  Value in kiloBytes/s. Value *kBps0* corresponds to 0 kiloBytes/s, value *kBps8* corresponds to 8 kiloBytes/s, value *kBps16* corresponds to 16 kiloBytes/s, and so on. |
| ***sl-Priority***  Sidelink logical channel priority, as specified in TS 38.321 [3]. |
| ***sl-SchedulingRequestId***  If present, it indicates the scheduling request configuration applicable for this sidelink logical channel, as specified in TS 38.321 [3]. |

#### – *SL-L2RelayUE-Config*

The IE *SL*-*L2RelayUE-Config* is used to configure L2 U2N relay operation related configurations used by L2 U2N Relay UE, e.g. *SRAP-Config*.

*SL-L2RelayUE-Config* information element

-- ASN1START

-- TAG-SL-L2RELAYUE-CONFIG-START

SL-L2RelayUE-Config-r17 ::= SEQUENCE {

sl-RemoteUE-ToAddModList-r17 SEQUENCE (SIZE (1..maxNrofRemoteUE-r17)) OF SL-RemoteUE-ToAddMod-r17 OPTIONAL, -- Need N

sl-RemoteUE-ToReleaseList-r17 SEQUENCE (SIZE (1..maxNrofRemoteUE-r17)) OF SL-DestinationIdentity-r16 OPTIONAL, -- Need N

...

}

SL-RemoteUE-ToAddMod-r17 ::= SEQUENCE {

sl-L2IdentityRemote-r17 SL-DestinationIdentity-r16,

sl-SRAP-Config-Relay-r17 SL-SRAP-Config-r17 OPTIONAL, -- Need M

...

}

-- TAG-SL-L2RELAYUE-CONFIG-STOP

-- ASN1STOP

| *SL-L2RelayUE-Config* field descriptions |
| --- |
| ***sl-RemoteUE-ToAddModList***  List of L2 U2N Remote UEs to be added and modified to the L2 U2N Relay UE. |
| ***sl-RemoteUE-ToReleaseList***  List of L2 U2N Remote UEs to be released by the L2 U2N Relay UE. |

#### – *SL-L2RemoteUE-Config*

The IE *SL*-*L2RemoteUE-Config* is used to configure L2 U2N relay operation related configurations used by L2 U2N Remote UE, e.g. *SRAP-Config*.

*SL-L2RemoteUE-Config* information element

-- ASN1START

-- TAG-SL-L2REMOTEUE-CONFIG-START

SL-L2RemoteUE-Config-r17 ::= SEQUENCE {

sl-SRAP-ConfigRemote-r17 SL-SRAP-Config-r17 OPTIONAL, --Need M

sl-UEIdentityRemote-r17 RNTI-Value OPTIONAL, -- Cond FirstRRCReconfig

...

}

-- TAG-SL-L2REMOTEUE-CONFIG-STOP

-- ASN1STOP

|  |
| --- |
| *SL-L2RemoteUE-Config* field descriptions |
| ***sl-SRAP-ConfigRemote***  Indicates SRAP configuration used for L2 U2N Remote UE. |
| ***sl-UEIdentityRemote***  Indicates the C-RNTI to the L2 U2N Remote UE. |

|  |  |
| --- | --- |
| Conditional Presence | Explanation |
| *FirstRRCReconfig* | This field is mandatory present in the first *RRCReconfiguration*. Otherwise the field is absent. |

#### – *SL-MeasConfigCommon*

The IE *SL-MeasConfigCommon* is used to set the cell specific SL RSRP measurement configurations for unicast destinations.

*SL-MeasConfigCommon* information element

-- ASN1START

-- TAG-SL-MEASCONFIGCOMMON-START

SL-MeasConfigCommon-r16 ::= SEQUENCE {

sl-MeasObjectListCommon-r16 SL-MeasObjectList-r16 OPTIONAL, -- Need R

sl-ReportConfigListCommon-r16 SL-ReportConfigList-r16 OPTIONAL, -- Need R

sl-MeasIdListCommon-r16 SL-MeasIdList-r16 OPTIONAL, -- Need R

sl-QuantityConfigCommon-r16 SL-QuantityConfig-r16 OPTIONAL, -- Need R

...

}

-- TAG-SL-MEASCONFIGCOMMON-STOP

-- ASN1STOP

| *SL-MeasConfigCommon* field descriptions |
| --- |
| ***sl-MeasIdListCommon***  List of sidelink measurement identities |
| ***sl-MeasObjectListCommon***  List of sidelink measurement objects. |
| ***sl-QuantityConfigCommon***  Indicates the layer 3 filtering coefficient for sidelink measurement. |
| ***sl-ReportConfigListCommon***  List of sidelink measurement reporting configurations. |

#### – *SL-MeasConfigInfo*

The IE *SL*-*MeasConfigInfo* is used to set RSRP measurement configurations for unicast destinations.

*SL-MeasConfigInfo* information element

-- ASN1START

-- TAG-SL-MEASCONFIGINFO-START

SL-MeasConfigInfo-r16 ::= SEQUENCE {

sl-DestinationIndex-r16 SL-DestinationIndex-r16,

sl-MeasConfig-r16 SL-MeasConfig-r16,

...

}

SL-MeasConfig-r16 ::= SEQUENCE {

sl-MeasObjectToRemoveList-r16 SL-MeasObjectToRemoveList-r16 OPTIONAL, -- Need N

sl-MeasObjectToAddModList-r16 SL-MeasObjectList-r16 OPTIONAL, -- Need N

sl-ReportConfigToRemoveList-r16 SL-ReportConfigToRemoveList-r16 OPTIONAL, -- Need N

sl-ReportConfigToAddModList-r16 SL-ReportConfigList-r16 OPTIONAL, -- Need N

sl-MeasIdToRemoveList-r16 SL-MeasIdToRemoveList-r16 OPTIONAL, -- Need N

sl-MeasIdToAddModList-r16 SL-MeasIdList-r16 OPTIONAL, -- Need N

sl-QuantityConfig-r16 SL-QuantityConfig-r16 OPTIONAL, -- Need M

...

}

SL-MeasObjectToRemoveList-r16 ::= SEQUENCE (SIZE (1..maxNrofSL-ObjectId-r16)) OF SL-MeasObjectId-r16

SL-ReportConfigToRemoveList-r16 ::= SEQUENCE (SIZE (1..maxNrofSL-ReportConfigId-r16)) OF SL-ReportConfigId-r16

SL-MeasIdToRemoveList-r16 ::= SEQUENCE (SIZE (1..maxNrofSL-MeasId-r16)) OF SL-MeasId-r16

-- TAG-SL-MEASCONFIGINFO-STOP

-- ASN1STOP

| *SL-MeasConfigInfo* field descriptions |
| --- |
| ***sl-MeasIdToAddModList***  List of sidelink measurement identities to add and/or modify. |
| ***sl-MeasIdToRemoveList***  List of sidelink measurement identities to remove. |
| ***sl-MeasObjectToAddModList***  List of sidelink measurement objects to add and/or modify. |
| ***sl-MeasObjectToRemoveList***  List of sidelink measurement objects to remove. |
| ***sl-QuantityConfig***  Indicates the layer 3 filtering coefficient for sidelink measurement. |
| ***sl-ReportConfigToAddModList***  List of sidelink measurement reporting configurations to add and/or modify. |
| ***sl-ReportConfigToRemoveList***  List of sidelink measurement reporting configurations to remove. |

#### – *SL-MeasIdList*

The IE *SL*-*MeasIdList* concerns a list of SL measurement identities to add or modify for a destination, with for each entry the *sl-MeasId*, the associated *sl-MeasObjectId* and the associated *sl-ReportConfigId*.

*SL-MeasIdList* information element

-- ASN1START

-- TAG-SL-MEASIDLIST-START

SL-MeasIdList-r16 ::= SEQUENCE (SIZE (1..maxNrofSL-MeasId-r16)) OF SL-MeasIdInfo-r16

SL-MeasIdInfo-r16 ::= SEQUENCE {

sl-MeasId-r16 SL-MeasId-r16,

sl-MeasObjectId-r16 SL-MeasObjectId-r16,

sl-ReportConfigId-r16 SL-ReportConfigId-r16,

...

}

SL-MeasId-r16 ::= INTEGER (1..maxNrofSL-MeasId-r16)

-- TAG-SL-MEASIDLIST-STOP

-- ASN1STOP

#### – *SL-MeasObjectList*

The IE *SL*-*MeasObjectList* concerns a list of SL measurement objects to add or modify for a destination.

*SL-MeasObjectList* information element

-- ASN1START

-- TAG-SL-MEASOBJECTLIST-START

SL-MeasObjectList-r16 ::= SEQUENCE (SIZE (1..maxNrofSL-ObjectId-r16)) OF SL-MeasObjectInfo-r16

SL-MeasObjectInfo-r16 ::= SEQUENCE {

sl-MeasObjectId-r16 SL-MeasObjectId-r16,

sl-MeasObject-r16 SL-MeasObject-r16,

...

}

SL-MeasObjectId-r16 ::= INTEGER (1..maxNrofSL-ObjectId-r16)

SL-MeasObject-r16 ::= SEQUENCE {

frequencyInfoSL-r16 ARFCN-ValueNR,

...

}

-- TAG-SL-MEASOBJECTLIST-STOP

-- ASN1STOP

| *SL-MeasObjectList* field descriptions |
| --- |
| ***sl-MeasObjectId***  It is used to identify a sidelink measurement object configuration. |
| ***sl-MeasObject***  It specifies information applicable for sidelink DMRS measurement. |

#### – *SL-PagingIdentityRemoteUE*

The IE *SL-PagingIdentityRemoteUE* includes the Remote UE's paging UE ID.

*SL-PagingIdentityRemoteUE* information element

-- ASN1START

-- TAG-SL-PAGINGIDENTITYREMOTEUE-START

SL-PagingIdentityRemoteUE-r17 ::= SEQUENCE {

ng-5G-S-TMSI-r17 NG-5G-S-TMSI,

fullI-RNTI-r17 I-RNTI-Value OPTIONAL -- Need R

}

-- TAG-SL-PAGINGIDENTITYREMOTEUE-STOP

-- ASN1STOP

#### – *SL-PBPS-CPS-Config*

The IE *SL-PBPS-CPS-Config* specifies the operation information for a resource pool which can be (pre-)configured to enable full sensing only, partial sensing only, random resource selection only, or any combination(s) thereof.

*SL-PBPS-CPS-Config* information element

-- ASN1START

-- TAG-SL-PBPS-CPS-CONFIG-START

SL-PBPS-CPS-Config-r17 ::= SEQUENCE {

sl-AllowedResourceSelectionConfig-r17 ENUMERATED {c1, c2, c3, c4, c5, c6, c7} OPTIONAL, -- Need M

sl-MinNumCandidateSlotsPeriodic-r17 INTEGER (1..32) OPTIONAL, -- Need M

sl-PBPS-OccasionReservePeriodList-r17 SEQUENCE (SIZE (1..16)) OF INTEGER (1..16) OPTIONAL, -- Need M

sl-Additional-PBPS-Occasion-r17 ENUMERATED { monitored } OPTIONAL, -- Need M

sl-CPS-WindowPeriodic-r17 INTEGER (5..30) OPTIONAL, -- Need M

sl-MinNumCandidateSlotsAperiodic-r17 INTEGER (1..32) OPTIONAL, -- Need M

sl-MinNumRssiMeasurementSlots-r17 INTEGER (1..800) OPTIONAL, -- Need M

sl-DefaultCBR-RandomSelection-r17 INTEGER (0..100) OPTIONAL, -- Need M

sl-DefaultCBR-PartialSensing-r17 INTEGER (0..100) OPTIONAL, -- Need M

sl-CPS-WindowAperiodic-r17 INTEGER (0..30) OPTIONAL, -- Need M

sl-PartialSensingInactiveTime-r17 ENUMERATED { enabled, disabled } OPTIONAL, -- Need M

...

}

-- TAG-SL-PBPS-CPS-CONFIG-STOP

-- ASN1STOP

| *SL-PBPS-CPS-Config* field descriptions |
| --- |
| ***sl-Additional-PBPS-Occasion***  Indicates that UE additionally monitors periodic sensing occasions that correspond to a set of values. (see TS 38.214 [19], clause 8.1.4). |
| ***sl-AllowedResourceSelectionConfig***  Indicates the allowed resource selection mechanism(s), i.e. full sensing only, partial sensing only, random resource selection only, or any combination(s) thereof. (see TS 38.214 [19], clause 8.1.4). Only c1, c4 , c5 or c7 can be configured for a Rel-16 resource pool.  c1: only full sensing allowed  c2: only partial sensing allowed  c3: only random selection allowed  c4: full sensing+random selection allowed  c5: full sensing+ partial sensing allowed  c6: partial sensing + random selection allowed  c7: full sensing+ partial sensing + random selection allowed. |
| ***sl-CPS-WindowAperiodic***  Parameter that indicates the minimum size of contiguous partial sensing window in logical slot units for a resource (re)selection procedure and re-evaluation/pre-emption checking triggered by aperiodic transmission. (see TS 38.214 [19], clause 8.1.4). If not configured, the size of contiguous partial sensing window in logical slot units is 31. |
| ***sl-CPS-WindowPeriodic***  Indicates the size of contiguous partial sensing window in logical slot units when UE performs periodic-based and contiguous partial sensing for a resource (re)selection procedure triggered by periodic transmission. If not configured, the size of contiguous partial sensing window in logical slot units is 31. |
| ***sl-DefaultCBR-PartialSensing***  Indicates default value of SL CBR measurement for a UE that is configured to perform partial sensing by its higher layer (including when SL DRX is configured) if the number of SL RSSI measurement slots over CBR measurement window is below *sl-MinNumRssiMeasurementSlots*, (see TS 38.214 [19], clause 8.1.6). Value 0 corresponds to 0, value 1 to 0.01, value 2 to 0.02, and so on. |
| ***sl-DefaultCBR-RandomSelection***  Indicates default value of CBR measurement for a UE that performs random resource selection if no SL CBR measurement result over SL CBR measurement window, (see TS 38.214 [19], clause 8.1.6). Value 0 corresponds to 0, value 1 to 0.01, value 2 to 0.02, and so on. |
| ***sl-MinNumCandidateSlotsAperiodic***  Indicates the minimum number of Y' slots that are included in the possible candidate resources corresponding to periodic-based partial sensing and/or contiguous partial sensing for resource (re)selection triggered by aperiodic transmission. (see TS 38.214 [19], clause 8.1.4). |
| ***sl-MinNumCandidateSlotsPeriodic***  Indicates the minimum number of Y slots that are included in the possible candidate resources corresponding to periodic-based partial sensing for resource (re)selection triggered by periodic transmission. (see TS 38.214 [19], clause 8.1.4). |
| ***sl-MinNumRssiMeasurementSlots***  Indicates a threshold for a minimum number of SL RSSI measurement slots over CBR measurement window for which the SL RSSI is measured for a UE that is configured to perform partial sensing by its higher layer (including when SL DRX is configured). (see TS 38.214 [19], clause 8.1.6). |
| ***sl-PartialSensingInactiveTime***  Indicates whether or not UE is required to perform SL reception of PSCCH and RSRP measurement for partial sensing on slots in SL DRX inactive time when partial sensing is configured by its higher layer. (see TS 38.214 [19], clause 8.1.4). |
| ***sl-PBPS-OccasionReservePeriodList***  Indicates the subset of periodicity values from *sl-ResourceReservePeriodList* used to determine periodic sensing occasions in periodic-based partial sensing, by means of an index to the corresponding entry in *sl-ResourceReservePeriodList-r16*. If not configured, all periodicity values from *sl-ResourceReservePeriodList* are used to determine periodic sensing occasions in periodic-based partial sensing. (see TS 38.214 [19], clause 8.1.4). |

#### – *SL-PDCP-Config*

The IE *SL*-*PDCP-Config* is used to set the configurable PDCP parameters for a sidelink radio bearer.

*SL-PDCP-Config* information element

-- ASN1START

-- TAG-SL-PDCP-CONFIG-START

SL-PDCP-Config-r16 ::= SEQUENCE {

sl-DiscardTimer-r16 ENUMERATED {ms3, ms10, ms20, ms25, ms30, ms40, ms50, ms60, ms75, ms100, ms150, ms200,

ms250, ms300, ms500, ms750, ms1500, infinity} OPTIONAL, -- Cond Setup

sl-PDCP-SN-Size-r16 ENUMERATED {len12bits, len18bits} OPTIONAL, -- Cond Setup2

sl-OutOfOrderDelivery ENUMERATED { true } OPTIONAL, -- Need R

...

}

-- TAG-SL-PDCP-CONFIG-STOP

-- ASN1STOP

| *SL-PDCP-Config* field descriptions |
| --- |
| ***sl-DiscardTimer***  Value in ms of *discardTimer* specified in TS 38.323 [5]. Value *ms50* corresponds to 50 ms, value *ms100* corresponds to 100 ms and so on. |
| ***sl-OutOfOrderDelivery***  Indicates whether or not outOfOrderDelivery specified in TS 38.323 [5] is configured. This field should be either always present or always absent, after the radio bearer is established. |
| ***sl-PDCP-SN-Size***  PDCP sequence number size for unicast NR sidelink communication, 12 or 18 bits, as specified in TS 38.323 [5]. For groupcast and broadcast NR sidelink communication, only 12 bits is applicable, as specified in 9.1.1.5. |

|  |  |
| --- | --- |
| Conditional Presence | Explanation |
| *Setup* | The field is mandatory present in case of sidelink DRB setup via dedicated signaling and in case of sidelink DRB configuration via system information and pre-configuration; otherwise the field is optionally present, need M. |
| *Setup2* | The field is mandatory present in case of sidelink DRB setup via dedicated signaling and in case of sidelink DRB configuration via system information and pre-configuration for RLC-AM and RLC-UM for unicast NR sidelink communication; otherwise the field is not present, Need M. |

– *SL-PSBCH-Config*

The IE *SL-PSBCH-Config* indicates PSBCH transmission parameters on each sidelink bandwidth part.

***SL-PSBCH-Config* information element**

-- ASN1START

-- TAG-SL-PSBCH-CONFIG-START

SL-PSBCH-Config-r16 ::= SEQUENCE {

dl-P0-PSBCH-r16 INTEGER (-16..15) OPTIONAL, -- Need M

dl-Alpha-PSBCH-r16 ENUMERATED {alpha0, alpha04, alpha05, alpha06, alpha07, alpha08, alpha09, alpha1} OPTIONAL, -- Need M

...,

[[

dl-P0-PSBCH-r17 INTEGER (-202..24) OPTIONAL -- Need M

]]

}

-- TAG-SL-PSBCH-CONFIG-STOP

-- ASN1STOP

| *SL-PSBCH-Config* field descriptions |
| --- |
| ***dl-Alpha-PSBCH***  Indicates alpha value for DL pathloss based power control for PSBCH. When the field is not configured the UE applies the value 1 |
| ***dl-P0-PSBCH***  Indicates P0 value for DL pathloss based power control for PSBCH. If not configured, DL pathloss based power control is disabled for PSBCH. |

#### – *SL-PSSCH-TxConfigList*

The IE *SL-PSSCH-TxConfigList* indicates PSSCH transmission parameters. When lower layers select parameters from the range indicated in IE *SL-PSSCH-TxConfigList*, the UE considers both configurations in IE *SL-PSSCH-TxConfigList* and the CBR-dependent configurations represented in IE *SL-CBR-PriorityTxConfigList*. Only one IE *SL-PSSCH-TxConfig* is provided per *SL-TypeTxSync*.

*SL-PSSCH-TxConfigList* information element

-- ASN1START

-- TAG-SL-PSSCH-TXCONFIGLIST-START

SL-PSSCH-TxConfigList-r16 ::= SEQUENCE (SIZE (1..maxPSSCH-TxConfig-r16)) OF SL-PSSCH-TxConfig-r16

SL-PSSCH-TxConfig-r16 ::= SEQUENCE {

sl-TypeTxSync-r16 SL-TypeTxSync-r16 OPTIONAL, -- Need R

sl-ThresUE-Speed-r16 ENUMERATED {kmph60, kmph80, kmph100, kmph120,

kmph140, kmph160, kmph180, kmph200},

sl-ParametersAboveThres-r16 SL-PSSCH-TxParameters-r16,

sl-ParametersBelowThres-r16 SL-PSSCH-TxParameters-r16,

...,

[[

sl-ParametersAboveThres-v1650 SL-MinMaxMCS-List-r16 OPTIONAL, -- Need R

sl-ParametersBelowThres-v1650 SL-MinMaxMCS-List-r16 OPTIONAL -- Need R

]]

}

SL-PSSCH-TxParameters-r16 ::= SEQUENCE {

sl-MinMCS-PSSCH-r16 INTEGER (0..27),

sl-MaxMCS-PSSCH-r16 INTEGER (0..31),

sl-MinSubChannelNumPSSCH-r16 INTEGER (1..27),

sl-MaxSubchannelNumPSSCH-r16 INTEGER (1..27),

sl-MaxTxTransNumPSSCH-r16 INTEGER (1..32),

sl-MaxTxPower-r16 SL-TxPower-r16 OPTIONAL -- Cond CBR

}

-- TAG-SL-PSSCH-TXCONFIGLIST-STOP

-- ASN1STOP

| *SL-PSSCH-TxConfigList* field descriptions |
| --- |
| ***sl-MaxTxTransNumPSSCH***  Indicates the maximum transmission number (including new transmission and retransmission) for PSSCH. |
| ***sl-MaxTxPower***  This field indicates the maximum transmission power for transmission on PSSCH and PSCCH. |
| ***sl-MinMCS-PSSCH, sl-MaxMCS-PSSCH***  This field indicates the minimum and maximum MCS values used for transmissions on PSSCH. The UE shall ignore the minimum and maximum MCS values used for the associated MCS table(s) in *sl-ParametersAboveThres-r16* and *sl-ParametersBelowThres-r16* if *sl-ParametersAboveThres-v1650* and *sl-ParametersBelowThres-v1650*are present, respectively. |
| ***sl-MinSubChannelNumPSSCH, sl-MaxSubChannelNumPSSCH***  This field indicates the minimum and maximum number of sub-channels which may be used for transmissions on PSSCH. |
| ***sl-TypeTxSync***  This field indicates the synchronization reference type. For configurations by the eNB/gNB, only *gnbEnb* can be configured; and for pre-configuration or when this field is absent, the configuration is applicable for all synchronization reference types. |
| ***sl-ThresUE-Speed***  This field indicates a UE absolute speed threshold. |

|  |  |
| --- | --- |
| Conditional Presence | Explanation |
| *CBR* | The field is optionally present, Need R, when the IE *SL-PSSCH-TxParameters* is present in *SL-CBR-CommonTxConfigList,* *SL-UE-SelectedConfig,* *SIB12* or *SidelinkPreconfigNR*; otherwise the field is not present, need R. |

#### – *SL-QoS-FlowIdentity*

The IE *SL-QoS-FlowIdentity* is used to identify a sidelink QoS flow.

*SL-QoS-FlowIdentity* information element

-- ASN1START

-- TAG-SL-QOS-FLOWIDENTITY-START

SL-QoS-FlowIdentity-r16 ::= INTEGER (1..maxNrofSL-QFIs-r16)

-- TAG-SL-QOS-FLOWIDENTITY-STOP

-- ASN1STOP

#### – *SL-QoS-Profile*

The IE *SL-QoS-Profile* is used to give the QoS parameters for a sidelink QoS flow. Need codes or conditions specified for *SL-QoS-Profile* do not apply, in case *SL-QoS-Profile* is included in *SidelinkUEInformationNR*.

*SL-QoS-Profile* information element

-- ASN1START

-- TAG-SL-QOS-PROFILE-START

SL-QoS-Profile-r16 ::= SEQUENCE {

sl-PQI-r16 SL-PQI-r16 OPTIONAL, -- Need R

sl-GFBR-r16 INTEGER (0..4000000000) OPTIONAL, -- Need R

sl-MFBR-r16 INTEGER (0..4000000000) OPTIONAL, -- Need R

sl-Range-r16 INTEGER (1..1000) OPTIONAL, -- Need R

...

}

SL-PQI-r16 ::= CHOICE {

sl-StandardizedPQI-r16 INTEGER (0..255),

sl-Non-StandardizedPQI-r16 SEQUENCE {

sl-ResourceType-r16 ENUMERATED {gbr, non-GBR, delayCriticalGBR, spare1} OPTIONAL, -- Need R

sl-PriorityLevel-r16 INTEGER (1..8) OPTIONAL, -- Need R

sl-PacketDelayBudget-r16 INTEGER (0..1023) OPTIONAL, -- Need R

sl-PacketErrorRate-r16 INTEGER (0..9) OPTIONAL, -- Need R

sl-AveragingWindow-r16 INTEGER (0..4095) OPTIONAL, -- Need R

sl-MaxDataBurstVolume-r16 INTEGER (0..4095) OPTIONAL, -- Need R

...

}

}

-- TAG-SL-QOS-PROFILE-STOP

-- ASN1STOP

| *SL-QoS-Profile* field descriptions |
| --- |
| ***sl-GFBR***  Indicate the guaranteed bit rate for a GBR QoS flow. The unit is: Kbit/s |
| ***sl-MFBR***  Indicate the maximum bit rate for a GBR QoS flow. The unit is: Kbit/s |
| ***sl-PQI***  This field indicates either the PQI for standardized PQI or non-standardized QoS parameters. |
| ***sl-Range***  This field indicates the range parameter of the Qos flow, as defined in clause 5.4.1.1.1, TS 23.287 [55]. It is present only for groupcast. The unit is meter. |

| *SL-PQI* field descriptions |
| --- |
| ***sl-AveragingWindow***  Indicates the Averaging Window for a QoS flow, and applies to GBR QoS flows only. Unit: ms. The default value of the IE is 2000ms. |
| ***sl-MaxDataBurstVolume***  Indicates the Maximum Data Burst Volume for a QoS flow, and applies to delay critical GBR QoS flows only. Unit: byte. |
| ***sl-PacketDelayBudget***  Indicates the Packet Delay Budget for a QoS flow. Upper bound value for the delay that a packet may experience expressed in unit of 0.5ms. |
| ***sl-PacketErrorRate***  Indicates the Packet Error Rate for a QoS flow. The packet error rate is expressed as Scalar x 10-k where k is the Exponent. |
| ***sl-PriorityLevel***  Indicates the Priority Level for a QoS flow. Values ordered in decreasing order of priority, i.e. with 1 as the highest priority and 8 as the lowest priority. |
| ***sl-StandardizedPQI***  Indicate the PQI for standardized PQI. |

#### – *SL-QuantityConfig*

The IE *SL*-*QuantityConfig* specifies the layer 3 filtering coefficients for NR SL RSRP measurement for a destination.

*SL-QuantityConfig* information element

-- ASN1START

-- TAG-SL-QUANTITYCONFIG-START

SL-QuantityConfig-r16 ::= SEQUENCE {

sl-FilterCoefficientDMRS-r16 FilterCoefficient DEFAULT fc4,

...

}

-- TAG-SL-QuantityConfig-STOP

-- ASN1STOP

| *SL-QuantityConfig* field descriptions |
| --- |
| ***sl-FilterCoefficientDMRS***  DMRS based L3 filter configuration:  Specifies L3 filter configuration for sidelink RSRP measurement result from the L1 fiter(s), as defined in TS 38.215 [9]. |

#### – *SL-RadioBearerConfig*

The IE *SL-RadioBearerConfig* specifies the sidelink DRB configuration information for NR sidelink communication.

*SL-RadioBearerConfig* information element

-- ASN1START

-- TAG-SL-RADIOBEARERCONFIG-START

SL-RadioBearerConfig-r16 ::= SEQUENCE {

slrb-Uu-ConfigIndex-r16 SLRB-Uu-ConfigIndex-r16,

sl-SDAP-Config-r16 SL-SDAP-Config-r16 OPTIONAL, -- Cond SLRBSetup

sl-PDCP-Config-r16 SL-PDCP-Config-r16 OPTIONAL, -- Cond SLRBSetup

sl-TransRange-r16 ENUMERATED {m20, m50, m80, m100, m120, m150, m180, m200, m220, m250, m270, m300, m350, m370,

m400, m420, m450, m480, m500, m550, m600, m700, m1000, spare9, spare8, spare7, spare6,

spare5, spare4, spare3, spare2, spare1} OPTIONAL, -- Need R

...

}

-- TAG-SL-RADIOBEARERCONFIG-STOP

-- ASN1STOP

| *SL-RadioBearerConfig* field descriptions |
| --- |
| ***sl-PDCP-Config***  This field indicates the PDCP parameters for the sidelink DRB. |
| ***sl-SDAP-Config***  This field indicates how to map sidelink QoS flows to sidelink DRB. |
| ***slrb-Uu-ConfigIndex***  This field indicates the index of sidelink DRB configuration. |
| ***sl-TransRange***  This field indicates the transmission range of the sidelink DRB. The unit is meter. |

|  |  |
| --- | --- |
| Conditional Presence | Explanation |
| *SLRBSetup* | The field is mandatory present in case of sidelink DRB setup via the dedicated signalling and in case of sidelink DRB configuration via system information and pre-configuration; otherwise the field is optionally present, need M. |

– *SL-RelayUE-Config*

The IE *SL-RelayUE-Config* specifies the configuration information for NR sidelink U2N Relay UE.

***SL-RelayUE-Config* information element**

-- ASN1START

-- TAG-SL-RELAYUE-CONFIG-START

SL-RelayUE-Config-r17::= SEQUENCE {

threshHighRelay-r17 RSRP-Range OPTIONAL, -- Need R

threshLowRelay-r17 RSRP-Range OPTIONAL, -- Need R

hystMaxRelay-r17 Hysteresis OPTIONAL, -- Cond ThreshHighRelay

hystMinRelay-r17 Hysteresis OPTIONAL -- Cond ThreshLowRelay

}

-- TAG-SL-RELAYUE-CONFIG-STOP

-- ASN1STOP

| *SL-RelayUE-Config* field descriptions |
| --- |
| ***threshHighRelay***  Indicates the upper threshold of Uu RSRP for a UE that is in network coverage to evaluate AS layer conditions for U2N relay UE operation, |
| ***threshLowRelay***  Indicates the lower threshold of Uu RSRP for a UE that is in network coverage to evaluate AS layer conditions for U2N relay UE operation. |

|  |  |
| --- | --- |
| Conditional Presence | Explanation |
| *ThreshHighRelay* | This field is mandatory present if threshHighRelay is included. Otherwise, the field is absent, Need R. |
| *ThreshLowRelay* | This field is mandatory present if threshLowRelay is included. Otherwise, the field is absent, Need R. |

#### – *SL-RemoteUE-Config*

The IE *SL-RemoteUE-Config* specifies the configuration information for NR sidelink U2N Remote UE.

*SL-RemoteUE-Config* information element

-- ASN1START

-- TAG-SL-REMOTEUE-CONFIG-START

SL-RemoteUE-Config-r17::= SEQUENCE {

threshHighRemote-r17 RSRP-Range OPTIONAL, -- Need R

hystMaxRemote-r17 Hysteresis OPTIONAL, -- Cond ThreshHighRemote

sl-ReselectionConfig-r17 SL-ReselectionConfig-r17 OPTIONAL -- Need R

}

SL-ReselectionConfig-r17::= SEQUENCE {

sl-RSRP-Thresh-r17 SL-RSRP-Range-r16 OPTIONAL, -- Need R

sl-FilterCoefficientRSRP-r17 FilterCoefficient OPTIONAL, -- Need R

sl-HystMin-r17 Hysteresis OPTIONAL -- Cond SL-RSRP-Thresh

}

-- TAG-SL-REMOTEUE-CONFIG-STOP

-- ASN1STOP

| *SL-RemoteUE-Config* field descriptions |
| --- |
| ***sl-ReselectionConfig***  Includes the parameters used by the U2N remote UE when selecting/ reselecting a U2N relay UE. |
| ***thresHighRemote***  Indicates the threshold of Uu RSRP for a UE that is in network coverage to evaluate AS layer conditions for U2N remote UE operation. |

| *SL-ReselectionConfig* field descriptions |
| --- |
| ***sl-FilterCoefficientRSRP***  Specifies L3 filter coefficient for SL communication/ discovery RSRP measurement results from L1 filter. |
| ***sl-RSRP-Thresh***  Indicates the threshold of SL communication/ discovery RSRP for a U2N remote UE to perform relay UE selection/ reselection. |

|  |  |
| --- | --- |
| Conditional Presence | Explanation |
| *SL-RSRP-Thresh* | This field is mandatory present if *sl-RSRP-Thresh* is included. Otherwise, the field is absent, Need R. |
| *ThreshHighRemote* | This field is mandatory present if threshHighRemote is included. Otherwise, the field is absent, Need R. |

#### – *SL-ReportConfigList*

The IE *SL*-*ReportConfigList* concerns a list of SL measurement reporting configurations to add or modify for a destination.

*SL-ReportConfigList* information element

-- ASN1START

-- TAG-SL-REPORTCONFIGLIST-START

SL-ReportConfigList-r16 ::= SEQUENCE (SIZE (1..maxNrofSL-ReportConfigId-r16)) OF SL-ReportConfigInfo-r16

SL-ReportConfigInfo-r16 ::= SEQUENCE {

sl-ReportConfigId-r16 SL-ReportConfigId-r16,

sl-ReportConfig-r16 SL-ReportConfig-r16,

...

}

SL-ReportConfigId-r16 ::= INTEGER (1..maxNrofSL-ReportConfigId-r16)

SL-ReportConfig-r16 ::= SEQUENCE {

sl-ReportType-r16 CHOICE {

sl-Periodical-r16 SL-PeriodicalReportConfig-r16,

sl-EventTriggered-r16 SL-EventTriggerConfig-r16,

...

},

...

}

SL-PeriodicalReportConfig-r16 ::= SEQUENCE {

sl-ReportInterval-r16 ReportInterval,

sl-ReportAmount-r16 ENUMERATED {r1, r2, r4, r8, r16, r32, r64, infinity},

sl-ReportQuantity-r16 SL-MeasReportQuantity-r16,

sl-RS-Type-r16 SL-RS-Type-r16,

...

}

SL-EventTriggerConfig-r16 ::= SEQUENCE {

sl-EventId-r16 CHOICE {

eventS1-r16 SEQUENCE {

s1-Threshold-r16 SL-MeasTriggerQuantity-r16,

sl-ReportOnLeave-r16 BOOLEAN,

sl-Hysteresis-r16 Hysteresis,

sl-TimeToTrigger-r16 TimeToTrigger,

...

},

eventS2-r16 SEQUENCE {

s2-Threshold-r16 SL-MeasTriggerQuantity-r16,

sl-ReportOnLeave-r16 BOOLEAN,

sl-Hysteresis-r16 Hysteresis,

sl-TimeToTrigger-r16 TimeToTrigger,

...

},

...

},

sl-ReportInterval-r16 ReportInterval,

sl-ReportAmount-r16 ENUMERATED {r1, r2, r4, r8, r16, r32, r64, infinity},

sl-ReportQuantity-r16 SL-MeasReportQuantity-r16,

sl-RS-Type-r16 SL-RS-Type-r16,

...

}

SL-MeasReportQuantity-r16 ::= CHOICE {

sl-RSRP-r16 BOOLEAN,

...

}

SL-MeasTriggerQuantity-r16 ::= CHOICE {

sl-RSRP-r16 RSRP-Range,

...

}

SL-RS-Type-r16 ::= ENUMERATED {dmrs, spare3, spare2, spare1}

-- TAG-SL-REPORTCONFIGLIST-STOP

-- ASN1STOP

| *SL-ReportConfig* field descriptions |
| --- |
| ***sl-ReportType***  Type of the configured sidelink measurement report. |

| *SL-EventTriggerConfig* field descriptions |
| --- |
| ***sl-EventId***  Choice of sidelink measurement event triggered reporting criteria. |
| ***sl-ReportAmount***  Number of sidelink measurement reports applicable for *sl-EventTriggered* report type. |
| ***sl-ReportInterval***  Indicates the interval between periodical reports (i.e., when *sl-ReportAmount* exceeds 1) for *sl-EventTriggered* report type. |
| ***sl-ReportOnLeave***  indicates whether or not the UE shall initiate the sidelink measurement reporting procedure when the leaving condition is met for a frequency in *sl-FrequencyTriggeredList*, as specified in 5.8.10.4.1. |
| ***sl-ReportQuantity***  The sidelink measurement quantities to be included in the sidelink measurement report. |
| ***sl-TimeToTrigger***  Time during which specific criteria for the event needs to be met in order to trigger a sidelink measurement report. |
| ***sN-Threshold***  Threshold used for events S1 and S2 specified in clauses 5.8.10.4.2 and 5.8.10.4.3, respectively. | |

| *SL-PeriodicalReportConfig* field descriptions |
| --- |
| ***sl-ReportAmount***  Number of sidelink measurement reports applicable for *sl-Periodical* report type. |
| ***sl-ReportInterval***  Indicates the interval between periodical reports (i.e., when *sl-ReportAmount* exceeds 1) for *sl-Periodical* report type. |
| ***sl-ReportQuantity***  The sidelink measurement quantities to be included in the sidelink measurement report. |

#### – *SL-ResourcePool*

The IE *SL-ResourcePool* specifies the configuration information for NR sidelink communication resource pool.

*SL-ResourcePool* information element

-- ASN1START

-- TAG-SL-RESOURCEPOOL-START

SL-ResourcePool-r16 ::= SEQUENCE {

sl-PSCCH-Config-r16 SetupRelease { SL-PSCCH-Config-r16 } OPTIONAL, -- Need M

sl-PSSCH-Config-r16 SetupRelease { SL-PSSCH-Config-r16 } OPTIONAL, -- Need M

sl-PSFCH-Config-r16 SetupRelease { SL-PSFCH-Config-r16 } OPTIONAL, -- Need M

sl-SyncAllowed-r16 SL-SyncAllowed-r16 OPTIONAL, -- Need M

sl-SubchannelSize-r16 ENUMERATED {n10, n12, n15, n20, n25, n50, n75, n100} OPTIONAL, -- Need M

dummy INTEGER (10..160) OPTIONAL, -- Need M

sl-StartRB-Subchannel-r16 INTEGER (0..265) OPTIONAL, -- Need M

sl-NumSubchannel-r16 INTEGER (1..27) OPTIONAL, -- Need M

sl-Additional-MCS-Table-r16 ENUMERATED {qam256, qam64LowSE, qam256-qam64LowSE } OPTIONAL, -- Need M

sl-ThreshS-RSSI-CBR-r16 INTEGER (0..45) OPTIONAL, -- Need M

sl-TimeWindowSizeCBR-r16 ENUMERATED {ms100, slot100} OPTIONAL, -- Need M

sl-TimeWindowSizeCR-r16 ENUMERATED {ms1000, slot1000} OPTIONAL, -- Need M

sl-PTRS-Config-r16 SL-PTRS-Config-r16 OPTIONAL, -- Need M

sl-UE-SelectedConfigRP-r16 SL-UE-SelectedConfigRP-r16 OPTIONAL, -- Need M

sl-RxParametersNcell-r16 SEQUENCE {

sl-TDD-Configuration-r16 TDD-UL-DL-ConfigCommon OPTIONAL, -- Need M

sl-SyncConfigIndex-r16 INTEGER (0..15)

} OPTIONAL, -- Need M

sl-ZoneConfigMCR-List-r16 SEQUENCE (SIZE (16)) OF SL-ZoneConfigMCR-r16 OPTIONAL, -- Need M

sl-FilterCoefficient-r16 FilterCoefficient OPTIONAL, -- Need M

sl-RB-Number-r16 INTEGER (10..275) OPTIONAL, -- Need M

sl-PreemptionEnable-r16 ENUMERATED {enabled, pl1, pl2, pl3, pl4, pl5, pl6, pl7, pl8} OPTIONAL, -- Need R

sl-PriorityThreshold-UL-URLLC-r16 INTEGER (1..9) OPTIONAL, -- Need M

sl-PriorityThreshold-r16 INTEGER (1..9) OPTIONAL, -- Need M

sl-X-Overhead-r16 ENUMERATED {n0,n3, n6, n9} OPTIONAL, -- Need S

sl-PowerControl-r16 SL-PowerControl-r16 OPTIONAL, -- Need M

sl-TxPercentageList-r16 SL-TxPercentageList-r16 OPTIONAL, -- Need M

sl-MinMaxMCS-List-r16 SL-MinMaxMCS-List-r16 OPTIONAL, -- Need M

...,

[[

sl-TimeResource-r16 BIT STRING (SIZE (10..160)) OPTIONAL -- Need M

]],

[[

sl-PBPS-CPS-Config-r17 SetupRelease { SL-PBPS-CPS-Config-r17 } OPTIONAL, -- Need M

sl-InterUE-CoordinationConfig-r17 SetupRelease { SL-InterUE-CoordinationConfig-r17 } OPTIONAL -- Need M

]]

}

SL-ZoneConfigMCR-r16 ::= SEQUENCE {

sl-ZoneConfigMCR-Index-r16 INTEGER (0..15),

sl-TransRange-r16 ENUMERATED {m20, m50, m80, m100, m120, m150, m180, m200, m220, m250, m270, m300, m350,

m370, m400, m420, m450, m480, m500, m550, m600, m700, m1000, spare9, spare8,

spare7, spare6, spare5, spare4, spare3, spare2, spare1}

OPTIONAL, -- Need M

sl-ZoneConfig-r16 SL-ZoneConfig-r16 OPTIONAL, -- Need M

...

}

SL-SyncAllowed-r16 ::= SEQUENCE {

gnss-Sync-r16 ENUMERATED {true} OPTIONAL, -- Need R

gnbEnb-Sync-r16 ENUMERATED {true} OPTIONAL, -- Need R

ue-Sync-r16 ENUMERATED {true} OPTIONAL -- Need R

}

SL-PSCCH-Config-r16 ::= SEQUENCE {

sl-TimeResourcePSCCH-r16 ENUMERATED {n2, n3} OPTIONAL, -- Need M

sl-FreqResourcePSCCH-r16 ENUMERATED {n10,n12, n15, n20, n25} OPTIONAL, -- Need M

sl-DMRS-ScrambleID-r16 INTEGER (0..65535) OPTIONAL, -- Need M

sl-NumReservedBits-r16 INTEGER (2..4) OPTIONAL, -- Need M

...

}

SL-PSSCH-Config-r16 ::= SEQUENCE {

sl-PSSCH-DMRS-TimePatternList-r16 SEQUENCE (SIZE (1..3)) OF INTEGER (2..4) OPTIONAL, -- Need M

sl-BetaOffsets2ndSCI-r16 SEQUENCE (SIZE (4)) OF SL-BetaOffsets-r16 OPTIONAL, -- Need M

sl-Scaling-r16 ENUMERATED {f0p5, f0p65, f0p8, f1} OPTIONAL, -- Need M

...

}

SL-PSFCH-Config-r16 ::= SEQUENCE {

sl-PSFCH-Period-r16 ENUMERATED {sl0, sl1, sl2, sl4} OPTIONAL, -- Need M

sl-PSFCH-RB-Set-r16 BIT STRING (SIZE (10..275)) OPTIONAL, -- Need M

sl-NumMuxCS-Pair-r16 ENUMERATED {n1, n2, n3, n6} OPTIONAL, -- Need M

sl-MinTimeGapPSFCH-r16 ENUMERATED {sl2, sl3} OPTIONAL, -- Need M

sl-PSFCH-HopID-r16 INTEGER (0..1023) OPTIONAL, -- Need M

sl-PSFCH-CandidateResourceType-r16 ENUMERATED {startSubCH, allocSubCH} OPTIONAL, -- Need M

...

}

SL-PTRS-Config-r16 ::= SEQUENCE {

sl-PTRS-FreqDensity-r16 SEQUENCE (SIZE (2)) OF INTEGER (1..276) OPTIONAL, -- Need M

sl-PTRS-TimeDensity-r16 SEQUENCE (SIZE (3)) OF INTEGER (0..29) OPTIONAL, -- Need M

sl-PTRS-RE-Offset-r16 ENUMERATED {offset01, offset10, offset11} OPTIONAL, -- Need M

...

}

SL-UE-SelectedConfigRP-r16 ::= SEQUENCE {

sl-CBR-PriorityTxConfigList-r16 SL-CBR-PriorityTxConfigList-r16 OPTIONAL, -- Need M

sl-Thres-RSRP-List-r16 SL-Thres-RSRP-List-r16 OPTIONAL, -- Need M

sl-MultiReserveResource-r16 ENUMERATED {enabled} OPTIONAL, -- Need M

sl-MaxNumPerReserve-r16 ENUMERATED {n2, n3} OPTIONAL, -- Need M

sl-SensingWindow-r16 ENUMERATED {ms100, ms1100} OPTIONAL, -- Need M

sl-SelectionWindowList-r16 SL-SelectionWindowList-r16 OPTIONAL, -- Need M

sl-ResourceReservePeriodList-r16 SEQUENCE (SIZE (1..16)) OF SL-ResourceReservePeriod-r16 OPTIONAL, -- Need M

sl-RS-ForSensing-r16 ENUMERATED {pscch, pssch},

...,

[[

sl-CBR-PriorityTxConfigList-v1650 SL-CBR-PriorityTxConfigList-v1650 OPTIONAL -- Need M

]]

}

SL-ResourceReservePeriod-r16 ::= CHOICE {

sl-ResourceReservePeriod1-r16 ENUMERATED {ms0, ms100, ms200, ms300, ms400, ms500, ms600, ms700, ms800, ms900, ms1000},

sl-ResourceReservePeriod2-r16 INTEGER (1..99)

}

SL-SelectionWindowList-r16 ::= SEQUENCE (SIZE (8)) OF SL-SelectionWindowConfig-r16

SL-SelectionWindowConfig-r16 ::= SEQUENCE {

sl-Priority-r16 INTEGER (1..8),

sl-SelectionWindow-r16 ENUMERATED {n1, n5, n10, n20}

}

SL-TxPercentageList-r16 ::= SEQUENCE (SIZE (8)) OF SL-TxPercentageConfig-r16

SL-TxPercentageConfig-r16 ::= SEQUENCE {

sl-Priority-r16 INTEGER (1..8),

sl-TxPercentage-r16 ENUMERATED {p20, p35, p50}

}

SL-MinMaxMCS-List-r16 ::= SEQUENCE (SIZE (1..3)) OF SL-MinMaxMCS-Config-r16

SL-MinMaxMCS-Config-r16 ::= SEQUENCE {

sl-MCS-Table-r16 ENUMERATED {qam64, qam256, qam64LowSE},

sl-MinMCS-PSSCH-r16 INTEGER (0..27),

sl-MaxMCS-PSSCH-r16 INTEGER (0..31)

}

SL-BetaOffsets-r16 ::= INTEGER (0..31)

SL-PowerControl-r16 ::= SEQUENCE {

sl-MaxTransPower-r16 INTEGER (-30..33),

sl-Alpha-PSSCH-PSCCH-r16 ENUMERATED {alpha0, alpha04, alpha05, alpha06, alpha07, alpha08, alpha09, alpha1} OPTIONAL, -- Need M

dl-Alpha-PSSCH-PSCCH-r16 ENUMERATED {alpha0, alpha04, alpha05, alpha06, alpha07, alpha08, alpha09, alpha1} OPTIONAL, -- Need S

sl-P0-PSSCH-PSCCH-r16 INTEGER (-16..15) OPTIONAL, -- Need S

dl-P0-PSSCH-PSCCH-r16 INTEGER (-16..15) OPTIONAL, -- Need M

dl-Alpha-PSFCH-r16 ENUMERATED {alpha0, alpha04, alpha05, alpha06, alpha07, alpha08, alpha09, alpha1} OPTIONAL, -- Need S

dl-P0-PSFCH-r16 INTEGER (-16..15) OPTIONAL, -- Need M

...,

[[

dl-P0-PSSCH-PSCCH-r17 INTEGER (-202..24) OPTIONAL, -- Need M

sl-P0-PSSCH-PSCCH-r17 INTEGER (-202..24) OPTIONAL, -- Need S

dl-P0-PSFCH-r17 INTEGER (-202..24) OPTIONAL -- Need M

]]

}

-- TAG-SL-RESOURCEPOOL-STOP

-- ASN1STOP

| *SL-ZoneConfigMCR* field descriptions |
| --- |
| ***sl-TransRange***  Indicates the communication range requirement for the corresponding *sl-ZoneConfigMCR-Index*. |
| ***sl-ZoneConfig***  Indicates the zone configuration for the corresponding *sl-ZoneConfigMCR-Index*. |
| ***sl-ZoneConfigMCR-Index***  Indicates the codepoint of the communication range requirement field in SCI. |

|  |
| --- |
| *SL-ResourcePool* field descriptions |
| ***dummy***  This field is not used in the specification. If received it shall be ignored by the UE. |
| ***sl-Additional-MCS-Table***  Indicates the MCS table(s) additionally used in the resource pool. 64QAM table is (pre-)configured as default. Zero, one or two can be additionally (pre-)configured using the 256QAM and/or low-SE MCS tables. If two MCS tables are indicated, 256QAM MCS table is the 1st table and qam64lowSE MCS table is the 2nd table as specified in TS 38.214 [19], clause 8.1.3.1. |
| ***sl-FilterCoefficient***  This field indicates the filtering coefficient for long-term measurement and reference signal power derivation used for sidelink open-loop power control. |
| ***sl-InterUE-CoordinationConfig***  Indicates the configured sidelink inter-UE coordination parameters. |
| ***sl-NumSubchannel***  Indicates the number of subchannels in the corresponding resource pool, which consists of contiguous PRBs only. |
| ***sl-PBPS-CPS-Config***  Indicates the allowed resource allocation schemes of full sensing only, partial sensing only, random resource selection only, or any combination(s), and the related configuration for power saving resource allocation schemes. This field is absent for sl-TxPoolExceptional. |
| ***sl-PreemptionEnable***  Indicates whether pre-emption is disabled or enabled in a resource pool. If the field is present and the value is *pl1*, *pl2*, and so on (but not *enabled*), it means that pre-emption is enabled and a priority level p\_preemption is configured. If the field is present and the value is *enabled*, the pre-emption is enabled (but p\_preemption is not configured) and pre-emption is applicable to all levels. |
| ***sl-PriorityThreshold-UL-URLLC***  Indicates the threshold used to determine whether NR sidelink transmission is prioritized over uplink transmission of priority index 1 as specified in TS 38.213[13], clause 16.2.4.3, or whether PUCCH transmission carrying SL HARQ is prioritized over PUCCH transmission carrying UCI of priority index 1 if they overlap in time as specified in TS 38.213 [13], clause 9.2.5.0. |
| ***sl-PriorityThreshold***  Indicates the threshold used to determine whether NR sidelink transmission is prioritized over uplink transmission of priority index 0 as specified in TS 38.213[13], clause 16.2.4.3, or whether PUCCH transmission carrying SL HARQ is prioritized over PUCCH transmission carrying UCI of priority index 0 if they overlap in time as specified in TS 38.213 [13], clause 9.2.5.0. |
| ***sl-RB-Number***  Indicates the number of PRBs in the corresponding resource pool, which consists of contiguous PRBs only. The remaining RB cannot be used (See TS 38.214[19], clause 8). |
| ***sl-StartRB-Subchannel***  Indicates the lowest RB index of the subchannel with the lowest index in the resource pool with respect to the lowest RB index of a SL BWP. |
| ***sl-SubchannelSize***  Indicates the minimum granularity in frequency domain for the sensing for PSSCH resource selection in the unit of PRB. |
| ***sl-SyncAllowed***  Indicates the allowed synchronization reference(s) which is (are) allowed to use the configured resource pool. |
| ***sl-SyncConfigIndex***  Indicates the synchronisation configuration that is associated with a reception pool, by means of an index to the corresponding entry *SL-SyncConfigList* of in *SIB12* for NR sidelink communication. |
| ***sl-TDD-Configuration***  Indicates the TDD configuration associated with the reception pool of the cell indicated by *sl-SyncConfigIndex*. |
| ***sl-ThreshS-RSSI-CBR***  Indicates the S-RSSI threshold for determining the contribution of a sub-channel to the CBR measurement. Value 0 corresponds to -112 dBm, value 1 to -110 dBm, value n to (-112 + n\*2) dBm, and so on. |
| ***sl-TimeResource***  Indicates the bitmap of the resource pool, which is defined by repeating the bitmap with a periodicity during a SFN or DFN cycle. |
| ***sl-TimeWindowSizeCBR***  Indicates the time window size for CBR measurement. |
| ***sl-TimeWindowSizeCR***  Indicates the time window size for CR evaluation. |
| ***sl-TxPercentageList***  Indicates the portion of candidate single-slot PSSCH resources over the total resources. Value p20 corresponds to 20%, and so on. |
| ***sl-X-Overhead***  Accounts for overhead from CSI-RS, PT-RS. If the field is absent, the UE applies value *n0* (see TS 38.214 [19], clause 5.1.3.2). |

| *SL-SyncAllowed* field descriptions |
| --- |
| ***gnbEnb-Sync***  If configured, the (pre-) configured resources can be used if the UE is directly or indirectly synchronized to eNB or gNB (i.e., synchronized to a reference UE which is directly synchronized to eNB or gNB). |
| ***gnss-Sync***  If configured, the (pre-) configured resources can be used if the UE is directly or indirectly synchronized to GNSS (i.e., synchronized to a reference UE which is directly synchronized to GNSS). |
| ***ue-Sync***  If configured, the (pre-) configured resources can be used if the UE is synchronized to a reference UE which is not synchronized to eNB, gNB and GNSS directly or indirectly. |

| *SL-PSCCH-Config* field descriptions |
| --- |
| ***sl-FreqResourcePSCCH***  Indicates the number of PRBs for PSCCH in a resource pool where it is not greater than the number PRBs of the subchannel. |
| ***sl-DMRS-ScrambleID***  Indicates the initialization value for PSCCH DMRS scrambling. |
| ***sl-NumReservedBits***  Indicates the number of reserved bits in first stage SCI. |
| ***sl-TimeResourcePSCCH***  Indicates the number of symbols of PSCCH in a resource pool. |

| *SL-PSSCH-Config* field descriptions |
| --- |
| ***sl-BetaOffsets2ndSCI***  Indicates candidates of beta-offset values to determine the number of coded modulation symbols for second stage SCI. The value indicates the index of Table 9.3-2 of TS 38.213 [13]. |
| ***sl-PSSCH-DMRS-TimePatternList***  Indicates the set of PSSCH DMRS time domain patterns in terms of PSSCH DMRS symbols in a slot that can be used in the resource pool. |
| ***sl-Scaling***  Indicates a scaling factor to limit the number of resource elements assigned to the second stage SCI on PSSCH. Value *f0p5* corresponds to 0.5, value *f0p65* corresponds to 0.65, and so on. |

| *SL-PSFCH-Config* field descriptions |
| --- |
| ***sl-MinTimeGapPSFCH***  The minimum time gap between PSFCH and the associated PSSCH in the unit of slots. |
| ***sl-NumMuxCS-Pair***  Indicates the number of cyclic shift pairs used for a PSFCH transmission that can be multiplexed in a PRB. |
| ***sl-PSFCH-CandidateResourceType***  Indicates the number of PSFCH resources available for multiplexing HARQ-ACK information in a PSFCH transmission (see TS 38.213 [13], clause 16.3). |
| ***sl-PSFCH-HopID***  Scrambling ID for sequence hopping of the PSFCH used in the resource pool. |
| ***sl-PSFCH-Period***  Indicates the period of PSFCH resource in the unit of slots within this resource pool. If set to *sl0*, no resource for PSFCH, and HARQ feedback for all transmissions in the resource pool is disabled. |
| ***sl-PSFCH-RB-Set***  Indicates the set of PRBs that are actually used for PSFCH transmission and reception. The leftmost bit of the bitmap refers to the lowest RB index in the resource pool, and so on. Value 0 in the bitmap indicates that the corresponding PRB is not used for PSFCH transmission and reception while value 1 indicates that the corresponding PRB is used for PSFCH transmission and reception (see TS 38.213 [13]). |

| *SL-PTRS-Config* field descriptions |
| --- |
| ***sl-PTRS-FreqDensity***  Presence and frequency density of SL PT-RS as a function of scheduled BW. If the field is not configured, the UE uses K\_PT-RS = 2 |
| ***sl-PTRS-TimeDensity***  Presence and time density of SL PT-RS as a function of MCS. If the field is not configured, the UE uses L\_PT-RS = 1 |
| ***sl-PTRS-RE-Offset***  Indicates the subcarrier offset for SL PT-RS . If the field is not configured, the UE applies the value *offset00* (see TS 38.211 [16], clause 8.4.1.2.2). |

| *SL-UE-SelectedConfigRP* field descriptions |
| --- |
| ***sl-CBR-PriorityTxConfigList***  Indicates the mapping between PSSCH transmission parameter (such as MCS, PRB number, retransmission number, CR limit) sets by using the indexes of the configurations in *sl-CBR-PSSCH-TxConfigList*, CBR ranges by using the indexes to the entry of the CBR range configurations in *sl-CBR-RangeConfigList*, and priority ranges. It also indicates the default PSSCH transmission parameters to be used when CBR measurement results are not available, and MCS range for the MCS tables used in the resource pool. The field *sl-CBR-PriorityTxConfigList-v1650* is present only when *sl-CBR-PriorityTxConfigList-r16* is configured. |
| ***sl-MaxNumPerReserve***  Indicates the maximum number of reserved PSCCH/PSSCH resources that can be indicated by an SCI. |
| ***sl-MultiReserveResource***  Indicates if it is allowed to reserve a sidelink resource for an initial transmission of a TB by an SCI associated with a different TB, based on sensing and resource selection procedure. |
| ***sl-ResourceReservePeriodList***  Set of possible resource reservation period allowed in the resource pool in the unit of ms. Up to 16 values can be configured per resource pool. The value *ms0* is always configured. |
| ***sl-RS-ForSensing***  Indicates whether DMRS of PSCCH or PSSCH is used for L1 RSRP measurement in the sensing operation. |
| ***sl-SensingWindow***  Parameter that indicates the start of the sensing window. |
| ***sl-SelectionWindowList***  Parameter that determines the end of the selection window in the resource selection for a TB with respect to priority indicated in SCI. Value n1 corresponds to 1\*2µ, value n5 corresponds to 5\*2µ, and so on, where µ = 0,1,2,3 refers to SCS 15,30,60,120 kHz respectively. |
| ***sl-Thres-RSRP-List***  Indicates a list of 64 thresholds, and the threshold should be selected based on the priority in the decoded SCI and the priority in the SCI to be transmitted. A resource is excluded if it is indicated or reserved by a decoded SCI and PSSCH/PSCCH RSRP in the associated data resource is above a threshold. |

| *SL-PowerControl* field descriptions |
| --- |
| ***sl-MaxTransPower***  Indicates the maximum value of the UE's sidelink transmission power on this resource pool. The unit is dBm. |
| ***sl-Alpha-PSSCH-PSCCH***  Indicates alpha value for sidelink pathloss based power control for PSCCH/PSSCH when *sl-P0-PSSCH-PSCCH* is configured. When the field is absent the UE applies the value 1. |
| ***sl-P0-PSSCH-PSCCH***  Indicates P0 value for sidelink pathloss based power control for PSCCH/PSSCH. If not configured, sidelink pathloss based power control is disabled for PSCCH/PSSCH. |
| ***dl-Alpha-PSSCH-PSCCH***  Indicates alpha value for downlink pathloss based power control for PSCCH/PSSCH when *dl-P0-PSSCH-PSCCH* is configured. When the field is absent the UE applies the value 1. |
| ***dl-P0-PSSCH-PSCCH***  Indicates P0 value for downlink pathloss based power control for PSCCH/PSSCH. If not configured, downlink pathloss based power control is disabled for PSCCH/PSSCH. |
| ***dl-Alpha-PSFCH***  Indicates alpha value for downlink pathloss based power control for PSFCH when *dl-P0-PSFCH* is configured. When the field is absent the UE applies the value 1. |
| ***dl-P0-PSFCH***  Indicates P0 value for downlink pathloss based power control for PSFCH. If not configured, downlink pathloss based power control is disabled for PSFCH. |

| *SL-MinMaxMCS-Config* field descriptions |
| --- |
| ***sl-MaxMCS-PSSCH***  Indicates the maximum MCS value when using the associated MCS table. If no MCS is configured, UE autonomously selects MCS from the full range of values. |
| ***sl-MinMCS-PSSCH***  Indicates the minimum MCS value when using the associated MCS table. If no MCS is configured, UE autonomously selects MCS from the full range of values. |

#### – *SL-RLC-BearerConfig*

The IE *SL-RLC-BearerConfig* specifies the SL RLC bearer configuration information for NR sidelink communication.

*SL-RLC-BearerConfig* information element

-- ASN1START

-- TAG-SL-RLC-BEARERCONFIG-START

SL-RLC-BearerConfig-r16 ::= SEQUENCE {

sl-RLC-BearerConfigIndex-r16 SL-RLC-BearerConfigIndex-r16,

sl-ServedRadioBearer-r16 SLRB-Uu-ConfigIndex-r16 OPTIONAL, -- Cond LCH-SetupOnly

sl-RLC-Config-r16 SL-RLC-Config-r16 OPTIONAL, -- Cond LCH-Setup

sl-MAC-LogicalChannelConfig-r16 SL-LogicalChannelConfig-r16 OPTIONAL, -- Cond LCH-Setup

...

}

-- TAG-SL-RLC-BEARERCONFIG-STOP

-- ASN1STOP

| *SL-RLC-BearerConfig* field descriptions |
| --- |
| ***sl-MAC-LogicalChannelConfig***  The field is used to configure MAC SL logical channel parameters. |
| ***sl-RLC-BearerConfigIndex***  The index of the RLC bearer configuration. |
| ***sl-RLC-Config***  Determines the RLC mode (UM, AM) and provides corresponding parameters. |
| ***sl-ServedRadioBearer***  Associates the sidelink RLC Bearer with a sidelink DRB. It indicates the index of SL radio bearer configuration, which is corresponding to the RLC bearer configuration. |

|  |  |
| --- | --- |
| Conditional Presence | Explanation |
| *LCH-Setup* | The field is mandatory present upon creation of a new sidelink logical channel via the dedicated signalling and in case of sidelink DRB configuration via system information and pre-configuration; otherwise the field is optionally present, Need M. |
| *LCH-SetupOnly* | This field is mandatory present upon creation of a new sidelink logical channel via the dedicated signalling and in case of sidelink DRB configuration via system information and pre-configuration. Otherwise, it is absent, Need M. |

#### – *SL-RLC-BearerConfigIndex*

The IE *SL-RLC-BearerConfigIndex* is used to identify a SL RLC bearer configuration.

*SL-RLC-BearerConfigIndex* information element

-- ASN1START

-- TAG-SL-RLC-BEARERCONFIGINDEX-START

SL-RLC-BearerConfigIndex-r16 ::= INTEGER (1..maxSL-LCID-r16)

-- TAG-RLC-BEARERCONFIGINDEX-STOP

-- ASN1STOP

#### – *SL-RLC-ChannelConfig*

The IE *SL-RLC-ChannelConfig* specifies the configuration information for PC5 Relay RLC channel between L2 U2N Relay UE and L2 U2N Remote UE.

*SL-RLC-ChannelConfig* information element

-- ASN1START

-- TAG-SL-RLC-RLC-CHANNEL-CONFIG-START

SL-RLC-ChannelConfig-r17 ::= SEQUENCE {

sl-RLC-ChannelID-r17 SL-RLC-ChannelID-r17,

sl-RLC-Config-r17 SL-RLC-Config-r16 OPTIONAL, -- Need M

sl-MAC-LogicalChannelConfig-r17 SL-LogicalChannelConfig-r16 OPTIONAL, -- Need M

sl-PacketDelayBudget-r17 INTEGER (0..1023) OPTIONAL, -- Need M

...}

-- TAG-SL-RLC-CHANNEL-CONFIG-STOP

-- ASN1STOP

|  |
| --- |
| *SL-RLC-ChannelConfig* field descriptions |
| ***sl-MAC-LogicalChannelConfig***  The field is used to configure MAC SL logical channel parameters. |
| ***sl-RLC-ChannelID***  Indicates the PC5 Relay RLC channel in the link between L2 U2N Relay UE and L2 U2N Remote UE. |
| ***sl-RLC-Config***  Determines the RLC mode (UM, AM) and provides corresponding parameters. |
| ***sl-PacketDelayBudget***  Indicates the Packet Delay Budget for a PC5 Relay RLC channel. Upper bound value for the delay that a packet may experience expressed in unit of 0.5ms. |

#### – *SL-RLC-ChannelID*

The IE *SL-RLC-ChannelID* is used to identify a PC5 Relay RLC channel in the link between L2 U2N Relay UE and L2 U2N Remote UE.

*SL-RLC-ChannelID* information element

-- ASN1START

-- TAG-SL-RLC-CHANNELID-START

SL-RLC-ChannelID-r17 ::= INTEGER (1..maxSL-LCID-r16)

-- TAG-SL-RLC-CHANNELID-STOP

-- ASN1STOP

#### – *SL-RLC-Config*

The IE *SL-RLC-Config* is used to specify the RLC configuration of sidelink DRB. RLC AM configuration is only applicable to the unicast NR sidelink communication.

*SL-RLC-Config* information element

-- ASN1START

-- TAG-SL-RLC-CONFIG-START

SL-RLC-Config-r16 ::= CHOICE {

sl-AM-RLC-r16 SEQUENCE {

sl-SN-FieldLengthAM-r16 SN-FieldLengthAM OPTIONAL, -- Cond SLRBSetup

sl-T-PollRetransmit-r16 T-PollRetransmit,

sl-PollPDU-r16 PollPDU,

sl-PollByte-r16 PollByte,

sl-MaxRetxThreshold-r16 ENUMERATED { t1, t2, t3, t4, t6, t8, t16, t32 },

...

},

sl-UM-RLC-r16 SEQUENCE {

sl-SN-FieldLengthUM-r16 SN-FieldLengthUM OPTIONAL, -- Cond SLRBSetup

...

},

...

}

-- TAG-SL-RLC-CONFIG-STOP

-- ASN1STOP

| *SL-RLC-Config* field descriptions |
| --- |
| ***sl-MaxRetxThreshold***  Parameter value of *maxRetxThreshold* for RLC AM for NR sidelink communications, see TS 38.322 [4]. Value *t1* corresponds to 1 retransmission, value *t2* corresponds to 2 retransmissions and so on. |
| ***sl-PollByte***  Parameter value of *pollByte* for RLC AM for NR sidelink communications, see TS 38.322 [4]. Value *kB25* corresponds to 25 kBytes, value *kB50* corresponds to 50 kBytes and so on. *infinity* corresponds to an infinite amount of kBytes. |
| ***sl-PollPDU***  Parameter value of *pollPDU* for RLC AM for NR sidelink communications, seeTS 38.322 [4]. Value *p4* corresponds to 4 PDUs, value *p8* corresponds to 8 PDUs and so on. *infinity* corresponds to an infinite number of PDUs. |
| ***sl-SN-FieldLength***  This field indicates the RLC SN field size for NR sidelink communication, see TS 38.322 [4]. For groupcast and broadcast, only value *size6* (6 bits) is configured for the field *sl-SN-FieldLengthUM*. |
| ***sl-T-PollRetransmit***  Timer value of *t-PollRetransmit* for RLC AM for NR sidelink communications, see TS 38.322 [4], in milliseconds. Value *ms5* means 5 ms, value *ms10* means 10 ms and so on. |

|  |  |
| --- | --- |
| Conditional Presence | Explanation |
| *SLRBSetup* | The field is mandatory present in case of sidelink DRB setup via the dedicated signalling and in case of sidelink DRB configuration via system information and pre-configuration; otherwise the field is optionally present, need M. |

#### – *SL-ScheduledConfig*

The IE *SL-ScheduledConfig* specifies sidelink communication configurations used for network scheduled NR sidelink communication.

*SL-ScheduledConfig* information element

-- ASN1START

-- TAG-SL-SCHEDULEDCONFIG-START

SL-ScheduledConfig-r16 ::= SEQUENCE {

sl-RNTI-r16 RNTI-Value,

mac-MainConfigSL-r16 MAC-MainConfigSL-r16 OPTIONAL, -- Need M

sl-CS-RNTI-r16 RNTI-Value OPTIONAL, -- Need M

sl-PSFCH-ToPUCCH-r16 SEQUENCE (SIZE (1..8)) OF INTEGER (0..15) OPTIONAL, -- Need M

sl-ConfiguredGrantConfigList-r16 SL-ConfiguredGrantConfigList-r16 OPTIONAL, -- Need M

...,

[[

sl-DCI-ToSL-Trans-r16 SEQUENCE (SIZE (1..8)) OF INTEGER (1..32) OPTIONAL -- Need M

]]

}

MAC-MainConfigSL-r16 ::= SEQUENCE {

sl-BSR-Config-r16 BSR-Config OPTIONAL, -- Need M

ul-PrioritizationThres-r16 INTEGER (1..16) OPTIONAL, -- Need M

sl-PrioritizationThres-r16 INTEGER (1..8) OPTIONAL, -- Need M

...

}

SL-ConfiguredGrantConfigList-r16 ::= SEQUENCE {

sl-ConfiguredGrantConfigToReleaseList-r16 SEQUENCE (SIZE (1..maxNrofCG-SL-r16)) OF SL-ConfigIndexCG-r16 OPTIONAL, -- Need N

sl-ConfiguredGrantConfigToAddModList-r16 SEQUENCE (SIZE (1..maxNrofCG-SL-r16)) OF SL-ConfiguredGrantConfig-r16 OPTIONAL -- Need N

}

-- TAG-SL-SCHEDULEDCONFIG-STOP

-- ASN1STOP

| *SL-ScheduledConfig* field descriptions |
| --- |
| ***sl-CS-RNTI***  Indicate the RNTI used to scramble CRC of DCI format 3\_0, see TS 38.321 [3]. |
| ***sl-DCI-ToSL-Trans***  Indicate the time gap between DCI reception and the first sidelink transmission scheduled by the DCI (see TS 38.214 [19], clause 8.1.2.1). Value 1 included in this field corresponds to 1 slot, value 2 corresponds to 2 slots and so on, based on the numerology of sidelink BWP. |
| ***sl-PSFCH-ToPUCCH***  For dynamic grant and configured grant type 2, this field configures the values of the PSFCH to PUCCH gap. The field PSFCH-to-HARQ\_feedback timing indicator in DCI format 3\_0 selects one of the configured values of the PSFCH to PUCCH gap. |
| ***sl-RNTI***  Indicate the C-RNTI used for monitoring the network scheduling to transmit NR sidelink communication (i.e. the mode 1). |

| *MAC-MainConfigSL* field descriptions |
| --- |
| ***sl-BSR-Config***  This field is to configure the sidelink buffer status report. |
| ***sl-PrioritizationThres***  Indicates the SL priority threshold, which is used to determine whether SL TX is prioritized over UL TX, as specified in TS 38.321 [3]. Network does not configure the *sl-PrioritizationThres* and the *ul-PrioritizationThres* to the UE separately. |
| ***ul-PrioritizationThres***  Indicates the UL priority threshold, which is used to determine whether SL TX is prioritized over UL TX, as specified in TS 38.321 [3]. Network does not configure the *sl-PrioritizationThres* and the *ul-PrioritizationThres* to the UE separately. |

#### – *SL-SDAP-Config*

The IE *SL-SDAP-Config* is used to set the configurable SDAP parameters for a Sidelink DRB.

*SL-SDAP-Config* information element

-- ASN1START

-- TAG-SL-SDAP-CONFIG-START

SL-SDAP-Config-r16 ::= SEQUENCE {

sl-SDAP-Header-r16 ENUMERATED {present, absent},

sl-DefaultRB-r16 BOOLEAN,

sl-MappedQoS-Flows-r16 CHOICE {

sl-MappedQoS-FlowsList-r16 SEQUENCE (SIZE (1..maxNrofSL-QFIs-r16)) OF SL-QoS-Profile-r16,

sl-MappedQoS-FlowsListDedicated-r16 SL-MappedQoS-FlowsListDedicated-r16

} OPTIONAL, -- Need M

sl-CastType-r16 ENUMERATED {broadcast, groupcast, unicast, spare1} OPTIONAL, -- Need M

...

}

SL-MappedQoS-FlowsListDedicated-r16 ::= SEQUENCE {

sl-MappedQoS-FlowsToAddList-r16 SEQUENCE (SIZE (1..maxNrofSL-QFIs-r16)) OF SL-QoS-FlowIdentity-r16 OPTIONAL, -- Need N

sl-MappedQoS-FlowsToReleaseList-r16 SEQUENCE (SIZE (1..maxNrofSL-QFIs-r16)) OF SL-QoS-FlowIdentity-r16 OPTIONAL -- Need N

}

-- TAG-SL-SDAP-CONFIG-STOP

-- ASN1STOP

|  |
| --- |
| *SL-SDAP-Config* field descriptions |
| ***sl-DefaultRB***  Indicates whether or not this is the default sidelink DRB for this NR sidelink communication transmission destination. Among all configured instances of *SL-SDAP-Config* for this destination, this field shall be set to *true* in at most one instance of *SL-SDAP-Config* and to *false* in all other instances. |
| ***sl-MappedQoS-Flows***  Indicates QoS flows to be mapped to the sidelink DRB. If the field is included in dedicated signalling, it is set to *sl-MappedQoS-FlowsListDedicated*; otherwise, it is set to *sl-MappedQoS-FlowsList*. |
| ***sl-MappedQoS-FlowsList***  Indicates the list of QoS profiles of the NR sidelink communication transmission destination mapped to this sidelink DRB. |
| ***sl-MappedQoS-FlowsToAddList***  Indicates the list of SL QoS flows ID of the NR sidelink communication transmission destination to be additionally mapped to this sidelink DRB. |
| ***sl-MappedQoS-FlowsToReleaseList***  Indicates the list of SL QoS flows ID of the NR sidelink communication transmission destination to be released from existing QoS flow to SLRB mapping of this sidelink DRB. |
| ***sl-SDAP-Header***  Indicates whether or not a SDAP header is present on this sidelink DRB. The field cannot be changed after a sidelink DRB is established. This field is set to present if the field *sl-DefaultRB* is set to *true*. |

#### – *SL-ServingCellInfo*

The IE *SL-ServingCellInfo* is used to indicate L2 U2N Remote UE's serving cell information.

*SL-ServingCellInfo* information element

-- ASN1START

-- TAG-SL-SERVINGCELLINFO-START

SL-ServingCellInfo-r17 ::= SEQUENCE {

sl-PhysCellId-r17 PhysCellId,

sl-CarrierFreqNR-r17 ARFCN-ValueNR

}

-- TAG-SL-SERVINGCELLINFO-STOP

-- ASN1STOP

| *SL-ServingCellInfo* field descriptions |
| --- |
| ***sl-CarrierFreqNR***  Indicates the DL frequency of the cell indicated by *sl-PhysCellId*. |
| ***sl-PhysCellId***  Indicates the PCI of the PCell. |

#### – *SL-SourceIdentity*

The IE *SL-SourceIdentity* is used to identify a source of a NR sidelink communication.

***SL-SourceIdentity* information element**

-- ASN1START

-- TAG-SL-SOURCEIDENTITY-START

SL-SourceIdentity-r17 ::= BIT STRING (SIZE (24))

-- TAG-SL-SOURCEIDENTITY-STOP

-- ASN1STOP

#### – *SL-SRAP-Config*

The IE SL-*SRAP-Config* is used to set the configurable SRAP parameters used by L2 U2N Relay UE and L2 U2N Remote UE as specified in TS 38.351 [66].

***SL-SRAP-Config* information element**

-- ASN1START

-- TAG-SL-SRAP-CONFIG-START

SL-SRAP-Config-r17 ::= SEQUENCE {

sl-LocalIdentity-r17 INTEGER (0..255) OPTIONAL, -- Need M

sl-MappingToAddModList-r17 SEQUENCE (SIZE (1..maxLC-ID)) OF SL-MappingToAddMod-r17 OPTIONAL, -- Need N

sl-MappingToReleaseList-r17 SEQUENCE (SIZE (1..maxLC-ID)) OF SL-RemoteUE-RB-Identity-r17 OPTIONAL, -- Need N

...

}

SL-MappingToAddMod-r17 ::= SEQUENCE {

sl-RemoteUE-RB-Identity-r17 SL-RemoteUE-RB-Identity-r17,

sl-EgressRLC-ChannelUu-r17 Uu-RelayRLC-ChannelID-r17 OPTIONAL, -- Cond L2RelayUE

sl-EgressRLC-ChannelPC5-r17 SL-RLC-ChannelID-r17 OPTIONAL, -- Need N

...

}

SL-RemoteUE-RB-Identity-r17 ::= CHOICE {

srb-Identity-r17 INTEGER (0..3),

drb-Identity-r17 DRB-Identity,

...

}

-- TAG-SL-SRAP-CONFIG-STOP

-- ASN1STOP

|  |
| --- |
| *SL-SRAP-Config* field descriptions |
| ***sl-LocalIdentity***  Indicates the local UE ID of the L2 U2N Remote UE used in SRAP as specified in TS 38.351 [66]. |
| ***sl-MappingToAddModList***  Indicates the list of mapping between the bearer identity of the L2 U2N Remote UE and the egress RLC channel as specified in TS 38.351 [66]. |
| ***sl-MappingToReleaseList***  Indicates the list of mapping to be released. |
| ***sl-RemoteUE-RB-Identity***  Identity of the end-to-end Uu bearer identity of the L2 U2N Remote UE. |
| ***sl-EgressRLC-ChannelUu***  Indicates the egress RLC channel on Uu Hop. |
| ***sl-EgressRLC-ChannelPC5***  Indicates the egress RLC channel on PC5 Hop. |

|  |  |
| --- | --- |
| Conditional Presence | Explanation |
| *L2RelayUE* | For L2 U2N Relay UE, the field is optionally present, Need M. Otherwise, it is absent. |

#### – *SL-SyncConfig*

The IE *SL-SyncConfig* specifies the configuration information concerning reception of synchronisation signals from neighbouring cells as well as concerning the transmission of synchronisation signals for sidelink communication.

*SL-SyncConfig* information element

-- ASN1START

-- TAG-SL-SYNCCONFIG-START

SL-SyncConfigList-r16 ::= SEQUENCE (SIZE (1..maxSL-SyncConfig-r16)) OF SL-SyncConfig-r16

SL-SyncConfig-r16 ::= SEQUENCE {

sl-SyncRefMinHyst-r16 ENUMERATED {dB0, dB3, dB6, dB9, dB12} OPTIONAL, -- Need R

sl-SyncRefDiffHyst-r16 ENUMERATED {dB0, dB3, dB6, dB9, dB12, dBinf} OPTIONAL, -- Need R

sl-filterCoefficient-r16 FilterCoefficient OPTIONAL, -- Need R

sl-SSB-TimeAllocation1-r16 SL-SSB-TimeAllocation-r16 OPTIONAL, -- Need R

sl-SSB-TimeAllocation2-r16 SL-SSB-TimeAllocation-r16 OPTIONAL, -- Need R

sl-SSB-TimeAllocation3-r16 SL-SSB-TimeAllocation-r16 OPTIONAL, -- Need R

sl-SSID-r16 INTEGER (0..671) OPTIONAL, -- Need R

txParameters-r16 SEQUENCE {

syncTxThreshIC-r16 SL-RSRP-Range-r16 OPTIONAL, -- Need R

syncTxThreshOoC-r16 SL-RSRP-Range-r16 OPTIONAL, -- Need R

syncInfoReserved-r16 BIT STRING (SIZE (2)) OPTIONAL -- Need R

},

gnss-Sync-r16 ENUMERATED {true} OPTIONAL, -- Need R

...

}

SL-RSRP-Range-r16 ::= INTEGER (0..13)

SL-SSB-TimeAllocation-r16 ::= SEQUENCE {

sl-NumSSB-WithinPeriod-r16 ENUMERATED {n1, n2, n4, n8, n16, n32, n64} OPTIONAL, -- Need R

sl-TimeOffsetSSB-r16 INTEGER (0..1279) OPTIONAL, -- Need R

sl-TimeInterval-r16 INTEGER (0..639) OPTIONAL -- Need R

}

-- TAG-SL-SYNCCONFIG-STOP

-- ASN1STOP

|  |
| --- |
| *SL-SyncConfig* field descriptions |
| ***gnss-Sync***  If configured, the synchronization configuration is used for SLSS transmission/reception when the UE is synchronized to GNSS. If not configured, the synchronization configuration is used for SLSS transmission/reception when the UE is synchronized to eNB/gNB. |
| ***sl-SyncRefMinHyst***  Hysteresis when evaluating a SyncRef UE using absolute comparison. |
| ***sl-SyncRefDiffHyst***  Hysteresis when evaluating a SyncRef UE using relative comparison. |
| ***sl-NumSSB-WithinPeriod***  Indicates the number of sidelink SSB transmissions within one sidelink SSB period. The applicable values are related to the subcarrier spacing and frequency as follows:  FR1, SCS = 15 kHz: 1  FR1, SCS = 30 kHz: 1, 2  FR1, SCS = 60 kHz: 1, 2, 4  FR2, SCS = 60 kHz: 1, 2, 4, 8, 16, 32  FR2, SCS = 120 kHz: 1, 2, 4, 8, 16, 32, 64 |
| ***sl-TimeOffsetSSB***  Indicates the slot offset from the start of sidelink SSB period to the first sidelink SSB. |
| ***sl-TimeInterval***  Indicates the slot interval between neighboring sidelink SSBs. This value is applicable when there are more than one sidelink SSBs within one sidelink SSB period. |
| ***sl-SSID***  Indicates the ID of sidelink synchronization signal associated with different synchronization priorities. |
| ***syncInfoReserved***  Reserved for future use. |
| ***syncTxThreshIC, syncTxThreshOoC***  Indicates the thresholds used while in coverage and out of coverage, respectively. Value 0 corresponds to -infinity, value 1 to -115 dBm, value 2 to -110 dBm, and so on (i.e. in steps of 5 dBm) until value 12, which corresponds to -60 dBm, while value 13 corresponds to +infinity. |

#### – *SL-Thres-RSRP-List*

IE *SL-Thres-RSRP-List* indicates a threshold used for sensing based UE autonomous resource selection (see TS 38.215 [9]). A resource is excluded if it is indicated or reserved by a decoded SCI and PSSCH/PSCCH RSRP in the associated data resource is above the threshold defined by IE *SL-Thres-RSRP-List*. Value 0 corresponds to minus infinity dBm, value 1 corresponds to -128dBm, value 2 corresponds to -126dBm, value n corresponds to (-128 + (n-1)\*2) dBm and so on, value 66 corresponds to infinity dBm.

*SL-Thres-RSRP-List* information element

-- ASN1START

-- TAG-SL-THRES-RSRP-LIST-START

SL-Thres-RSRP-List-r16 ::= SEQUENCE (SIZE (64)) OF SL-Thres-RSRP-r16

SL-Thres-RSRP-r16 ::= INTEGER (0..66)

-- TAG-SL-THRES-RSRP-LIST-STOP

-- ASN1STOP

#### – *SL-TxPower*

The IE *SL-TxPower* is used to limit the UE's sidelink transmission power on a carrier frequency. The unit is dBm. Value minusinfinity corresponds to –infinity.

*SL-TxPower* information element

-- ASN1START

-- TAG-SL-TXPOWER-START

SL-TxPower-r16 ::= CHOICE{

minusinfinity-r16 NULL,

txPower-r16 INTEGER (-30..33)

}

-- TAG-SL-TXPOWER-STOP

-- ASN1STOP

#### – *SL-TypeTxSync*

The IE *SL-TypeTxSync* indicates the synchronization reference type.

*SL-TypeTxSync* information element

-- ASN1START

-- TAG-SL-TYPETXSYNC-START

SL-TypeTxSync-r16 ::= ENUMERATED {gnss, gnbEnb, ue}

-- TAG-SL-TYPETXSYNC-STOP

-- ASN1STOP

#### – *SL-UE-SelectedConfig*

IE *SL-UE-SelectedConfig* specifies sidelink communication configurations used for UE autonomous resource selection.

*SL-UE-SelectedConfig* information element

-- ASN1START

-- TAG-SL-UE-SELECTEDCONFIG-START

SL-UE-SelectedConfig-r16 ::= SEQUENCE {

sl-PSSCH-TxConfigList-r16 SL-PSSCH-TxConfigList-r16 OPTIONAL, -- Need R

sl-ProbResourceKeep-r16 ENUMERATED {v0, v0dot2, v0dot4, v0dot6, v0dot8} OPTIONAL, -- Need R

sl-ReselectAfter-r16 ENUMERATED {n1, n2, n3, n4, n5, n6, n7, n8, n9} OPTIONAL, -- Need R

sl-CBR-CommonTxConfigList-r16 SL-CBR-CommonTxConfigList-r16 OPTIONAL, -- Need R

ul-PrioritizationThres-r16 INTEGER (1..16) OPTIONAL, -- Need R

sl-PrioritizationThres-r16 INTEGER (1..8) OPTIONAL, -- Need R

...

}

-- TAG-SL-UE-SELECTEDCONFIG-STOP

-- ASN1STOP

|  |
| --- |
| *SL-UE-SelectedConfig* field descriptions |
| ***sl-PrioritizationThres***  Indicates the SL priority threshold, which is used to determine whether SL TX is prioritized over UL TX, as specified in TS 38.321 [3]. Network does not configure the *sl-PrioritizationThres* and the *ul-PrioritizationThres* to the UE separately. |
| ***sl-ProbResourceKeep***  Indicates the probability with which the UE keeps the current resource when the resource reselection counter reaches zero for sensing based UE autonomous resource selection (see TS 38.321 [3]). |
| ***sl-PSSCH-TxConfigList***  Indicates PSSCH TX parameters such as MCS, sub-channel number, retransmission number, associated to different UE absolute speeds and different synchronization reference types for UE autonomous resource selection. |
| ***sl-ReselectAfter***  Indicates the number of consecutive skipped transmissions before triggering resource reselection for sidelink communication (see TS 38.321 [3]). |
| ***ul-PrioritizationThres***  Indicates the UL priority threshold, which is used to determine whether SL TX is prioritized over UL TX, as specified in TS 38.321 [3]. Network does not configure the *sl-PrioritizationThres* and the *ul-PrioritizationThres* to the UE separately. |

#### – *SL-ZoneConfig*

The IE *SL-ZoneConfig* is used to configure the zone ID related parameters.

*SL-ZoneConfig* information element

-- ASN1START

-- TAG-SL-ZONECONFIG-START

SL-ZoneConfig-r16 ::= SEQUENCE {

sl-ZoneLength-r16 ENUMERATED { m5, m10, m20, m30, m40, m50, spare2, spare1},

...

}

-- TAG-SL-ZONECONFIG-STOP

-- ASN1STOP

|  |
| --- |
| *SL-ZoneConfig* field descriptions |
| ***sl-ZoneLength***  Indicates the length of each geographic zone. |

#### – *SLRB-Uu-ConfigIndex*

The IE *SLRB-Uu-ConfigIndex* is used to identify a sidelink DRB configuration from the network side.

*SLRB-Uu-ConfigIndex* information element

-- ASN1START

-- TAG-SLRB-UU-CONFIGINDEX-START

SLRB-Uu-ConfigIndex-r16 ::= INTEGER (1..maxNrofSLRB-r16)

-- TAG-SLRB-UU-CONFIGINDEX-STOP

-- ASN1STOP

### 6.3.6 MBS information elements

#### – *CarrierFreqListMBS*

The IE *CarrierFreqListMBS* is used to inform network of the frequencies on which the UE is receiving or interested to receive MBS broadcast service via a broadcast MRB.

*CarrierFreqListMBS* information element

-- ASN1START

-- TAG-CARRIERFREQLISTMBS-START

CarrierFreqListMBS-r17 ::= SEQUENCE (SIZE (1..maxFreqMBS-r17)) OF ARFCN-ValueNR

-- TAG-CARRIERFREQLISTMBS-STOP

-- ASN1STOP

#### – *CFR-ConfigMCCH-MTCH*

The IE *CFR-ConfigMCCH-MTCH* is used to configure the common frequency resource used for MCCH and MTCH reception.

*CFR-ConfigMCCH-MTCH* information element

-- ASN1START

-- TAG-CFR-CONFIGMCCH-MTCH-START

CFR-ConfigMCCH-MTCH-r17 ::= SEQUENCE {

locationAndBandwidthBroadcast-r17 LocationAndBandwidthBroadcast-r17 OPTIONAL, -- Need S

pdsch-ConfigMCCH-r17 PDSCH-ConfigBroadcast-r17 OPTIONAL, -- Need S

commonControlResourceSetExt-r17 ControlResourceSet OPTIONAL -- Cond NotSIB1CommonControlResource

}

LocationAndBandwidthBroadcast-r17 ::= CHOICE {

sameAsSib1ConfiguredLocationAndBW NULL,

locationAndBandwidth INTEGER (0..37949)

}

-- TAG-CFR-CONFIGMCCH-MTCH-STOP

-- ASN1STOP

| *CFR-ConfigMCCH-MTCH* field descriptions |
| --- |
| ***commonControlResourceSetExt***  An additional common control resource set which may be configured and used for *searchSpaceMCCH*/*searchSpaceMTCH* or UE-specific search space in the BWP where *searchSpaceMCCH* is configured. It is contained in the bandwidth of *locationAndBandwidthBroadcast*. |
| ***locationAndBandwidthBroadcast***  Indicates starting PRB and the number of PRBs of CFR used for MCCH and MTCH reception.  Value *sameAsSib1ConfiguredLocationAndBW* means the CFR for broadcast has the same location and size as the *locationAndBandwidth* for initial BWP configured in SIB1.  Value *locationAndBandwidth* is used to configure CFR with bandwidth that is larger than and fully contains the bandwidth for the initial DL BWP and CORESET#0 configured in SIB1.  If the field is absent, the CFR for broadcast has the same location and size as CORESET0. |
| ***pdsch-ConfigMCCH***  Indicates PDSCH parameters used for MCCH transmission. If the field is absent, PDSCH paramers used for MCCH are the same as those of PDSCH configuration provided in *initialDownlinkBWP* in *SIB1*. |

|  |  |
| --- | --- |
| Conditional Presence | Explanation |
| *NotSIB1CommonControlResource* | The field is optional present in case *commonControlResourceSet* is not configured in SIB1, Need R, otherwise it is absent. |

#### – *DRX-ConfigPTM*

The IE *DRX-Config-PTM* is used to configure DRX related parameters for PTM transmission as specified in TS 38.321 [3].

*DRX-Config-PTM* information element

-- ASN1START

-- TAG-DRX-CONFIGPTM-START

DRX-ConfigPTM-r17 ::= SEQUENCE {

drx-onDurationTimerPTM-r17 CHOICE {

subMilliSeconds INTEGER (1..31),

milliSeconds ENUMERATED {

ms1, ms2, ms3, ms4, ms5, ms6, ms8, ms10, ms20, ms30, ms40, ms50, ms60,

ms80, ms100, ms200, ms300, ms400, ms500, ms600, ms800, ms1000, ms1200,

ms1600, spare8, spare7, spare6, spare5, spare4, spare3, spare2, spare1

}

},

drx-InactivityTimerPTM-r17 ENUMERATED {

ms0, ms1, ms2, ms3, ms4, ms5, ms6, ms8, ms10, ms20, ms30, ms40, ms50, ms60, ms80,

ms100, ms200, ms300, ms500, ms750, ms1280, ms1920, ms2560, spare9, spare8,

spare7, spare6, spare5, spare4, spare3, spare2, spare1

},

drx-HARQ-RTT-TimerDL-PTM-r17 INTEGER (0..56) OPTIONAL, -- Cond HARQFeedback

drx-RetransmissionTimerDL-PTM-r17 ENUMERATED {

sl0, sl1, sl2, sl4, sl6, sl8, sl16, sl24, sl33, sl40, sl64, sl80, sl96, sl112, sl128,

sl160, sl320, spare15, spare14, spare13, spare12, spare11, spare10, spare9,

spare8, spare7, spare6, spare5, spare4, spare3, spare2, spare1

} OPTIONAL, -- Cond HARQFeedback

drx-LongCycleStartOffsetPTM-r17 CHOICE {

ms10 INTEGER(0..9),

ms20 INTEGER(0..19),

ms32 INTEGER(0..31),

ms40 INTEGER(0..39),

ms60 INTEGER(0..59),

ms64 INTEGER(0..63),

ms70 INTEGER(0..69),

ms80 INTEGER(0..79),

ms128 INTEGER(0..127),

ms160 INTEGER(0..159),

ms256 INTEGER(0..255),

ms320 INTEGER(0..319),

ms512 INTEGER(0..511),

ms640 INTEGER(0..639),

ms1024 INTEGER(0..1023),

ms1280 INTEGER(0..1279),

ms2048 INTEGER(0..2047),

ms2560 INTEGER(0..2559),

ms5120 INTEGER(0..5119),

ms10240 INTEGER(0..10239)

},

drx-SlotOffsetPTM-r17 INTEGER (0..31)

}

-- TAG-DRX-CONFIGPTM-STOP

-- ASN1STOP

|  |
| --- |
| *DRX-Config-PTM* field descriptions |
| ***drx-HARQ-RTT-Timer-DL-PTM***  Value in number of symbols of the CFR where the transport block was received. |
| ***drx-InactivityTimerPTM***  Value in multiple integers of 1 ms. *ms0* corresponds to 0, *ms1* corresponds to 1 ms, *ms2* corresponds to 2 ms, and so on. |
| ***drx-LongCycleStartOffsetPTM***  *drx-LongCycle-PTM* in ms and *drx-StartOffset-PTM* in multiples of 1 ms. |
| ***drx-onDurationTimerPTM***  Value in multiples of 1/32 ms (subMilliSeconds) or in ms (milliSecond). For the latter, value *ms1* corresponds to 1 ms, value *ms2* corresponds to 2 ms, and so on. |
| ***drx-RetransmissionTimer-DL-PTM***  Value in number of slot lengths of the CFR where the transport block was received. value *sl0* corresponds to 0 slots, *sl1* corresponds to 1 slot, *sl2* corresponds to 2 slots, and so on. |
| ***drx-SlotOffsetPTM***  Value in 1/32 ms. Value 0 corresponds to 0 ms, value 1 corresponds to 1/32 ms, value 2 corresponds to 2/32 ms, and so on. |

|  |  |
| --- | --- |
| Conditional Presence | Explanation |
| *HARQFeedback* | The field is mandatory present if HARQ feedback is enabled for a G-RNTI/G-CS-RNTI associated with this DRX configuration. It is absent otherwise. |

#### – *MBS-NeighbourCellList*

The IE *MBS-NeighbourCellList* indicates a list of neighbour cells where ongoing MBS sessions provided via broadcast MRB in the current cells are also provided.

*MBS-NeighbourCellList* information element

-- ASN1START

-- TAG-MBS-NEIGHBOURCELLLIST-START

MBS-NeighbourCellList-r17 ::= SEQUENCE (SIZE (0..maxNeighCellMBS-r17)) OF MBS-NeighbourCell-r17

MBS-NeighbourCell-r17 ::= SEQUENCE {

physCellId-r17 PhysCellId,

carrierFreq-r17 ARFCN-ValueNR OPTIONAL -- Need S

}

-- TAG-MBS-NEIGHBOURCELLLIST-STOP

-- ASN1STOP

| *MBS-NeighbourCellList* field descriptions |
| --- |
| ***carrierFreq***  Indicates the frequency of the neighbour cell indicated by *physCellId*. Absence of the IE means that the neighbour cell is on the same frequency as the current cell. |

#### – *MBS-ServiceList*

The IE *MBS-* *ServiceList* is used to inform the network of the MBS services that the UE is receiving or interested to receive.

*MBS-ServiceList* information element

-- ASN1START

-- TAG-MBS-SERVICELIST-START

MBS-ServiceList-r17 ::= SEQUENCE (SIZE (1..maxNrofMBS-ServiceListPerUE-r17)) OF MBS-ServiceInfo-r17

MBS-ServiceInfo-r17 ::= SEQUENCE {

tmgi-r17 TMGI-r17

}

-- TAG-MBS-SERVICELIST-STOP

-- ASN1STOP

#### – *MBS-SessionInfoList*

The IE *MBS-SessionInfoList* provides the list of ongoing MBS broadcast sessions transmitted via broadcast MRB and, for each MBS broadcast session, the associated G-RNTI and scheduling information.

*MBS-SessionInfoList* information element

-- ASN1START

-- TAG-MBS-SESSIONINFOLIST-START

MBS-SessionInfoList-r17 ::= SEQUENCE (SIZE (1..maxNrofMBS-Session-r17)) OF MBS-SessionInfo-r17

MBS-SessionInfo-r17 ::= SEQUENCE {

mbs-SessionId-r17 TMGI-r17,

g-RNTI-r17 RNTI-Value,

mrb-ListBroadcast-r17 MRB-ListBroadcast-r17,

mtch-SchedulingInfo-r17 DRX-ConfigPTM-Index-r17 OPTIONAL, -- Need S

mtch-NeighbourCell-r17 BIT STRING (SIZE(maxNeighCellMBS-r17)) OPTIONAL, -- Need S

pdsch-ConfigIndex-r17 PDSCH-ConfigIndex-r17 OPTIONAL, -- Need S

mtch-SSB-MappingWindowIndex-r17 MTCH-SSB-MappingWindowIndex-r17 OPTIONAL -- Need R

}

DRX-ConfigPTM-Index-r17 ::= INTEGER (0..maxNrofDRX-ConfigPTM-1-r17)

PDSCH-ConfigIndex-r17 ::= INTEGER (0..maxNrofPDSCH-ConfigPTM-1-r17)

MTCH-SSB-MappingWindowIndex-r17 ::= INTEGER (0..maxNrofMTCH-SSB-MappingWindow-1-r17)

MRB-ListBroadcast-r17 ::= SEQUENCE (SIZE (1..maxNrofMRB-Broadcast-r17)) OF MRB-InfoBroadcast-r17

MRB-InfoBroadcast-r17 ::= SEQUENCE {

pdcp-Config-r17 MRB-PDCP-ConfigBroadcast-r17,

rlc-Config-r17 MRB-RLC-ConfigBroadcast-r17,

...

}

MRB-PDCP-ConfigBroadcast-r17 ::= SEQUENCE {

pdcp-SN-SizeDL-r17 ENUMERATED {len12bits} OPTIONAL, -- Need S

headerCompression-r17 CHOICE {

notUsed NULL,

rohc SEQUENCE {

maxCID-r17 INTEGER (1..16) DEFAULT 15,

profiles-r17 SEQUENCE {

profile0x0000-r17 BOOLEAN,

profile0x0001-r17 BOOLEAN,

profile0x0002-r17 BOOLEAN

}

}

},

t-Reordering-r17 ENUMERATED {ms1, ms10, ms40, ms160, ms500, ms1000, ms1250, ms2750} OPTIONAL -- Need S

}

MRB-RLC-ConfigBroadcast-r17 ::= SEQUENCE {

logicalChannelIdentity-r17 LogicalChannelIdentity,

sn-FieldLength-r17 ENUMERATED {size6} OPTIONAL, -- Need S

t-Reassembly-r17 T-Reassembly OPTIONAL -- Need S

}

-- TAG-MBS-SESSIONINFOLIST-STOP

-- ASN1STOP

|  |
| --- |
| *MBS-SessionInfoList* field descriptions |
| ***g-RNTI***  G-RNTI used to scramble the scheduling and transmission of MTCH. |
| ***headerCompression***  If *rohc* is configured, the UE shall apply the configured ROHC profile(s) in downlink. When the field is absent the UE applies the value as specified in 9.1.1.7. |
| ***mbsSessionId***  Indicates an identifier of the MBS session provided by the MTCH. |
| ***mrb-listBroadcast***  A list of broadcast MRBs to which the associated broadcast MBS session is mapped to. |
| ***mtch-neighbourCell***  Indicates neighbour cells which provide this service on MTCH. The first bit is set to 1 if the service is provided on MTCH in the first cell in *mbs-NeighbourCellList*, otherwise it is set to 0. The second bit is set to 1 if the service is provided on MTCH in the second cell in *mbs-NeighbourCellList*, and so on. If the service is not available in any neighbouring cell and *mbs-NeighbourCellList* is signalled, the network sets all bits in this field to 0. If this field is absent, the related service may or may not be available in any neighbouring cell, i.e. the UE cannot determine the presence or absence of an MBS service in neighbouring cells based on the absence of this field. |
| ***mtch-schedulingInfo***  Indicates the index of DRX configuration entry in *drx-ConfigPTM-List* that is used for scheduling the MTCH. The value 0 corresponds to the first entry in *drx-ConfigPTM-List*, the value 1 corresponds to the second entry in *drx-ConfigPTM-List* and so on. In case *mtch-schedulingInfo* is absent for a G-RNTI (i.e. no PTM DRX), the UE shall monitor for PDCCH scrambled with G-RNTI in any slot according to the search space configured for MTCH [see TS 38.213 [13], clause 10.1]. |
| ***mtch-SSB-MappingWindowIndex***  Indicates the index of *MTCH-SSB-MappingWindowCycleOffset* configuration entry in *MTCH-SSB-MappingWindowList*. The value 0 corresponds to the first entry in *MTCH-SSB-MappingWindowList*, the value 1 corresponds to the second entry in *MTCH-SSB-MappingWindowList* and so on. This field is set to the same value for all MBS sessions mapped to the same G-RNTI. |
| ***pdcp-SN-SizeDL***  Indicates that PDCP sequence number size of 12 bits is used, as specified in TS 38.323 [5]. When the field is absent the UE applies the value as specified in 9.1.1.7. |
| ***pdschConfigIndex***  Indicates the index of PDSCH configuration entry in *pdschConfigList* for MTCH. Value 0 corresponds to the first entry in *pdschConfigList*, the value 1 corresponds to the second entry in *pdschConfigList* and so on. When the field is absent the UE applies the first entry in pdschConfigList for MTCH. |
| ***sn-FieldLength***  Indicates that the RLC SN field size of 6 bits is used, see TS 38.322 [4]. When the field is absent the UE applies the value as specified in 9.1.1.7. |
| ***t-Reassembly***  Timer for reassembly in TS 38.322 [4], in milliseconds. Value ms0 means 0 ms, value ms5 means 5 ms and so on. When the field is absent the UE applies the value in specified in 9.1.1.7. |
| ***t-Reordering***  Value in ms of t-Reordering specified in TS 38.323 [5]. Value ms1 corresponds to 1 ms, value ms10 corresponds to 10 ms, and so on. When the field is absent the UE applies the value as specified in 9.1.1.7. |

#### – *MTCH-SSB-MappingWindowList*

The IE *MTCH-SSB-MappingWindowList* is used to configure MTCH PDCCH ocassions to SSB mapping window related periodic and offset parameters.

*MTCH-SSB-MappingWindowList* information element

-- ASN1START

-- TAG-MTCH-SSB-MAPPINGWINDOWLIST-START

MTCH-SSB-MappingWindowList-r17 ::= SEQUENCE (SIZE (1..maxNrofMTCH-SSB-MappingWindow-r17)) OF MTCH-SSB-MappingWindowCycleOffset-r17

MTCH-SSB-MappingWindowCycleOffset-r17 ::= CHOICE {

ms10 INTEGER(0..9),

ms20 INTEGER(0..19),

ms32 INTEGER(0..31),

ms64 INTEGER(0..63),

ms128 INTEGER(0..127),

ms256 INTEGER(0..255)

}

-- TAG-MTCH-SSB-MAPPINGWINDOWLIST-STOP

-- ASN1STOP

|  |
| --- |
| *MTCH-SSB-MappingWindowList* field descriptions |
| ***MTCH-SSB-MappingWindowCycleOffset***  Indicates the *cycle* and *offset* for MTCH PDCCH ocassions to SSB mapping. Values in unit of ms. *ms10* corresponds to cycle of 10 ms with corresponding offset between 0 and 9 ms, value *ms20* corresponds to cycle of 20 ms with corresponding offset between 0 and 19 ms, and so on. The mapping window starts at a subframe in a SFN where [(SFN number × 10) + subframe number] modulo (*cycle*) = *offset.*  PDCCH monitoring occasions for MTCH in a mapping window which are not overlapping with UL symbols (determined according to *tdd-UL-DL-ConfigurationCommon*) are sequentially numbered starting from 1 in the maping window. The [x×N+K]th PDCCH monitoring occasion for MTCH in this mapping window corresponds to the Kth transmitted SSB, where x = 0, 1, ...X-1, K = 1, 2, …N, N is the number of actual transmitted SSBs determined according to *ssb-PositionsInBurst* in *SIB1* and X is equal to CEIL(number of PDCCH monitoring occasions in MTCH to SSB mapping transmission window/N). The actual transmitted SSBs are sequentially numbered from one in ascending order of their SSB indexes. |

#### – *PDSCH-ConfigBroadcast*

The IE *PDSCH-ConfigBroadcast* is used to configure parameters for acquiring the PDSCH for MCCH and MTCH.

*PDSCH-ConfigBroadcast* information element

-- ASN1START

-- TAG-PDSCH-CONFIGBROADCAST-START

PDSCH-ConfigBroadcast-r17 ::= SEQUENCE {

pdschConfigList-r17 SEQUENCE (SIZE (1..maxNrofPDSCH-ConfigPTM-r17) ) OF PDSCH-ConfigPTM-r17,

pdsch-TimeDomainAllocationList-r17 PDSCH-TimeDomainResourceAllocationList-r16 OPTIONAL, -- Need R

rateMatchPatternToAddModList-r17 SEQUENCE (SIZE (1..maxNrofRateMatchPatterns)) OF RateMatchPattern OPTIONAL, -- Need R

lte-CRS-ToMatchAround-r17 RateMatchPatternLTE-CRS OPTIONAL, -- Need R

mcs-Table-r17 ENUMERATED {qam256, qam64LowSE} OPTIONAL, -- Need S

xOverhead-r17 ENUMERATED {xOh6, xOh12, xOh18} OPTIONAL -- Need S

}

PDSCH-ConfigPTM-r17 ::= SEQUENCE {

dataScramblingIdentityPDSCH-r17 INTEGER (0..1023) OPTIONAL, -- Need S

dmrs-ScramblingID0-r17 INTEGER (0..65535) OPTIONAL, -- Need S

pdsch-AggregationFactor-r17 ENUMERATED {n2, n4, n8} OPTIONAL -- Need S

}

-- TAG-PDSCH-CONFIGBROADCAST-STOP

-- ASN1STOP

|  |
| --- |
| *PDSCH-ConfigBroadcast* field descriptions |
| ***lte-CRS-ToMatchAround***  Parameters to determine an LTE CRS pattern that the UE shall rate match around. |
| ***pdschConfigList***  List of PDSCH parameters which can be configured per G-RNTI. Only one entity is allowed to be configured if included in SIB20. |
| ***pdsch-TimeDomainAllocationList***  List of time-domain configurations for timing of DL assignment to DL data.  The field *pdsch-TimeDomainAllocationList* applies to DCI format 4\_0 (see table 5.1.2.1.1-1 in TS 38.214 [19]). When the field is absent, the UE follows PDSCH time domain resource allocation determination rule as specified in TS 38.214 [19], clause 5.1.2.1.1. |
| ***rateMatchPatternToAddModList***  Resources patterns which the UE should rate match PDSCH around. The UE rate matches around the union of all resources indicated in the rate match patterns (see TS 38.214 [19], clause 5.1.4.1). |
| ***mcs-Table***  Indicates which MCS table the UE shall use for PDSCH. If the field is absent the UE applies the value 64QAM. The field *mcs-Table* applies to DCI format 4\_0 with CRC scrambled by MCCH-RNTI/G-RNTI (see TS 38.214 [19], clause 5.1.3.1). |
| ***xOverhead***  Accounts for an overhead from CSI-RS, CORESET, etc. If the field is absent, the UE applies value xOh0 (see TS 38.214 [19], clause 5.1.3.2). |

|  |
| --- |
| *PDSCH-ConfigPTM* field descriptions |
| ***dataScramblingIdentityPDSCH***  Identifier(s) used to initialize data scrambling (c\_init) for PDSCH as specified in TS 38.211 [16], clause 7.3.1.1. When the field is absent the UE applies the value physCellId configured for this serving cell. |
| ***dmrs-ScramblingID0***  DL DMRS scrambling initialization (see TS 38.211 [16], clause 7.4.1.1.1). When the field is absent the UE applies the value *physCellId* configured for this serving cell. |
| ***pdsch-AggregationFactor***  Number of repetitions for dynamic scheduling of MBS broadcast data for MTCH PDSCH (see TS 38.214 [19], clause 5.1.2.1). When the field is absent the UE applies the value 1. |

#### – *TMGI*

The IE *TMGI* is used to identify the MBS session.

*TMGI* information element

-- ASN1START

-- TAG-TMGI-START

TMGI-r17 ::= SEQUENCE {

plmn-Id-r17 CHOICE {

plmn-Index INTEGER (1..maxPLMN),

explicitValue PLMN-Identity

},

serviceId-r17 OCTET STRING (SIZE (3))

}

-- TAG-TMGI-STOP

-- ASN1STOP

|  |
| --- |
| *TMGI* field descriptions |
| ***serviceId***  Uniquely identifies the identity of an MBMS service within a PLMN. The field contains octet 3- 5 of the IE Temporary Mobile Group Identity (TMGI) as defined in TS 24.008 [38]. The first octet contains the third octet of the TMGI, the second octet contains the fourth octet of the TMGI and so on. |

## <<<<<<<<<<<<<<<<<<<Unchanged parts skipped>>>>>>>>>>>>>>>>>>>>>>>>>>>

## 6.6 PC5 RRC messages

### 6.6.1 General message structure

#### – *PC5-RRC-Definitions*

This ASN.1 segment is the start of the PC5 RRC PDU definitions.

-- ASN1START

-- TAG-PC5-RRC-DEFINITIONS-START

PC5-RRC-Definitions DEFINITIONS AUTOMATIC TAGS ::=

BEGIN

IMPORTS

CellAccessRelatedInfo,

SetupRelease,

RRC-TransactionIdentifier,

SN-FieldLengthAM,

SN-FieldLengthUM,

LogicalChannelIdentity,

maxNrofSLRB-r16,

maxNrofSL-RxInfoSet-r17,

maxNrofSL-QFIs-r16,

maxNrofSL-QFIsPerDest-r16,

PagingCycle,

PagingRecord,

RSRP-Range,

SL-MeasConfig-r16,

SL-MeasId-r16,

FreqBandList,

FreqBandIndicatorNR,

maxNrofRelayMeas-r17,

maxSimultaneousBands,

maxBandComb,

maxBands,

maxSIB-MessagePlus1-r17,

maxSL-LCID-r16,

BandParametersSidelink-r16,

RLC-ParametersSidelink-r16,

SIB1,

SL-DRX-ConfigUC-r17,

SL-DRX-ConfigUC-SemiStatic-r17,

SL-PagingIdentityRemoteUE-r17,

SL-RLC-ChannelID-r17,

SL-SourceIdentity-r17,

SystemInformation

FROM NR-RRC-Definitions;

-- TAG-PC5-RRC-DEFINITIONS-STOP

-- ASN1STOP

#### – *SBCCH-SL-BCH-Message*

The *SBCCH-SL-BCH-Message* class is the set of RRC messages that may be sent from the UE to the UE via SL-BCH on the SBCCH logical channel.

-- ASN1START

-- TAG-SBCCH-SL-BCH-MESSAGE-START

SBCCH-SL-BCH-Message ::= SEQUENCE {

message SBCCH-SL-BCH-MessageType

}

SBCCH-SL-BCH-MessageType::= CHOICE {

c1 CHOICE {

masterInformationBlockSidelink MasterInformationBlockSidelink,

spare1 NULL

},

messageClassExtension SEQUENCE {}

}

-- TAG-SBCCH-SL-BCH-MESSAGE-STOP

-- ASN1STOP

#### – *SCCH-Message*

The *SCCH-Message* class is the set of RRC messages that may be sent from the UE to the UE for unicast of NR sidelink communication on SCCH logical channel.

-- ASN1START

-- TAG-SCCH-MESSAGE-START

SCCH-Message ::= SEQUENCE {

message SCCH-MessageType

}

SCCH-MessageType ::= CHOICE {

c1 CHOICE {

measurementReportSidelink MeasurementReportSidelink,

rrcReconfigurationSidelink RRCReconfigurationSidelink,

rrcReconfigurationCompleteSidelink RRCReconfigurationCompleteSidelink,

rrcReconfigurationFailureSidelink RRCReconfigurationFailureSidelink,

ueCapabilityEnquirySidelink UECapabilityEnquirySidelink,

ueCapabilityInformationSidelink UECapabilityInformationSidelink,

uuMessageTransferSidelink-r17 UuMessageTransferSidelink-r17,

remoteUEInformationSidelink-r17 RemoteUEInformationSidelink-r17

},

messageClassExtension CHOICE {

c2 CHOICE {

notificationMessageSidelink-r17 NotificationMessageSidelink-r17,

ueAssistanceInformationSidelink-r17 UEAssistanceInformationSidelink-r17,

spare6 NULL, spare5 NULL, spare4 NULL, spare3 NULL, spare2 NULL, spare1 NULL

},

messageClassExtensionFuture-r17 SEQUENCE {}

}

}

-- TAG-SCCH-MESSAGE-STOP

-- ASN1STOP

6.6.2 Message definitions

#### – *MasterInformationBlockSidelink*

The *MasterInformationBlockSidelink* includes the system information transmitted by a UE via SL-BCH.

Signalling radio bearer: N/A

RLC-SAP: TM

Logical channel: SBCCH

Direction: UE to UE

*MasterInformationBlockSidelink*

-- ASN1START

-- TAG-MASTERINFORMATIONBLOCKSIDELINK-START

MasterInformationBlockSidelink ::= SEQUENCE {

sl-TDD-Config-r16 BIT STRING (SIZE (12)),

inCoverage-r16 BOOLEAN,

directFrameNumber-r16 BIT STRING (SIZE (10)),

slotIndex-r16 BIT STRING (SIZE (7)),

reservedBits-r16 BIT STRING (SIZE (2))

}

-- TAG-MASTERINFORMATIONBLOCKSIDELINK-STOP

-- ASN1STOP

|  |
| --- |
| *MasterInformationBlockSidelink* field descriptions |
| ***directFrameNumber***  Indicates the frame number in which S-SSB transmitted. |
| ***inCoverage***  Value true indicates that the UE transmitting the *MasterInformationBlockSidelink* is in network coverage, or UE selects GNSS timing as the synchronization reference source. |
| ***slotIndex***  Indicates the slot index in which S-SSB transmitted. |

#### – *MeasurementReportSidelink*

The *MeasurementReportSidelink* message is used for the indication of measurement results of NR sidelink.

Signalling radio bearer: SL-SRB3

RLC-SAP: AM

Logical channel: SCCH

Direction: UE to UE

*MeasurementReportSidelink* message

-- ASN1START

-- TAG-MEASUREMENTREPORTSIDELINK-START

MeasurementReportSidelink ::= SEQUENCE {

criticalExtensions CHOICE {

measurementReportSidelink-r16 MeasurementReportSidelink-r16-IEs,

criticalExtensionsFuture SEQUENCE {}

}

}

MeasurementReportSidelink-r16-IEs ::= SEQUENCE {

sl-measResults-r16 SL-MeasResults-r16,

lateNonCriticalExtension OCTET STRING OPTIONAL,

nonCriticalExtension SEQUENCE{} OPTIONAL

}

SL-MeasResults-r16 ::= SEQUENCE {

sl-MeasId-r16 SL-MeasId-r16,

sl-MeasResult-r16 SL-MeasResult-r16,

...

}

SL-MeasResult-r16 ::= SEQUENCE {

sl-ResultDMRS-r16 SL-MeasQuantityResult-r16 OPTIONAL,

...

}

SL-MeasQuantityResult-r16 ::= SEQUENCE {

sl-RSRP-r16 RSRP-Range OPTIONAL,

...

}

SL-MeasResultListRelay-r17 ::= SEQUENCE (SIZE (1..maxNrofRelayMeas-r17)) OF SL-MeasResultRelay-r17

SL-MeasResultRelay-r17 ::= SEQUENCE {

cellIdentity-r17 CellAccessRelatedInfo,

sl-RelayUEIdentity-r17 SL-SourceIdentity-r17,

sl-MeasResult-r17 SL-MeasResult-r16,

...

}

-- TAG-MEASUREMENTREPORTSIDELINK-STOP

-- ASN1STOP

|  |
| --- |
| *MeasurementReportSidelink* field descriptions |
| ***sl-MeasId***  Identifies the sidelink measurement identity for which the reporting is being performed. |
| ***sl-MeasResult***  Measured RSRP results of a unicast destination. |

#### – *NotificationMessageSidelink*

The *NotificationMessageSidelink* message is used to send notification message from U2N Relay UE to the connected U2N Remote UE.

Signalling radio bearer: SL-SRB3

RLC-SAP: AM

Logical channel: SCCH

Direction: U2N Relay UE to U2N Remote UE

*NotificationMessageSidelink* message

-- ASN1START

-- TAG-NOTIFICATIONMESSAGESIDELINK-START

NotificationMessageSidelink-r17 ::= SEQUENCE {

criticalExtensions CHOICE {

notificationMessageSidelink-r17 NotificationMessageSidelink-r17-IEs,

criticalExtensionsFuture SEQUENCE {}

}

}

NotificationMessageSidelink-r17-IEs ::= SEQUENCE {

indicationType-r17 ENUMERATED {

relayUE-Uu-RLF, relayUE-HO, relayUE-CellReselection,

relayUE-Uu-RRC-Failure

} OPTIONAL, -- Need N

lateNonCriticalExtension OCTET STRING OPTIONAL,

nonCriticalExtension SEQUENCE {} OPTIONAL

}

-- TAG-NOTIFICATIONMESSAGESIDELINK -STOP

-- ASN1STOP

#### – *RemoteUEInformationSidelink*

The *RemoteUEInformationSidelink* message is used to request SIB(s) or provide paging related information as specified in clause 5.8.9.8.1.

Signalling radio bearer: SL-SRB3

RLC-SAP: AM

Logical channel: SCCH

Direction: L2 U2N Remote UE to L2 U2N Relay UE

*RemoteUEInformationSidelink* message

-- ASN1START

-- TAG-REMOTEUEINFORMATIONSIDELINK-START

RemoteUEInformationSidelink-r17 ::= SEQUENCE {

criticalExtensions CHOICE {

remoteUEInformationSidelink-r17 RemoteUEInformationSidelink-r17-IEs,

criticalExtensionsFuture SEQUENCE {}

}

}

RemoteUEInformationSidelink-r17-IEs ::= SEQUENCE {

sl-RequestedSIB-List-r17 SetupRelease { SL-RequestedSIB-List-r17} OPTIONAL, -- Need M

sl-PagingInfo-RemoteUE-r17 SetupRelease { SL-PagingInfo-RemoteUE-r17} OPTIONAL, -- Need M

lateNonCriticalExtension OCTET STRING OPTIONAL,

nonCriticalExtension SEQUENCE {} OPTIONAL

}

SL-RequestedSIB-List-r17 ::= SEQUENCE (SIZE (maxSIB-MessagePlus1-r17)) OF SL-SIB-ReqInfo-r17

SL-PagingInfo-RemoteUE-r17 ::= SEQUENCE {

sl-PagingIdentityRemoteUE-r17 SL-PagingIdentityRemoteUE-r17,

sl-PagingCycleRemoteUE-r17 PagingCycle OPTIONAL -- Need M

}

SL-SIB-ReqInfo-r17 ::= ENUMERATED { sib1, sib2, sib3, sib4, sib5, sib6, sib7, sib8, sib9, sib10, sib11, sib12, sib13,

sib14, sib15, sib16, sib17, sib18, sib19, sib20, sib21, spare11, spare10, spare9,

spare8, spare7, spare6, spare5, spare4, spare3, spare2, spare1, ... }

-- TAG-REMOTEUEINFORMATIONSIDELINK-STOP

-- ASN1STOP

|  |
| --- |
| *RemoteUEInformationSidelink-IEs* field descriptions |
| ***sl-RequestedSIB-List***  Contains a list of requested SIBs. |
| ***sl-PagingInfo-RemoteUE***  Indicates the paging information used by L2 U2N Relay UE to perform the connected L2 U2N Remote UE's paging monitoring. |
| ***sl-PagingIdentityRemoteUE***  Indicates the L2 U2N Remote UE's paging UE ID. |
| ***sl-PagingCycleRemoteUE***  Indicates the L2 U2N Remote UE's UE specific DRX cycle as the minimum value of the one provided by upper layers (if configured) and the one provided by RRC layer (if configured). Value rf32 corresponds to 32 radio frames, value rf64 corresponds to 64 radio frames and so on. |

#### – *RRCReconfigurationSidelink*

The *RRCReconfigurationSidelink* message is the command to AS configuration of the PC5 RRC connection. It is only applied to unicast of NR sidelink communication.

Signalling radio bearer: SL-SRB3

RLC-SAP: AM

Logical channel: SCCH

Direction: UE to UE

*RRCReconfigurationSidelink* message

-- ASN1START

-- TAG-RRCRECONFIGURATIONSIDELINK-START

RRCReconfigurationSidelink ::= SEQUENCE {

rrc-TransactionIdentifier-r16 RRC-TransactionIdentifier,

criticalExtensions CHOICE {

rrcReconfigurationSidelink-r16 RRCReconfigurationSidelink-r16-IEs,

criticalExtensionsFuture SEQUENCE {}

}

}

RRCReconfigurationSidelink-r16-IEs ::= SEQUENCE {

slrb-ConfigToAddModList-r16 SEQUENCE (SIZE (1..maxNrofSLRB-r16)) OF SLRB-Config-r16 OPTIONAL, -- Need N

slrb-ConfigToReleaseList-r16 SEQUENCE (SIZE (1..maxNrofSLRB-r16)) OF SLRB-PC5-ConfigIndex-r16 OPTIONAL, -- Need N

sl-MeasConfig-r16 SetupRelease {SL-MeasConfig-r16} OPTIONAL, -- Need M

sl-CSI-RS-Config-r16 SetupRelease {SL-CSI-RS-Config-r16} OPTIONAL, -- Need M

sl-ResetConfig-r16 ENUMERATED {true} OPTIONAL, -- Need N

sl-LatencyBoundCSI-Report-r16 INTEGER (3..160) OPTIONAL, -- Need M

lateNonCriticalExtension OCTET STRING OPTIONAL,

nonCriticalExtension RRCReconfigurationSidelink-v1700-IEs OPTIONAL

}

RRCReconfigurationSidelink-v1700-IEs ::= SEQUENCE {

sl-DRX-ConfigUC-PC5-r17 SetupRelease { SL-DRX-ConfigUC-r17 } OPTIONAL, -- Need M

sl-LatencyBoundIUC-Report-r17 SetupRelease { SL-LatencyBoundIUC-Report-r17 } OPTIONAL, -- Need M

sl-RLC-ChannelToReleaseListPC5-r17 SEQUENCE (SIZE (1..maxSL-LCID-r16)) OF SL-RLC-ChannelID-r17 OPTIONAL, -- Need N

sl-RLC-ChannelToAddModListPC5-r17 SEQUENCE (SIZE (1..maxSL-LCID-r16)) OF SL-RLC-ChannelConfigPC5-r17 OPTIONAL, -- Need N

nonCriticalExtension SEQUENCE {} OPTIONAL

}

SL-LatencyBoundIUC-Report-r17::= INTEGER (3..160)

SLRB-Config-r16::= SEQUENCE {

slrb-PC5-ConfigIndex-r16 SLRB-PC5-ConfigIndex-r16,

sl-SDAP-ConfigPC5-r16 SL-SDAP-ConfigPC5-r16 OPTIONAL, -- Need M

sl-PDCP-ConfigPC5-r16 SL-PDCP-ConfigPC5-r16 OPTIONAL, -- Need M

sl-RLC-ConfigPC5-r16 SL-RLC-ConfigPC5-r16 OPTIONAL, -- Need M

sl-MAC-LogicalChannelConfigPC5-r16 SL-LogicalChannelConfigPC5-r16 OPTIONAL, -- Need M

...

}

SLRB-PC5-ConfigIndex-r16 ::= INTEGER (1..maxNrofSLRB-r16)

SL-SDAP-ConfigPC5-r16 ::= SEQUENCE {

sl-MappedQoS-FlowsToAddList-r16 SEQUENCE (SIZE (1.. maxNrofSL-QFIsPerDest-r16)) OF SL-PQFI-r16 OPTIONAL, -- Need N

sl-MappedQoS-FlowsToReleaseList-r16 SEQUENCE (SIZE (1.. maxNrofSL-QFIsPerDest-r16)) OF SL-PQFI-r16 OPTIONAL, -- Need N

sl-SDAP-Header-r16 ENUMERATED {present, absent},

...

}

SL-PDCP-ConfigPC5-r16 ::= SEQUENCE {

sl-PDCP-SN-Size-r16 ENUMERATED {len12bits, len18bits} OPTIONAL, -- Need M

sl-OutOfOrderDelivery-r16 ENUMERATED { true } OPTIONAL, -- Need R

...

}

SL-RLC-ConfigPC5-r16 ::= CHOICE {

sl-AM-RLC-r16 SEQUENCE {

sl-SN-FieldLengthAM-r16 SN-FieldLengthAM OPTIONAL, -- Need M

...

},

sl-UM-Bi-Directional-RLC-r16 SEQUENCE {

sl-SN-FieldLengthUM-r16 SN-FieldLengthUM OPTIONAL, -- Need M

...

},

sl-UM-Uni-Directional-RLC-r16 SEQUENCE {

sl-SN-FieldLengthUM-r16 SN-FieldLengthUM OPTIONAL, -- Need M

...

}

}

SL-LogicalChannelConfigPC5-r16 ::= SEQUENCE {

sl-LogicalChannelIdentity-r16 LogicalChannelIdentity,

...

}

SL-PQFI-r16 ::= INTEGER (1..64)

SL-CSI-RS-Config-r16 ::= SEQUENCE {

sl-CSI-RS-FreqAllocation-r16 CHOICE {

sl-OneAntennaPort-r16 BIT STRING (SIZE (12)),

sl-TwoAntennaPort-r16 BIT STRING (SIZE (6))

} OPTIONAL, -- Need M

sl-CSI-RS-FirstSymbol-r16 INTEGER (3..12) OPTIONAL, -- Need M

...

}

SL-RLC-ChannelConfigPC5-r17::= SEQUENCE {

sl-RLC-ChannelID-PC5-r17 SL-RLC-ChannelID-r17,

sl-RLC-ConfigPC5-r17 SL-RLC-ConfigPC5-r16 OPTIONAL, -- Need M

sl-MAC-LogicalChannelConfigPC5-r17 SL-LogicalChannelConfigPC5-r16 OPTIONAL, -- Need M

...

}

-- TAG-RRCRECONFIGURATIONSIDELINK-STOP

-- ASN1STOP

|  |
| --- |
| *RRCReconfigurationSidelink* field descriptions |
| ***sl-CSI-RS-FreqAllocation***  Indicates the frequency domain position for sidelink CSI-RS. |
| ***sl-CSI-RS-FirstSymbol***  Indicates the position of first symbol of sidelink CSI-RS. |
| ***sl-DRX-ConfigUC-PC5***  Indicates the NR sidelink DRX configuration for unicast communication, as specified in TS 38.321 [3] |
| ***sl-LatencyBoundCSI-Report***  Indicates the latency bound of SL CSI report from the associated SL CSI triggering in terms of number of slots. |
| ***sl-LatencyBoundIUC-Report***  Indicates the latency bound of SL Inter-UE coordination report from the associated SL Inter-UE coordination explicit request triggering in terms of number of slots. |
| ***sl-LogicalChannelIdentity***  Indicates the identity of the sidelink logical channel. |
| ***sl-MappedQoS-FlowsToAddList***  Indicate the QoS flows to be mapped to the configured sidelink DRB. Each entry is indicated by the *SL-PQFI*, which is used between UEs, as defined in TS 23.287 [55]. |
| ***sl-MappedQoS-FlowsToReleaseList***  Indicate the QoS flows to be released from the configured sidelink DRB. Each entry is indicated by the *SL-PQFI*, which is used between UEs, as defined in TS 23.287 [55]. |
| ***sl-MeasConfig***  Indicates the sidelink measurement configuration for the unicast destination. |
| ***sl-OutOfOrderDelivery***  Indicates whether or not outOfOrderDelivery specified in TS 38.323 [5] is configured. This field should be either always present or always absent, after the sidelink radio bearer is established. |
| ***sl-PDCP-SN-Size***  Indicates the PDCP SN size of the configured sidelink DRB. |
| ***sl-Resetconfig***  Indicates that the full configuration should be applicable for the *RRCReconfigurationSidelink* message. |
| ***sl-SDAP-Header***  Indicates whether or not a SDAP header is present on this sidelink DRB. |

#### – *RRCReconfigurationCompleteSidelink*

The *RRCReconfigurationCompleteSidelink* message is used to confirm the successful completion of a PC5 RRC AS reconfiguration. It is only applied to unicast of NR sidelink communication.

Signalling radio bearer: SL-SRB3

RLC-SAP: AM

Logical channel: SCCH

Direction: UE to UE

*RRCReconfigurationCompleteSidelink* message

-- ASN1START

-- TAG-RRCRECONFIGURATIONCOMPLETESIDELINK-START

RRCReconfigurationCompleteSidelink ::= SEQUENCE {

rrc-TransactionIdentifier-r16 RRC-TransactionIdentifier,

criticalExtensions CHOICE {

rrcReconfigurationCompleteSidelink-r16 RRCReconfigurationCompleteSidelink-r16-IEs,

criticalExtensionsFuture SEQUENCE {}

}

}

RRCReconfigurationCompleteSidelink-r16-IEs ::= SEQUENCE {

lateNonCriticalExtension OCTET STRING OPTIONAL,

nonCriticalExtension RRCReconfigurationCompleteSidelink-v1710-IEs OPTIONAL

}

RRCReconfigurationCompleteSidelink-v1710-IEs ::= SEQUENCE {

dummy ENUMERATED {true},

nonCriticalExtension RRCReconfigurationCompleteSidelink-v17xy-IEs OPTIONAL

}

RRCReconfigurationCompleteSidelink-v17xy-IEs ::= SEQUENCE {

sl-DRX-ConfigReject-v17xy ENUMERATED {true} OPTIONAL,

nonCriticalExtension SEQUENCE {} OPTIONAL

}

-- TAG-RRCRECONFIGURATIONCOMPLETESIDELINK-STOP

-- ASN1STOP

|  |
| --- |
| *RRCReconfigurationCompleteSidelink* field descriptions |
| ***dummy***  This field is not used in the specification. The UE shall not include this field. If received it shall be ignored by the peer UE. |
| ***sl-DRX-ConfigReject***  Indicates the rejection of sidelink DRX configuration received from the peer UE for the corresponding NR sidelink unicast communication. |

#### – *RRCReconfigurationFailureSidelink*

The *RRCReconfigurationFailureSidelink* message is used to indicate the failure of a PC5 RRC AS reconfiguration. It is only applied to unicast of NR sidelink communication.

Signalling radio bearer: SL-SRB3

RLC-SAP: AM

Logical channel: SCCH

Direction: UE to UE

*RRCReconfigurationFailureSidelink* message

-- ASN1START

-- TAG-RRCRECONFIGURATIONFAILURESIDELINK-START

RRCReconfigurationFailureSidelink ::= SEQUENCE {

rrc-TransactionIdentifier-r16 RRC-TransactionIdentifier,

criticalExtensions CHOICE {

rrcReconfigurationFailureSidelink-r16 RRCReconfigurationFailureSidelink-r16-IEs,

criticalExtensionsFuture SEQUENCE {}

}

}

RRCReconfigurationFailureSidelink-r16-IEs ::= SEQUENCE {

lateNonCriticalExtension OCTET STRING OPTIONAL,

nonCriticalExtension SEQUENCE {} OPTIONAL

}

-- TAG-RRCRECONFIGURATIONFAILURESIDELINK-STOP

-- ASN1STOP

#### – *UEAssistanceInformationSidelink*

The *UEAssistanceInformationSidelink* message may include sidelink DRX assistance information used to determine the sidelink DRX configuration.

Signalling radio bearer: SL-SRB3

RLC-SAP: AM

Logical channel: SCCH

Direction: UE to UE

*UEAssistanceInformationSidelink* message

-- ASN1START

-- TAG-UEASSISTANCEINFORMATIONSIDELINK-START

UEAssistanceInformationSidelink-r17 ::= SEQUENCE {

criticalExtensions CHOICE {

ueAssistanceInformationSidelink-r17 UEAssistanceInformationSidelink-r17-IEs,

criticalExtensionsFuture SEQUENCE {}

}

}

UEAssistanceInformationSidelink-r17-IEs ::= SEQUENCE {

sl-PreferredDRX-ConfigList-r17 SEQUENCE (SIZE (1..maxNrofSL-RxInfoSet-r17)) OF SL-DRX-ConfigUC-SemiStatic-r17

OPTIONAL, -- Need R

lateNonCriticalExtension OCTET STRING OPTIONAL,

nonCriticalExtension SEQUENCE {} OPTIONAL

}

-- TAG-UEASSISTANCEINFORMATIONSIDELINK-STOP

-- ASN1STOP

|  |
| --- |
| *UEAssistanceInformationSidelink* field descriptions |
| ***sl-PreferredDRX-ConfigList***  Indicates a list of the reference sidelink DRX configurations provided by a UE to a peer UE for determining the sidelink DRX configuration. |

#### – *UECapabilityEnquirySidelink*

The *UECapabilityEnquirySidelink* message is used to request UE sidelink capabilities. It is only applied to unicast of NR sidelink communication.

Signalling radio bearer: SL-SRB3

RLC-SAP: AM

Logical channel: SCCH

Direction: UE to UE

*UECapabilityEnquirySidelink* message

-- ASN1START

-- TAG-UECAPABILITYENQUIRYSIDELINK-START

UECapabilityEnquirySidelink ::= SEQUENCE {

rrc-TransactionIdentifier-r16 RRC-TransactionIdentifier,

criticalExtensions CHOICE {

ueCapabilityEnquirySidelink-r16 UECapabilityEnquirySidelink-r16-IEs,

criticalExtensionsFuture SEQUENCE {}

}

}

UECapabilityEnquirySidelink-r16-IEs ::= SEQUENCE {

frequencyBandListFilterSidelink-r16 FreqBandList OPTIONAL, -- Need N

ue-CapabilityInformationSidelink-r16 OCTET STRING OPTIONAL, -- Need N

lateNonCriticalExtension OCTET STRING OPTIONAL,

nonCriticalExtension SEQUENCE{} OPTIONAL

}

-- TAG-UECAPABILITYENQUIRYSIDELINK-STOP

-- ASN1STOP

|  |
| --- |
| *UECapabilityEnquirySidelink-IEs* field descriptions |
| ***frequencyBandListFilterSidelink***  This field is used to indicate frequency bands for which the peer UE is requested to provide supported bands and band combinations for NR sidelink communications. The UE always provides this field. |
| ***ue-CapabilityInformationSidelink***  This field indicates the *UECapabilityInformationSidelink* message to provide the UE sidelink capability, which can be optionally sent together with *UECapabilityEnquirySidelink*. |

#### – *UECapabilityInformationSidelink*

The *UECapabilityInformationSidelink* message is used to transfer UE radio access capabilities. It is only applied to unicast of NR sidelink communication.

Signalling radio bearer: SL-SRB3

RLC-SAP: AM

Logical channel: SCCH

Direction: UE to UE

*UECapabilityInformationSidelink* message

-- ASN1START

-- TAG-UECAPABILITYINFORMATIONSIDELINK-START

UECapabilityInformationSidelink ::= SEQUENCE {

rrc-TransactionIdentifier-r16 RRC-TransactionIdentifier,

criticalExtensions CHOICE {

ueCapabilityInformationSidelink-r16 UECapabilityInformationSidelink-r16-IEs,

criticalExtensionsFuture SEQUENCE {}

}

}

UECapabilityInformationSidelink-r16-IEs ::= SEQUENCE {

accessStratumReleaseSidelink-r16 AccessStratumReleaseSidelink-r16,

pdcp-ParametersSidelink-r16 PDCP-ParametersSidelink-r16 OPTIONAL,

rlc-ParametersSidelink-r16 RLC-ParametersSidelink-r16 OPTIONAL,

supportedBandCombinationListSidelinkNR-r16 BandCombinationListSidelinkNR-r16 OPTIONAL,

supportedBandListSidelink-r16 SEQUENCE (SIZE (1..maxBands)) OF BandSidelinkPC5-r16 OPTIONAL,

appliedFreqBandListFilter-r16 FreqBandList OPTIONAL,

lateNonCriticalExtension OCTET STRING OPTIONAL,

nonCriticalExtension UECapabilityInformationSidelink-v1700-IEs OPTIONAL

}

UECapabilityInformationSidelink-v1700-IEs ::= SEQUENCE {

mac-ParametersSidelink-r17 MAC-ParametersSidelink-r17 OPTIONAL,

supportedBandCombinationListSidelinkNR-v1710 BandCombinationListSidelinkNR-v1710 OPTIONAL,

nonCriticalExtension SEQUENCE {} OPTIONAL

}

MAC-ParametersSidelink-r17 ::= SEQUENCE {

drx-OnSidelink-r17 ENUMERATED {supported} OPTIONAL,

...

}

AccessStratumReleaseSidelink-r16 ::= ENUMERATED { rel16, rel17, spare6, spare5, spare4, spare3, spare2, spare1, ... }

PDCP-ParametersSidelink-r16 ::= SEQUENCE {

outOfOrderDeliverySidelink-r16 ENUMERATED {supported} OPTIONAL,

...

}

BandCombinationListSidelinkNR-r16 ::= SEQUENCE (SIZE (1..maxBandComb)) OF BandCombinationParametersSidelinkNR-r16

BandCombinationListSidelinkNR-v1710 ::= SEQUENCE (SIZE (1..maxBandComb)) OF BandCombinationParametersSidelinkNR-v1710

BandCombinationParametersSidelinkNR-r16 ::= SEQUENCE (SIZE (1..maxSimultaneousBands)) OF BandParametersSidelink-r16

BandCombinationParametersSidelinkNR-v1710 ::= SEQUENCE (SIZE (1..maxSimultaneousBands)) OF BandParametersSidelink-v1710

BandParametersSidelink-v1710 ::= SEQUENCE {

--32-5a-1

tx-IUC-Scheme1-Mode2Sidelink-r17 ENUMERATED {supported} OPTIONAL,

--32-5b-1

tx-IUC-Scheme2-Mode2Sidelink-r17 ENUMERATED {n4, n8, n16} OPTIONAL

}

BandSidelinkPC5-r16 ::= SEQUENCE {

freqBandSidelink-r16 FreqBandIndicatorNR,

--15-1

sl-Reception-r16 SEQUENCE {

harq-RxProcessSidelink-r16 ENUMERATED {n16, n24, n32, n64},

pscch-RxSidelink-r16 ENUMERATED {value1, value2},

scs-CP-PatternRxSidelink-r16 CHOICE {

fr1-r16 SEQUENCE {

scs-15kHz-r16 BIT STRING (SIZE (16)) OPTIONAL,

scs-30kHz-r16 BIT STRING (SIZE (16)) OPTIONAL,

scs-60kHz-r16 BIT STRING (SIZE (16)) OPTIONAL

},

fr2-r16 SEQUENCE {

scs-60kHz-r16 BIT STRING (SIZE (16)) OPTIONAL,

scs-120kHz-r16 BIT STRING (SIZE (16)) OPTIONAL

}

} OPTIONAL,

extendedCP-RxSidelink-r16 ENUMERATED {supported} OPTIONAL

} OPTIONAL,

--15-10

sl-Tx-256QAM-r16 ENUMERATED {supported} OPTIONAL,

--15-12

lowSE-64QAM-MCS-TableSidelink-r16 ENUMERATED {supported} OPTIONAL,

...,

[[

--15-14

csi-ReportSidelink-r16 SEQUENCE {

csi-RS-PortsSidelink-r16 ENUMERATED {p1, p2}

} OPTIONAL,

--15-19

rankTwoReception-r16 ENUMERATED {supported} OPTIONAL,

--15-23

sl-openLoopPC-RSRP-ReportSidelink-r16 ENUMERATED {supported} OPTIONAL,

--13-1

sl-Rx-256QAM-r16 ENUMERATED {supported} OPTIONAL

]],

[[

--32-5a-2

rx-IUC-Scheme1-PreferredMode2Sidelink-r17 ENUMERATED {supported} OPTIONAL,

--32-5a-3

rx-IUC-Scheme1-NonPreferredMode2Sidelink-r17 ENUMERATED {supported} OPTIONAL,

--32-5b-2

rx-IUC-Scheme2-Mode2Sidelink-r17 ENUMERATED {n5, n15, n25, n32, n35, n45, n50, n64} OPTIONAL,

--32-6-1

rx-IUC-Scheme1-SCI-r17 ENUMERATED {supported} OPTIONAL,

--32-6-2

rx-IUC-Scheme1-SCI-ExplicitReq-r17 ENUMERATED {supported} OPTIONAL,

--32-7

scheme2-ConflictDeterminationRSRP-r17 ENUMERATED {supported} OPTIONAL

]]

}

-- TAG-UECAPABILITYINFORMATIONSIDELINK-STOP

-- ASN1STOP

#### – *UuMessageTransferSidelink*

The *UuMessageTransferSidelink* message is used for the sidelink transfer of Paging message and System Information messages.

Signalling radio bearer: SL-SRB3

RLC-SAP: AM

Logical channel: SCCH

Direction: L2 U2N Relay UE to L2 U2N Remote UE

*UuMessageTransferSidelink* message

-- ASN1START

-- TAG-UUMESSAGETRANSFERSIDELINK-START

UuMessageTransferSidelink-r17 ::= SEQUENCE {

criticalExtensions CHOICE {

uuMessageTransferSidelink-r17 UuMessageTransferSidelink-r17-IEs,

criticalExtensionsFuture SEQUENCE {}

}

}

UuMessageTransferSidelink-r17-IEs ::= SEQUENCE {

sl-PagingDelivery-r17 OCTET STRING (CONTAINING PagingRecord) OPTIONAL, -- Need N

sl-SIB1-Delivery-r17 OCTET STRING (CONTAINING SIB1) OPTIONAL, -- Need N

sl-SystemInformationDelivery-r17 OCTET STRING (CONTAINING SystemInformation) OPTIONAL, -- Need N

lateNonCriticalExtension OCTET STRING OPTIONAL,

nonCriticalExtension SEQUENCE {} OPTIONAL

}

-- TAG-UUMESSAGETRANSFERSIDELINK-STOP

-- ASN1STOP

|  |
| --- |
| *UuMessageTransferSidelink-IEs* field descriptions |
| ***sl-PagingDelivery***  This field is used to transfer PagingRecord relevant to the L2 U2N Remote UE in RRC\_IDLE or RRC\_INACTIVE. |
| ***sl-SIB1-Delivery***  This field is used to transfer SIB1 to the L2 U2N Remote UE in RRC\_IDLE or RRC\_INACTIVE. |
| ***sl-SystemInformationDelivery***  This field is used to transfer SIBs to the L2 U2N Remote UE in RRC\_IDLE or RRC\_INACTIVE. |

#### – *End of PC5-RRC-Definitions*

-- ASN1START

END

-- ASN1STOP

## <<<<<<<<Unchanged parts skipped>>>>>>>>>>>>>>>

# 9 Specified and default radio configurations

Specified and default configurations are configurations of which the details are specified in the standard. Specified configurations are fixed while default configurations can be modified using dedicated signalling. The default value for the parameters not listed in following clauses shall be set such as the corresponding features are not configured, i.e. *release* or *false* unless explicitly stated otherwise.

NOTE: The UE applies the default values specified in the field description of ASN.1 parameters only when the parent IE is present. Hence, the UE does not apply all default values in field descriptions when it applies the "default radio configuration" in accordance with this clause.

## 9.1 Specified configurations

### 9.1.1 Logical channel configurations

#### 9.1.1.1 BCCH configuration

Parameters

| Name | Value | Semantics description | Ver |
| --- | --- | --- | --- |
| SDAP configuration | Not used |  |  |
| PDCP configuration | Not used |  |  |
| RLC configuration | TM |  |  |
| Logical channel configuration | Not used |  |  |

NOTE: RRC will perform padding, if required due to the granularity of the TF signalling, as defined in 8.5.

#### 9.1.1.2 CCCH configuration

Parameters

| Name | Value | Semantics description | Ver |
| --- | --- | --- | --- |
| SDAP configuration | Not used |  |  |
| PDCP configuration | Not used |  |  |
| RLC configuration | TM |  |  |
| Logical channel configuration |  |  |  |
| *>priority* | 1 | Highest priority |  |
| *>prioritisedBitRate* | infinity |  |  |
| *>bucketSizeDuration* | ms1000 |  |  |
| *>logicalChannelGroup* | 0 |  |  |

#### 9.1.1.3 PCCH configuration

Parameters

| Name | Value | Semantics description | Ver |
| --- | --- | --- | --- |
| SDAP configuration | Not used |  |  |
| PDCP configuration | Not used |  |  |
| RLC configuration | TM |  |  |
| Logical channel configuration | Not used |  |  |

NOTE: RRC will perform padding, if required due to the granularity of the TF signalling, as defined in 8.5.

#### 9.1.1.4 SCCH configuration

Parameters that are specified for unicast of NR sidelink communication, which is used for the sidelink signalling radio bearer of PC5-RRC message. The SL-SRB using this SCCH configuration is named as SL-SRB3.

| Name | Value | Semantics description | Ver |
| --- | --- | --- | --- |
| PDCP configuration |  |  |  |
| *>t-Reordering* | Undefined | Selected by the receiving UE, up to UE implementation |  |
| *>pdcp-SN-Size* | 12 |  |  |
| RLC configuration |  | AM RLC |  |
| *>sn-FieldLength* | 12 |  |  |
| *>t-Reassembly* | Undefined | Selected by the receiving UE, up to UE implementation |  |
| *>t-PollRetransmit* | Undefined | Selected by the transmitting UE, up to UE implementation |  |
| *>pollPDU* | Undefined | Selected by the transmitting UE, up to UE implementation |  |
| *>pollByte* | Undefined | Selected by the transmitting UE, up to UE implementation |  |
| *>maxRetxThreshold* | Undefined | Selected by the transmitting UE, up to UE implementation |  |
| *>t-StatusProhibit* | Undefined | Selected by the receiving UE, up to UE implementation |  |
| *>logicalChannelIdentity* | 3 |  |  |
| MAC configuration |  |  |  |
| *>priority* | 1 |  |  |
| *>prioritisedBitRate* | infinity |  |  |
| *>logicalChannelGroup* | 0 |  |  |
| >*schedulingRequestId* | 0 | The scheduling request configuration with this value is applicable for this SCCH if configured by the network. |  |
| >*sl-HARQ-FeedbackEnabled* | Undefined | Selected by the transmitting UE, up to UE implementation |  |

Parameters that are specified of NR sidelink communication, which is used for the sidelink signalling radio bearer of unprotected PC5-S message (e.g. Direct Link Establishment Request, TS 24.587 [57]). The SL-SRB using this SCCH configuration is named as SL-SRB0.

| Name | Value | Semantics description | Ver |
| --- | --- | --- | --- |
| PDCP configuration |  |  |  |
| *>t-Reordering* | Undefined | Selected by the receiving UE, up to UE implementation |  |
| *>pdcp-SN-Size* | 12 |  |  |
| RLC configuration |  | UM RLC |  |
| *>sn-FieldLength* | 6 |  |  |
| *>t-Reassembly* | Undefined | Selected by the receiving UE, up to UE implementation |  |
| *>logicalChannelIdentity* | 0 |  |  |
| MAC configuration |  |  |  |
| *>priority* | 1 |  |  |
| *>prioritisedBitRate* | infinity |  |  |
| *>logicalChannelGroup* | 0 |  |  |
| >*schedulingRequestId* | 0 | The scheduling request configuration with this value is applicable for this SCCH if configured by the network. |  |
| >*sl-HARQ-FeedbackEnabled* | Undefined | Selected by the transmitting UE, up to UE implementation |  |

Parameters that are specified for unicast of NR sidelink communication, which is used for the sidelink signalling radio bearer of PC5-S message establishing PC5-S security (e.g. Direct Link Security Mode Command and Direct Link Security Mode Complete, TS 24.587 [57]). The SL-SRB using this SCCH configuration is named as SL-SRB1.

| Name | Value | Semantics description | Ver |
| --- | --- | --- | --- |
| PDCP configuration |  |  |  |
| *>t-Reordering* | Undefined | Selected by the receiving UE, up to UE implementation |  |
| *>pdcp-SN-Size* | 12 |  |  |
| RLC configuration |  | AM RLC |  |
| *>sn-FieldLength* | 12 |  |  |
| *>t-Reassembly* | Undefined | Selected by the receiving UE, up to UE implementation |  |
| *>t-PollRetransmit* | Undefined | Selected by the transmitting UE, up to UE implementation |  |
| *>pollPDU* | Undefined | Selected by the transmitting UE, up to UE implementation |  |
| *>pollByte* | Undefined | Selected by the transmitting UE, up to UE implementation |  |
| *>maxRetxThreshold* | Undefined | Selected by the transmitting UE, up to UE implementation |  |
| *>t-StatusProhibit* | Undefined | Selected by the receiving UE, up to UE implementation |  |
| *>logicalChannelIdentity* | 1 |  |  |
| MAC configuration |  |  |  |
| *>priority* | 1 |  |  |
| *>prioritisedBitRate* | infinity |  |  |
| *>logicalChannelGroup* | 0 |  |  |
| >*schedulingRequestId* | 0 | The scheduling request configuration with this value is applicable for this SCCH if configured by the network. |  |
| >*sl-HARQ-FeedbackEnabled* | Undefined | Selected by the transmitting UE, up to UE implementation |  |

Parameters that are specified for unicast of NR sidelink communication, which is used for the sidelink signalling radio bearer of protected PC5-S message except Direct Link Security Mode Complete. The SL-SRB using this SCCH configuration is named as SL-SRB2.

| Name | Value | Semantics description | Ver |
| --- | --- | --- | --- |
| PDCP configuration |  |  |  |
| *>t-Reordering* | Undefined | Selected by the receiving UE, up to UE implementation |  |
| *>pdcp-SN-Size* | 12 |  |  |
| RLC configuration |  | AM RLC |  |
| *>sn-FieldLength* | 12 |  |  |
| *>t-Reassembly* | Undefined | Selected by the receiving UE, up to UE implementation |  |
| *>t-PollRetransmit* | Undefined | Selected by the transmitting UE, up to UE implementation |  |
| *>pollPDU* | Undefined | Selected by the transmitting UE, up to UE implementation |  |
| *>pollByte* | Undefined | Selected by the transmitting UE, up to UE implementation |  |
| *>maxRetxThreshold* | Undefined | Selected by the transmitting UE, up to UE implementation |  |
| *>t-StatusProhibit* | Undefined | Selected by the receiving UE, up to UE implementation |  |
| *>logicalChannelIdentity* | 2 |  |  |
| MAC configuration |  |  |  |
| *>priority* | 1 |  |  |
| *>prioritisedBitRate* | infinity |  |  |
| *>logicalChannelGroup* | 0 |  |  |
| >*schedulingRequestId* | 0 | The scheduling request configuration with this value is applicable for this SCCH if configured by the network. |  |
| >*sl-HARQ-FeedbackEnabled* | Undefined | Selected by the transmitting UE, up to UE implementation |  |

Parameters that are specified for NR sidelink discovery, which is used for the sidelink signalling radio bearer of NR sidelink discovery messages (e.g., Announcement message, Solicitation message and Response message, see TS 23.304 [65]). The SL-SRB using this SCCH configuration is named as SL-SRB4.

| Name | Value | Semantics description | Ver |
| --- | --- | --- | --- |
| PDCP configuration |  |  |  |
| *>*t-Reordering | Undefined | Selected by the receiving UE, up to UE implementation |  |
| *>*pdcp-SN-Size | 12 |  |  |
| RLC configuration |  | UM RLC |  |
| *>sn-FieldLength* | 6 |  |  |
| *>*t-Reassembly | Undefined | Selected by the receiving UE, up to UE implementation |  |
| *>*logicalChannelIdentity | 58 |  |  |
| MAC configuration |  |  |  |
| *>priority* | 1 |  |  |
| *>prioritisedBitRate* | infinity |  |  |
| *>logicalChannelGroup* | 0 |  |  |
| >*schedulingRequestId* | 0 | The scheduling request configuration with this value is applicable for this SCCH if configured by the network. |  |
| >*sl-HARQ-FeedbackEnabled* | disabled | HARQ feedback is not supported for NR sidelink discovery transmission |  |

Parameters that are specified for NR sidelink L2 U2N Relay operations, which is used for the PC5 Relay RLC channel for Remote UE's SRB0 message transmission. The PC5 Relay RLC channel using this configuration is named as SL-RLC0.

| Name | Value | Semantics description | Ver |
| --- | --- | --- | --- |
| RLC configuration |  | AM |  |
| *>sn-FieldLength* | 12 |  |  |
| *>t-Reassembly* | Undefined | Selected by the receving UE, up to UE implementation |  |
| *>t-PollRetransmit* | Undefined | Selected by the transmitting UE, up to UE implementation |  |
| *>pollPDU* | Undefined | Selected by the transmitting UE, up to UE implementation |  |
| *>pollByte* | Undefined | Selected by the transmitting UE, up to UE implementation |  |
| *>maxRetxThreshold* | Undefined | Selected by the transmitting UE, up to UE implementation |  |
| *>t-StatusProhibit* | Undefined | Selected by the receiving UE, up to UE implementation |  |
| *>logicalChannelIdentity* | 56 |  |  |
| MAC configuration |  |  |  |
| *>priority* | 1 |  |  |
| *>proritisedBitRate* | Inifinity |  |  |
| *>logicalChannelGroup* | 0 |  |  |
| >*schedulingRequestId* | 0 | The scheduling request configuration with this value is applicable for this SCCH if configured by the network. The scheduling request configuration is not applicable to L2 U2N Remote UE. |  |
| >*sl-HARQ-FeedbackEnabled* | Undefined | Selected by the transmitting UE, up to UE implementation |  |

#### 9.1.1.5 STCH configuration

Parameters that are specified for NR sidelink communication, which is used for the sidelink data radio bearer.

| Name | Value | Semantics description | Ver |
| --- | --- | --- | --- |
| PDCP configuration |  |  |  |
| *>t-Reordering* | Undefined | Selected by the receiving UE, up to UE implementation |  |
| *>pdcp-SN-Size* | 12 | For broadcast and groupcast of NR sidelink communication |  |
| *>maxCID* | 15 | For broadcast and groupcast of NR sidelink communication |  |
| *>profiles* |  |  |  |
| RLC configuration |  | For broadcast and groupcast of NR sidelink communication, uni-directional UM RLC  UM window size is set to 32 |  |
| *>t-Reassembly* | Undefined | Selected by the receiving UE, up to Up to UE implementation |  |
| *>sn-FieldLength* | 6 | For broadcast and groupcast of NR sidelink communication |  |
| *>logicalChannelIdentity* | Undefined | Selected by the transmitting UE, up to UE implementation |  |
| MAC configuration |  |  |  |
| *>priority* |  |  |  |

#### 9.1.1.6 MCCH configuration

Parameters that are specified for MCCH.

| Name | Value | Semantics description | Ver |
| --- | --- | --- | --- |
| RLC configuration |  | UM RLC |  |
| *>sn-FieldLength* | 6 |  |  |
| *>t-Reassembly* | ms0 |  |  |

#### 9.1.1.7 MTCH configuration for MBS broadcast

Parameters that are specified for MBS broadcast MTCH.

| Name | Value | Semantics description | Ver |
| --- | --- | --- | --- |
| PDCP configuration |  |  |  |
| *>t-Reordering* | 0 |  |  |
| *>pdcp-SN-SizeDL* | 18 |  |  |
| RLC configuration |  | UM RLC |  |
| *>sn-FieldLength* | 12 |  |  |
| *>t-Reassembly* | ms0 |  |  |

### 9.1.2 Void

## 9.2 Default radio configurations

The following clauses only list default values for REL-15 parameters included in protocol version v15.3.0. For all fields introduced in a later protocol version, the default value is "released" or "false" unless explicitly specified otherwise. If the UE is to apply default configuration while it is configured with some critically extended fields, the UE shall apply the original version of those fields with only default values.

NOTE 1: In general, the signalling should preferably support a "release" option for fields introduced after v15.3.0. The "value not applicable" should be used restrictively, mainly limited to for fields which value is relevant only if another field is set to a value other than its default.

NOTE 2: For parameters in *ServingCellConfig*, the default values are specified in the corresponding specification.

### 9.2.1 Default SRB configurations

Parameters

| Name | Value | | | | Semantics description | Ver |
| --- | --- | --- | --- | --- | --- | --- |
|  | SRB1 | SRB2 | | SRB3 |  |  |
| *PDCP-Config*  *>t-Reordering* | infinity | | | |  |  |
| *RLC-Config* CHOICE | Am | | | |  |  |
| *ul-AM-RLC*  *>sn-FieldLength*  *>t-PollRetransmit*  *>pollPDU*  *>pollByte*  *>maxRetxThreshold* | size12  ms45  infinity  infinity  t8 | | | |  |  |
| *dl-AM-RLC*  *>sn-FieldLength*  *>t-Reassembly*  *>t-StatusProhibit* | size12  ms35  ms0 | | | |  |  |
| *logicalChannelIdentity* | 1 | 2 | 3 | |  |  |
| *LogicalChannelConfig* |  | | | |  |  |
| *>priority* | 1 | 3 | 1 | |  |  |
| *>prioritisedBitRate* | infinity | | | |  |  |
| *>logicalChannelGroup* | 0 | | | |  |  |

### 9.2.2 Default MAC Cell Group configuration

Parameters

| Name | Value | Semantics description | Ver |
| --- | --- | --- | --- |
| MAC Cell Group configuration |  |  |  |
| *bsr-Config* |  |  |  |
| *>periodicBSR-Timer* | sf10 |  |  |
| *>retxBSR-Timer* | sf80 |  |  |
| *phr-Config* |  |  |  |
| *>phr-PeriodicTimer* | sf10 |  |  |
| *>phr-ProhibitTimer* | sf10 |  |  |
| *>phr-Tx-PowerFactorChange* | dB1 |  |  |

### 9.2.3 Default values timers and constants

Parameters

| Name | Value | Semantics description | Ver |
| --- | --- | --- | --- |
| t310 | ms1000 |  |  |
| n310 | n1 |  |  |
| t311 | ms30000 |  |  |
| n311 | n1 |  |  |

### 9.2.4 Default PC5 Relay RLC Channel

Parameters of the PC5 Relay RLC Channel used for Remote UE's SRB1 RRC message transmission and reception. The PC5 Relay RLC Channel using this configuration is named as SL-RLC1.

| Name | Value | Semantics description | Ver |
| --- | --- | --- | --- |
| RLC configuration |  | AM |  |
| *>sn-FieldLength* | 12 |  |  |
| *>t-Reassembly* | Undefined | Selected by the receving UE, up to UE implementation |  |
| *>t-PollRetransmit* | Undefined | Selected by the transmitting UE, up to UE implementation |  |
| *>pollPDU* | Undefined | Selected by the transmitting UE, up to UE implementation |  |
| *>pollByte* | Undefined | Selected by the transmitting UE, up to UE implementation |  |
| *>maxRetxThreshold* | Undefined | Selected by the transmitting UE, up to UE implementation |  |
| *>t-StatusProhibit* | Undefined | Selected by the receiving UE, up to UE implementation |  |
| *>logicalChannelIdentity* | 57 |  |  |
| MAC configuration |  |  |  |
| *>priority* | 1 |  |  |
| *>proritisedBitRate* | Inifinity |  |  |
| *>logicalChannelGroup* | 0 |  |  |
| >*schedulingRequestId* | 0 | The scheduling request configuration with this value is applicable for this SCCH if configured by the network. |  |

### 9.2.5 Default SRAP configurations

Parameters that are used for receiption of Remote UE's *RRCResume* and *RRCReestablishmen* messages.

| Name | Value | Semantics description | Ver |
| --- | --- | --- | --- |
| SL SRAP Config |  |  |  |
| *> sl-LocalIdentity* | Undefined | SRAP PDUs with any local Identity will be submitted to the SRB1 PDCP entity. |  |
| *>* *sl-RemoteUE-RB-Identity* | SRB1 |  |  |

## 9.3 Sidelink pre-configured parameters

This ASN.1 segment is the start of the NR definitions of pre-configured sidelink parameters.

#### – *NR-Sidelink-Preconf*

-- ASN1START

-- TAG-NR-SIDELINK-PRECONF-DEFINITIONS-START

NR-Sidelink-Preconf DEFINITIONS AUTOMATIC TAGS ::=

BEGIN

IMPORTS

SL-RemoteUE-Config-r17,

SL-DRX-ConfigGC-BC-r17,

ffsUpperLimit, -- to be removed later

SL-FreqConfigCommon-r16,

SL-RadioBearerConfig-r16,

SL-RLC-BearerConfig-r16,

SL-EUTRA-AnchorCarrierFreqList-r16,

SL-NR-AnchorCarrierFreqList-r16,

SL-MeasConfigCommon-r16,

SL-UE-SelectedConfig-r16,

TDD-UL-DL-ConfigCommon,

maxNrofFreqSL-r16,

maxNrofSLRB-r16,

maxSL-LCID-r16

FROM NR-RRC-Definitions;

-- TAG-NR-SIDELINK-PRECONF-DEFINITIONS-STOP

-- ASN1STOP

#### – *SL-PreconfigurationNR*

The IE *SL-PreconfigurationNR* includes the sidelink pre-configured parameters used for NR sidelink communication. Need codes or conditions specified for subfields in *SL-PreconfigurationNR* do not apply.

*SL-PreconfigurationNR* information elements

-- ASN1START

-- TAG-SL-PRECONFIGURATIONNR-START

SL-PreconfigurationNR-r16 ::= SEQUENCE {

sidelinkPreconfigNR-r16 SidelinkPreconfigNR-r16,

...

}

SidelinkPreconfigNR-r16 ::= SEQUENCE {

sl-PreconfigFreqInfoList-r16 SEQUENCE (SIZE (1..maxNrofFreqSL-r16)) OF SL-FreqConfigCommon-r16 OPTIONAL,

sl-PreconfigNR-AnchorCarrierFreqList-r16 SL-NR-AnchorCarrierFreqList-r16 OPTIONAL,

sl-PreconfigEUTRA-AnchorCarrierFreqList-r16 SL-EUTRA-AnchorCarrierFreqList-r16 OPTIONAL,

sl-RadioBearerPreConfigList-r16 SEQUENCE (SIZE (1..maxNrofSLRB-r16)) OF SL-RadioBearerConfig-r16 OPTIONAL,

sl-RLC-BearerPreConfigList-r16 SEQUENCE (SIZE (1..maxSL-LCID-r16)) OF SL-RLC-BearerConfig-r16 OPTIONAL,

sl-MeasPreConfig-r16 SL-MeasConfigCommon-r16 OPTIONAL,

sl-OffsetDFN-r16 INTEGER (1..1000) OPTIONAL,

t400-r16 ENUMERATED{ms100, ms200, ms300, ms400, ms600, ms1000, ms1500, ms2000} OPTIONAL,

sl-MaxNumConsecutiveDTX-r16 ENUMERATED {n1, n2, n3, n4, n6, n8, n16, n32} OPTIONAL,

sl-SSB-PriorityNR-r16 INTEGER (1..8) OPTIONAL,

sl-PreconfigGeneral-r16 SL-PreconfigGeneral-r16 OPTIONAL,

sl-UE-SelectedPreConfig-r16 SL-UE-SelectedConfig-r16 OPTIONAL,

sl-CSI-Acquisition-r16 ENUMERATED {enabled} OPTIONAL,

sl-RoHC-Profiles-r16 SL-RoHC-Profiles-r16 OPTIONAL,

sl-MaxCID-r16 INTEGER (1..16383) DEFAULT 15,

...,

[[

sl-DRX-PreConfig-GC-BC-r17 SL-DRX-ConfigGC-BC-r17 OPTIONAL,

sl-TxProfileList-r17 SL-TxProfileList-r17 OPTIONAL,

sl-PreconfigDiscConfig-r17 SL-RemoteUE-Config-r17 OPTIONAL

]]

}

SL-TxProfileList-r17 ::= SEQUENCE (SIZE (1..256)) OF SL-TxProfile-r17

SL-TxProfile-r17 ::= ENUMERATED {drx-Compatible, drx-Incompatible, spare6, spare5, spare4, spare3,spare2, spare1}

SL-PreconfigGeneral-r16 ::= SEQUENCE {

sl-TDD-Configuration-r16 TDD-UL-DL-ConfigCommon OPTIONAL,

reservedBits-r16 BIT STRING (SIZE (2)) OPTIONAL,

...

}

SL-RoHC-Profiles-r16 ::= SEQUENCE {

profile0x0001-r16 BOOLEAN,

profile0x0002-r16 BOOLEAN,

profile0x0003-r16 BOOLEAN,

profile0x0004-r16 BOOLEAN,

profile0x0006-r16 BOOLEAN,

profile0x0101-r16 BOOLEAN,

profile0x0102-r16 BOOLEAN,

profile0x0103-r16 BOOLEAN,

profile0x0104-r16 BOOLEAN

}

-- TAG-SL-PRECONFIGURATIONNR-STOP

-- ASN1STOP

| *SL-PreconfigurationNR* field descriptions |
| --- |
| ***sl-DRX-PreConfig-GC-BC***  This field indicates the sidelink DRX configuration for groupcast and broadcast communication, as specified in TS 38.321 [3]. |
| ***sl-OffsetDFN***  Indicates the timing offset for the UE to determine DFN timing when GNSS is used for timing reference. Value 1 corresponds to 0.001 milliseconds, value 2 corresponds to 0.002 milliseconds, and so on. If the field is absent, no offset is applied. |
| ***sl-PreconfigDiscConfig***  This field indicates the configuration for discovery message transmission used by NR sidelink U2N Remote UE. |
| ***sl-PreconfigEUTRA-AnchorCarrierFreqList***  This field indicates the EUTRA anchor carrier frequency list, which can provide the NR sidelink communication configuration. |
| ***sl-PreconfigFreqInfoList***  This field indicates the NR sidelink communication and/ or NR sidelink discovery configuration some carrier frequency(ies). In this release, only one *SL-FreqConfig* can be configured in the list. |
| ***sl-PreconfigNR-AnchorCarrierFreqList***  This field indicates the NR anchor carrier frequency list, which can provide the NR sidelink communication configuration. |
| ***sl-RadioBearerPreConfigList***  This field indicates one or multiple sidelink radio bearer configurations. |
| ***sl-RLC-BearerPreConfigList***  This field indicates one or multiple sidelink RLC bearer configurations. |
| ***sl-RoHC-Profiles***  This field indicates the supported RoHC profiles for NR sidelink communications. |
| ***sl-SSB-PriorityNR***  This field indicates the priority of NR sidelink SSB transmission and reception. |
| ***sl-TxProfileList***  List of one or multiple Tx profiles, which are indicated by upper layer in order of increasing Tx profile pointer identities, indicate the compatibility of supporting SL DRX as specified in TS 38.321 [3]. |

#### – *End of NR-Sidelink-Preconf*

-- ASN1START

END

-- ASN1STOP

End of Changes