**3GPP TSG-RAN WG2 Meeting #118** **R2-2206455**

**eMeeting, 09th May – 20th May, 2022**

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| *CR-Form-v12.0* | | | | | | | | |
| **CHANGE REQUEST** | | | | | | | | |
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|  | **38.331** | **CR** | **3057** | **rev** | **1** | **Current version:** | **17.0.0** |  |
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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:*** | Clarification and correction for measurement gap enhancement features | | | | | | | | | |
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| ***Source to WG:*** | MediaTek Inc. | | | | | | | | | |
| ***Source to TSG:*** | R2 | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Work item code:*** | NR\_MG\_enh-Core | | | | |  | ***Date:*** | | | 2022/05/09 |
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| ***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-12 (Release 12) Rel-13 (Release 13) Rel-14 (Release 14) Rel-15 (Release 15) Rel-16 (Release 16)* | |
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| ***Reason for change:*** | | Some correction/clarification are needed for measurement gap enhancement features according to the ASN.1 Review result and agreements from RAN2#118.  (Based on R2-2205241)  For NW-controlled mechanism, the current RRC use deactivatedMeasGapList to list the gaps to be in deactivated status in a BWP. However, if the deactivatedMeasGapList is absent for all BWPs, it is unclear the UE autonomous mechanism should be used or it is for NW-controlled mechanism with activated gap for all BWPs. The issue is mentioned in RIL H650. We suggest to fix it by adding a bitmap indicating the activated/deactivated status of all gaps in each BWP configuration. The same configuration should be used in SCell for consistency.  In RIL H651, it is suggested to clarify that *deactivatedMeasGapList* is optional present for NW-controlled mechanism. However, in our understanding, this field is used to indicate whether the NW-controlled mechanism or UE autonomous mechanism is configured. We think it is better to clarify that the UE shall apply NW-controlled mechanism if this field present.   Furthermore, with above proposals, the original editor note on *deactivatedMeasGapList* becomes irrelevant, so we suggest to remove it.  (Based on R2-2206454)  The current SPEC using 3 new ToAddModList for each “gap type” for concurrent gap configuration. It is suggested to use only one list as all gaps share the same ID space.  The current ASN.1 allowed NW to use legacy field (i.e. *gapFR2*, *gapFR1*, and *gapUE*) to configure new R17 MGE features. It is suggested to use only R17 field to configure R17 features to have a clean approach.  In addition, the maximum number of gap ID(s) and the maximum number of gap priority are not defined yet. For R17 concurrent gap feature, only 3 concurrent gaps and 2 priority level is needed. However, Larger value is proposed to have future proof.  (Based on R2-2206677) 1. Both the deriveSSB-IndexFromCell IE and deriveSSB-IndexFromCellInter IE can be used to indicate SFN and frame boundary alignment across all cells on the frequency indicated by the MeasObjectNR. In order to avoid inter-operability issue, RAN2 needs to clarify the relationship between the two IEs.  2. For the IE deriveSSB-IndexFromCellInter, the frequency should be different between the neighbour cells and timing reference cell where the timing reference cell is one of the serving cells which can be indicated by ServCellIndex. It should be explictly captured in the field description.  (Based on R2-2206491) [H804] As metioned in LS from RAN4 (R4-2206890), the mgta = 0.25ms should not be used for NCSG. In addition, the mgl {ms1, ms2, ms5} and mgta {ms0dot75} should apply to NCSG only.  (Based on option 1a in R2-2206680) It is suggested to update IE name *NeedForNCSG* with *NeedForGapNCSG* as the IE include not only NCSG requirement but also normal gap requirement information. | | | | | | | | |
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| ***Summary of change:*** | | Correct the issues from the following RILs   * H645/H646/H647/H648 - The format should be re-designed to increase readability * M601 – Remove editor note on MG definition * I020/I023 – Missing Need code for absence that is relevant here. * I033 – Replace the field with needForNSCG-BandListEUTRA-r17 and delete the NeedForNSCG-BandListEUTRA-r17 * H805 –Fix typo – “nscg” to “ncsg” * H650/H651 – Add a bitmap to indicate the activated/deactivated status of all pre-configured MG for each BWP and deactivated SCell. Clarify that the bitmap is used indicate the UE shall apply the NW-controlled mechanism. * M602/M603 – Remove the editor note - “Editor Note: It is FFS whether the deactivated MG list configured in BWP or SCell could be configured with size zero * E034 – Define a single *ToAddModList* to enable concurrent gaps, instead of the 3 new *ToAddModList* for per UE, FR1, and FR2 gap. * E033 – Create a separate IE (i.e. *GapConfig-r17)* so R17 gap is configured by R17 IE. * M604 – Define the gap ID as mandatory field in *GapConfig-r17*. * M605 – Define the maximum number of gap ID to 8 * M606 – Define the maximum number of gap priority to 16 * Z142 - Clarify the followings in the field description of *deriveSSB-IndexFromCellInter* IE.  When this field is configured, the network should set the legacy *deriveSSB-IndexFromCell* IE to true. The IE can only be applied to the case where the neighbour cell(s) is on a frequency different than the frequency from the reference serving cell. * H804 -  1) Add clarfication that mgta=0.25ms cannot be configured to NCSG in field descriptions of mgta IE.   2) Add clarification to the field description that mgl {ms1, ms2, ms5} and mgta {ms0dot75} can only be configured for NCSG.   * Rename the following IE   NeedForNCSG-InfoNR to NeedForGapNCSG-InfoNR  NeedForNCSG-InfoEUTRA to NeedForGapNCSG-InfoEUTRA  NeedForNCSG-ConfigNR to NeedForGapNCSG-ConfigNR  NeedForNCSG-ConfigEUTRA to NeedForGapNCSG-ConfigEUTRA | | | | | | | | |
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| ***Consequences if not approved:*** | | Ambiguities in MGE features | | | | | | | | |
|  | |  | | | | | | | | |
| ***Clauses affected:*** | | 5.3.5.3, 5.3.13.4, 5.5.1, 5.5.2.9, 6.2.2, 6.3.2, 6.4, 11.2.1, 11.2.2 | | | | | | | | |
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|  | | **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:*** | | R2-2205223 | | | | | | | | |

#### 5.3.5.3 Reception of an *RRCReconfiguration* by the UE

The UE shall perform the following actions upon reception of the *RRCReconfiguration,* or upon execution of the conditional reconfiguration (CHO, CPA or CPC):

1> if the *RRCReconfiguration* was received neither within *mrdc-SecondaryCellGroup* nor within E-UTRA *RRCConnectionReconfiguration* nor within E-UTRA *RRCConnectionResume*:

2> if the *RRCReconfiguration* includes the *scg-State*:

3> perform SCG deactivation as specified in 5.3.5.13b;

2> else:

3> perform SCG activation as specified in 5.3.5.13a;

Editor's note: FFS how to ensure that the notification to MAC is only processed at the time the SCG configuration is processed, if included.

1> if the *RRCReconfiguration* is applied due to a conditional reconfiguration execution upon cell selection performed while timer T311 was running, as defined in 5.3.7.3:

2> remove all the entries within *VarConditionalReconfig*, if any;

1> if the *RRCReconfiguration* includes the *daps-SourceRelease*:

2> reset the source MAC and release the source MAC configuration;

2> for each DAPS bearer:

3> release the RLC entity or entities as specified in TS 38.322 [4], clause 5.1.3, and the associated logical channel for the source SpCell;

3> reconfigure the PDCP entity to release DAPS as specified in TS 38.323 [5];

2> for each SRB:

3> release the PDCP entity for the source SpCell;

3> release the RLC entity as specified in TS 38.322 [4], clause 5.1.3, and the associated logical channel for the source SpCell;

2> release the physical channel configuration for the source SpCell;

2> discard the keys used in the source SpCell (the KgNB key, the KRRCenc key, the KRRCint key, the KUPint key and the KUPenc key), if any;

1> if the *RRCReconfiguration* is received via other RAT (i.e., inter-RAT handover to NR):

2> if the *RRCReconfiguration* does not include the *fullConfig* and the UE is connected to 5GC (i.e., delta signalling during intra 5GC handover):

3> re-use the source RAT SDAP and PDCP configurations if available (i.e., current SDAP/PDCP configurations for all RBs from source E-UTRA RAT prior to the reception of the inter-RAT HO *RRCReconfiguration* message);

1> else:

2> if the RRCReconfiguration includes the fullConfig:

3> perform the full configuration procedure as specified in 5.3.5.11;

1> if the *RRCReconfiguration* includes the *masterCellGroup*:

2> perform the cell group configuration for the received *masterCellGroup* according to 5.3.5.5;

1> if the *RRCReconfiguration* includes the *masterKeyUpdate*:

2> perform AS security key update procedure as specified in 5.3.5.7;

1> if the *RRCReconfiguration* includes the *sk-Counter*:

2> perform security key update procedure as specified in 5.3.5.7;

1> if the *RRCReconfiguration* includes the *secondaryCellGroup*:

2> perform the cell group configuration for the SCG according to 5.3.5.5;

1> if the *RRCReconfiguration* includes the *mrdc-SecondaryCellGroupConfig:*

2> if the *mrdc-SecondaryCellGroupConfig* is set to *setup*:

3> if the *mrdc-SecondaryCellGroupConfig* includes *mrdc-ReleaseAndAdd*:

4> perform MR-DC release as specified in clause 5.3.5.10;

3> if the received *mrdc-SecondaryCellGroup* is set to *nr-SCG*:

4> perform the RRC reconfiguration according to 5.3.5.3 for the *RRCReconfiguration* message included in *nr-SCG*;

3> if the received *mrdc-SecondaryCellGroup* is set to *eutra-SCG*:

4> perform the RRC connection reconfiguration as specified in TS 36.331 [10], clause 5.3.5.3 for the *RRCConnectionReconfiguration* message included in *eutra-SCG*;

2> else (*mrdc-SecondaryCellGroupConfig* is set to *release*):

3> perform MR-DC release as specified in clause 5.3.5.10;

1> if the *RRCReconfiguration* message includes the *radioBearerConfig*:

2> perform the radio bearer configuration according to 5.3.5.6;

1> if the *RRCReconfiguration* message includes the *radioBearerConfig2*:

2> perform the radio bearer configuration according to 5.3.5.6;

1> if the *RRCReconfiguration* message includes the *measConfig*:

2> perform the measurement configuration procedure as specified in 5.5.2;

1> if the *RRCReconfiguration* message includes the *dedicatedNAS-MessageList*:

2> forward each element of the *dedicatedNAS-MessageList* to upper layers in the same order as listed;

1> if the *RRCReconfiguration* message includes the *dedicatedSIB1-Delivery*:

2> perform the action upon reception of *SIB1* as specified in 5.2.2.4.2;

NOTE 0: If this *RRCReconfiguration* is associated to the MCG and includes *reconfigurationWithSync* in *spCellConfig* and *dedicatedSIB1-Delivery*, the UE initiates (if needed) the request to acquire required SIBs, according to clause 5.2.2.3.5, only after the random access procedure towards the target SpCell is completed.

1> if the *RRCReconfiguration* message includes the *dedicatedSystemInformationDelivery*:

2> perform the action upon reception of System Information as specified in 5.2.2.4;

1> if the *RRCReconfiguration* message includes the *dedicatedPosSysInfoDelivery*:

2> perform the action upon reception of the contained posSIB(s), as specified in clause 5.2.2.4.16;

1> if the *RRCReconfiguration* message includes the *otherConfig*:

2> perform the other configuration procedure as specified in 5.3.5.9;

1> if the *RRCReconfiguration* message includes the *bap-Config*:

2> perform the BAP configuration procedure as specified in 5.3.5.12;

1> if the *RRCReconfiguration* message includes the *iab-IP-AddressConfigurationList*:

2> if *iab-IP-AddressToReleaseList* is included:

3> perform release of IP address as specified in 5.3.5.12a.1.1;

2> if *iab-IP-AddressToAddModList* is included:

3> perform IAB IP address addition/update as specified in 5.3.5.12a.1.2;

1> if the *RRCReconfiguration* message includes the *conditionalReconfiguration*:

2> perform conditional reconfiguration as specified in 5.3.5.13;

1> if the *RRCReconfiguration* message includes the *needForGapsConfigNR*:

2> if *needForGapsConfigNR* is set to *setup*:

3> consider itself to be configured to provide the measurement gap requirement information of NR target bands;

2> else:

3> consider itself not to be configured to provide the measurement gap requirement information of NR target bands;

1> if the *RRCReconfiguration* message includes the *needForGapNCSG-ConfigNR*:

2> if *needForGapNCSG-ConfigNR* is set to *setup*:

3> consider itself to be configured to provide the measurement gap and NCSG requirement information of NR target bands;

2> else:

3> consider itself not to be configured to provide the measurement gap and NCSG requirement information of NR target bands;

1> if the *RRCReconfiguration* message includes the *needForGapNCSG-ConfigEUTRA*:

2> if *needForGapNCSG-ConfigEUTRA* is set to *setup*:

3> consider itself to be configured to provide the measurement gap and NCSG requirement information of E‑UTRA target bands;

2> else:

3> consider itself not to be configured to provide the measurement gap and NCSG requirement information of E‑UTRA target bands;

1> if the *RRCReconfiguration* message includes the *sl-ConfigDedicatedNR*:

2> perform the sidelink dedicated configuration procedure as specified in 5.3.5.14;

NOTE 0a: If the *sl-ConfigDedicatedNR* was received embedded within an E-UTRA *RRCConnectionReconfiguration* message, the UE does not build an NR *RRCReconfigurationComplete* message for the received *sl-ConfigDedicatedNR*.

1> if the *RRCReconfiguration* message includes the *sl-L2RelayUEConfig*:

2> perform the L2 U2N Relay UE configuration procedure as specified in 5.3.5.15;

1> if the *RRCReconfiguration* message includes the *sl-L2RemoteUEConfig*:

2> perform the L2 U2N Remote UE configuration procedure as specified in 5.3.5.16;

1> if the *RRCReconfiguration* message includes the *dedicatedPagingDelivery*:

2> if the *ue-Identity* included in the *PagingRecord* in the *Paging* message matches the UE identity in *sl-PagingIdentity-RemoteUE* in *sl-PagingInfo-RemoteUE* received in *RemoteUEInformationSidelink* message in accordance with 5.8.9.8.3:

3> inititate the Uu Message transfer in sidelink as specified in 5.8.9.9;

1> if the *RRCReconfiguration* message includes the *sl-ConfigDedicatedEUTRA-Info*:

2> perform related procedures for V2X sidelink communication in accordance with TS 36.331 [10], clause 5.3.10 and clause 5.5.2;

1> if the *RRCReconfiguration* message includes the *ul-GapFR2-Config*:

2> perform the FR2 UL gap configuration procedure as specified in 5.3.5.13c;

1> if the *RRCReconfiguration* message includes the *musim-GapConfig*:

2> for each periodic *musim-GapID* included in the received *musim-GapToReleaseList*:

3> release the MUSIM periodic gap associated to the *musim-GapID* from the *musim-GapConfigList*;

2> for each periodic *musim-GapID* included in the received *musim-GapToAddModList*:

3> if an entry with the matching *musim-GapID* exists in the *musim-GapConfigList*:

4> replace the entry with the value received for this *musim-GapID*;

3> else:

4> add a new entry for this *musim-GapID*;

1> if the *RRCReconfiguration* message includes the *appLayerMeasConfig*:

2> perform the application layer measurement configuration procedure as specified in 5.3.5.13d;

1> set the content of the *RRCReconfigurationComplete* message as follows:

2> if the *RRCReconfiguration* includes the *masterCellGroup* containing the *reportUplinkTxDirectCurrent*:

3> include the *uplinkTxDirectCurrentList* for each MCG serving cell with UL;

3> include *uplinkDirectCurrentBWP-SUL* for each MCG serving cell configured with SUL carrier, if any, within the *uplinkTxDirectCurrentList*;

2> if the *RRCReconfiguration* includes the *masterCellGroup* containing the *reportUplinkTxDirectCurrentTwoCarrier*:

3> include in the *uplinkTxDirectCurrentTwoCarrierList* the list of uplink Tx DC locations for the configured intra-band uplink carrier aggregation in the MCG;

2> if the *RRCReconfiguration* includes the *secondaryCellGroup* containing the *reportUplinkTxDirectCurrent*:

3> include the *uplinkTxDirectCurrentList* for each SCG serving cell with UL;

3> include *uplinkDirectCurrentBWP-SUL* for each SCG serving cell configured with SUL carrier, if any, within the *uplinkTxDirectCurrentList*;

2> if the *RRCReconfiguration* includes the *secondaryCellGroup* containing the *reportUplinkTxDirectCurrentTwoCarrier*:

3> include in the *uplinkTxDirectCurrentTwoCarrierList* the list of uplink Tx DC locations for the configured intra-band uplink carrier aggregation in the SCG;

NOTE 0b: It is expected that the *reportUplinkTxDirectCurrentTwoCarrier* is only received either in *masterCellGroup* or in *secondaryCellGroup* but not both.

2> if the *RRCReconfiguration* message includes the *mrdc-SecondaryCellGroupConfig* with *mrdc-SecondaryCellGroup* set to *eutra-SCG*:

3> include in the *eutra-SCG-Response* the E-UTRA *RRCConnectionReconfigurationComplete* message in accordance with TS 36.331 [10] clause 5.3.5.3;

2> if the *RRCReconfiguration* message includes the *mrdc-SecondaryCellGroupConfig* with *mrdc-SecondaryCellGroup* set to *nr-SCG*:

3> include in the *nr-SCG-Response* the SCG *RRCReconfigurationComplete* message;

3> if the *RRCReconfiguration* message is applied due to conditional reconfiguration execution:

4> include in the *selectedCondRRCReconfig* the *condReconfigId* for the selected cell of conditional reconfiguration execution;

2> if the *RRCReconfiguration* includes the *reconfigurationWithSync* in *spCellConfig* of an MCG:

3> if the UE has logged measurements available for NR and if the RPLMN is included in *plmn-IdentityList* stored in *VarLogMeasReport*:

4> if the *sigLoggedMeasType* in *VarLogMeasReport* is included:

5> include the *sigLogMeasConfigAvailable* in the *RRCReconfigurationComplete* message and set it according to the following:

6> if T330 timer is running:

7> set *sigLogMeasConfigAvailable* to *true* in the *RRCReconfigurationComplete* message;

6> else:

7> set *sigLogMeasConfigAvailable* to false in the *RRCReconfigurationComplete* message;

4> include the *logMeasAvailable* in the *RRCReconfigurationComplete* message;

4> if Bluetooth measurement results are included in the logged measurements the UE has available for NR:

5> include the *logMeasAvailableBT* in the *RRCReconfigurationComplete* message;

4> if WLAN measurement results are included in the logged measurements the UE has available for NR:

5> include the *logMeasAvailableWLAN* in the *RRCReconfigurationComplete* message;

3> if the *sigLoggedMeasType* in *VarLogMeasReport* is included:

4> if T330 timer is running:

5> set *sigLogMeasConfigAvailable* to *true* in the *RRCReconfigurationComplete* message;

4> else:

5> if the UE has logged measurements available for NR:

6> set *sigLogMeasConfigAvailable* to false in the *RRCReconfigurationComplete* message;

3> if the UE has connection establishment failure or connection resume failure information available in *VarConnEstFailReport* or *VarConnEstFailReportList* and if the RPLMN is equal to *plmn-Identity* stored in *VarConnEstFailReport* or *VarConnEstFailReportList*:

4> include *connEstFailInfoAvailable* in the *RRCReconfigurationComplete* message;

3> if the UE has radio link failure or handover failure information available in *VarRLF-Report* and if the RPLMN is included in *plmn-IdentityList* stored in *VarRLF-Report*; or

3> if the UE has radio link failure or handover failure information available in *VarRLF-Report* of TS 36.331 [10] and if the UE is capable of cross-RAT RLF reporting and if the RPLMN is included in *plmn-IdentityList* stored in *VarRLF-Report* of TS 36.331 [10]:

4> include *rlf-InfoAvailable* in the *RRCReconfigurationComplete* message;

3> if the UE was configured with *successHO-Config* when connected to the source PCell; and

3> if the applied *RRCReconfiguration* is not due to a conditional reconfiguration execution upon cell selection performed while timer T311 was running, as defined in 5.3.7.3:

4> perform the actions for the successful handover report determination as specified in clause 5.7.10.6, upon successfully completing the Random Access procedure triggered for the *reconfigurationWithSync* in *spCellConfig* of the MCG;

3> if the UE has successful handover information available in *VarSuccessHO-Report* and if the RPLMN is included in *plmn-IdentityList* stored in *VarSuccessHO-Report*:

4> include *successHO-InfoAvailable* in the *RRCReconfigurationComplete* message;

2> if the *RRCReconfiguration* message was received via SRB1, but not within *mrdc-SecondaryCellGroup* or E-UTRA *RRCConnectionReconfiguration* or E-UTRA *RRCConnectionResume*:

3> if the UE is configured to provide the measurement gap requirement information of NR target bands:

4> if the *RRCReconfiguration* message includes the *needForGapsConfigNR*; or

4> if the *NeedForGapsInfoNR* information is changed compared to last time the UE reported this information:

5> include the *NeedForGapsInfoNR* and set the contents as follows:

6> include *intraFreq-needForGap* and set the gap requirement information of intra-frequency measurement for each NR serving cell;

6> if *requestedTargetBandFilterNR* is configured:

7> for each supported NR band that is also included in *requestedTargetBandFilterNR*, include an entry in *interFreq-needForGap* and set the gap requirement information for that band;

6> else:

7> include an entry in *interFreq-needForGap* and set the corresponding gap requirement information for each supported NR band;

3> if the UE is configured to provide the measurement gap and NCSG requirement information of NR target bands:

4> if the *RRCReconfiguration* message includes the *needForGapNCSG-ConfigNR*; or

4> if the *needForGapNCSG-InfoNR* information is changed compared to last time the UE reported this information:

5> include the *NeedForGapNCSG-InfoNR* and set the contents as follows:

6> include *intraFreq-needForNCSG* and set the gap and NCSG requirement information of intra-frequency measurement for each NR serving cell;

6> if *requestedTargetBandFilterNCSG-NR* is configured:

7> for each supported NR band included in *requestedTargetBandFilterNCSG-NR*, include an entry in *interFreq-needForNCSG* and set the NCSG requirement information for that band;

6> else:

7> include an entry for each supported NR band in *interFreq-needForNCSG* and set the corresponding NCSG requirement information;

3> if the UE is configured to provide the measurement gap and NCSG requirement information of E‑UTRA target bands:

4> if the *RRCReconfiguration* message includes the *needForGapNCSG-ConfigEUTRA*; or

4> if the *needForGapNCSG-InfoEUTRA* information is changed compared to last time the UE reported this information:

5> include the *NeedForGapNCSG-InfoEUTRA* and set the contents as follows:

6> if *requestedTargetBandFilterNCSG-EUTRA* is configured, for each supported E-UTRA band included in *requestedTargetBandFilterNCSG-EUTRA*, include an entry in *needForNCSG-EUTRA* and set the NCSG requirement information for that band; otherwise, include an entry for each supported E-UTRA band in *needForNCSG-EUTRA* and set the corresponding NCSG requirement information;

1> if the UE is configured with E-UTRA *nr-SecondaryCellGroupConfig* (UE in (NG)EN-DC):

2> if the *RRCReconfiguration* message was received via E-UTRA SRB1 as specified in TS 36.331 [10]; or

2> if the *RRCReconfiguration* message was received via E-UTRA RRC message *RRCConnectionReconfiguration* within *MobilityFromNRCommand* (handover from NR standalone to (NG)EN-DC);

3> if the *RRCReconfiguration* is applied due to a conditional reconfiguration execution for CPC which is configured via *conditionalReconfiguration* contained in *nr-SecondaryCellGroupConfig* specified in TS 36.331 [10]:

4> submit the *RRCReconfigurationComplete* message via the E-UTRA MCG embedded in E-UTRA RRC message *ULInformationTransferMRDC* as specified in TS 36.331 [10], clause 5.6.2a.

3> else if the *RRCReconfiguration* message was included in E-UTRA *RRCConnectionResume* message:

4> submit the *RRCReconfigurationComplete* message via E-UTRA embedded in E-UTRA RRC message *RRCConnectionResumeComplete* as specified in TS 36.331 [10], clause 5.3.3.4a;

3> else:

4> submit the *RRCReconfigurationComplete* via E-UTRA embedded in E-UTRA RRC message *RRCConnectionReconfigurationComplete* as specified in TS 36.331 [10], clause 5.3.5.3/5.3.5.4/5.4.2.3;

3> if the *scg-State* is not included in the E-UTRA *RRCConnectionReconfiguration* message containing the *RRCReconfiguration* message:

4> if *reconfigurationWithSync* was included in *spCellConfig* of an SCG; or

4> if the SCG was deactivated before the reception of the E-UTRA RRC message containing the *RRCReconfiguration* message and lower layers consider that a Random Access procedure is needed for SCG activation:

5> initiate the Random Access procedure on the SpCell, as specified in TS 38.321 [3];

4> else:

5> the procedure ends;

3> else:

4> the procedure ends;

2> if the *RRCReconfiguration* message was received within *nr-SecondaryCellGroupConfig* in *RRCConnectionReconfiguration* message received via SRB3 within *DLInformationTransferMRDC*:

3> submit the *RRCReconfigurationComplete* via E-UTRA embedded in E-UTRA RRC message *RRCConnectionReconfigurationComplete* as specified in TS 36.331 [10], clause 5.3.5.3/5.3.5.4;

3> if *reconfigurationWithSync* was included in *spCellConfig* of an SCG:

4> initiate the Random Access procedure on the SpCell, as specified in TS 38.321 [3];

3> else:

4> the procedure ends;

NOTE 1: The order the UE sends the *RRCConnectionReconfigurationComplete* message and performs the Random Access procedure towards the SCG is left to UE implementation.

2> else (*RRCReconfiguration* was received via SRB3) but not within *DLInformationTransferMRDC*:

3> submit the *RRCReconfigurationComplete* message via SRB3 to lower layers for transmission using the new configuration;

NOTE 2: In (NG)EN-DC and NR-DC, in the case *RRCReconfiguration* is received via SRB1 or within *DLInformationTransferMRDC* via SRB3, the random access is triggered by RRC layer itself as there is not necessarily other UL transmission. In the case *RRCReconfiguration* is received via SRB3 but not within *DLInformationTransferMRDC*, the random access is triggered by the MAC layer due to arrival of *RRCReconfigurationComplete*.

1> else if the *RRCReconfiguration* message was received via SRB1 within the *nr-SCG* within *mrdc-SecondaryCellGroup* (UE in NR-DC, *mrdc-SecondaryCellGroup* was received in *RRCReconfiguration* or *RRCResume* via SRB1):

2> if the *RRCReconfiguration* is applied due to a conditional reconfiguration execution for CPC which is configured via *conditionalReconfiguration* contained in *nr-SCG* within *mrdc-SecondaryCellGroup*:

3> submit the *RRCReconfigurationComplete* message via the NR MCG embedded in NR RRC message *ULInformationTransferMRDC* as specified in clause 5.7.2a.3.

2> if the *scg-State* is not included in the *RRCReconfiguration* or *RRCResume* message containing the *RRCReconfiguration* message:

3> if *reconfigurationWithSync* was included in *spCellConfig* in nr-SCG; or

3> if the SCG was deactivated before the reception of the NR RRC message containing the *RRCReconfiguration* message and lower layers consider that a Random Access procedure is needed for SCG activation:

4> initiate the Random Access procedure on the PSCell, as specified in TS 38.321 [3];

3> else:

4> the procedure ends;

2> else

3> the procedure ends;

NOTE 2a: The order in which the UE sends the *RRCReconfigurationComplete* message and performs the Random Access procedure towards the SCG is left to UE implementation.

1> else if the *RRCReconfiguration* message was received via SRB3 (UE in NR-DC):

2> if the *RRCReconfiguration* message was received within *DLInformationTransferMRDC*:

3> if the *RRCReconfiguration* message was received within the *nr-SCG* within *mrdc-SecondaryCellGroup* (NR SCG RRC Reconfiguration):

4> if *reconfigurationWithSync* was included in *spCellConfig* in *nr-SCG*:

5> initiate the Random Access procedure on the PSCell, as specified in TS 38.321 [3];

4> else:

5> the procedure ends;

3> else:

4> submit the *RRCReconfigurationComplete* message via SRB1 to lower layers for transmission using the new configuration;

2> else:

3> submit the *RRCReconfigurationComplete* message via SRB3 to lower layers for transmission using the new configuration;

1> else(*RRCReconfiguration* was received via SRB1):

2> submit the *RRCReconfigurationComplete* message via SRB1 to lower layers for transmission using the new configuration;

2> if this is the first *RRCReconfiguration* message after successful completion of the RRC re-establishment procedure:

3> resume SRB2, SRB4, and DRBs, multicast MRB, and BH RLC channels for IAB-MT, that are suspended;

1> if *reconfigurationWithSync* was included in *spCellConfig* of an MCG or SCG, and when MAC of an NR cell group successfully completes a Random Access procedure triggered above:

2> stop timer T304 for that cell group;

2> stop timer T310 for source SpCell if running;

2> apply the parts of the CSI reporting configuration, the scheduling request configuration and the sounding RS configuration that do not require the UE to know the SFN of the respective target SpCell, if any;

2> apply the parts of the measurement and the radio resource configuration that require the UE to know the SFN of the respective target SpCell (e.g. measurement gaps, periodic CQI reporting, scheduling request configuration, sounding RS configuration), if any, upon acquiring the SFN of that target SpCell;

2> for each DRB configured as DAPS bearer, request uplink data switching to the PDCP entity, as specified in TS 38.323 [5];

2> if the *reconfigurationWithSync* was included in *spCellConfig* of an MCG:

3> if T390 is running:

4> stop timer T390 for all access categories;

4> perform the actions as specified in 5.3.14.4.

3> if T350 is running:

4> stop timer T350;

3> if *RRCReconfiguration* does not include *dedicatedSIB1-Delivery* and

3> if the active downlink BWP, which is indicated by the *firstActiveDownlinkBWP-Id* for the target SpCell of the MCG, has a common search space configured by *searchSpaceSIB1*:

4> acquire the *SIB1*, which is scheduled as specified in TS 38.213 [13], of the target SpCell of the MCG;

4> upon acquiring *SIB1*, perform the actions specified in clause 5.2.2.4.2;

2> if the *reconfigurationWithSync* was included in *spCellConfig* of an MCG; or

2> if the *reconfigurationWithSync* was included in *spCellConfig* of an SCG and the CPA or CPC was configured

3> remove all the entries within *VarConditionalReconfig*, if any;

3> remove all the entries within *VarConditionalReconfiguration* as specified in TS 36.331 [10], clause 5.3.5.9.6, if any;

3> for each *measId* of the source SpCell configuration, if the associated *reportConfig* has a *reportType* set to *condTriggerConfig*:

4> for the associated *reportConfigId*:

5> remove the entry with the matching *reportConfigId* from the *reportConfigList* within the *VarMeasConfig*;

4> if the associated *measObjectId* is only associated to a *reportConfig* with *reportType* set to *condTriggerConfig*:

5> remove the entry with the matching *measObjectId* from the *measObjectList* within the *VarMeasConfig*;

4> remove the entry with the matching *measId* from the *measIdList* within the *VarMeasConfig*;

2> if *reconfigurationWithSync* was included in *masterCellGroup* or *secondaryCellGroup*:

3> if the UE initiated transmission of a *UEAssistanceInformation* message for the corresponding cell group during the last 1 second, and the UE is still configured to provide the concerned UE assistance information for the corresponding cell group; or

3> if the *RRCReconfiguration* message is applied due to a conditional reconfiguration execution, and the UE is configured to provide UE assistance information for the corresponding cell group, and the UE has initiated transmission of a *UEAssistanceInformation* message for the corresponding cell group since it was configured to do so in accordance with 5.7.4.2:

4> initiate transmission of a *UEAssistanceInformation* message for the corresponding cell group in accordance with clause 5.7.4.3 to provide the concerned UE assistance information;

4> start or restart the prohibit timer (if exists) associated with the concerned UE assistance information with the timer value set to the value in corresponding configuration;

3> if *SIB12* is provided by the target PCell; and the UE initiated transmission of a *SidelinkUEInformationNR* message indicating a change of NR sidelink communication related parameters relevant in target PCell (i.e. change of *sl-RxInterestedFreqList* or *sl-TxResourceReqList*) during the last 1 second preceding reception of the *RRCReconfiguration* message including *reconfigurationWithSync* in *spCellConfig* of an MCG; or

3> if the *RRCReconfiguration* message is applied due to a conditional reconfiguration execution and the UE is capable of NR sidelink communication and *SIB12* is provided by the target PCell, and the UE has initiated transmission of a *SidelinkUEInformationNR* message since it was configured to do so in accordance with 5.8.3.2:

4> initiate transmission of the *SidelinkUEInformationNR* message in accordance with 5.8.3.3;

2> the procedure ends.

NOTE 3: The UE is only required to acquire broadcasted *SIB1* if the UE can acquire it without disrupting unicast or MBS multicast data reception, i.e. the broadcast and unicast/MBS multicast beams are quasi co-located.

NOTE 4: The UE sets the content of *UEAssistanceInformation* according to latest configuration (i.e. the configuration after applying the *RRCReconfiguration* message) and latest UE preference. The UE may include more than the concerned UE assistance information within the *UEAssistanceInformation* according to 5.7.4.2. Therefore, the content of *UEAssistanceInformation* message might not be the same as the content of the previous *UEAssistanceInformation* message.

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#### 5.3.13.4 Reception of the *RRCResume* by the UE

The UE shall:

1> stop timer T319, if running;

1> stop timer T319a, if running;

1> stop timer T380, if running;

1> if T331 is running:

2> stop timer T331;

2> perform the actions as specified in 5.7.8.3;

1> if the *RRCResume* includes the *fullConfig*:

2> perform the full configuration procedure as specified in 5.3.5.11;

1> else:

2> if the *RRCResume* does not include the *restoreMCG-SCells*:

3> release the MCG SCell(s) from the UE Inactive AS context, if stored;

2> if the *RRCResume* does not include the *restoreSCG*:

3> release the MR-DC related configurations (i.e., as specified in 5.3.5.10) from the UE Inactive AS context, if stored;

2> restore the *masterCellGroup, mrdc-SecondaryCellGroup*, if stored, and *pdcp-Config* from the UE Inactive AS context;

2> configure lower layers to consider the restored MCG and SCG SCell(s) (if any) to be in deactivated state;

1> discard the UE Inactive AS context;

1> store the used *nextHopChainingCount* value associated to the current KgNB;

1> release the *suspendConfig* except the *ran-NotificationAreaInfo*;

1> if the *RRCResume* includes the *masterCellGroup*:

2> perform the cell group configuration for the received *masterCellGroup* according to 5.3.5.5;

1> if the *RRCResume* includes the *mrdc-SecondaryCellGroup:*

2> if the received *mrdc-SecondaryCellGroup* is set to *nr-SCG*:

3> if the *RRCResume* includes the *scg-State*:

4> perform SCG deactivation as specified in 5.3.5.13b;

3> else:

4> perform SCG activation as specified in 5.3.5.13a;

3> perform the RRC reconfiguration according to 5.3.5.3 for the *RRCReconfiguration* message included in *nr-SCG*;

2> if the received *mrdc-SecondaryCellGroup* is set to *eutra-SCG*:

3> perform the RRC connection reconfiguration as specified in TS 36.331 [10], clause 5.3.5.3 for the *RRCConnectionReconfiguration* message included in *eutra-SCG*;

1> if the *RRCResume* includes the *radioBearerConfig*:

2> perform the radio bearer configuration according to 5.3.5.6;

1> if the *RRCResume* message includes the *sk-Counter*:

2> perform security key update procedure as specified in 5.3.5.7;

1> if the *RRCResume* message includes the *radioBearerConfig2*:

2> perform the radio bearer configuration according to 5.3.5.6;

1> if the *RRCResume* message includes the *needForGapsConfigNR*:

2> if *needForGapsConfigNR* is set to *setup*:

3> consider itself to be configured to provide the measurement gap requirement information of NR target bands;

2> else:

3> consider itself not to be configured to provide the measurement gap requirement information of NR target bands;

1> if the *RRCResume* message includes the *needForGapNCSG-ConfigNR*:

2> if *needForGapNCSG-ConfigNR* is set to *setup*:

3> consider itself to be configured to provide the measurement gap and NCSG requirement information of NR target bands;

2> else:

3> consider itself not to be configured to provide the measurement gap and NCSG requirement information of NR target bands;

1> if the *RRCResume* message includes the *needForGapNCSG-ConfigEUTRA*:

2> if *needForGapNCSG-ConfigEUTRA* is set to *setup*:

3> consider itself to be configured to provide the measurement gap and NCSG requirement information of E‑UTRA target bands;

2> else:

3> consider itself not to be configured to provide the measurement gap and NCSG requirement information of E‑UTRA target bands;

1> if the *RRCResume* message includes the *appLayerMeasConfig*:

2> perform the application layer measurement configuration procedure as specified in 5.3.5.13d;

1> resume SRB2 (if suspended), SRB3 (if configured), all DRBs (that are suspended) and multicast MRBs;

1> if stored, discard the cell reselection priority information provided by the *cellReselectionPriorities* or inherited from another RAT;

1> stop timer T320, if running;

1> if the *RRCResume* message includes the *measConfig*:

2> perform the measurement configuration procedure as specified in 5.5.2;

1> resume measurements if suspended;

1> if T390 is running:

2> stop timer T390 for all access categories;

2> perform the actions as specified in 5.3.14.4;

1> if T302 is running:

2> stop timer T302;

2> perform the actions as specified in 5.3.14.4;

1> enter RRC\_CONNECTED;

1> indicate to upper layers that the suspended RRC connection has been resumed;

1> stop the cell re-selection procedure;

1> stop relay reselection procedure if any for L2 U2N Remote UE;

1> consider the current cell to be the PCell;

1> set the content of the of *RRCResumeComplete* message as follows:

2> if the upper layer provides NAS PDU, set the *dedicatedNAS-Message* to include the information received from upper layers;

2> if upper layers provides a PLMN:

3> if the UE is either allowed or instructed to access the PLMN via a cell for which at least one CAG ID is broadcast:

4> set the *selectedPLMN-Identity* from the *npn-IdentityInfoList*;

3> else:

4> set the *selectedPLMN-Identity* to the PLMN selected by upper layers from the *plmn-IdentityInfoList*;

2> if the *masterCellGroup* contains the *reportUplinkTxDirectCurrent*:

3> include the *uplinkTxDirectCurrentList* for each MCG serving cell with UL;

3> include *uplinkDirectCurrentBWP-SUL* for each MCG serving cell configured with SUL carrier, if any, within the *uplinkTxDirectCurrentList*;

2> if the *masterCellGroup* contains the *reportUplinkTxDirectCurrentTwoCarrier*:

3> include in the *uplinkTxDirectCurrentTwoCarrierList* the list of uplink Tx DC locations for the configured uplink carrier aggregation in the MCG;

2> if the UE has idle/inactive measurement information concerning cells other than the PCell available in *VarMeasIdleReport*:

3> if the *idleModeMeasurementReq* is included in the *RRCResume* message:

4> set the *measResultIdleEUTRA* in the *RRCResumeComplete* message to the value of *measReportIdleEUTRA* in the *VarMeasIdleReport,* if available;

4> set the *measResultIdleNR* in the *RRCResumeComplete* message to the value of *measReportIdleNR* in the *VarMeasIdleReport*, if available;

4> discard the *VarMeasIdleReport* upon successful delivery of the *RRCResumeComplete* message is confirmed by lower layers;

3> else:

4> if the SIB1 contains *idleModeMeasurementsNR* and the UE has NR idle/inactive measurement information concerning cells other than the PCell available in *VarMeasIdleReport*; or

4> if the SIB1 contains *idleModeMeasurementsEUTRA* and the UE has E-UTRA idle/inactive measurement information available in *VarMeasIdleReport*:

5> include the *idleMeasAvailable*;

2> if the *RRCResume* message includes *mrdc-SecondaryCellGroup* set to *eutra-SCG*:

3> include in the *eutra-SCG-Response* the E-UTRA *RRCConnectionReconfigurationComplete* message in accordance with TS 36.331 [10] clause 5.3.5.3;

2> if the *RRCResume* message includes *mrdc-SecondaryCellGroup* set to *nr-SCG*:

3> include in the *nr-SCG-Response* the SCG *RRCReconfigurationComplete* message;

2> if the UE has logged measurements available for NR and if the RPLMN is included in *plmn-IdentityList* stored in *VarLogMeasReport*:

3> if the sigLoggedMeasType in VarLogMeasReport is included:

4> include the *sigLogMeasConfigAvailable* in the *RRCResumeComplete* message and set it according to the following:

5> if T330 timer is running:

6> set *sigLogMeasConfigAvailable* to *true* in the *RRCResumeComplete* message;

5> else:

6> set *sigLogMeasConfigAvailable* to false in the *RRCResumeComplete* message;

3> include the *logMeasAvailable* in the *RRCResumeComplete* message*;*

3> if Bluetooth measurement results are included in the logged measurements the UE has available for NR:

4> include the *logMeasAvailableBT* in the *RRCResumeComplete* message;

3> if WLAN measurement results are included in the logged measurements the UE has available for NR:

4> include the *logMeasAvailableWLAN* in the *RRCResumeComplete* message;

2> if the *sigLoggedMeasType* in *VarLogMeasReport* is included:

3> if T330 timer is running:

4> set *sigLogMeasConfigAvailable* to *true* in the *RRCResumeComplete* message;

3> else:

4> if the UE has logged measurements available for NR:

5> set *sigLogMeasConfigAvailable* to false in the *RRCResumeComplete* message;

2> if the UE has connection establishment failure or connection resume failure information available in *VarConnEstFailReport* or *VarConnEstFailReportList* and if the RPLMN is equal to *plmn-Identity* stored in *VarConnEstFailReport* or *VarConnEstFailReportList*:

3> include *connEstFailInfoAvailable* in the *RRCResumeComplete* message;

2> if the UE has radio link failure or handover failure information available in *VarRLF-Report* and if the RPLMN is included in *plmn-IdentityList* stored in *VarRLF-Report*; or

2> if the UE has radio link failure or handover failure information available in *VarRLF-Report* of TS 36.331 [10] and if the UE is capable of cross-RAT RLF reporting and if the RPLMN is included in *plmn-IdentityList* stored in *VarRLF-Report* of TS 36.331 [10]:

3> include *rlf-InfoAvailable* in the *RRCResumeComplete* message;

2> if the UE has successful handover information available in *VarSuccessHO-Report* and if the RPLMN is included in *plmn-IdentityList* stored in *VarSuccessHO-Report*:

3> include *successHO-InfoAvailable* in the *RRCResumeComplete* message;

2> if the UE supports storage of mobility history information and the UE has mobility history information available in *VarMobilityHistoryReport*:

3> include the *mobilityHistoryAvail* in the *RRCResumeComplete* message;

2> if *speedStateReselectionPars* is configured in the *SIB2*:

3> include the *mobilityState* in the *RRCResumeComplete* message and set it to the mobility state (as specified in TS 38.304 [20]) of the UE just prior to entering RRC\_CONNECTED state;

2> if the UE is configured to provide the measurement gap requirement information of NR target bands:

3> include the *NeedForGapsInfoNR* and set the contents as follows:

4> include *intraFreq-needForGap* and set the gap requirement information of intra-frequency measurement for each NR serving cell;

4> if *requestedTargetBandFilterNR* is configured, for each supported NR band that is also included in *requestedTargetBandFilterNR*, include an entry in *interFreq-needForGap* and set the gap requirement information for that band; otherwise, include an entry in *interFreq-needForGap* and set the corresponding gap requirement information for each supported NR band;

2> if the UE is configured to provide the measurement gap and NCSG requirement information of NR target bands:

3> include the *NeedForGapNCSG-InfoNR* and set the contents as follows:

4> include *intraFreq-needForNCSG* and set the gap and NCSG requirement information of intra-frequency measurement for each NR serving cell;

4> if *requestedTargetBandFilterNCSG-NR* is configured:

5> for each supported NR band included in *requestedTargetBandFilterNCSG-NR*, include an entry in *interFreq-needForNCSG* and set the NCSG requirement information for that band;

4> else:

5> include an entry for each supported NR band in *interFreq-needForNCSG* and set the corresponding NCSG requirement information;

2> if the UE is configured to provide the measurement gap and NCSG requirement information of E‑UTRA target bands:

3> include the *NeedForGapNCSG-InfoEUTRA* and set the contents as follows:

4> if *requestedTargetBandFilterNCSG-EUTRA* is configured:

5> for each supported E-UTRA band included in *requestedTargetBandFilterNCSG-EUTRA*, include an entry in *needForNCSG-EUTRA* and set the NCSG requirement information for that band;

4> else:

5> include an entry for each supported E-UTRA band in *needForNCSG-EUTRA* and set the corresponding NCSG requirement information;

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

1> the procedure ends.

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### 5.5.1 Introduction

The network may configure an RRC\_CONNECTED UE to perform measurements. The network may configure the UE to report them in accordance with the measurement configuration or perform conditional reconfiguration evaluation in accordance with the conditional reconfiguration. The measurement configuration is provided by means of dedicated signalling i.e. using the *RRCReconfiguration* or *RRCResume.*

The network may configure the UE to perform the following types of measurements:

- NR measurements;

- Inter-RAT measurements of E-UTRA frequencies;

- Inter-RAT measurements of UTRA-FDD frequencies;

- NR sidelink measurements of L2 U2N Relay UEs.

The network may configure the UE to report the following measurement information based on SS/PBCH block(s):

- Measurement results per SS/PBCH block;

- Measurement results per cell based on SS/PBCH block(s);

- SS/PBCH block(s) indexes.

The network may configure the UE to report the following measurement information based on CSI-RS resources:

- Measurement results per CSI-RS resource;

- Measurement results per cell based on CSI-RS resource(s);

- CSI-RS resource measurement identifiers.

The network may configure the UE to perform the following types of measurements for NR sidelink and V2X sidelink:

- CBR measurements.

The network may configure the UE to report the following CLI measurement information based on SRS resources:

- Measurement results per SRS resource;

- SRS resource(s) indexes.

The network may configure the UE to report the following CLI measurement information based on CLI-RSSI resources:

- Measurement results per CLI-RSSI resource;

- CLI-RSSI resource(s) indexes.

The network may configure the UE to report the following Rx-Tx time difference measurement information based on CSI-RS for tracking or PRS:

- UE Rx-Tx time difference measurement result.

The measurement configuration includes the following parameters:

**1. Measurement objects:** A list of objects on which the UE shall perform the measurements.

- For intra-frequency and inter-frequency measurements a measurement object indicates the frequency/time location and subcarrier spacing of reference signals to be measured. Associated with this measurement object, the network may configure a list of cell specific offsets, a list of 'exclude-listed' cells and a list of 'allow-listed' cells. Exclude-listed cells are not applicable in event evaluation or measurement reporting. Allow-listed cells are the only ones applicable in event evaluation or measurement reporting.

- The *measObjectId* of the MO which corresponds to each serving cell is indicated by *servingCellMO* within the serving cell configuration.

- For inter-RAT E-UTRA measurements a measurement object is a single E-UTRA carrier frequency. Associated with this E-UTRA carrier frequency, the network can configure a list of cell specific offsets and a list of 'exclude-listed' cells. Exclude-listed cells are not applicable in event evaluation or measurement reporting.

- For inter-RAT UTRA-FDD measurements a measurement object is a set of cells on a single UTRA-FDD carrier frequency.

- For NR sidelink measurements of L2 U2N Relay UEs, a measurement object is a single NR sidelink frequency to be measured.

- For CBR measurement of NR sidelink communication, a measurement object is a set of transmission resource pool(s) on a single carrier frequency for NR sidelink communication.

- For CLI measurements a measurement object indicates the frequency/time location of SRS resources and/or CLI-RSSI resources, and subcarrier spacing of SRS resources to be measured.

**2. Reporting configurations:** A list of reporting configurations where there can be one or multiple reporting configurations per measurement object. Each measurement reporting configuration consists of the following:

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

- RS type: The RS that the UE uses for beam and cell measurement results (SS/PBCH block or CSI-RS).

- Reporting format: The quantities per cell and per beam that the UE includes in the measurement report (e.g. RSRP) and other associated information such as the maximum number of cells and the maximum number beams per cell to report.

In case of conditional reconfiguration, each configuration consists of the following:

- Execution criteria: The criteria the UE uses for conditional reconfiguration execution.

- RS type: The RS that the UE uses for obtaining beam and cell measurement results (SS/PBCH block-based or CSI-RS-based), used for evaluating conditional reconfiguration execution condition.

**3. Measurement identities:** For measurement reporting, a list of measurement identities where each measurement identity links one measurement object with one reporting configuration. By configuring multiple measurement identities, it is possible to link more than one measurement object to the same reporting configuration, as well as to link more than one reporting configuration to the same measurement object. The measurement identity is also included in the measurement report that triggered the reporting, serving as a reference to the network. For conditional reconfiguration triggering, one measurement identity links to exactly one conditional reconfiguration trigger configuration. And up to 2 measurement identities can be linked to one conditional reconfiguration execution condition.

**4. Quantity configurations:** The quantity configuration defines the measurement filtering configuration used for all event evaluation and related reporting, and for periodical reporting of that measurement. For NR measurements, the network may configure up to 2 quantity configurations with a reference in the NR measurement object to the configuration that is to be used. In each configuration, different filter coefficients can be configured for different measurement quantities, for different RS types, and for measurements per cell and per beam.

**5. Measurement gaps:** Periods that the UE may use to perform measurements.

A UE in RRC\_CONNECTED maintains a measurement object list, a reporting configuration list, and a measurement identities list according to signalling and procedures in this specification. The measurement object list possibly includes NR measurement object(s), CLI measurement object(s), inter-RAT objects, and L2 U2N Relay objects. Similarly, the reporting configuration list includes NR, inter-RAT, and L2 U2N Relay reporting configurations. Any measurement object can be linked to any reporting configuration of the same RAT type. Some reporting configurations may not be linked to a measurement object. Likewise, some measurement objects may not be linked to a reporting configuration.

The measurement procedures distinguish the following types of cells:

1. The NR serving cell(s) – these are the SpCell and one or more SCells.

2. Listed cells – these are cells listed within the measurement object(s).

3. Detected cells – these are cells that are not listed within the measurement object(s) but are detected by the UE on the SSB frequency(ies) and subcarrier spacing(s) indicated by the measurement object(s).

For NR measurement object(s), the UE measures and reports on the serving cell(s)/serving Relay UE (for L2 U2N Remote UE), listed cells and/or detected cells. For inter-RAT measurements object(s) of E-UTRA, the UE measures and reports on listed cells and detected cells and, for RSSI and channel occupancy measurements, the UE measures and reports on the configured resources on the indicated frequency. For inter-RAT measurements object(s) of UTRA-FDD, the UE measures and reports on listed cells. For CLI measurement object(s), the UE measures and reports on configured measurement resources (i.e. SRS resources and/or CLI-RSSI resources). For L2 U2N Relay object(s), the UE measures and reports on the serving NR cell(s), as well as the discovered L2 U2N Relay UEs.

Whenever the procedural specification, other than contained in clause 5.5.2, refers to a field it concerns a field included in the *VarMeasConfig* unless explicitly stated otherwise i.e. only the measurement configuration procedure covers the direct UE action related to the received *measConfig*.

In NR-DC, the UE may receive two independent *measConfig*:

- a *measConfig*, associated with MCG, that is included in the *RRCReconfiguration* message received via SRB1; and

- a *measConfig*, associated with SCG, that is included in the *RRCReconfiguration* message received via SRB3, or, alternatively, included within a *RRCReconfiguration* message embedded in a *RRCReconfiguration* message received via SRB1.

In this case, the UE maintains two independent *VarMeasConfig* and *VarMeasReportList*, one associated with each *measConfig*, and independently performs all the procedures in clause 5.5 for each *measConfig* and the associated *VarMeasConfig* and *VarMeasReportList*, unless explicitly stated otherwise.

The configurations related to CBR measurements are only included in the *measConfig* associated with MCG.

The configurations related to Rx-Tx time difference measurement are only included in the *measConfig* associated with MCG.

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#### 5.5.2.9 Measurement gap configuration

The UE shall:

1> if *gapFR1* is set to *setup*:

2> if an FR1 measurement gap configuration configured by *gapFR1* is already setup, release the FR1 measurement gap configuration;

2> setup the FR1 measurement gap configuration indicated by the *gapFR1* in accordance with the received *gapOffset*, i.e., the first subframe of each gap occurs at an SFN and subframe meeting the following condition:

SFN mod *T* = FLOOR(*gapOffset*/10);

subframe = *gapOffset* mod 10;

with *T* = MGRP/10 as defined in TS 38.133 [14];

2> apply the specified timing advance *mgta* to the gap occurrences calculated above (i.e. the UE starts the measurement *mgta* ms before the gap subframe occurrences);

1> else if *gapFR1* is set to *release*:

2> release the FR1 measurement gap configuration configured by *gapFR1*;

1> if *gapFR2* is set to *setup*:

2> if an FR2 measurement gap configuration configured by *gapFR2* is already setup, release the FR2 measurement gap configuration;

2> setup the FR2 measurement gap configuration indicated by the *gapFR2* in accordance with the received *gapOffset*, i.e., the first subframe of each gap occurs at an SFN and subframe meeting the following condition:

SFN mod *T* = FLOOR(*gapOffset*/10);

subframe = *gapOffset* mod 10;

with *T* = MGRP/10 as defined in TS 38.133 [14];

2> apply the specified timing advance *mgta* to the gap occurrences calculated above (i.e. the UE starts the measurement *mgta* ms before the gap subframe occurrences);

1> else if *gapFR2* is set to *release*:

2> release the FR2 measurement gap configuration configured by *gapFR2*;

1> if *gapUE* is set to *setup*:

2> if a per UE measurement gap configuration configured by *gapUE* is already setup, release the per UE measurement gap configuration;

2> setup the per UE measurement gap configuration indicated by the *gapUE* in accordance with the received *gapOffset*, i.e., the first subframe of each gap occurs at an SFN and subframe meeting the following condition:

SFN mod *T* = FLOOR(*gapOffset*/10);

subframe = *gapOffset* mod 10;

with *T* = MGRP/10 as defined in TS 38.133 [14];

2> apply the specified timing advance *mgta* to the gap occurrences calculated above (i.e. the UE starts the measurement *mgta* ms before the gap subframe occurrences);

1> else if *gapUE* is set to *release*:

2> release the per UE measurement gap configuration configured by *gapUE*.

1> for each *measGapId* included in the received *gapToReleaseList*:

2> release the measurement gap configuration associated with the *measGapId*;

1> for each *GapConfig* received in *gapToAddModList*:

2> setup ameasurement gap configuration indicated by the *GapConfig* in accordance with the received *gapOffset*, i.e., the first subframe of each gap occurs at an SFN and subframe meeting the following condition:

SFN mod *T* = FLOOR(*gapOffset*/10);

subframe = *gapOffset* mod 10;

with *T* = MGRP/10 as defined in TS 38.133 [14];

2> apply the specified timing advance *mgta* to the gap occurrences calculated above (i.e. the UE starts the measurement *mgta* ms before the gap subframe occurrences);

2> apply the the measurement gap as per UE measurement gap, FR1 measurement gap, or FR2 measurement gap according to the *gapType* indicated by the *GapConfig*;

2> associate the measurement gap with the *measGapId* indicated by the *GapConfig*;

2> if *gapSharing* in the *GapConfig* is present:

3> setup the gap sharing configuration for the measurement gap in accordance with the received *gapSharing* as defined in TS 38.133 [14];

2> else:

3> release the gap sharing configuration (if configured) for the FR1 measurement gap;

1> for each FR1, FR2, and per UE measurement gap that is setup:

2> if *preConfigInd-r17* in the corresponding *GapConfig* is present:

3> determine whether the measurement gap is activated or not according to TS 38.133 [14];

2> else:

3> consider the measurement gap to be activated;

NOTE 1: For FR2 gap configuration with synchronous CA, for the UE in NE-DC or NR-DC, the SFN and subframe of the serving cell indicated by the *refServCellIndicator* is used in the gap calculation. Otherwise, the SFN and subframe of a serving cell on FR2 frequency is used in the gap calculation

NOTE 2: For FR1 gap or per UE gap configuration, for the UE in NE-DC or NR-DC, the SFN and subframe of the serving cell indicated by the *refServCellIndicator* in is used in the gap calculation. Otherwise, the SFN and subframe of the PCell is used in the gap calculation.

NOTE 3: For FR2 gap configuration with asynchronous CA, for the UE in NE-DC or NR-DC, the SFN and subframe of the serving cell indicated by the *refServCellIndicator* and *refFR2ServCellAsyncCA* is used in the gap calculation. Otherwise, the SFN and subframe of a serving cell on FR2 frequency indicated by the *refFR2ServCellAsyncCA* is used in the gap calculation

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# 6 Protocol data units, formats and parameters (ASN.1)

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### 6.2.2 Message definitions

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#### – *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

ul-GapFR2-Config-r17 SetupRelease { UL-GapFR2-Config-r17 } OPTIONAL, -- Need M

sl-L2RelayUEConfig-r17 SetupRelease { SL-L2RelayUEConfig-r17 } OPTIONAL, -- Cond L2RelayUE

sl-L2RemoteUEConfig-r17 SetupRelease { SL-L2RemoteUEConfig-r17 } OPTIONAL, -- Cond L2RemoteUE

dedicatedPagingDelivery-r17 OCTET STRING (CONTAINING Paging) OPTIONAL, -- L2U2NRelay

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

scg-State-r17 ENUMERATED { deactivated } OPTIONAL, -- Need S

appLayerMeasConfig-r17 AppLayerMeasConfig-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}

-- 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 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*. 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 and 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 to the L2 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. The field has the same values as the corresponding configuration in *servingCellConfigCommon*. |
| ***dedicatedSystemInformationDelivery***  This field is used to transfer *SIB6*, *SIB7*, *SIB8* to the UE with an active BWP with no common serach space configured. For UEs in RRC\_CONNECTED, 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 on the MCG. |
| ***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* and *bap-Config*.  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. The field is absent if CPA or CPC is configured for the UE, or if the *RRCReconfiguration* message is contained in *CondRRCReconfig*. |
| ***sl-L2RelayUEConfig***  Contains L2 U2N relay operation related configurations used by L2 U2N Relay UE. |
| ***sl-L2RemoteUEConfig***  Contains L2 U2N relay operation related configurations used by L2 U2N Remote UE. |
| ***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. |
| ***ul-GapFR2-Config-r17***  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 configures FR2 bands to UE 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 |
| *L2RelayUE* | For L2 U2N Relay UE, the field is optionally present, Need M. Otherwise, it is absent. |
| *L2RemoteUE* | The field is optional present for L2 U2N Remote UE, need M; otherwise it is absent. |
| *L2U2NRelay* | For L2 U2N Relay UE, the field is optionally present, Need N. Otherwise, it is absent. |

<Skip>

#### *– 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*). |

<Skip>

#### – *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-L2RemoteUEConfig-r17 SetupRelease {SL-L2RemoteUEConfig-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-L2RemoteUEConfig***  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, need M; 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*). |

<Skip>

### 6.3.2 Radio resource control information elements

<Skip>

#### – *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 {BeamFailureRecoverySCellConfig-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

beamFailureRecoveryServingCellConfig-r17 SetupRelease { BeamFailureRecoveryServingCellConfig-r17} OPTIONAL, -- Need M

harq-FeedbackEnablingforSPSactive-r17 BOOLEAN OPTIONAL, -- Need R

cfr-ConfigMulticast-r17 SetupRelease { CFR-ConfigMulticast-r17 } OPTIONAL, -- Need M

dl-PRS-ProcessingWindowPreConfigAddModList-r17 DL-PRS-ProcessingWindowPreConfigAddModList-r17 OPTIONAL, -- Need N

dl-PRS-ProcessingWindowPreConfigReleaseList-r17 DL-PRS-ProcessingWindowPreConfigReleaseList-r17 OPTIONAL, -- Need N

nonCellDefiningSSB-r17 NonCellDefiningSSB-r17 OPTIONAL -- Need R

]]

}

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-PRS-ProcessingWindowPreConfigAddModList-r17 ::= SEQUENCE (SIZE (1..maxNrofPPW-Config-r17)) OF DL-PRS-ProcessingWindowPreConfig-r17

DL-PRS-ProcessingWindowPreConfigReleaseList-r17 ::= SEQUENCE (SIZE (1..maxNrofPPW-Config-r17)) OF DL-PRS-ProcessingWindowPreConfig-r17

-- TAG-BWP-DOWNLINKDEDICATED-STOP

-- ASN1STOP

|  |
| --- |
| *BWP-DownlinkDedicated* field descriptions |
| ***beamFailureRecoverySCellConfig***  Configuration of candidate RS for beam failure recovery in SCells. |
| ***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. |
| ***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 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 (FFS on 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. |
| ***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 |
| *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. |

<Skip>

#### – *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-Relay-RLC-ChannelToAddModList-r17 SEQUENCE (SIZE(1..maxUu-Relay-RLC-ChannelID-r17)) OF Uu-Relay-RLC-ChannelConfig-r17

OPTIONAL, -- Need N

uu-Relay-RLC-ChannelToReleaseList-r17 SEQUENCE (SIZE(1..maxUu-Relay-RLC-ChannelID-r17)) OF Uu-Relay-RLC-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

]]

}

-- 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 {ffs},

t-SearchDeltaP-Connected-r17 ENUMERATED {ffs}

} 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 -- Need M

]]

}

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 -- 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 CHOICE {

offsetFR1-r17 ENUMERATED {db2, db4, db6, db8},

offsetFR2-r17 ENUMERATED {db2, db4, db6, db8}

}

}

SL-PathSwitchConfig-r17 ::= SEQUENCE {

targetRelayUEIdentity-r17 SL-SourceIdentity-r17,

t420-r17 ENUMERATED {ms50, ms100, ms150, ms200, ms500, ms1000, ms2000, ms10000},

...

}

-- TAG-CELLGROUPCONFIG-STOP

-- ASN1STOP

Editor's NOTE: Whether serving cell quality criterion is configured per Scell for BFD needs RAN4 confirmation.

Editor's NOTE: Current text assumes the low mobility criterion is configured commonly for RLM and BFD. It is FFS whether the low mobility criterion can be configured independently for RLM and BFD.

Editor's NOTE: Values and range of *SearchDeltaP-Connected* and *t-SearchDeltaP-Connected* are still FFS in RAN4.

|  |
| --- |
| *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. |
| ***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. |
| ***sCellState***  Indicates whether the SCell shall be considered to be in activated state upon SCell configuration. |
| ***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 which can be updated simultaneously for TCI relation with a MAC CE. The different lists shall not contain same serving cells. Network should configure in these lists only 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-Relay-RLC-ChannelToAddModList***  Configuration of the Uu RLC entities and the corresponding MAC Logical Channels to be added and modified. |
| ***uu-Relay-RLC-ChannelToReleaseList***  List of the Uu RLC entities and the corresponding MAC Logical Channels to be released. |

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| Conditional Presence | Explanation |
| *2Tx* | The field is optionally present, Need R, if *uplinkTxSwitching* is configured; otherwise it is absent, Need R. |

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| *DeactivatedSCG-Config* field descriptions |
| ***bfd-and-RLM***  When the SCG is deactivated, indicates whether the UE performs BFD and RLM. |

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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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| *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. |

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| *SCellConfig* field descriptions |
| ***goodServingCellEvaluationBFD***  ***I***ndicates the criterion for a UE to detect the good serving cell quality for BFD relaxation in an SCell in RRC\_CONNECTED. |
| ***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. |
| ***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. |
| ***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". And the *t-SearchDeltaP-Connected* is the parameter " TSearchDeltaP-Connected". 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. |

|  |
| --- |
| *SL-PathSwitchConfig* field descriptions |
| ***targetRelayUEIdentity***  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 during path switch. |

|  |  |
| --- | --- |
| Conditional Presence | Explanation |
| *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 at path switch to the target L2 U2N Relay UE, need N. 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 to the target PCell for a L2 U2N Remote UE,  - path switch 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 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. |

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*.

<Skip>

#### – *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

<Skip>

#### – *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

]],

[[

posMeasGapPreConfigToAddModList-r17 PosMeasGapPreConfigToAddModList-r17 OPTIONAL, -- Need N

posMeasGapPreConfigToRemoveList PosMeasGapPreConfigToRemoveList-r17 OPTIONAL -- Need N

]]

}

MeasObjectToRemoveList ::= SEQUENCE (SIZE (1..maxNrofObjectId)) OF MeasObjectId

MeasIdToRemoveList ::= SEQUENCE (SIZE (1..maxNrofMeasId)) OF MeasId

ReportConfigToRemoveList ::= SEQUENCE (SIZE (1..maxReportConfigId)) OF ReportConfigId

PosMeasGapPreConfigToAddModList-r17 ::= SEQUENCE (SIZE (1..maxGapConfig-r17)) OF PosMeasGapPreConfig-r17

PosMeasGapPreConfigToRemoveList-r17 ::= SEQUENCE (SIZE (1..maxGapConfig-r17)) OF PosMeasGapPreConfig-r17

--Editor's Note: maxGapConfig is FFS--

-- 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. |

<Skip>

#### *– 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, -- Cond SSBorAssociatedSSB

measCyclePSCell-r17 ENUMERATED {ffs} OPTIONAL -- Need R FFS

]]

}

SSB-MTC3List-r16::= SEQUENCE (SIZE(1..4)) OF SSB-MTC3-r16

SSB-MTC4List-r17::= SEQUENCE (SIZE(1..4)) 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

]]

}

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

CellsToAddMod ::= SEQUENCE {

physCellId PhysCellId,

cellIndividualOffset Q-OffsetRangeList

}

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

]]

}

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

}

-- TAG-MEASOBJECTNR-STOP

-- ASN1STOP

Editor's note: The rmtc-Bandwidth-r17 needs RAN4 confirmation.

|  |
| --- |
| *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. |
| ***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*. |
| ***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. Details FFS. FFS whether smtc1 or smtc2 can be configured with this. |
| ***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 (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. |

|  |
| --- |
| *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. Otherwise, it is absent, Need R. |

<Skip>

#### – *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

]]

}

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

...

}

-- 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]. |
| ***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]. |
| ***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). |
| ***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]. |
| ***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

<Skip>

#### – *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-NeedForNCSGInfoNR-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. |

<Skip>

6.4 RRC multiplicity and type constraint values

– Multiplicity and type constraint definitions

-- ASN1START

-- TAG-MULTIPLICITY-AND-TYPE-CONSTRAINT-DEFINITIONS-START

maxAdditionalRACH-r17 INTEGER ::= 999 -- Maximum number of additional RACH configurations is FFS, value 999 to

-- make ASN.1 compile

maxAI-DCI-PayloadSize-r16 INTEGER ::= 128 --Maximum size of the DCI payload scrambled with ai-RNTI

maxAI-DCI-PayloadSize-1-r16 INTEGER ::= 127 --Maximum size of the DCI payload scrambled with ai-RNTI minus 1

maxBandComb INTEGER ::= 65536 -- Maximum number of DL band combinations

maxBandsUTRA-FDD-r16 INTEGER ::= 64 -- Maximum number of bands listed in UTRA-FDD UE caps

maxBH-RLC-ChannelID-r16 INTEGER ::= 65536 -- Maximum value of BH RLC Channel ID

maxBT-IdReport-r16 INTEGER ::= 32 -- Maximum number of Bluetooth IDs to report

maxBT-Name-r16 INTEGER ::= 4 -- Maximum number of Bluetooth name

maxCAG-Cell-r16 INTEGER ::= 16 -- Maximum number of NR CAG cell ranges in SIB3, SIB4

maxTwoPUCCH-Grp-ConfigList-r16 INTEGER ::= 32 -- Maximum number of supported configuration(s) of {primary PUCCH group

-- config, secondary PUCCH group config}

maxCBR-Config-r16 INTEGER ::= 8 -- Maximum number of CBR range configurations for sidelink communication

-- congestion control

maxCBR-Config-1-r16 INTEGER ::= 7 -- Maximum number of CBR range configurations for sidelink communication

-- congestion control minus 1

maxCBR-Level-r16 INTEGER ::= 16 -- Maximum number of CBR levels

maxCBR-Level-1-r16 INTEGER ::= 15 -- Maximum number of CBR levels minus 1

maxCellExcluded INTEGER ::= 16 -- Maximum number of NR exclude-listed cell ranges in SIB3, SIB4

maxCellGroupings-r16 INTEGER ::= 32 -- Maximum number of cell groupings for NR-DC

maxCellHistory-r16 INTEGER ::= 16 -- Maximum number of visited PCells reported

maxPSCellHistory-r17 INTEGER ::= 16 -- Maximum number of visited PSCells reported

maxCellInter INTEGER ::= 16 -- Maximum number of inter-Freq cells listed in SIB4

maxCellIntra INTEGER ::= 16 -- Maximum number of intra-Freq cells listed in SIB3

maxCellMeasEUTRA INTEGER ::= 32 -- Maximum number of cells in E-UTRAN

maxCellMeasIdle-r16 INTEGER ::= 8 -- Maximum number of cells per carrier for idle/inactive measurements

maxCellMeasUTRA-FDD-r16 INTEGER ::= 32 -- Maximum number of cells in FDD UTRAN

maxCellAllowed INTEGER ::= 16 -- Maximum number of NR allow-listed cell ranges in SIB3, SIB4

maxEARFCN INTEGER ::= 262143 -- Maximum value of E-UTRA carrier frequency

maxEUTRA-CellExcluded INTEGER ::= 16 -- Maximum number of E-UTRA exclude-listed physical cell identity ranges

-- in SIB5

maxEUTRA-NS-Pmax INTEGER ::= 8 -- Maximum number of NS and P-Max values per band

maxFeatureCombPreambles-FFS-r17 INTEGER ::= 999 -- Maximum number of feature combination preambles FFS, value 999 to make

-- ASN.1 compile

maxLogMeasReport-r16 INTEGER ::= 520 -- Maximum number of entries for logged measurements

maxMultiBands INTEGER ::= 8 -- Maximum number of additional frequency bands that a cell belongs to

maxNARFCN INTEGER ::= 3279165 -- Maximum value of NR carrier frequency

maxNR-NS-Pmax INTEGER ::= 8 -- Maximum number of NS and P-Max values per band

maxFreqIdle-r16 INTEGER ::= 8 -- Maximum number of carrier frequencies for idle/inactive measurements

maxNrofServingCells INTEGER ::= 32 -- Max number of serving cells (SpCells + SCells)

maxNrofServingCells-1 INTEGER ::= 31 -- Max number of serving cells (SpCells + SCells) minus 1

maxNrofAggregatedCellsPerCellGroup INTEGER ::= 16

maxNrofAggregatedCellsPerCellGroupMinus4-r16 INTEGER ::= 12

maxNrofDUCells-r16 INTEGER ::= 512 -- Max number of cells configured on the collocated IAB-DU

maxNrofAppLayerMeas-r17 INTEGER ::= 16 -- Max number of simultaneous application layer measurements

maxNrofAppLayerMeas-1-r17 INTEGER ::= 15 -- Max number of simultaneous application layer measurements-1

maxNrofAvailabilityCombinationsPerSet-r16 INTEGER ::= 512 -- Max number of AvailabilityCombinationId used in the DCI format 2\_5

maxNrofAvailabilityCombinationsPerSet-1-r16 INTEGER ::= 511 -- Max number of AvailabilityCombinationId used in the DCI format 2\_5 minus 1

maxNrofSCellActRS-r17 INTEGER ::= 255 -- Max number of RS configurations per SCell for SCell activation

maxNrofSCells INTEGER ::= 31 -- Max number of secondary serving cells per cell group

maxNrofCellMeas INTEGER ::= 32 -- Maximum number of entries in each of the cell lists in a measurement object

maxNrofRelayToMeasure-r17 INTEGER ::= 32 -- Maximum number of L2 U2N Relay UEs to measure for each measurement object

-- on sidelink frequency

maxNrofCG-SL-r16 INTEGER ::= 8 -- Max number of sidelink configured grant

maxNrofCG-SL-1-r16 INTEGER ::= 7 -- Max number of sidelink configured grant minus 1

maxSL-GC-BC-DRX-QoS-r17 INTEGER ::= ffsUpperLimit -- FFS

maxNrofSL-Rx-InfoSet-r17 INTEGER ::= 4 -- Max number of sidelink DRX assistant information set [FFS]

maxNrofSS-BlocksToAverage INTEGER ::= 16 -- Max number for the (max) number of SS blocks to average to determine cell measurement

maxNrofCondCells-r16 INTEGER ::= 8 -- Max number of conditional candidate SpCells

maxNrofCSI-RS-ResourcesToAverage INTEGER ::= 16 -- Max number for the (max) number of CSI-RS to average to determine cell measurement

maxNrofDL-Allocations INTEGER ::= 16 -- Maximum number of PDSCH time domain resource allocations

maxNrofPDU-Sessions-r17 INTEGER ::= 256 -- Maximum number of PDU Sessions

maxNrofSR-ConfigPerCellGroup INTEGER ::= 8 -- Maximum number of SR configurations per cell group

maxLCG-ID INTEGER ::= 7 -- Maximum value of LCG ID

maxLCG-ID-IAB-r17 INTEGER ::= 255 -- Maximum value of LCG ID for IAB-MT

maxLC-ID INTEGER ::= 32 -- Maximum value of Logical Channel ID

maxLC-ID-Iab-r16 INTEGER ::= 65855 -- Maximum value of BH Logical Channel ID extension

maxLTE-CRS-Patterns-r16 INTEGER ::= 3 -- Maximum number of additional LTE CRS rate matching patterns

maxNrofTAGs INTEGER ::= 4 -- Maximum number of Timing Advance Groups

maxNrofTAGs-1 INTEGER ::= 3 -- Maximum number of Timing Advance Groups minus 1

maxNrofBWPs INTEGER ::= 4 -- Maximum number of BWPs per serving cell

maxNrofCombIDC INTEGER ::= 128 -- Maximum number of reported MR-DC combinations for IDC

maxNrofSymbols-1 INTEGER ::= 13 -- Maximum index identifying a symbol within a slot (14 symbols, indexed from 0..13)

maxNrofSlots INTEGER ::= 320 -- Maximum number of slots in a 10 ms period

maxNrofSlots-1 INTEGER ::= 319 -- Maximum number of slots in a 10 ms period minus 1

maxNrofPhysicalResourceBlocks INTEGER ::= 275 -- Maximum number of PRBs

maxNrofPhysicalResourceBlocks-1 INTEGER ::= 274 -- Maximum number of PRBs minus 1

maxNrofPhysicalResourceBlocksPlus1 INTEGER ::= 276 -- Maximum number of PRBs plus 1

maxNrofControlResourceSets INTEGER ::= 12 -- Max number of CoReSets configurable on a serving cell

maxNrofControlResourceSets-1 INTEGER ::= 11 -- Max number of CoReSets configurable on a serving cell minus 1

maxNrofControlResourceSets-1-r16 INTEGER ::= 15 -- Max number of CoReSets configurable on a serving cell extended in minus 1

maxNrofCoresetPools-r16 INTEGER ::= 2 -- Maximum number of CORESET pools

maxCoReSetDuration INTEGER ::= 3 -- Max number of OFDM symbols in a control resource set

maxNrofSearchSpaces-1 INTEGER ::= 39 -- Max number of Search Spaces minus 1

maxNrofSearchSpacesLinks-1-r17 INTEGER ::= ffsUpperLimit -- Max number of Search Space links minus 1 FFS on actual size

maxNrofBFDResourcePerSet-r17 INTEGER ::= ffsUpperLimit -- Size is FFS

max-DLorJointTCI-r17 INTEGER ::= ffsUpperLimit -- Size is FFS

maxNrofCandidateBeams-r17 INTEGER ::= ffsUpperLimit -- Size is FFS

maxSFI-DCI-PayloadSize INTEGER ::= 128 -- Max number payload of a DCI scrambled with SFI-RNTI

maxSFI-DCI-PayloadSize-1 INTEGER ::= 127 -- Max number payload of a DCI scrambled with SFI-RNTI minus 1

maxIAB-IP-Address-r16 INTEGER ::= 32 -- Max number of assigned IP addresses

maxINT-DCI-PayloadSize INTEGER ::= 126 -- Max number payload of a DCI scrambled with INT-RNTI

maxINT-DCI-PayloadSize-1 INTEGER ::= 125 -- Max number payload of a DCI scrambled with INT-RNTI minus 1

maxNrofRateMatchPatterns INTEGER ::= 4 -- Max number of rate matching patterns that may be configured

maxNrofRateMatchPatterns-1 INTEGER ::= 3 -- Max number of rate matching patterns that may be configured minus 1

maxNrofRateMatchPatternsPerGroup INTEGER ::= 8 -- Max number of rate matching patterns that may be configured in one group

maxNrofCSI-ReportConfigurations INTEGER ::= 48 -- Maximum number of report configurations

maxNrofCSI-ReportConfigurations-1 INTEGER ::= 47 -- Maximum number of report configurations minus 1

maxNrofCSI-ResourceConfigurations INTEGER ::= 112 -- Maximum number of resource configurations

maxNrofCSI-ResourceConfigurations-1 INTEGER ::= 111 -- Maximum number of resource configurations minus 1

maxNrofAP-CSI-RS-ResourcesPerSet INTEGER ::= 16

maxNrOfCSI-AperiodicTriggers INTEGER ::= 128 -- Maximum number of triggers for aperiodic CSI reporting

maxNrofReportConfigPerAperiodicTrigger INTEGER ::= 16 -- Maximum number of report configurations per trigger state for aperiodic reporting

maxNrofNZP-CSI-RS-Resources INTEGER ::= 192 -- Maximum number of Non-Zero-Power (NZP) CSI-RS resources

maxNrofNZP-CSI-RS-Resources-1 INTEGER ::= 191 -- Maximum number of Non-Zero-Power (NZP) CSI-RS resources minus 1

maxNrofNZP-CSI-RS-ResourcesPerSet INTEGER ::= 64 -- Maximum number of NZP CSI-RS resources per resource set

maxNrofNZP-CSI-RS-ResourceSets INTEGER ::= 64 -- Maximum number of NZP CSI-RS resource sets per cell

maxNrofNZP-CSI-RS-ResourceSets-1 INTEGER ::= 63 -- Maximum number of NZP CSI-RS resource sets per cell minus 1

maxNrofNZP-CSI-RS-ResourceSetsPerConfig INTEGER ::= 16 -- Maximum number of resource sets per resource configuration

maxNrofNZP-CSI-RS-ResourcesPerConfig INTEGER ::= 128 -- Maximum number of resources per resource configuration

maxNrofZP-CSI-RS-Resources INTEGER ::= 32 -- Maximum number of Zero-Power (ZP) CSI-RS resources

maxNrofZP-CSI-RS-Resources-1 INTEGER ::= 31 -- Maximum number of Zero-Power (ZP) CSI-RS resources minus 1

maxNrofZP-CSI-RS-ResourceSets-1 INTEGER ::= 15

maxNrofZP-CSI-RS-ResourcesPerSet INTEGER ::= 16

maxNrofZP-CSI-RS-ResourceSets INTEGER ::= 16

maxNrofCSI-IM-Resources INTEGER ::= 32 -- Maximum number of CSI-IM resources

maxNrofCSI-IM-Resources-1 INTEGER ::= 31 -- Maximum number of CSI-IM resources minus 1

maxNrofCSI-IM-ResourcesPerSet INTEGER ::= 8 -- Maximum number of CSI-IM resources per set

maxNrofCSI-IM-ResourceSets INTEGER ::= 64 -- Maximum number of NZP CSI-IM resource sets per cell

maxNrofCSI-IM-ResourceSets-1 INTEGER ::= 63 -- Maximum number of NZP CSI-IM resource sets per cell minus 1

maxNrofCSI-IM-ResourceSetsPerConfig INTEGER ::= 16 -- Maximum number of CSI IM resource sets per resource configuration

maxNrofCSI-SSB-ResourcePerSet INTEGER ::= 64 -- Maximum number of SSB resources in a resource set

maxNrofCSI-SSB-ResourceSets INTEGER ::= 64 -- Maximum number of CSI SSB resource sets per cell

maxNrofCSI-SSB-ResourceSets-1 INTEGER ::= 63 -- Maximum number of CSI SSB resource sets per cell minus 1

maxNrofCSI-SSB-ResourceSetsPerConfig INTEGER ::= 1 -- Maximum number of CSI SSB resource sets per resource configuration

maxNrofCSI-SSB-ResourceSetsPerConfigExt INTEGER ::= 2 -- Maximum number of CSI SSB resource sets per resource configuration

-- extended

maxNrofFailureDetectionResources INTEGER ::= 10 -- Maximum number of failure detection resources

maxNrofFailureDetectionResources-1 INTEGER ::= 9 -- Maximum number of failure detection resources minus 1

maxNrofFreqSL-r16 INTEGER ::= 8 -- Maximum number of carrier frequency for NR sidelink communication

maxNrofSL-BWPs-r16 INTEGER ::= 4 -- Maximum number of BWP for NR sidelink communication

maxFreqSL-EUTRA-r16 INTEGER ::= 8 -- Maximum number of EUTRA anchor carrier frequency for NR sidelink communication

maxNrofSL-MeasId-r16 INTEGER ::= 64 -- Maximum number of sidelink measurement identity (RSRP) per destination

maxNrofSL-ObjectId-r16 INTEGER ::= 64 -- Maximum number of sidelink measurement objects (RSRP) per destination

maxNrofSL-ReportConfigId-r16 INTEGER ::= 64 -- Maximum number of sidelink measurement reporting configuration(RSRP) per destination

maxNrofSL-PoolToMeasureNR-r16 INTEGER ::= 8 -- Maximum number of resource pool for NR sidelink measurement to measure for

-- each measurement object (for CBR)

maxFreqSL-NR-r16 INTEGER ::= 8 -- Maximum number of NR anchor carrier frequency for NR sidelink communication

maxNrofSL-QFIs-r16 INTEGER ::= 2048 -- Maximum number of QoS flow for NR sidelink communication per UE

maxNrofSL-QFIsPerDest-r16 INTEGER ::= 64 -- Maximum number of QoS flow per destination for NR sidelink communication

maxNrofObjectId INTEGER ::= 64 -- Maximum number of measurement objects

maxNrofPageRec INTEGER ::= 32 -- Maximum number of page records

maxNrofPCI-Ranges INTEGER ::= 8 -- Maximum number of PCI ranges

maxPLMN INTEGER ::= 12 -- Maximum number of PLMNs broadcast and reported by UE at establishment

maxTAC-r17 INTEGER ::= 12 -- Maximum number of Tracking Area Codes to which a cell belongs to

maxNrofCSI-RS-ResourcesRRM INTEGER ::= 96 -- Maximum number of CSI-RS resources per cell for an RRM measurement object

maxNrofCSI-RS-ResourcesRRM-1 INTEGER ::= 95 -- Maximum number of CSI-RS resources per cell for an RRM measurement object

-- minus 1.

maxNrofMeasId INTEGER ::= 64 -- Maximum number of configured measurements

maxNrofQuantityConfig INTEGER ::= 2 -- Maximum number of quantity configurations

maxNrofCSI-RS-CellsRRM INTEGER ::= 96 -- Maximum number of cells with CSI-RS resources for an RRM measurement object

maxNrofSL-Dest-r16 INTEGER ::= 32 -- Maximum number of destination for NR sidelink communication

maxNrofSL-Dest-1-r16 INTEGER ::= 31 -- Highest index of destination for NR sidelink communication

maxNrofSLRB-r16 INTEGER ::= 512 -- Maximum number of radio bearer for NR sidelink communication per UE

maxSL-LCID-r16 INTEGER ::= 512 -- Maximum number of RLC bearer for NR sidelink communication per UE

maxSL-SyncConfig-r16 INTEGER ::= 16 -- Maximum number of sidelink Sync configurations

maxNrofRXPool-r16 INTEGER ::= 16 -- Maximum number of Rx resource pool for NR sidelink communication

maxNrofTXPool-r16 INTEGER ::= 8 -- Maximum number of Tx resource pool for NR sidelink communication

maxNrofPoolID-r16 INTEGER ::= 16 -- Maximum index of resource pool for NR sidelink communication

maxNrofSRS-PathlossReferenceRS-r16 INTEGER ::= 64 -- Maximum number of RSs used as pathloss reference for SRS power control.

maxNrofSRS-PathlossReferenceRS-1-r16 INTEGER ::= 63 -- Maximum number of RSs used as pathloss reference for SRS power control

-- minus 1.

maxNrofSRS-ResourceSets INTEGER ::= 16 -- Maximum number of SRS resource sets in a BWP.

maxNrofSRS-ResourceSets-1 INTEGER ::= 15 -- Maximum number of SRS resource sets in a BWP minus 1.

maxNrofSRS-PosResourceSets-r16 INTEGER ::= 16 -- Maximum number of SRS Positioning resource sets in a BWP.

maxNrofSRS-PosResourceSets-1-r16 INTEGER ::= 15 -- Maximum number of SRS Positioning resource sets in a BWP minus 1.

maxNrofSRS-Resources INTEGER ::= 64 -- Maximum number of SRS resources.

maxNrofSRS-Resources-1 INTEGER ::= 63 -- Maximum number of SRS resources minus 1.

maxNrofSRS-PosResources-r16 INTEGER ::= 64 -- Maximum number of SRS Positioning resources.

maxNrofSRS-PosResources-1-r16 INTEGER ::= 63 -- Maximum number of SRS Positioning resources minus 1.

maxNrofSRS-ResourcesPerSet INTEGER ::= 16 -- Maximum number of SRS resources in an SRS resource set

maxNrofSRS-TriggerStates-1 INTEGER ::= 3 -- Maximum number of SRS trigger states minus 1, i.e., the largest code point.

maxNrofSRS-TriggerStates-2 INTEGER ::= 2 -- Maximum number of SRS trigger states minus 2.

maxRAT-CapabilityContainers INTEGER ::= 8 -- Maximum number of interworking RAT containers (incl NR and MRDC)

maxSimultaneousBands INTEGER ::= 32 -- Maximum number of simultaneously aggregated bands

maxULTxSwitchingBandPairs INTEGER ::= 32 -- Maximum number of band pairs supporting dynamic UL Tx switching in a band

-- combination.

maxNrofSlotFormatCombinationsPerSet INTEGER ::= 512 -- Maximum number of Slot Format Combinations in a SF-Set.

maxNrofSlotFormatCombinationsPerSet-1 INTEGER ::= 511 -- Maximum number of Slot Format Combinations in a SF-Set minus 1.

maxNrofTrafficPattern-r16 INTEGER ::= 8 -- Maximum number of Traffic Pattern for NR sidelink communication.

maxNrofPUCCH-Resources INTEGER ::= 128

maxNrofPUCCH-Resources-1 INTEGER ::= 127

maxNrofPUCCH-ResourceSets INTEGER ::= 4 -- Maximum number of PUCCH Resource Sets

maxNrofPUCCH-ResourceSets-1 INTEGER ::= 3 -- Maximum number of PUCCH Resource Sets minus 1.

maxNrofPUCCH-ResourcesPerSet INTEGER ::= 32 -- Maximum number of PUCCH Resources per PUCCH-ResourceSet

maxNrofPUCCH-P0-PerSet INTEGER ::= 8 -- Maximum number of P0-pucch present in a p0-pucch set

maxNrofPUCCH-PathlossReferenceRSs INTEGER ::= 4 -- Maximum number of RSs used as pathloss reference for PUCCH power control.

maxNrofPUCCH-PathlossReferenceRSs-1 INTEGER ::= 3 -- Maximum number of RSs used as pathloss reference for PUCCH power control

-- minus 1.

maxNrofPUCCH-PathlossReferenceRSs-r16 INTEGER ::= 64 -- Maximum number of RSs used as pathloss reference for PUCCH power control

-- extended.

maxNrofPUCCH-PathlossReferenceRSs-1-r16 INTEGER ::= 63 -- Maximum number of RSs used as pathloss reference for PUCCH power control

-- minus 1 extended.

maxNrofPUCCH-PathlossReferenceRSsDiff-r16 INTEGER ::= 60 -- Difference between the extended maximum and the non-extended maximum

maxNrofPUCCH-ResourceGroups-r16 INTEGER ::= 4 -- Maximum number of PUCCH resources groups.

maxNrofPUCCH-ResourcesPerGroup-r16 INTEGER ::= 128 -- Maximum number of PUCCH resources in a PUCCH group.

maxNrofPowerControlSetInfos-r17 INTEGER ::= 8 -- Maximum number of PUCCH power control set infos

maxNrofMultiplePUSCHs-r16 INTEGER ::= 8 -- Maximum number of multiple PUSCHs in PUSCH TDRA list

maxNrofP0-PUSCH-AlphaSets INTEGER ::= 30 -- Maximum number of P0-pusch-alpha-sets (see TS 38.213 [13], clause 7.1)

maxNrofP0-PUSCH-AlphaSets-1 INTEGER ::= 29 -- Maximum number of P0-pusch-alpha-sets minus 1 (see TS 38.213 [13], clause 7.1)

maxNrofPUSCH-PathlossReferenceRSs INTEGER ::= 4 -- Maximum number of RSs used as pathloss reference for PUSCH power control.

maxNrofPUSCH-PathlossReferenceRSs-1 INTEGER ::= 3 -- Maximum number of RSs used as pathloss reference for PUSCH power control

-- minus 1.

maxNrofPUSCH-PathlossReferenceRSs-r16 INTEGER ::= 64 -- Maximum number of RSs used as pathloss reference for PUSCH power control

-- extended

maxNrofPUSCH-PathlossReferenceRSs-1-r16 INTEGER ::= 63 -- Maximum number of RSs used as pathloss reference for PUSCH power control

-- extended minus 1

maxNrofPUSCH-PathlossReferenceRSsDiff-r16 INTEGER ::= 60 -- Difference between maxNrofPUSCH-PathlossReferenceRSs-r16 and

-- maxNrofPUSCH-PathlossReferenceRSs

maxNrofNAICS-Entries INTEGER ::= 8 -- Maximum number of supported NAICS capability set

maxBands INTEGER ::= 1024 -- Maximum number of supported bands in UE capability.

maxBandsMRDC INTEGER ::= 1280

maxBandsEUTRA INTEGER ::= 256

maxCellReport INTEGER ::= 8

maxDRB INTEGER ::= 29 -- Maximum number of DRBs (that can be added in DRB-ToAddModList).

maxFreq INTEGER ::= 8 -- Max number of frequencies.

maxFreqLayers INTEGER ::= 4 -- Max number of frequency layers.

maxFreqIDC-r16 INTEGER ::= 128 -- Max number of frequencies for IDC indication.

maxCombIDC-r16 INTEGER ::= 128 -- Max number of reported UL CA for IDC indication.

maxFreqIDC-MRDC INTEGER ::= 32 -- Maximum number of candidate NR frequencies for MR-DC IDC indication

maxNrofCandidateBeams INTEGER ::= 16 -- Max number of PRACH-ResourceDedicatedBFR in BFR config.

maxNrofCandidateBeams-r16 INTEGER ::= 64 -- Max number of candidate beam resources in BFR config.

maxNrofCandidateBeamsExt-r16 INTEGER ::= 48 -- Max number of PRACH-ResourceDedicatedBFR in the CandidateBeamRSListExt

maxNrofPCIsPerSMTC INTEGER ::= 64 -- Maximum number of PCIs per SMTC.

maxNrofQFIs INTEGER ::= 64

maxNrofResourceAvailabilityPerCombination-r16 INTEGER ::= 256

maxNrOfSemiPersistentPUSCH-Triggers INTEGER ::= 64 -- Maximum number of triggers for semi persistent reporting on PUSCH

maxNrofSR-Resources INTEGER ::= 8 -- Maximum number of SR resources per BWP in a cell.

maxNrofSlotFormatsPerCombination INTEGER ::= 256

maxNrofSpatialRelationInfos INTEGER ::= 8

maxNrofSpatialRelationInfos-plus-1 INTEGER ::= 9

maxNrofSpatialRelationInfos-r16 INTEGER ::= 64

maxNrofSpatialRelationInfosDiff-r16 INTEGER ::= 56 -- Difference between maxNrofSpatialRelationInfos-r16 and maxNrofSpatialRelationInfos

maxNrofIndexesToReport INTEGER ::= 32

maxNrofIndexesToReport2 INTEGER ::= 64

maxNrofSSBs-r16 INTEGER ::= 64 -- Maximum number of SSB resources in a resource set.

maxNrofSSBs-1 INTEGER ::= 63 -- Maximum number of SSB resources in a resource set minus 1.

maxNrofS-NSSAI INTEGER ::= 8 -- Maximum number of S-NSSAI.

maxNrofTCI-StatesPDCCH INTEGER ::= 64

maxNrofTCI-States INTEGER ::= 128 -- Maximum number of TCI states.

maxNrofTCI-States-1 INTEGER ::= 127 -- Maximum number of TCI states minus 1.

maxULTCI-r17 INTEGER ::= 64 -- Maximum number of TCI states.

maxULTCI-1-r17 INTEGER ::= 63 -- Maximum number of TCI states minus 1.

maxNrofAdditionalPCI-r17 INTEGER ::= 7 -- Maximum number of additional PCI

maxNrofAdditionalPCI-1-r17 INTEGER ::= 6 -- Maximum number of additional PCI minus 1.

maxMPE-Resources-r17 INTEGER ::= 64 -- Maximum number of pooled MPE resources

maxNrofUL-Allocations INTEGER ::= 16 -- Maximum number of PUSCH time domain resource allocations.

maxQFI INTEGER ::= 63

maxRA-CSIRS-Resources INTEGER ::= 96

maxRA-OccasionsPerCSIRS INTEGER ::= 64 -- Maximum number of RA occasions for one CSI-RS

maxRA-Occasions-1 INTEGER ::= 511 -- Maximum number of RA occasions in the system

maxRA-SSB-Resources INTEGER ::= 64

maxSCSs INTEGER ::= 5

maxSecondaryCellGroups INTEGER ::= 3

maxNrofServingCellsEUTRA INTEGER ::= 32

maxMBSFN-Allocations INTEGER ::= 8

maxNrofMultiBands INTEGER ::= 8

maxCellSFTD INTEGER ::= 3 -- Maximum number of cells for SFTD reporting

maxReportConfigId INTEGER ::= 64

maxNrofCodebooks INTEGER ::= 16 -- Maximum number of codebooks supported by the UE

maxNrofCSI-RS-ResourcesExt-r16 INTEGER ::= 16 -- Maximum number of codebook resources supported by the UE for eType2/Codebook combo

maxNrofCSI-RS-ResourcesExt-r17 INTEGER ::= 8 -- Maximum number of codebook resources for fetype2Rank1 and fetype2Rank2

maxNrofCSI-RS-Resources INTEGER ::= 7 -- Maximum number of codebook resources supported by the UE

maxNrofCSI-RS-ResourcesAlt-r16 INTEGER ::= 512 -- Maximum number of alternative codebook resources supported by the UE

maxNrofCSI-RS-ResourcesAlt-1-r16 INTEGER ::= 511 -- Maximum number of alternative codebook resources supported by the UE minus 1

maxNrofSRI-PUSCH-Mappings INTEGER ::= 16

maxNrofSRI-PUSCH-Mappings-1 INTEGER ::= 15

maxSIB INTEGER::= 32 -- Maximum number of SIBs

maxSI-Message INTEGER::= 32 -- Maximum number of SI messages

maxSI-MessagePlus1-r17 INTEGER::= 33 -- Maximum number of SI messages plus 1

maxPO-perPF INTEGER ::= 4 -- Maximum number of paging occasion per paging frame

maxPEI-perPF-r17 INTEGER ::= 4 -- Maximum number of PEI occasion per paging frame

maxAccessCat-1 INTEGER ::= 63 -- Maximum number of Access Categories minus 1

maxBarringInfoSet INTEGER ::= 8 -- Maximum number of access control parameter sets

maxCellEUTRA INTEGER ::= 8 -- Maximum number of E-UTRA cells in SIB list

maxEUTRA-Carrier INTEGER ::= 8 -- Maximum number of E-UTRA carriers in SIB list

maxPLMNIdentities INTEGER ::= 8 -- Maximum number of PLMN identities in RAN area configurations

maxDownlinkFeatureSets INTEGER ::= 1024 -- (for NR DL) Total number of FeatureSets (size of the pool)

maxUplinkFeatureSets INTEGER ::= 1024 -- (for NR UL) Total number of FeatureSets (size of the pool)

maxEUTRA-DL-FeatureSets INTEGER ::= 256 -- (for E-UTRA) Total number of FeatureSets (size of the pool)

maxEUTRA-UL-FeatureSets INTEGER ::= 256 -- (for E-UTRA) Total number of FeatureSets (size of the pool)

maxFeatureSetsPerBand INTEGER ::= 128 -- (for NR) The number of feature sets associated with one band.

maxPerCC-FeatureSets INTEGER ::= 1024 -- (for NR) Total number of CC-specific FeatureSets (size of the pool)

maxFeatureSetCombinations INTEGER ::= 1024 -- (for MR-DC/NR)Total number of Feature set combinations (size of the pool)

maxInterRAT-RSTD-Freq INTEGER ::= 3

maxGIN-r17 INTEGER ::= 24 -- Maximum number of broadcast GINs

maxHRNN-Len-r16 INTEGER ::= 48 -- Maximum length of HRNNs

maxNPN-r16 INTEGER ::= 12 -- Maximum number of NPNs broadcast and reported by UE at establishment

maxNrOfMinSchedulingOffsetValues-r16 INTEGER ::= 2 -- Maximum number of min. scheduling offset (K0/K2) configurations

maxK0-SchedulingOffset-r16 INTEGER ::= 16 -- Maximum number of slots configured as min. scheduling offset (K0)

maxK2-SchedulingOffset-r16 INTEGER ::= 16 -- Maximum number of slots configured as min. scheduling offset (K2)

maxK0-SchedulingOffset-r17 INTEGER ::= 64 -- Maximum number of slots configured as min. scheduling offset (K0)

maxK2-SchedulingOffset-r17 INTEGER ::= 64 -- Maximum number of slots configured as min. scheduling offset (K2)

maxDCI-2-6-Size-r16 INTEGER ::= 140 -- Maximum size of DCI format 2-6

maxDCI-2-7-Size-r17 INTEGER ::= 43 -- Maximum size of DCI format 2-7

maxDCI-2-6-Size-1-r16 INTEGER ::= 139 -- Maximum DCI format 2-6 size minus 1

maxNrofUL-Allocations-r16 INTEGER ::= 64 -- Maximum number of PUSCH time domain resource allocations

maxNrofP0-PUSCH-Set-r16 INTEGER ::= 2 -- Maximum number of P0 PUSCH set(s)

maxOnDemandSIB-r16 INTEGER ::= 8 -- Maximum number of SIB(s) that can be requested on-demand

maxOnDemandPosSIB-r16 INTEGER ::= 32 -- Maximum number of posSIB(s) that can be requested on-demand

maxCI-DCI-PayloadSize-r16 INTEGER ::= 126 -- Maximum number of the DCI size for CI

maxCI-DCI-PayloadSize-1-r16 INTEGER ::= 125 -- Maximum number of the DCI size for CI minus 1

maxUu-Relay-RLC-ChannelID-r17 INTEGER ::= 32 -- Maximum value of Uu Relay RLC channel ID

maxWLAN-Id-Report-r16 INTEGER ::= 32 -- Maximum number of WLAN IDs to report

maxWLAN-Name-r16 INTEGER ::= 4 -- Maximum number of WLAN name

maxRAReport-r16 INTEGER ::= 8 -- Maximum number of RA procedures information to be included in the RA report

maxTxConfig-r16 INTEGER ::= 64 -- Maximum number of sidelink transmission parameters configurations

maxTxConfig-1-r16 INTEGER ::= 63 -- Maximum number of sidelink transmission parameters configurations minus 1

maxPSSCH-TxConfig-r16 INTEGER ::= 16 -- Maximum number of PSSCH TX configurations

maxNrofCLI-RSSI-Resources-r16 INTEGER ::= 64 -- Maximum number of CLI-RSSI resources for UE

maxNrofCLI-RSSI-Resources-1-r16 INTEGER ::= 63 -- Maximum number of CLI-RSSI resources for UE minus 1

maxNrofCLI-SRS-Resources-r16 INTEGER ::= 32 -- Maximum number of SRS resources for CLI measurement for UE

maxCLI-Report-r16 INTEGER ::= 8

maxNrofConfiguredGrantConfig-r16 INTEGER ::= 12 -- Maximum number of configured grant configurations per BWP

maxNrofConfiguredGrantConfig-1-r16 INTEGER ::= 11 -- Maximum number of configured grant configurations per BWP minus 1

maxNrofCG-Type2DeactivationState INTEGER ::= 16 -- Maximum number of deactivation state for type 2 configured grants per BWP

maxNrofConfiguredGrantConfigMAC-1-r16 INTEGER ::= 31 -- Maximum number of configured grant configurations per MAC entity minus 1

maxNrofSPS-Config-r16 INTEGER ::= 8 -- Maximum number of SPS configurations per BWP

maxNrofSPS-Config-1-r16 INTEGER ::= 7 -- Maximum number of SPS configurations per BWP minus 1

maxNrofSPS-DeactivationState INTEGER ::= 16 -- Maximum number of deactivation state for SPS per BWP

maxNrofPPW-Config-r17 INTEGER ::= ffsUpperLimit -- Maximum number of Preconfigured PPW is FFS

maxUE-Tx-TEG-ID-r17 INTEGER ::= ffsUpperLimit -- Maximum number of UE Tx Timing Error Group ID is FFS

maxGapConfig-r17 INTEGER ::= ffsUpperLimit -- Maximum number of Preconfigured Gaps is FFS

maxNrofDormancyGroups INTEGER ::= 5 --

maxNrofPagingSubgroups-r17 INTEGER ::= 8 -- Maximum number of paging subgroups per paging occasion

maxNrofPUCCH-ResourceGroups-1-r16 INTEGER ::= 3 --

maxNrofServingCellsTCI-r16 INTEGER ::= 32 -- Maximum number of serving cells in simultaneousTCI-UpdateList

maxNrofTxDC-TwoCarrier-r16 INTEGER ::= 64 -- Maximum number of UL Tx DC locations reported by the UE for 2CC uplink CA

maxNrofRbSetGroups-r17 INTEGER ::= 8 -- Maximum number of RB set groups

maxNrofRbSets-r17 INTEGER ::= 8 -- Maximum number of RB sets

maxNrofEnhType3HARQ-ACK-r17 INTEGER ::= 8 -- Maximum number of enhanced type 3 HARQ-ACK codebook

maxNrofEnhType3HARQ-ACK-1-r17 INTEGER ::= 7 -- Maximum number of enhanced type 3 HARQ-ACK codebook minus 1

maxNrofPRS-ResourcesPerSet-r17 INTEGER ::= 64 -- Maximum number of PRS resources for one set

maxNrofPRS-ResourcesPerSet-1-r17 INTEGER ::= 63 -- Maximum number of PRS resources for one set minus 1

maxNrofPRS-ResourceOffsetValue-1-r17 INTEGER ::= 511

maxNrofGapId-r17 INTEGER ::= 8 -- Maximum number of measurement gap ID is FFS

maxNrOfGapPri-r17 INTEGER ::= 16 -- Maximum number of gap priority level is FFS

maxCEFReport-r17 INTEGER ::= 4 -- Maximum number of CEF reports by the UE

maxNrofMultiplePDSCHs-r17 INTEGER ::= 8 -- Maximum number of PDSCHs in PDSCH TDRA list

maxSliceInfo-r17 INTEGER ::= 8 -- Maximum number of slice groups. FFS on the exact value

maxCellSlice-r17 INTEGER ::= 16 -- Maximum number of cells supporting the slice group

maxNrofTRS-ResourceSets-r17 INTEGER ::= 64 -- Maximum number of TRS resource sets

maxNrofSearchSpaceGroups-1-r17 INTEGER ::= 2 -- Maximum number of search space groups minus 1

maxRemoteUE-r17 INTEGER ::= ffsUpperLimit -- FFS

maxDCI-4-2-Size-r17 INTEGER ::= 140 -- Maximum size of DCI format 4-2

maxFreqMBS-r17 INTEGER ::= 5 -- FFS: if a higher value, e.g. 8 or 16 is needed

maxNrofDRX-ConfigPTM-r17 INTEGER ::= 64 -- Max number of DRX configuration for PTM provided in MBS broadcast in a

-- cell

maxNrofDRX-ConfigPTM-1-r17 INTEGER ::= 63 -- Max number of DRX configuration for PTM provided in MBS broadcast in a

-- cell minus 1

maxNrofMBS-ServiceListPerUE-r17 INTEGER ::= 16 -- Maximum number of services which the UE can include in the MBS interest

-- indication

maxNrofMBS-Session-r17 INTEGER ::= 1024 -- Maximum number of MBS sessions provided in MBS broadcast in a cell

maxNrofMTCH-SSB-MappingWindow-r17 INTEGER ::= 16 -- FFS: Maximum number of MTCH to SSB beam mapping pattern

maxNrofMTCH-SSB-MappingWindow-1-r17 INTEGER ::= 15 -- FFS: Maximum number of MTCH to SSB beam mapping pattern minus 1

maxNrofMRB-Broadcast-r17 INTEGER ::= 4 -- Maximum number of broadcast MRBs configured for one MBS broadcast service

-- FFS: if a higher value, e.g. 8, is needed

maxNrofPageGroup-r17 INTEGER ::= 32 -- Maximum number of paging groups in a paging message

maxNrofPDSCH-ConfigPTM-r17 INTEGER ::= 16 -- Maximum number of PDSCH configuration groups for PTM

maxNrofPDSCH-ConfigPTM-1-r17 INTEGER ::= 15 -- Maximum number of PDSCH configuration groups for PTM minus 1

maxG-RNTI-r17 INTEGER ::= 16 -- Maximum number of G-RNTI that can be configured for a UE. FFS: if the

-- final value should be different based on the related RAN1 discussion on

-- UE capabilities

maxG-RNTI-1-r17 INTEGER ::= 15 -- Maximum number of G-RNTI that can be configured for a UE minus 1.

-- FFS: if the final value should be different based on the related RAN1

-- discussion on UE capabilities

maxG-CS-RNTI-r17 INTEGER ::= 8 -- Maximum number of G-CS-RNTI that can be configured for a UE.

-- FFS: the final value should be different based on the related RAN1

-- discussion on UE capabilities

maxG-CS-RNTI-1-r17 INTEGER ::= 7 -- FFS: Maximum number of G-CS-RNTI that can be configured for a UE minus 1.

maxMRB-r17 INTEGER ::= 32 -- Maximum number of multicast MRBs (that can be added in MRB-ToAddModLIst)

maxFSAI-MBS-r17 INTEGER ::= 64 -- Maximum number of MBS frequency selection area identities

maxNeighCell-MBS-r17 INTEGER ::= 8 -- Maximum number of MBS broadcast neighbour cells

-- TAG-MULTIPLICITY-AND-TYPE-CONSTRAINT-DEFINITIONS-STOP

-- ASN1STOP

Editor's note: *maxK0-SchedulingOffset* and *maxK0-SchedulingOffset* need confirmation by RAN1.

– End of NR-RRC-Definitions

-- ASN1START

END

-- ASN1STOP

<Skip>

### 11.2.1 General

This clause specifies RRC messages that are sent either across the X2-, Xn- or the NG-interface, either to or from the gNB, i.e. a single 'logical channel' is used for all RRC messages transferred across network nodes. The information could originate from or be destined for another RAT.

-- ASN1START

-- TAG-NR-INTER-NODE-DEFINITIONS-START

NR-InterNodeDefinitions DEFINITIONS AUTOMATIC TAGS ::=

BEGIN

IMPORTS

ARFCN-ValueNR,

ARFCN-ValueEUTRA,

CellIdentity,

CGI-InfoEUTRA,

CGI-InfoNR,

CondReconfigExecCondSCG-r17,

CSI-RS-Index,

CSI-RS-CellMobility,

DRX-Config,

EUTRA-PhysCellId,

FeatureSetDownlinkPerCC-Id,

FeatureSetUplinkPerCC-Id,

FreqBandIndicatorNR,

GapConfig,

maxBandComb,

maxBands,

maxBandsEUTRA,

maxCellSFTD,

maxFeatureSetsPerBand,

maxFreqIDC-MRDC,

maxNrofCombIDC,

maxNrofCondCells-r16,

ffsUpperLimit, -- to be removed later

maxNrofPhysicalResourceBlocks,

maxNrofSCells,

maxNrofServingCells,

maxNrofServingCells-1,

maxNrofServingCellsEUTRA,

maxNrofIndexesToReport,

maxSimultaneousBands,

MBSInterestIndication-r17,

MeasQuantityResults,

MeasResultCellListSFTD-EUTRA,

MeasResultCellListSFTD-NR,

MeasResultList2NR,

MeasResultSCG-Failure,

MeasResultServFreqListEUTRA-SCG,

NeedForGapsInfoNR-r16,

NeedForGapNCSG-InfoNR-r17,

NeedForGapNCSG-InfoEUTRA-r17,

OverheatingAssistance,

OverheatingAssistance-r17,

P-Max,

PhysCellId,

RadioBearerConfig,

RAN-NotificationAreaInfo,

RRCReconfiguration,

ServCellIndex,

SetupRelease,

SSB-Index,

SSB-MTC,

SSB-ToMeasure,

SS-RSSI-Measurement,

ShortMAC-I,

SubcarrierSpacing,

UEAssistanceInformation,

UE-CapabilityRAT-ContainerList,

maxNrofCLI-RSSI-Resources-r16,

maxNrofCLI-SRS-Resources-r16,

RSSI-ResourceId-r16,

SidelinkUEInformationNR-r16,

SRS-ResourceId

FROM NR-RRC-Definitions;

-- TAG-NR-INTER-NODE-DEFINITIONS-STOP

-- ASN1STOP

<Skip>

11.2.2 Message definitions

<Skip>

– *HandoverPreparationInformation*

This message is used to transfer the NR RRC information used by the target gNB during handover preparation or UE context retrieval, e.g. in case of resume or re-establishment, including UE capability information. This message is also used for transferring the information between the CU and DU.

Direction: source gNB/source RAN to target gNB or CU to DU.

***HandoverPreparationInformation* message**

-- ASN1START

-- TAG-HANDOVER-PREPARATION-INFORMATION-START

HandoverPreparationInformation ::= SEQUENCE {

criticalExtensions CHOICE {

c1 CHOICE{

handoverPreparationInformation HandoverPreparationInformation-IEs,

spare3 NULL, spare2 NULL, spare1 NULL

},

criticalExtensionsFuture SEQUENCE {}

}

}

HandoverPreparationInformation-IEs ::= SEQUENCE {

ue-CapabilityRAT-List UE-CapabilityRAT-ContainerList,

sourceConfig AS-Config OPTIONAL, -- Cond HO

rrm-Config RRM-Config OPTIONAL,

as-Context AS-Context OPTIONAL,

nonCriticalExtension SEQUENCE {} OPTIONAL

}

AS-Config ::= SEQUENCE {

rrcReconfiguration OCTET STRING (CONTAINING RRCReconfiguration),

...,

[[

sourceRB-SN-Config OCTET STRING (CONTAINING RadioBearerConfig) OPTIONAL,

sourceSCG-NR-Config OCTET STRING (CONTAINING RRCReconfiguration) OPTIONAL,

sourceSCG-EUTRA-Config OCTET STRING OPTIONAL

]],

[[

sourceSCG-Configured ENUMERATED {true} OPTIONAL

]]

}

AS-Context ::= SEQUENCE {

reestablishmentInfo ReestablishmentInfo OPTIONAL,

configRestrictInfo ConfigRestrictInfoSCG OPTIONAL,

...,

[[ ran-NotificationAreaInfo RAN-NotificationAreaInfo OPTIONAL

]],

[[ ueAssistanceInformation OCTET STRING (CONTAINING UEAssistanceInformation) OPTIONAL -- Cond HO2

]],

[[

selectedBandCombinationSN BandCombinationInfoSN OPTIONAL

]],

[[

configRestrictInfoDAPS-r16 ConfigRestrictInfoDAPS-r16 OPTIONAL,

sidelinkUEInformationNR-r16 OCTET STRING OPTIONAL,

sidelinkUEInformationEUTRA-r16 OCTET STRING OPTIONAL,

ueAssistanceInformationEUTRA-r16 OCTET STRING OPTIONAL,

ueAssistanceInformationSCG-r16 OCTET STRING (CONTAINING UEAssistanceInformation) OPTIONAL, -- Cond HO2

needForGapsInfoNR-r16 NeedForGapsInfoNR-r16 OPTIONAL

]],

[[

configRestrictInfoDAPS-v1640 ConfigRestrictInfoDAPS-v1640 OPTIONAL

]],

[[

needForGapNCSG-InfoNR-r17 NeedForGapNCSG-InfoNR-r17 OPTIONAL,

needForGapNCSG-InfoEUTRA-r17 NeedForGapNCSG-InfoEUTRA-r17 OPTIONAL,

mbsInterestIndication-r17 OCTET STRING (CONTAINING MBSInterestIndication-r17) OPTIONAL

]]

}

ConfigRestrictInfoDAPS-r16 ::= SEQUENCE {

powerCoordination-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 }

} OPTIONAL

}

ConfigRestrictInfoDAPS-v1640 ::= SEQUENCE {

sourceFeatureSetPerDownlinkCC-r16 FeatureSetDownlinkPerCC-Id,

sourceFeatureSetPerUplinkCC-r16 FeatureSetUplinkPerCC-Id

}

ReestablishmentInfo ::= SEQUENCE {

sourcePhysCellId PhysCellId,

targetCellShortMAC-I ShortMAC-I,

additionalReestabInfoList ReestabNCellInfoList OPTIONAL

}

ReestabNCellInfoList ::= SEQUENCE ( SIZE (1..maxCellPrep) ) OF ReestabNCellInfo

ReestabNCellInfo::= SEQUENCE{

cellIdentity CellIdentity,

key-gNodeB-Star BIT STRING (SIZE (256)),

shortMAC-I ShortMAC-I

}

RRM-Config ::= SEQUENCE {

ue-InactiveTime ENUMERATED {

s1, s2, s3, s5, s7, s10, s15, s20,

s25, s30, s40, s50, min1, min1s20, min1s40,

min2, min2s30, min3, min3s30, min4, min5, min6,

min7, min8, min9, min10, min12, min14, min17, min20,

min24, min28, min33, min38, min44, min50, hr1,

hr1min30, hr2, hr2min30, hr3, hr3min30, hr4, hr5, hr6,

hr8, hr10, hr13, hr16, hr20, day1, day1hr12, day2,

day2hr12, day3, day4, day5, day7, day10, day14, day19,

day24, day30, dayMoreThan30} OPTIONAL,

candidateCellInfoList MeasResultList2NR OPTIONAL,

...,

[[

candidateCellInfoListSN-EUTRA MeasResultServFreqListEUTRA-SCG OPTIONAL

]]

}

-- TAG-HANDOVER-PREPARATION-INFORMATION-STOP

-- ASN1STOP

|  |
| --- |
| ***HandoverPreparationInformation* field descriptions** |
| ***as-Context***  Local RAN context required by the target gNB or DU. |
| ***rrm-Config***  Local RAN context used mainly for RRM purposes. |
| ***sourceConfig***  The radio resource configuration as used in the source cell. |
| ***ue-CapabilityRAT-List***  The UE radio access related capabilities concerning RATs supported by the UE. A gNB that retrieves MRDC related capability containers ensures that the set of included MRDC containers is consistent w.r.t. the feature set related information. |
| ***ue-InactiveTime***  Duration while UE has not received or transmitted any user data. Thus the timer is still running in case e.g., UE measures the neighbour cells for the HO purpose. Value *s1* corresponds to 1 second, *s2* corresponds to 2 seconds and so on. Value *min1* corresponds to 1 minute, value *min1s20* corresponds to 1 minute and 20 seconds, value *min1s40* corresponds to 1 minute and 40 seconds and so on. Value *hr1* corresponds to 1 hour, *hr1min30* corresponds to 1 hour and 30 minutes and so on. |

|  |
| --- |
| ***AS-Config* field descriptions** |
| ***rrcReconfiguration***  Contains the *RRCReconfiguration* configuration as generated entirely by the MN. |
| ***sourceRB-SN-Config***  Contains the IE *RadioBearerConfig* as generated entirely by the SN. This field is only used when the UE is configured with SN terminated RB(s). |
| ***sourceSCG-Configured***  Value *true* indicates that the UE is configured with NR or EUTRA SCG in source configuration. The field is only used in NR-DC and NE-DC and is included only if the fields *sourceSCG-NR-Config* and *sourceSCG-EUTRA-Config* are absent. |
| ***sourceSCG-EUTRA-Config***  Contains the current dedicated SCG configuration in *RRCConnectionReconfiguration* message as specified in TS 36.331 [10] and generated entirely by the SN. In this version of the specification, the E-UTRA *RRCConnectionReconfiguration* message can only include the field *scg-Configuration* . This field is only used in NE-DC. |
| ***sourceSCG-NR-Config***  Contains the current dedicated SCG configuration in *RRCReconfiguration* message as generated entirely by the SN. In this version of the specification, the *RRCReconfiguration* message can only include fields *secondaryCellGroup* and *measConfig*. This field is only used in NR-DC. |

|  |
| --- |
| ***AS-Context* field descriptions** |
| ***configRestrictInfoDAPS***  Includes fields for which source cell explicitly indicates the restriction to be observed by target cell during DAPS handover. |
| ***mbsInterestIndication***  Includes the information last reported by the UE in the NR *MBSInterestIndication* message, if any. |
| ***needForGapsInfoNR***  Includes measurement gap requirement information of the UE for NR target bands. |
| ***selectedBandCombinationSN***  Indicates the band combination selected by SN in (NG)EN-DC, NE-DC, and NR-DC. |
| ***sidelinkUEInformationEUTRA***  This field includes *SidelinkUEInformation* IE as specified in TS 36.331 [10]. |
| ***sidelinkUEInformationNR***  This field includes *SidelinkUEInformationNR* IE. |
| ***ueAssistanceInformation***  Includes for each UE assistance feature the information last reported by the UE, if any. |
| ***ueAssistanceInformationSCG***  Includes for each UE assistance feature associated with the SCG, the information last reported by the UE in the NR *UEAssistanceInformation* message for the SCG, if any. |

|  |
| --- |
| ***ConfigRestrictInfoDAPS* field descriptions** |
| ***sourceFeatureSetPerUplinkCC/sourceFeatureSetPerDownlinkCC***  Indicates an index referring to the position of the *FeatureSetUplinkPerCC*/*FeatureSetDownlinkPerCC* selected by source in the *featureSetsUplinkPerCC*/*featureSetsDownlinkPerCC*. |

|  |
| --- |
| ***RRM-Config* field descriptions** |
| ***candidateCellInfoList***  A list of the best cells on each frequency for which measurement information was available |
| ***candidateCellInfoListSN-EUTRA***  A list of EUTRA cells including serving cells and best neighbour cells on each serving frequency, for which measurement results were available. This field is only used in NE-DC. |

|  |  |
| --- | --- |
| **Conditional Presence** | **Explanation** |
| *HO* | The field is mandatory present in case of handover within NR or UE context retrieval, e.g. in case of resume or re-establishment. The field is optionally present in case of handover from E-UTRA/5GC. Otherwise the field is absent. |
| *HO2* | The field is optionally present in case of handover within NR; otherwise the field is absent. |

NOTE 1: The following table indicates per source RAT whether RAT capabilities are included or not.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Source RAT** | **NR capabilities** | **E-UTRA capabilities** | **MR-DC capabilities** | **UTRA capabilities** |
| NR | May be included if UE Radio Capability ID as specified in 23.502 [43] is used for the UE. Included otherwise. | May be included | May be included | May be included, ignored by gNB if received |
| E-UTRAN | May be included if UE Radio Capability ID as specified in 23.502 [43] is used for the UE. Included otherwise. | May be included | May be included | May be included, ignored by gNB if received |

NOTE 2: The following table indicates, in case of inter-RAT handover from E-UTRA, which additional IEs are included or not:

|  |  |  |  |
| --- | --- | --- | --- |
| **Source system** | **sourceConfig** | **rrm-Config** | **as-Context** |
| E-UTRA/EPC | Not included | May be included | Not included |
| E-UTRA/5GC | May be included, but only *radioBearerConfig* is included in the *RRCReconfiguration*. | May be included | Not included |