**3GPP TSG-RAN WG2 #131R2-25xxxxx**

**Bengaluru (Bangalore), India, 25th – 29th Aug. 2025**

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| *CR-Form-v12.3* | | | | | | | | |
| **CHANGE REQUEST** | | | | | | | | |
|  | | | | | | | | |
|  | **38.331** | **CR** | **5400** | **rev** | **1** | **Current version:** | **18.6.0** |  |
|  | | | | | | | | |
| *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:*** | Introduction of Rel-19 Multi-carrier enhancements | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Source to WG:*** | Lenovo | | | | | | | | | |
| ***Source to TSG:*** |  | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Work item code:*** | NR\_MC\_enh2 | | | | |  | ***Date:*** | | | 7 |
|  |  | | | |  | |  | | |  |
| ***Category:*** | **B** |  | | | | | ***Release:*** | | |  |
|  | *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-17 (Release 17) Rel-18 (Release 18) Rel-19 (Release 19)  Rel-20 (Release 20)* | |
|  |  | | | | | | | | | |
| ***Reason for change:*** | | This CR implements RAN1 parameters for Multi-carrier enhancements based on R1-2503243 included in LS (R2-2505000). | | | | | | | | |
|  | |  | | | | | | | | |
| ***Summary of change:*** | | The following parameters for Rel-19 Multi-carrier enhancements have been implemented in ASN.1.  - TDRA-FieldIndexListDCI-1-3-r19  - TDRA-FieldIndexDCI-1-3-r19  - pdsch-TimeDomainAllocationListForMultiPDSCH-DCI-1-3  - TDRA-FieldIndexListDCI-0-3-r19  - TDRA-FieldIndexDCI-0-3-r19  - pusch-TimeDomainAllocationListForMultiPUSCH-DCI-0-3 | | | | | | | | |
|  | |  | | | | | | | | |
| ***Consequences if not approved:*** | | If the CR is not approved, Rel-19 Multi-carrier enhancements will not be supported. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Clauses affected:*** | | 6.3.2, 6.4 | | | | | | | | |
|  | |  | | | | | | | | |
|  | | **Y** | **N** |  | | | |  | | |
| ***Other specs*** | | **X** |  | Other core specifications | | | | TS 38.300 CR1005 | | |
| ***affected:*** | |  | **X** | Test specifications | | | | TS/TR ... CR ... | | |
| ***(show related CRs)*** | |  | **X** | O&M Specifications | | | | TS/TR ... CR ... | | |
|  | |  | | | | | | | | |
| ***Other comments:*** | |  | | | | | | | | |
|  | |  | | | | | | | | |
| ***This CR's revision history:*** | |  | | | | | | | | |

*Start to change*

### 6.3.2 Radio resource control information elements

-----------------------------------------<skip no change part>------------------------------------------------------------

#### – *PDSCH-Config*

The *PDSCH-Config* IE is used to configure the UE specific PDSCH parameters. If this IE is used for MBS CFR, the following fields shall be absent: *tci-StatesToAddModList*, *tci-StatesToReleaseList*, *zp-CSI-RS-ResourceToAddModList*, *minimumSchedulingOffsetK0*, *antennaPortsFieldPresenceDCI-1-2*, *aperiodicZP-CSI-RS-ResourceSetsToAddModListDCI-1-2*, *aperiodicZP-CSI-RS-ResourceSetsToReleaseListDCI-1-2*, *dmrs-DownlinkForPDSCH-MappingTypeA-DCI-1-2*, *dmrs-DownlinkForPDSCH-MappingTypeB-DCI-1-2*, *dmrs-SequenceInitializationDCI-1-2*, *harq-ProcessNumberSizeDCI-1-2*, *mcs-TableDCI-1-2*, *numberOfBitsForRV-DCI-1-2*, *pdsch-AggregationFactor*, *pdsch-TimeDomainAllocationListDCI-1-2*, *prb-BundlingTypeDCI-1-2*, *priorityIndicatorDCI-1-2*, *rateMatchPatternGroup1DCI-1-2*, *rateMatchPatternGroup2DCI-1-2*, *resourceAllocationType1GranularityDCI-1-2*, *vrb-ToPRB-InterleaverDCI-1-2*, *referenceOfSLIVDCI-1-2*, *resourceAllocationDCI-1-2*, *dataScramblingIdentityPDSCH2-r16*, *repetitionSchemeConfig*, *pdsch-ConfigDCI-1-3,* *pdsch-TimeDomainAllocationListForMultiPDSCH-DCI-1-3*.

*PDSCH-Config* information element

-- ASN1START

-- TAG-PDSCH-CONFIG-START

PDSCH-Config ::= SEQUENCE {

dataScramblingIdentityPDSCH INTEGER (0..1023) OPTIONAL, -- Need S

dmrs-DownlinkForPDSCH-MappingTypeA SetupRelease { DMRS-DownlinkConfig } OPTIONAL, -- Need M

dmrs-DownlinkForPDSCH-MappingTypeB SetupRelease { DMRS-DownlinkConfig } OPTIONAL, -- Need M

tci-StatesToAddModList SEQUENCE (SIZE(1..maxNrofTCI-States)) OF TCI-State OPTIONAL, -- Need N

tci-StatesToReleaseList SEQUENCE (SIZE(1..maxNrofTCI-States)) OF TCI-StateId OPTIONAL, -- Need N

vrb-ToPRB-Interleaver ENUMERATED {n2, n4} OPTIONAL, -- Need S

resourceAllocation ENUMERATED { resourceAllocationType0, resourceAllocationType1, dynamicSwitch},

pdsch-TimeDomainAllocationList SetupRelease { PDSCH-TimeDomainResourceAllocationList } OPTIONAL, -- Need M

pdsch-AggregationFactor ENUMERATED { n2, n4, n8 } OPTIONAL, -- Need S

rateMatchPatternToAddModList SEQUENCE (SIZE (1..maxNrofRateMatchPatterns)) OF RateMatchPattern OPTIONAL, -- Need N

rateMatchPatternToReleaseList SEQUENCE (SIZE (1..maxNrofRateMatchPatterns)) OF RateMatchPatternId OPTIONAL, -- Need N

rateMatchPatternGroup1 RateMatchPatternGroup OPTIONAL, -- Need R

rateMatchPatternGroup2 RateMatchPatternGroup OPTIONAL, -- Need R

rbg-Size ENUMERATED {config1, config2},

mcs-Table ENUMERATED {qam256, qam64LowSE} OPTIONAL, -- Need S

maxNrofCodeWordsScheduledByDCI ENUMERATED {n1, n2} OPTIONAL, -- Need R

prb-BundlingType CHOICE {

staticBundling SEQUENCE {

bundleSize ENUMERATED { n4, wideband } OPTIONAL -- Need S

},

dynamicBundling SEQUENCE {

bundleSizeSet1 ENUMERATED { n4, wideband, n2-wideband, n4-wideband } OPTIONAL, -- Need S

bundleSizeSet2 ENUMERATED { n4, wideband } OPTIONAL -- Need S

}

},

zp-CSI-RS-ResourceToAddModList SEQUENCE (SIZE (1..maxNrofZP-CSI-RS-Resources)) OF ZP-CSI-RS-Resource

OPTIONAL, -- Need N

zp-CSI-RS-ResourceToReleaseList SEQUENCE (SIZE (1..maxNrofZP-CSI-RS-Resources)) OF ZP-CSI-RS-ResourceId

OPTIONAL, -- Need N

aperiodic-ZP-CSI-RS-ResourceSetsToAddModList SEQUENCE (SIZE (1..maxNrofZP-CSI-RS-ResourceSets)) OF ZP-CSI-RS-ResourceSet

OPTIONAL, -- Need N

aperiodic-ZP-CSI-RS-ResourceSetsToReleaseList SEQUENCE (SIZE (1..maxNrofZP-CSI-RS-ResourceSets)) OF ZP-CSI-RS-ResourceSetId

OPTIONAL, -- Need N

sp-ZP-CSI-RS-ResourceSetsToAddModList SEQUENCE (SIZE (1..maxNrofZP-CSI-RS-ResourceSets)) OF ZP-CSI-RS-ResourceSet

OPTIONAL, -- Need N

sp-ZP-CSI-RS-ResourceSetsToReleaseList SEQUENCE (SIZE (1..maxNrofZP-CSI-RS-ResourceSets)) OF ZP-CSI-RS-ResourceSetId

OPTIONAL, -- Need N

p-ZP-CSI-RS-ResourceSet SetupRelease { ZP-CSI-RS-ResourceSet }

OPTIONAL, -- Need M

...,

[[

maxMIMO-Layers-r16 SetupRelease { MaxMIMO-LayersDL-r16 } OPTIONAL, -- Need M

minimumSchedulingOffsetK0-r16 SetupRelease { MinSchedulingOffsetK0-Values-r16 } OPTIONAL, -- Need M

-- Start of the parameters for DCI format 1\_2 introduced in V16.1.0

antennaPortsFieldPresenceDCI-1-2-r16 ENUMERATED {enabled} OPTIONAL, -- Need S

aperiodicZP-CSI-RS-ResourceSetsToAddModListDCI-1-2-r16 SEQUENCE (SIZE (1..maxNrofZP-CSI-RS-ResourceSets)) OF ZP-CSI-RS-ResourceSet

OPTIONAL, -- Need N

aperiodicZP-CSI-RS-ResourceSetsToReleaseListDCI-1-2-r16 SEQUENCE (SIZE (1..maxNrofZP-CSI-RS-ResourceSets)) OF ZP-CSI-RS-ResourceSetId

OPTIONAL, -- Need N

dmrs-DownlinkForPDSCH-MappingTypeA-DCI-1-2-r16 SetupRelease { DMRS-DownlinkConfig } OPTIONAL, -- Need M

dmrs-DownlinkForPDSCH-MappingTypeB-DCI-1-2-r16 SetupRelease { DMRS-DownlinkConfig } OPTIONAL, -- Need M

dmrs-SequenceInitializationDCI-1-2-r16 ENUMERATED {enabled} OPTIONAL, -- Need S

harq-ProcessNumberSizeDCI-1-2-r16 INTEGER (0..4) OPTIONAL, -- Need R

mcs-TableDCI-1-2-r16 ENUMERATED {qam256, qam64LowSE} OPTIONAL, -- Need S

numberOfBitsForRV-DCI-1-2-r16 INTEGER (0..2) OPTIONAL, -- Need R

pdsch-TimeDomainAllocationListDCI-1-2-r16 SetupRelease { PDSCH-TimeDomainResourceAllocationList-r16 }

OPTIONAL, -- Need M

prb-BundlingTypeDCI-1-2-r16 CHOICE {

staticBundling-r16 SEQUENCE {

bundleSize-r16 ENUMERATED { n4, wideband } OPTIONAL -- Need S

},

dynamicBundling-r16 SEQUENCE {

bundleSizeSet1-r16 ENUMERATED { n4, wideband, n2-wideband, n4-wideband } OPTIONAL, -- Need S

bundleSizeSet2-r16 ENUMERATED { n4, wideband } OPTIONAL -- Need S

}

} OPTIONAL, -- Need R

priorityIndicatorDCI-1-2-r16 ENUMERATED {enabled} OPTIONAL, -- Need S

rateMatchPatternGroup1DCI-1-2-r16 RateMatchPatternGroup OPTIONAL, -- Need R

rateMatchPatternGroup2DCI-1-2-r16 RateMatchPatternGroup OPTIONAL, -- Need R

resourceAllocationType1GranularityDCI-1-2-r16 ENUMERATED {n2,n4,n8,n16} OPTIONAL, -- Need S

vrb-ToPRB-InterleaverDCI-1-2-r16 ENUMERATED {n2, n4} OPTIONAL, -- Need S

referenceOfSLIVDCI-1-2-r16 ENUMERATED {enabled} OPTIONAL, -- Need S

resourceAllocationDCI-1-2-r16 ENUMERATED { resourceAllocationType0, resourceAllocationType1, dynamicSwitch}

OPTIONAL, -- Need M

-- End of the parameters for DCI format 1\_2 introduced in V16.1.0

priorityIndicatorDCI-1-1-r16 ENUMERATED {enabled} OPTIONAL, -- Need S

dataScramblingIdentityPDSCH2-r16 INTEGER (0..1023) OPTIONAL, -- Need R

pdsch-TimeDomainAllocationList-r16 SetupRelease { PDSCH-TimeDomainResourceAllocationList-r16 } OPTIONAL, -- Need M

repetitionSchemeConfig-r16 SetupRelease { RepetitionSchemeConfig-r16} OPTIONAL -- Need M

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repetitionSchemeConfig-v1630 SetupRelease { RepetitionSchemeConfig-v1630} OPTIONAL -- Need M

]],

[[

pdsch-HARQ-ACK-OneShotFeedbackDCI-1-2-r17 ENUMERATED {enabled} OPTIONAL, -- Need R

pdsch-HARQ-ACK-EnhType3DCI-1-2-r17 ENUMERATED {enabled} OPTIONAL, -- Need R

pdsch-HARQ-ACK-EnhType3DCI-Field-1-2-r17 ENUMERATED {enabled} OPTIONAL, -- Need R

pdsch-HARQ-ACK-RetxDCI-1-2-r17 ENUMERATED {enabled} OPTIONAL, -- Need R

pucch-sSCellDynDCI-1-2-r17 ENUMERATED {enabled} OPTIONAL, -- Need R

dl-OrJointTCI-StateList-r17 CHOICE {

explicitlist SEQUENCE {

dl-OrJointTCI-StateToAddModList-r17 SEQUENCE (SIZE (1..maxNrofTCI-States)) OF TCI-State

OPTIONAL, -- Need N

dl-OrJointTCI-StateToReleaseList-r17 SEQUENCE (SIZE (1..maxNrofTCI-States)) OF TCI-StateId

OPTIONAL -- Need N

},

unifiedTCI-StateRef-r17 ServingCellAndBWP-Id-r17

} OPTIONAL, -- Need R

beamAppTime-r17 ENUMERATED {n1, n2, n4, n7, n14, n28, n42, n56, n70, n84, n98, n112, n224, n336, spare2,

spare1} OPTIONAL, -- Need R

dummy SetupRelease { Dummy-TDRA-List } OPTIONAL, -- Need M

dmrs-FD-OCC-DisabledForRank1-PDSCH-r17 ENUMERATED {true} OPTIONAL, -- Need R

minimumSchedulingOffsetK0-r17 SetupRelease { MinSchedulingOffsetK0-Values-r17 } OPTIONAL, -- Need M

harq-ProcessNumberSizeDCI-1-2-v1700 INTEGER (0..5) OPTIONAL, -- Need R

harq-ProcessNumberSizeDCI-1-1-r17 INTEGER (5) OPTIONAL, -- Need R

mcs-Table-r17 ENUMERATED {qam1024} OPTIONAL, -- Need R

mcs-TableDCI-1-2-r17 ENUMERATED {qam1024} OPTIONAL, -- Need R

xOverheadMulticast-r17 ENUMERATED {xOh6, xOh12, xOh18} OPTIONAL, -- Need S

priorityIndicatorDCI-4-2-r17 ENUMERATED {enabled} OPTIONAL, -- Need S

sizeDCI-4-2-r17 INTEGER (20..maxDCI-4-2-Size-r17) OPTIONAL -- Need R

]],

[[

pdsch-TimeDomainAllocationListForMultiPDSCH-r17 SetupRelease { MultiPDSCH-TDRA-List-r17 } OPTIONAL -- Need M

]],

[[

advancedReceiver-MU-MIMO-r18 SetupRelease { AdvancedReceiver-MU-MIMO-r18 } OPTIONAL, -- Need M

pdsch-ConfigDCI-1-3-r18 SetupRelease { PDSCH-ConfigDCI-1-3-r18 } OPTIONAL -- Need M

]],

[[

pdsch-ConfigDCI-1-3-v1860 SetupRelease { PDSCH-ConfigDCI-1-3-v1860 } OPTIONAL -- Need M

]],

[[

pdsch-TimeDomainAllocationListForMultiPDSCH-DCI-1-3-r19 SetupRelease { MultiPDSCH-TDRA-List-r17 } OPTIONAL -- Need M

]]

}

RateMatchPatternGroup ::= SEQUENCE (SIZE (1..maxNrofRateMatchPatternsPerGroup)) OF CHOICE {

cellLevel RateMatchPatternId,

bwpLevel RateMatchPatternId

}

MinSchedulingOffsetK0-Values-r16 ::= SEQUENCE (SIZE (1..maxNrOfMinSchedulingOffsetValues-r16)) OF INTEGER (0..maxK0-SchedulingOffset-r16)

MinSchedulingOffsetK0-Values-r17 ::= SEQUENCE (SIZE (1..maxNrOfMinSchedulingOffsetValues-r16)) OF INTEGER (0..maxK0-SchedulingOffset-r17)

MaxMIMO-LayersDL-r16 ::= INTEGER (1..8)

PDSCH-ConfigDCI-1-3-r18 ::= SEQUENCE {

resourceAllocationDCI-1-3-r18 ENUMERATED {resourceAllocationType0, resourceAllocationType1, dynamicSwitch}

OPTIONAL, -- Need M

rbg-SizeDCI-1-3-r18 ENUMERATED {config1, config2, config3, spare1} OPTIONAL, -- Cond DCI-1-3

resourceAllocationType1GranularityDCI-1-3-r18 ENUMERATED {n2,n4,n8,n16} OPTIONAL, -- Need S

numberOfBitsForRV-DCI-1-3-r18 INTEGER (0..2) OPTIONAL, -- Need R

harq-ProcessNumberSizeDCI-1-3-r18 INTEGER (0..5) OPTIONAL -- Need R

}

PDSCH-ConfigDCI-1-3-v1860 ::= SEQUENCE {

enabledDefaultBeamForMultiCellScheduling-r18 ENUMERATED {enabled}

}

-- TAG-PDSCH-CONFIG-STOP

-- ASN1STOP

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| --- |
| *PDSCH-Config* field descriptions |
| ***advancedReceiver-MU-MIMO***  A set of assistance information for R-ML (reduced complexity ML) receivers with enhanced inter-user interference suppression for MU-MIMO transmissions. |
| ***antennaPortsFieldPresenceDCI-1-2***  Configure the presence of "Antenna ports" field in DCI format 1\_2. When the field is configured, then the "Antenna ports" field is present in DCI format 1\_2. Otherwise, the field size is set to 0 for DCI format 1\_2 (See TS 38.212 [17], clause 7.3.1.1.3). If neither *dmrs-DownlinkForPDSCH-MappingTypeA-DCI-1-2* nor *dmrs-DownlinkForPDSCH-MappingTypeB-DCI-1-2* is configured, this field is absent. |
| ***aperiodic-ZP-CSI-RS-ResourceSetsToAddModList, aperiodic-ZP-CSI-RS-ResourceSetsToAddModListDCI-1-2***  AddMod/Release lists for configuring aperiodically triggered zero-power CSI-RS resource sets. Each set contains a *ZP-CSI-RS-ResourceSetId* and the IDs of one or more *ZP-CSI-RS-Resources* (the actual resources are defined in the *zp-CSI-RS-ResourceToAddModList*). The network configures the UE with at most 3 aperiodic *ZP-CSI-RS-ResourceSets* and it uses only the *ZP-CSI-RS-ResourceSetId* 1 to 3. The network triggers a set by indicating its *ZP-CSI-RS-ResourceSetId* in the DCI payload. The DCI codepoint '01' triggers the resource set with *ZP-CSI-RS-ResourceSetId* 1, the DCI codepoint '10' triggers the resource set with *ZP-CSI-RS-ResourceSetId 2*, and the DCI codepoint '11' triggers the resource set with *ZP-CSI-RS-ResourceSetId* 3 (see TS 38.214 [19], clause 5.1.4.2). The field *aperiodic-ZP-CSI-RS-ResourceSetsToAddModList* applies to DCI format 1\_1 and the field *aperiodic-ZP-CSI-RS-ResourceSetsToAddModListDCI-1-2* applies to DCI format 1\_2 (see TS 38.214 [19], clause 5.1.4.2 and TS 38.212 [17] clause 7.3.1). |
| ***beamAppTime***  Indicates the first slot to apply the unified TCI indicated by DCI as specified in TS 38.214 Clause 5.1.5. The value n1 means 1 symbol, n2 two symbols and so on. The first slot is at least Y symbols indicated by beamAppTime parameter after the last symbol of the acknowledgment of the joint or separate DL/UL beam indication. The same value shall be configured for all serving cells in any one of the *simultaneousU-TCI-UpdateListN* configured in IE *CellGroupConfig* based on the smallest SCS of the active BWP. |
| ***dataScramblingIdentityPDSCH, dataScramblingIdentityPDSCH2***  Identifier(s) used to initialize data scrambling (c\_init) for PDSCH as specified in TS 38.211 [16], clause 7.3.1.1. The *dataScramblingIdentityPDSCH2* is configured if *coresetPoolIndex* is configured with 1 for at least one CORESET in the same BWP. |
| ***dl-OrJointTCI-StateToAddModList***  A list of Transmission Configuration Indicator (TCI) states indicating a transmission configuration which includes QCL-relationships between the DL RSs in one RS set and the PDSCH DMRS ports, PDCCH DMRS ports, and CSI-RS, and in case of joint mode, also the PUSCH, PUCCH and SRS (see TS 38.214 [19], clause 5.1.5). |
| ***dmrs-DownlinkForPDSCH-MappingTypeA, dmrs-DownlinkForPDSCH-MappingTypeA-DCI-1-2***  DMRS configuration for PDSCH transmissions using PDSCH mapping type A (chosen dynamically via *PDSCH-TimeDomainResourceAllocation*). Only the fields *dmrs-Type*, *dmrs-AdditionalPosition* and *maxLength* may be set differently for mapping type A and B. The field *dmrs-DownlinkForPDSCH-MappingTypeA* applies to DCI formats 1\_1 and 1\_3, and the field *dmrs-DownlinkForPDSCH-MappingTypeA-DCI-1-2* applies to DCI format 1\_2 (see TS 38.212 [17], clause 7.3.1). |
| ***dmrs-DownlinkForPDSCH-MappingTypeB, dmrs-DownlinkForPDSCH-MappingTypeB-DCI-1-2***  DMRS configuration for PDSCH transmissions using PDSCH mapping type B (chosen dynamically via *PDSCH-TimeDomainResourceAllocation*). Only the fields *dmrs-Type*, *dmrs-AdditionalPosition* and *maxLength* may be set differently for mapping type A and B. The field *dmrs-DownlinkForPDSCH-MappingTypeB* applies to DCI formats 1\_1 and 1\_3, and the field *dmrs-DownlinkForPDSCH-MappingTypeB-DCI-1-2* applies to DCI format 1\_2 (see TS 38.212 [17], clause 7.3.1). |
| ***dmrs-FD-OCC-DisabledForRank1-PDSCH***  If configured, the UE may assume that the set of remaining orthogonal antenna ports, which are within the same code division multiplexing (CDM) group and have different frequency domain orthogonal cover codes (FD-OCC), are not associated with the PDSCH of another UE (see TS 38.214 [19], clause 5.1.6.2). It is applicable for PDSCH SCS of 480 and 960 kHz when rank 1 PDSCH with type-1 or type-2 DMRS is scheduled. If *dmrs-TypeEnh-r18* is configured, this field is not configured. |
| ***dmrs-SequenceInitializationDCI-1\_2***  Configure whether the field "DMRS Sequence Initialization" is present or not in DCI format 1\_2 If the field is absent, then the UE applies the value of 0 bit for the field "DMRS Sequence Initialization" in DCI format 1\_2. If the field is present, then the UE applies the value of 1 bit as in DCI format 1\_2 (see TS 38.212 [17], clause 7.3.1). |
| ***dummy***  This field is not used in the specification. If received it shall be ignored by the UE. |
| ***harq-ProcessNumberSizeDCI-1-2***  Configure the number of bits for the field "HARQ process number" in DCI format 1\_2 (see TS 38.212 [17], clause 7.3.1). |
| ***maxMIMO-Layers***  Indicates the maximum number of MIMO layers to be used for PDSCH in this DL BWP. If not configured, the UE uses the *maxMIMO-Layers* configuration in IE *PDSCH-ServingCellConfig* of the serving cell to which this BWP belongs, when the UE operates in this BWP. The value of *maxMIMO-Layers* for a DL BWP shall be smaller than or equal to the value of *maxMIMO-Layers* configured in IE *PDSCH-ServingCellConfig* of the serving cell to which this BWP belongs.  For MBS multicast, indicates the maximum number of MIMO layers to be used for group-common PDSCH of MBS multicast in this CFR. If not configured for CFR, the UE applies value 1. The value of *maxMIMO-Layers* for a CFR shall be smaller than or equal to the value of *maxMIMO-Layers* configured in *PDSCH-ServingCellConfig* IE of the serving cell to which this CFR belongs. |
| ***maxNrofCodeWordsScheduledByDCI***  Maximum number of code words that a single DCI may schedule. This changes the number of MCS/RV/NDI bits in the DCI message from 1 to 2. |
| ***mcs-Table***  Indicates which MCS table the UE shall use for PDSCH for DCI formats 1\_0, 1\_1 and 1\_3 (see TS 38.214 [19], clause 5.1.3.1). If all fields are absent the UE applies the value 64QAM. If the field *mcs-Table-r17* is present for DCI formats 1\_1 and 1\_3, the network does not configure the field *mcs-Table* (without suffix). For an (e)RedCap UE, the 256QAM MCS table for PDSCH is only supported if the UE indicates support of 256QAM for PDSCH. |
| ***mcs-TableDCI-1-2***  Indicates which MCS table the UE shall use for PDSCH for DCI format 1\_2 (see TS 38.214 [19], clause 5.1.3.1). If all fields are absent the UE applies the value 64QAM. If the field *mcs-TableDCI-1-2-r17* is present, the network does not configure the field *mcs-TableDCI-1-2-r16*. For an (e)RedCap UE, the 256QAM MCS table for PDSCH is only supported if the UE indicates support of 256QAM for PDSCH. |
| ***minimumSchedulingOffsetK0***  List of minimum K0 values. Minimum K0 parameter denotes minimum applicable value(s) for the TDRA table for PDSCH and for A-CSI RS triggering Offset(s) (see TS 38.214 [19], clause 5.3.1). |
| ***numberOfBitsForRV-DCI-1-2***  Configures the number of bits for "Redundancy version" in the DCI format 1\_2 (see TS 38.212 [17], clause 7.3.1 and TS 38.214 [19], clause 5.1.2.1). |
| ***pdsch-AggregationFactor***  Number of repetitions for data (see TS 38.214 [19], clause 5.1.2.1). When the field is absent in *PDSCH-Config* which is not used for MBS CFR, the UE applies the value 1. |
| ***pdsch-HARQ-ACK-EnhType3DCI-1-2***  When configured, enhanced Type 3 HARQ-ACK codebook triggering by DCI format 1\_2 is enabled. |
| ***pdsch-HARQ-ACK-EnhType3DCI-Field-1-2***  Enables the enhanced Type 3 codebook through a new DCI field to indicate the enhanced Type 3 HARQ-ACK codebook in DCI format 1\_2 if the more than one enhanced Type 3 HARQ-ACK codebook is configured for the primary PUCCH cell group. |
| ***pdsch-HARQ-ACK-OneShotFeedbackDCI-1-2***  When configured, DCI format 1\_2 can request the UE to report A/N for all HARQ processes and all component carriers configured in the PUCCH group (see TS 38.212 [17], clause 7.3.1). |
| ***pdsch-HARQ-ACK-RetxDCI-1-2***  When configured, DCI format 1\_2 can request the UE to perform a HARQ-ACK re-transmission on a PUCCH resource (see TS 38.213 [13], clause 9.1.5). |
| ***pdsch-TimeDomainAllocationList, pdsch-TimeDomainAllocationListDCI-1-2, pdsch-TimeDomainAllocationListForMultiPDSCH, pdsch-TimeDomainAllocationListForMultiPDSCH-DCI-1-3***  List of time-domain configurations for timing of DL assignment to DL data.  The field *pdsch-TimeDomainAllocationList* (with or without suffix) applies to DCI format 1\_0, DCI format 1\_1 and DCI format 1\_3 (see table 5.1.2.1.1-1 in TS 38.214 [19]), and if the field *pdsch-TimeDomainAllocationListDCI-1-2* is not configured, to DCI format 1\_2. If the field *pdsch-TimeDomainAllocationListDCI-1-2* is configured, it applies to DCI format 1\_2 (see table 5.1.2.1.1-1A in TS 38.214 [19]). The field *pdsch-TimeDomainAllocationListForMultiPDSCH* applies to DCI format 1\_1. The field *pdsch-TimeDomainAllocationListForMultiPDSCH-DCI-1-3* applies to DCI format 1\_3.  The network does not configure the *pdsch-TimeDomainAllocationList-r16* simultaneously with the *pdsch-TimeDomainAllocationList* (without suffix) in the same *PDSCH-Config*. |
| ***prb-BundlingType,*** ***prb-BundlingTypeDCI-1-2***  Indicates the PRB bundle type and bundle size(s) (see TS 38.214 [19], clause 5.1.2.3). If *dynamic* is chosen, the actual *bundleSizeSet1 or bundleSizeSet2* to use is indicated via DCI. Constraints on *bundleSize(Set)* setting depending on *vrb-ToPRB-Interleaver* and *rbg-Size* settings are described in TS 38.214 [19], clause 5.1.2.3. If a *bundleSize(Set)* value is absent, the UE applies the value *n2*. The field *prb-BundlingType* applies to DCI formats 1\_1 and 1\_3, and the field *prb-BundlingTypeDCI-1-2* applies to DCI format 1\_2 (see TS 38.212 [17], clause 7.3.1 and TS 38.214 [19], clause 5.1.2.3). |
| ***priorityIndicatorDCI-1-1, priorityIndicatorDCI-1-2, priorityIndicatorDCI-4-2***  Configure the presence of "priority indicator" in DCI format 1\_1/1\_2/4\_2. When the field is absent in the IE, then 0 bit for "priority indicator" in DCI format 1\_1/1\_2/4\_2. The field *priorityIndicatorDCI-1-1* applies to DCI format 1\_1, the field *priorityIndicatorDCI-1-2* applies to DCI format 1\_2 and the field *priorityIndicatorDCI-4-2* applies to DCI format 4\_2, respectively (see TS 38.212 [17], clause 7.3.1 and TS 38.213 [13] clause 9). |
| ***pucch-sSCellDynDCI-1-2***  When configured, PUCCH cell switching based on dynamic indication in DCI format 1\_2 is enabled (see TS 38.213 [13], clause 9.A). |
| ***p-ZP-CSI-RS-ResourceSet***  A set of periodically occurring ZP-CSI-RS-Resources (the actual resources are defined in the zp-CSI-RS-ResourceToAddModList). The network uses the ZP-CSI-RS-ResourceSetId=0 for this set.  If *p-ZP-CSI-RS-ResourceSet* is configured in both *PDSCH-Config* for MBS CFR and *PDSCH-Config* for the assoicated BWP, it is subject to UE capability whether the *p-ZP-CSI-RS-ResourceSet* configured in *PDSCH-Config* for MBS CFR can be different from the *p-ZP-CSI-RS-ResourceSet* configured in *PDSCH-Config* for the assoicated BWP. |
| ***rateMatchPatternGroup1, rateMatchPatternGroup1DCI-1-2***  The IDs of a first group of *RateMatchPatterns* defined in *PDSCH-Config*->*rateMatchPatternToAddModList* (BWP level) or in *ServingCellConfig* ->*rateMatchPatternToAddModLis*t (cell level). These patterns can be activated dynamically by DCI (see TS 38.214 [19], clause 5.1.4.1). The field *rateMatchPatternGroup1* applies to DCI formats 1\_1 and 1\_3, and the field *rateMatchPatternGroup1DCI-1-2* applies to DCI format 1\_2 (see TS 38.214 [19], clause 5.1.4.1). |
| ***rateMatchPatternGroup2, rateMatchPatternGroup2DCI-1-2***  The IDs of a second group of *RateMatchPatterns* defined in *PDSCH-Config*->*rateMatchPatternToAddModList* (BWP level) or in *ServingCellConfig* ->*rateMatchPatternToAddModLis*t (cell level). These patterns can be activated dynamically by DCI (see TS 38.214 [19], clause 5.1.4.1). The field *rateMatchPatternGroup2* applies to DCI formats 1\_1 and 1\_3, and the field *rateMatchPatternGroup2DCI-1-2* applies to DCI format 1\_2 (see TS 38.214 [19], clause 5.1.4.1). |
| ***rateMatchPatternToAddModList***  Resources patterns which the UE should rate match PDSCH around. The UE rate matches around the union of all resources indicated in the rate match patterns (see TS 38.214 [19], clause 5.1.4.1). If a *RateMatchPattern* with the same *RateMatchPatternId* is configured in both MBS CFR and its associated BWP, the entire *RateMatchPattern* configuration, including the set of RBs/REs indicated by the patterns for the rate matching around, shall be the same and they are counted as a single rate match pattern in the total configured rate match patterns as defined in TS 38.214 [19]. |
| ***rbg-Size***  Selection between config 1 and config 2 for RBG size for PDSCH except PDSCH scheduled by DCI format 1\_3. The UE ignores this field if *resourceAllocation* is set to *resourceAllocationType1* (see TS 38.214 [19], clause 5.1.2.2.1). |
| ***referenceOfSLIVDCI-1-2***  Enable using the starting symbol of the PDCCH monitoring occasion in which the DL assignment is detected as the reference of the SLIV for DCI format 1\_2. When the RRC parameter enables the utilization of the new reference, the new reference is applied for TDRA entries with K0=0. For other entries (if any) in the same TDRA table, the reference is slot boundary as in Rel-15. PDSCH mapping type A is not supported with the new reference. The new reference of SLIV is not configured for a serving cell configured to be scheduled by cross-carrier scheduling on a scheduling cell with different numerology (see TS 38.212 [17] clause 7.3.1 and TS 38.214 [19] clause 5.1.2.1). |
| ***repetitionSchemeConfig***  Configure the UE with repetition schemes. The network does not configure *repetitionSchemeConfig-r16* and *repetitionSchemeConfig-v1630* simultaneously to *setup* in the same *PDSCH-Config*. The network does not configure this parameter and *sfnSchemePDSCH* in *MIMOParam-r17* simultaneously in the same serving cell. |
| ***resourceAllocation, resourceAllocationDCI-1-2***  Configuration of resource allocation type 0 and resource allocation type 1 for non-fallback DCI (see TS 38.214 [19], clause 5.1.2.2). The field *resourceAllocation* applies to DCI format 1\_1, and the field *resourceAllocationDCI-1-2* applies to DCI format 1\_2 (see TS 38.214 [19], clause 5.1.2.2). |
| ***resourceAllocationType1GranularityDCI-1-2***  Configure the scheduling granularity applicable for both the starting point and length indication for resource allocation type 1 in DCI format 1\_2. If this field is absent, the granularity is 1 PRB (see TS 38.214 [19], clause 5.1.2.2.2). |
| ***sizeDCI-4-2***  Indicates the size of DCI format 4-2 (see TS 38.213 [13], clause 10.1). |
| ***sp-ZP-CSI-RS-ResourceSetsToAddModList***  AddMod/Release lists for configuring semi-persistent zero-power CSI-RS resource sets. Each set contains a *ZP-CSI-RS-ResourceSetId* and the IDs of one or more *ZP-CSI-RS-Resources* (the actual resources are defined in the *zp-CSI-RS-ResourceToAddModList*) (see TS 38.214 [19], clause 5.1.4.2). |
| ***tci-StatesToAddModList***  A list of Transmission Configuration Indicator (TCI) states indicating a transmission configuration which includes QCL-relationships between the DL RSs in one RS set and the PDSCH DMRS ports (see TS 38.214 [19], clause 5.1.5). If *unifiedTCI-StateType* is configured for the serving cell, no element in this list is configured. |
| ***unifiedTCI-StateRef***  Provides the serving cell and BWP where the configuration for *dl-OrJointTCI-StateToAddModList-r17* are defined. When this field is present, *dl-OrJointTCI-StateToAddModList* and *dl-OrJointTCI-StateToReleaseList* are not present. The value of *unifiedTCI-StateType* of current serving cell is the same in the serving cell indicated by *unifiedTCI-StateRef.* |
| ***vrb-ToPRB-Interleaver, vrb-ToPRB-InterleaverDCI-1-2***  Interleaving unit configurable between 2 and 4 PRBs (see TS 38.211 [16], clause 7.3.1.6). When the field is absent, the UE performs non-interleaved VRB-to-PRB mapping. |
| ***xOverheadMulticast***  Accounts for an overhead from CSI-RS, CORESET etc. If the field is absent, the UE applies value xOh0 (see TS 38.214 [19]). |
| ***zp-CSI-RS-ResourceToAddModList***  A list of Zero-Power (ZP) CSI-RS resources used for PDSCH rate-matching. Each resource in this list may be referred to from only one type of resource set, i.e., aperiodic, semi-persistent or periodic (see TS 38.214 [19]). |

|  |
| --- |
| *PDSCH-ConfigDCI-1-3* field descriptions |
| ***enabledDefaultBeamForMultiCellScheduling***  This field indicates whether default beam selection for DCI format 1\_3 scheduled PDSCH or aperiodic CSI-RS is enabled (see TS 38.214 [19], clause 5.1.5 and clause 5.2.1.5). |
| ***harq-ProcessNumberSizeDCI-1-3***  Configure the number of bits for the field "HARQ process number" in DCI format 1\_3 (see TS 38.212 [17], clause 7.3.1). |
| ***numberOfBitsForRV-DCI-1-3***  Configures the number of bits for "Redundancy version" in the DCI format 1\_3 (see TS 38.212 [17], clause 7.3.1 and TS 38.214 [19], clause 5.1.2.1). |
| ***rbg-SizeDCI-1-3***  Selection among config 1, config 2 and config 3 for RBG size for PDSCH scheduled by DCI format 1\_3. The UE ignores this field if resourceAllocationDCI-1-3 is set to resourceAllocationType1. (see TS 38.214 [19], clause 5.1.2.2.1). |
| ***resourceAllocationDCI-1-3***  Configuration of resource allocation type 0 and resource allocation type 1 for DCI format 1\_3 (see TS 38.214 [19], clause 5.1.2.2). |
| ***resourceAllocationType1GranularityDCI-1-3***  Configure the scheduling granularity applicable for both the starting point and length indication for resource allocation type 1 in DCI format 1\_3. If this field is absent, the granularity is 1 PRB (see TS 38.214 [19], clause 5.1.2.2.2). |

|  |  |
| --- | --- |
| Conditional Presence | Explanation |
| *DCI-1-3* | This field is mandatory present when *ScheduledCellListDCI-1-3* is configured to the serving cell. Otherwise, it is absent, Need R. |

#### – *PDSCH-ConfigCommon*

The IE *PDSCH-ConfigCommon* is used to configure cell specific PDSCH parameters.

*PDSCH-ConfigCommon* information element

-- ASN1START

-- TAG-PDSCH-CONFIGCOMMON-START

PDSCH-ConfigCommon ::= SEQUENCE {

pdsch-TimeDomainAllocationList PDSCH-TimeDomainResourceAllocationList OPTIONAL, -- Need R

...

}

-- TAG-PDSCH-CONFIGCOMMON-STOP

-- ASN1STOP

|  |
| --- |
| *PDSCH-ConfigCommon* field descriptions |
| ***pdsch-TimeDomainAllocationList***  List of time-domain configurations for timing of DL assignment to DL data (see table 5.1.2.1.1-1 in TS 38.214 [19]). |

#### – *PDSCH-ServingCellConfig*

The IE *PDSCH-ServingCellConfig* is used to configure UE specific PDSCH parameters that are common across the UE's BWPs of one serving cell.

*PDSCH-ServingCellConfig* information element

-- ASN1START

-- TAG-PDSCH-SERVINGCELLCONFIG-START

PDSCH-ServingCellConfig ::= SEQUENCE {

codeBlockGroupTransmission SetupRelease { PDSCH-CodeBlockGroupTransmission } OPTIONAL, -- Need M

xOverhead ENUMERATED { xOh6, xOh12, xOh18 } OPTIONAL, -- Need S

nrofHARQ-ProcessesForPDSCH ENUMERATED {n2, n4, n6, n10, n12, n16} OPTIONAL, -- Need S

pucch-Cell ServCellIndex OPTIONAL, -- Cond SCellAddOnly

...,

[[

maxMIMO-Layers INTEGER (1..8) OPTIONAL, -- Need M

processingType2Enabled BOOLEAN OPTIONAL -- Need M

]],

[[

pdsch-CodeBlockGroupTransmissionList-r16 SetupRelease { PDSCH-CodeBlockGroupTransmissionList-r16 } OPTIONAL -- Need M

]],

[[

downlinkHARQ-FeedbackDisabled-r17 SetupRelease { DownlinkHARQ-FeedbackDisabled-r17 } OPTIONAL, -- Need M

nrofHARQ-ProcessesForPDSCH-v1700 ENUMERATED {n32} OPTIONAL -- Need R

]]

}

PDSCH-CodeBlockGroupTransmission ::= SEQUENCE {

maxCodeBlockGroupsPerTransportBlock ENUMERATED {n2, n4, n6, n8},

codeBlockGroupFlushIndicator BOOLEAN,

...

}

PDSCH-CodeBlockGroupTransmissionList-r16 ::= SEQUENCE (SIZE (1..2)) OF PDSCH-CodeBlockGroupTransmission

DownlinkHARQ-FeedbackDisabled-r17 ::= BIT STRING (SIZE (32))

-- TAG-PDSCH-SERVINGCELLCONFIG-STOP

-- ASN1STOP

|  |
| --- |
| *PDSCH-CodeBlockGroupTransmission* field descriptions |
| ***codeBlockGroupFlushIndicator***  Indicates whether CBGFI for CBG based (re)transmission in DL is enabled (true). (see TS 38.212 [17], clause 7.3.1.2.2). |
| ***maxCodeBlockGroupsPerTransportBlock***  Maximum number of code-block-groups (CBGs) per TB. In case of multiple CW, the maximum CBG is 4 (see TS 38.213 [13], clause 9.1.1). |

|  |
| --- |
| *PDSCH-ServingCellConfig* field descriptions |
| ***codeBlockGroupTransmission***  Enables and configures code-block-group (CBG) based transmission (see TS 38.213 [13], clause 9.1.1). Network does not configure for a UE both spatial bundling of HARQ ACKs and *codeBlockGroupTransmission* within the same cell group.  The network does not configure this field if  - the SCS of at least one DL BWP configured in the cell is 480 or 960 kHz  - Type-1 HARQ-ACK codebook is configured and *pdsch-TimeDomainAllocationListForMultiPDSCH-r17* for this serving cell contains pdsch-AllocationList with multiple entries (multiple PDSCH)  - Type-2 HARQ-ACK codebook is configured and *pdsch-TimeDomainAllocationListForMultiPDSCH-r17* for any cell in the same PUCCH cell group associated with this serving cell contains pdsch-AllocationList with multiple entries (multiple PDSCH) |
| ***downlinkHARQ-FeedbackDisabled***  Used to disable the DL HARQ feedback, sent in the uplink, per HARQ process ID. The first/leftmost bit corresponds to HARQ process ID 0, the next bit to HARQ process ID 1 and so on. Bits corresponding to HARQ process IDs that are not configured shall be ignored. The bit(s) set to one identify HARQ processes with disabled DL HARQ feedback and the bit(s) set to zero identify HARQ processes with enabled DL HARQ feedback. |
| ***maxMIMO-Layers***  Indicates the maximum number of MIMO layers to be used for PDSCH in all BWPs of this serving cell. (see TS 38.212 [17], clause 5.4.2.1). |
| ***nrofHARQ-ProcessesForPDSCH***  The number of HARQ processes to be used on the PDSCH of a serving cell. Value *n2* corresponds to 2 HARQ processes, value *n4* to 4 HARQ processes, and so on. If both *nrofHARQ-ProcessesForPDSCH* and *nrofHARQ-ProcessesForPDSCH-v1700* are absent, the UE uses 8 HARQ processes (see TS 38.214 [19], clause 5.1). |
| ***pdsch-CodeBlockGroupTransmissionList***  A list of configurations for up to two simultaneously constructed HARQ-ACK codebooks (see TS 38.213 [13], clause 9.3). |
| ***processingType2Enabled***  Enables configuration of advanced processing time capability 2 for PDSCH (see 38.214 [19], clause 5.3). |
| ***pucch-Cell***  The ID of the serving cell (of the same cell group) to use for PUCCH. If the field is absent, the UE sends the HARQ feedback on the PUCCH of the SpCell of this cell group, or on this serving cell if it is a PUCCH SCell. |
| ***xOverhead***  Accounts for overhead from CSI-RS, CORESET, etc. If the field is absent, the UE applies value xOh0 (see TS 38.214 [19], clause 5.1.3.2). |

|  |  |
| --- | --- |
| Conditional Presence | Explanation |
| *SCellAddOnly* | It is optionally present, Need S, for (non-PUCCH) SCells when adding a new SCell. The field is absent, Need M, when reconfiguring SCells. The field is also absent for the SpCells as well as for a PUCCH SCell. |

#### – *PDSCH-TimeDomainResourceAllocationList*

The IE *PDSCH-TimeDomainResourceAllocation* is used to configure a time domain relation between PDCCH and PDSCH. The *PDSCH-TimeDomainResourceAllocationList* contains one or more of such *PDSCH-TimeDomainResourceAllocations*. The network indicates in the DL assignment which of the configured time domain allocations the UE shall apply for that DL assignment. The UE determines the bit width of the DCI field based on the number of entries in the *PDSCH-TimeDomainResourceAllocationList*. Value 0 in the DCI field refers to the first element in this list, value 1 in the DCI field refers to the second element in this list, and so on.

*PDSCH-TimeDomainResourceAllocationList* information element

-- ASN1START

-- TAG-PDSCH-TIMEDOMAINRESOURCEALLOCATIONLIST-START

PDSCH-TimeDomainResourceAllocationList ::= SEQUENCE (SIZE(1..maxNrofDL-Allocations)) OF PDSCH-TimeDomainResourceAllocation

PDSCH-TimeDomainResourceAllocation ::= SEQUENCE {

k0 INTEGER(0..32) OPTIONAL, -- Need S

mappingType ENUMERATED {typeA, typeB},

startSymbolAndLength INTEGER (0..127)

}

PDSCH-TimeDomainResourceAllocationList-r16 ::= SEQUENCE (SIZE(1..maxNrofDL-Allocations)) OF PDSCH-TimeDomainResourceAllocation-r16

PDSCH-TimeDomainResourceAllocation-r16 ::= SEQUENCE {

k0-r16 INTEGER(0..32) OPTIONAL, -- Need S

mappingType-r16 ENUMERATED {typeA, typeB},

startSymbolAndLength-r16 INTEGER (0..127),

repetitionNumber-r16 ENUMERATED {n2, n3, n4, n5, n6, n7, n8, n16} OPTIONAL, -- Cond Formats1-0\_1-1\_4-0\_4-1\_4-2

...,

[[

k0-v1710 INTEGER(33..128) OPTIONAL -- Need S

]],

[[

repetitionNumber-v1730 ENUMERATED {n2, n3, n4, n5, n6, n7, n8, n16} OPTIONAL -- Cond Format1-2

]]

}

Dummy-TDRA-List ::= SEQUENCE (SIZE(1.. maxNrofDL-Allocations)) OF MultiPDSCH-TDRA-r17

MultiPDSCH-TDRA-List-r17 ::= SEQUENCE (SIZE(1.. maxNrofDL-AllocationsExt-r17)) OF MultiPDSCH-TDRA-r17

MultiPDSCH-TDRA-r17 ::= SEQUENCE {

pdsch-TDRA-List-r17 SEQUENCE (SIZE(1..maxNrofMultiplePDSCHs-r17)) OF PDSCH-TimeDomainResourceAllocation-r16,

...

}

-- TAG-PDSCH-TIMEDOMAINRESOURCEALLOCATIONLIST-STOP

-- ASN1STOP

|  |
| --- |
| *PDSCH-TimeDomainResourceAllocation* field descriptions |
| ***k0***  Slot offset between DCI and its scheduled PDSCH (see TS 38.214 [19], clause 5.1.2.1). *k0-v1710* is only applicable for PDSCH SCS of 480 kHz and 960 kHz. If multiple PDSCHs are configured per PDCCH, the network always configures this field. Otherwise, when the field is absent and only one PDSCH is configured per PDCCH, the UE applies the value 0. |
| ***mappingType***  PDSCH mapping type (see TS 38.214 [19], clause 5.3). |
| ***repetitionNumber***  Indicates the number of PDSCH transmission occasions for slot-based repetition scheme in IE *RepetitionSchemeConfig.* The parameter is used as specified in 38.214 [19]. |
| ***startSymbolAndLength***  An index giving valid combinations of start symbol and length (jointly encoded) as start and length indicator (SLIV). The network configures the field so that the allocation does not cross the slot boundary (see TS 38.214 [19], clause 5.1.2.1). |

|  |
| --- |
| *MultiPDSCH-TimeDomainResourceAllocation* field descriptions |
| ***pdsch-TDRA-List***  One or multiple PDSCHs which can be in consecutive or non-consecutive slots (see TS 38.214 [19], clause 5.1.2.1). |

|  |  |
| --- | --- |
| Conditional Presence | Explanation |
| *Format1-2* | In *pdsch-TimeDomainAllocationListDCI-1-2*, this field is optionally present, Need R. It is absent, Need R, otherwise. |
| *Formats1-0\_1-1\_4-0\_4-1\_4-2* | In *pdsch-TimeDomainAllocationListDCI-1-2*, *pdsch-TimeDomainAllocationListForMultiPDSCH*, and *SIB20*, this field is absent.  Otherwise, in *pdsch-TimeDomainResourceAllocationList-r16*, this field is optionally present, Need R. |

#### – *PDU-SessionID*

The IE *PDU-SessionID* identifies the PDU Session.

*PDU-SessionID* information element

-- ASN1START

-- TAG-PDU-SESSIONID-START

PDU-SessionID ::= INTEGER (0..255)

-- TAG-PDU-SESSIONID-STOP

-- ASN1STOP

#### – *PHR-Config*

The IE *PHR-Config* is used to configure parameters for power headroom reporting.

*PHR-Config* information element

-- ASN1START

-- TAG-PHR-CONFIG-START

PHR-Config ::= SEQUENCE {

phr-PeriodicTimer ENUMERATED {sf10, sf20, sf50, sf100, sf200,sf500, sf1000, infinity},

phr-ProhibitTimer ENUMERATED {sf0, sf10, sf20, sf50, sf100,sf200, sf500, sf1000},

phr-Tx-PowerFactorChange ENUMERATED {dB1, dB3, dB6, infinity},

multiplePHR BOOLEAN,

dummy BOOLEAN,

phr-Type2OtherCell BOOLEAN,

phr-ModeOtherCG ENUMERATED {real, virtual},

...,

[[

mpe-Reporting-FR2-r16 SetupRelease { MPE-Config-FR2-r16 } OPTIONAL -- Need M

]],

[[

mpe-Reporting-FR2-r17 SetupRelease { MPE-Config-FR2-r17 } OPTIONAL, -- Need M

twoPHRMode-r17 ENUMERATED {enabled} OPTIONAL -- Need R

]],

[[

phr-AssumedPUSCH-Reporting-r18 ENUMERATED {enabled} OPTIONAL, -- Need R

dpc-Reporting-FR1-r18 ENUMERATED {enabled} OPTIONAL -- Need R

]]

}

MPE-Config-FR2-r16 ::= SEQUENCE {

mpe-ProhibitTimer-r16 ENUMERATED {sf0, sf10, sf20, sf50, sf100, sf200, sf500, sf1000},

mpe-Threshold-r16 ENUMERATED {dB3, dB6, dB9, dB12}

}

MPE-Config-FR2-r17 ::= SEQUENCE {

mpe-ProhibitTimer-r17 ENUMERATED {sf0, sf10, sf20, sf50, sf100, sf200, sf500, sf1000},

mpe-Threshold-r17 ENUMERATED {dB3, dB6, dB9, dB12},

numberOfN-r17 INTEGER(1..4),

...

}

-- TAG-PHR-CONFIG-STOP

-- ASN1STOP

|  |
| --- |
| *PHR-Config* field descriptions |
| ***dpc-Reporting-FR1***  Indicates if the delta power class (DPC) is reported, as specified in TS 38.321 [3]. |
| ***dummy***  This field is not used in this version of the specification and the UE ignores the received value. |
| ***mpe-ProhibitTimer***  Value in number of subframes for MPE reporting, as specified in TS 38.321 [3]. Value sf10 corresponds to 10 subframes, and so on. |
| ***mpe-Reporting-FR2***  Indicates whether the UE shall report MPE P-MPR in the PHR MAC control element, as specified in TS 38.321 [3]. |
| ***mpe-Threshold***  Value of the P-MPR threshold in dB for reporting MPE P-MPR when FR2 is configured, as specified in TS 38.321 [3]. The same value applies for each serving cell (although the associated functionality is performed independently for each cell). |
| ***multiplePHR***  Indicates if power headroom shall be reported using the Single Entry PHR MAC control element or Multiple Entry PHR MAC control element defined in TS 38.321 [3]. True means to use Multiple Entry PHR MAC control element and False means to use the Single Entry PHR MAC control element defined in TS 38.321 [3]. The network configures this field to *true* for MR-DC and UL CA for NR, and to *false* in all other cases. |
| ***numberOfN***  Number of reported P-MPR values in a PHR MAC CE. |
| ***phr-AssumedPUSCH-Reporting***  Indicates if the PHR with an assumed PUSCH is reported, as specified in TS 38.321 [3]. The network ensures *phr-AssumedPUSCH-Reporting-r18* and *twoPHRMode-r17* are not configured at the same time for a UE. |
| ***phr-ModeOtherCG***  Indicates the mode (i.e. real or virtual) used for the PHR of the activated cells that are part of the other Cell Group (i.e. MCG or SCG), when DC is configured. If the UE is configured with only one cell group (no DC), it ignores the field. |
| ***phr-PeriodicTimer***  Value in number of subframes for PHR reporting as specified in TS 38.321 [3]. Value *sf10* corresponds to 10 subframes, value *sf20* corresponds to 20 subframes, and so on. |
| ***phr-ProhibitTimer***  Value in number of subframes for PHR reporting as specified in TS 38.321 [3]. Value *sf0* corresponds to 0 subframe, value *sf10* corresponds to 10 subframes, value *sf20* corresponds to 20 subframes, and so on. |
| ***phr-Tx-PowerFactorChange***  Value in dB for PHR reporting as specified in TS 38.321 [3]. Value *dB1* corresponds to 1 dB, *dB3* corresponds to 3 dB and so on. The same value applies for each serving cell (although the associated functionality is performed independently for each cell). |
| ***phr-Type2OtherCell***  If set to true, the UE shall report a PHR type 2 for the SpCell of the other MAC entity. See TS 38.321 [3], clause 5.4.6. Network sets this field to *false* if the UE is not configured with an E-UTRA MAC entity. |
| ***twoPHRMode***  Indicates if the power headroom shall be reported as two PHRs (each PHR associated with a SRS resource set) is enabled or not. The network ensures *phr-AssumedPUSCH-Reporting-r18* and *twoPHRMode-r17* are not configured at the same time for a UE. |

#### – *PhysCellId*

The *PhysCellId* identifies the physical cell identity (PCI).

*PhysCellId* information element

-- ASN1START

-- TAG-PHYSCELLID-START

PhysCellId ::= INTEGER (0..1007)

-- TAG-PHYSCELLID-STOP

-- ASN1STOP

#### – *PhysicalCellGroupConfig*

The IE *PhysicalCellGroupConfig* is used to configure cell-group specific L1 parameters.

*PhysicalCellGroupConfig* information element

-- ASN1START

-- TAG-PHYSICALCELLGROUPCONFIG-START

PhysicalCellGroupConfig ::= SEQUENCE {

harq-ACK-SpatialBundlingPUCCH ENUMERATED {true} OPTIONAL, -- Need S

harq-ACK-SpatialBundlingPUSCH ENUMERATED {true} OPTIONAL, -- Need S

p-NR-FR1 P-Max OPTIONAL, -- Need R

pdsch-HARQ-ACK-Codebook ENUMERATED {semiStatic, dynamic},

tpc-SRS-RNTI RNTI-Value OPTIONAL, -- Need R

tpc-PUCCH-RNTI RNTI-Value OPTIONAL, -- Need R

tpc-PUSCH-RNTI RNTI-Value OPTIONAL, -- Need R

sp-CSI-RNTI RNTI-Value OPTIONAL, -- Need R

cs-RNTI SetupRelease { RNTI-Value } OPTIONAL, -- Need M

...,

[[

mcs-C-RNTI RNTI-Value OPTIONAL, -- Need R

p-UE-FR1 P-Max OPTIONAL -- Cond MCG-Only

]],

[[

xScale ENUMERATED {dB0, dB6, spare2, spare1} OPTIONAL -- Cond SCG-Only

]],

[[

pdcch-BlindDetection SetupRelease { PDCCH-BlindDetection } OPTIONAL -- Need M

]],

[[

dcp-Config-r16 SetupRelease { DCP-Config-r16 } OPTIONAL, -- Need M

harq-ACK-SpatialBundlingPUCCH-secondaryPUCCHgroup-r16 ENUMERATED {enabled, disabled} OPTIONAL, -- Cond twoPUCCHgroup

harq-ACK-SpatialBundlingPUSCH-secondaryPUCCHgroup-r16 ENUMERATED {enabled, disabled} OPTIONAL, -- Cond twoPUCCHgroup

pdsch-HARQ-ACK-Codebook-secondaryPUCCHgroup-r16 ENUMERATED {semiStatic, dynamic} OPTIONAL, -- Cond twoPUCCHgroup

p-NR-FR2-r16 P-Max OPTIONAL, -- Need R

p-UE-FR2-r16 P-Max OPTIONAL, -- Cond MCG-Only

nrdc-PCmode-FR1-r16 ENUMERATED {semi-static-mode1, semi-static-mode2, dynamic} OPTIONAL, -- Cond MCG-Only

nrdc-PCmode-FR2-r16 ENUMERATED {semi-static-mode1, semi-static-mode2, dynamic} OPTIONAL, -- Cond MCG-Only

pdsch-HARQ-ACK-Codebook-r16 ENUMERATED {enhancedDynamic} OPTIONAL, -- Need R

nfi-TotalDAI-Included-r16 ENUMERATED {true} OPTIONAL, -- Need R

ul-TotalDAI-Included-r16 ENUMERATED {true} OPTIONAL, -- Need R

pdsch-HARQ-ACK-OneShotFeedback-r16 ENUMERATED {true} OPTIONAL, -- Need R

pdsch-HARQ-ACK-OneShotFeedbackNDI-r16 ENUMERATED {true} OPTIONAL, -- Need R

pdsch-HARQ-ACK-OneShotFeedbackCBG-r16 ENUMERATED {true} OPTIONAL, -- Need R

downlinkAssignmentIndexDCI-0-2-r16 ENUMERATED { enabled } OPTIONAL, -- Need S

downlinkAssignmentIndexDCI-1-2-r16 ENUMERATED {n1, n2, n4} OPTIONAL, -- Need S

pdsch-HARQ-ACK-CodebookList-r16 SetupRelease {PDSCH-HARQ-ACK-CodebookList-r16} OPTIONAL, -- Need M

ackNackFeedbackMode-r16 ENUMERATED {joint, separate} OPTIONAL, -- Need R

pdcch-BlindDetectionCA-CombIndicator-r16 SetupRelease { PDCCH-BlindDetectionCA-CombIndicator-r16 } OPTIONAL, -- Need M

pdcch-BlindDetection2-r16 SetupRelease { PDCCH-BlindDetection2-r16 } OPTIONAL, -- Need M

pdcch-BlindDetection3-r16 SetupRelease { PDCCH-BlindDetection3-r16 } OPTIONAL, -- Need M

bdFactorR-r16 ENUMERATED {n1} OPTIONAL -- Need R

]],

[[

-- start of enhanced Type3 feedback

pdsch-HARQ-ACK-EnhType3ToAddModList-r17 SEQUENCE (SIZE(1..maxNrofEnhType3HARQ-ACK-r17)) OF PDSCH-HARQ-ACK-EnhType3-r17

OPTIONAL, -- Need N

pdsch-HARQ-ACK-EnhType3ToReleaseList-r17 SEQUENCE (SIZE(1..maxNrofEnhType3HARQ-ACK-r17)) OF PDSCH-HARQ-ACK-EnhType3Index-r17

OPTIONAL, -- Need N

pdsch-HARQ-ACK-EnhType3SecondaryToAddModList-r17 SEQUENCE (SIZE(1..maxNrofEnhType3HARQ-ACK-r17)) OF PDSCH-HARQ-ACK-EnhType3-r17

OPTIONAL, -- Need N

pdsch-HARQ-ACK-EnhType3SecondaryToReleaseList-r17 SEQUENCE (SIZE(1..maxNrofEnhType3HARQ-ACK-r17)) OF PDSCH-HARQ-ACK-EnhType3Index-r17

OPTIONAL, -- Need N

pdsch-HARQ-ACK-EnhType3DCI-FieldSecondaryPUCCHgroup-r17 ENUMERATED {enabled} OPTIONAL, -- Cond twoPUCCHgroup

pdsch-HARQ-ACK-EnhType3DCI-Field-r17 ENUMERATED {enabled} OPTIONAL, -- Need R

-- end of enhanced Type3 feedback

-- start of triggering of HARQ-ACK re-transmission on a PUCCH resource

pdsch-HARQ-ACK-Retx-r17 ENUMERATED {enabled} OPTIONAL, -- Need R

pdsch-HARQ-ACK-RetxSecondaryPUCCHgroup-r17 ENUMERATED {enabled} OPTIONAL, -- Cond twoPUCCHgroup

-- end of triggering of HARQ-ACK re-transmission on a PUCCH resource

-- start of PUCCH Cell switching

pucch-sSCell-r17 SCellIndex OPTIONAL, -- Need R

pucch-sSCellSecondaryPUCCHgroup-r17 SCellIndex OPTIONAL, -- Cond twoPUCCHgroup

pucch-sSCellDyn-r17 ENUMERATED {enabled} OPTIONAL, -- Need R

pucch-sSCellDynSecondaryPUCCHgroup-r17 ENUMERATED {enabled} OPTIONAL, -- Cond twoPUCCHgroup

pucch-sSCellPattern-r17 SEQUENCE (SIZE(1..maxNrofSlots)) OF INTEGER (0..1) OPTIONAL, -- Need R

pucch-sSCellPatternSecondaryPUCCHgroup-r17 SEQUENCE (SIZE(1..maxNrofSlots)) OF INTEGER (0..1) OPTIONAL, -- Cond twoPUCCHgroup

-- end of PUCCH Cell switching

uci-MuxWithDiffPrio-r17 ENUMERATED {enabled} OPTIONAL, -- Need R

uci-MuxWithDiffPrioSecondaryPUCCHgroup-r17 ENUMERATED {enabled} OPTIONAL, -- Cond twoPUCCHgroup

simultaneousPUCCH-PUSCH-r17 ENUMERATED {enabled} OPTIONAL, -- Need R

simultaneousPUCCH-PUSCH-SecondaryPUCCHgroup-r17 ENUMERATED {enabled} OPTIONAL, -- Cond twoPUCCHgroup

prioLowDG-HighCG-r17 ENUMERATED {enabled} OPTIONAL, -- Need R

prioHighDG-LowCG-r17 ENUMERATED {enabled} OPTIONAL, -- Need R

twoQCLTypeDforPDCCHRepetition-r17 ENUMERATED {enabled} OPTIONAL, -- Need R

multicastConfig-r17 SetupRelease { MulticastConfig-r17 } OPTIONAL, -- Need M

pdcch-BlindDetectionCA-CombIndicator-r17 SetupRelease { PDCCH-BlindDetectionCA-CombIndicator-r17 } OPTIONAL -- Need M

]],

[[

simultaneousSR-PUSCH-diffPUCCH-Groups-r17 ENUMERATED {enabled} OPTIONAL -- Cond twoPUCCHgroup

]],

[[

intraBandNC-PRACH-simulTx-r17 ENUMERATED {enabled} OPTIONAL -- Need R

]],

[[

pdcch-BlindDetection4-r17 SetupRelease { PDCCH-BlindDetection4-r17 } OPTIONAL -- Need M

]],

[[

simultaneousPUCCH-PUSCH-SamePriority-r17 ENUMERATED {enabled} OPTIONAL, -- Need R

simultaneousPUCCH-PUSCH-SamePriority-SecondaryPUCCHgroup-r17 ENUMERATED {enabled} OPTIONAL -- Cond twoPUCCHgroup

]],

[[

ncr-RNTI-r18 RNTI-Value OPTIONAL, -- Cond NCR

cellDTRX-DCI-config-r18 SetupRelease { CellDTRX-DCI-config-r18 } OPTIONAL, -- Need M

twoQCL-TypeD-ForMultiDCI-r18 ENUMERATED {enabled} OPTIONAL, -- Need R

enableType1HARQ-ACK-MuxForDL-AssignmentAfterUL-Grant-r18 ENUMERATED {enabled} OPTIONAL, -- Need R

enableType2HARQ-ACK-MuxForDL-AssignmentAfterUL-Grant-r18 ENUMERATED {enabled} OPTIONAL, -- Need R

enableType3HARQ-ACK-MuxForDL-AssignmentAfterUL-Grant-r18 ENUMERATED {enabled} OPTIONAL, -- Need R

enableDiffPUCCH-Resource-r18 ENUMERATED {enabled} OPTIONAL, -- Need R

enableDiffCB-Size-r18 ENUMERATED {enabled} OPTIONAL -- Need R

]]

}

PDSCH-HARQ-ACK-EnhType3-r17 ::= SEQUENCE {

pdsch-HARQ-ACK-EnhType3Index-r17 PDSCH-HARQ-ACK-EnhType3Index-r17,

applicable-r17 CHOICE {

perCC SEQUENCE (SIZE (1..maxNrofServingCells)) OF INTEGER (0..1),

perHARQ SEQUENCE (SIZE (1..maxNrofServingCells)) OF BIT STRING (SIZE (16))

},

pdsch-HARQ-ACK-EnhType3NDI-r17 ENUMERATED {true} OPTIONAL, -- Need R

pdsch-HARQ-ACK-EnhType3CBG-r17 ENUMERATED {true} OPTIONAL, -- Need S

...,

[[

perHARQ-Ext-r17 SEQUENCE (SIZE (1..maxNrofServingCells)) OF BIT STRING (SIZE (32)) OPTIONAL -- Need R

]]

}

PDSCH-HARQ-ACK-EnhType3Index-r17 ::= INTEGER (0..maxNrofEnhType3HARQ-ACK-1-r17)

PDCCH-BlindDetection ::= INTEGER (1..15)

DCP-Config-r16 ::= SEQUENCE {

ps-RNTI-r16 RNTI-Value,

ps-Offset-r16 INTEGER (1..120),

sizeDCI-2-6-r16 INTEGER (1..maxDCI-2-6-Size-r16),

ps-PositionDCI-2-6-r16 INTEGER (0..maxDCI-2-6-Size-1-r16),

ps-WakeUp-r16 ENUMERATED {true} OPTIONAL, -- Need S

ps-TransmitPeriodicL1-RSRP-r16 ENUMERATED {true} OPTIONAL, -- Need S

ps-TransmitOtherPeriodicCSI-r16 ENUMERATED {true} OPTIONAL -- Need S

}

PDSCH-HARQ-ACK-CodebookList-r16 ::= SEQUENCE (SIZE (1..2)) OF ENUMERATED {semiStatic, dynamic}

PDCCH-BlindDetectionCA-CombIndicator-r16 ::= SEQUENCE {

pdcch-BlindDetectionCA1-r16 INTEGER (1..15),

pdcch-BlindDetectionCA2-r16 INTEGER (1..15)

}

PDCCH-BlindDetection2-r16 ::= INTEGER (1..15)

PDCCH-BlindDetection3-r16 ::= INTEGER (1..15)

PDCCH-BlindDetection4-r17 ::= INTEGER (1..15)

MulticastConfig-r17 ::= SEQUENCE {

pdsch-HARQ-ACK-CodebookListMulticast-r17 SetupRelease { PDSCH-HARQ-ACK-CodebookList-r16} OPTIONAL, -- Need M

type1CodebookGenerationMode-r17 ENUMERATED { mode1, mode2} OPTIONAL -- Need M

}

PDCCH-BlindDetectionCA-CombIndicator-r17 ::= SEQUENCE {

pdcch-BlindDetectionCA1-r17 INTEGER (1..15) OPTIONAL, -- Need R

pdcch-BlindDetectionCA2-r17 INTEGER (1..15) OPTIONAL, -- Need R

pdcch-BlindDetectionCA3-r17 INTEGER (1..15)

}

CellDTRX-DCI-config-r18 ::= SEQUENCE {

cellDTRX-RNTI-r18 RNTI-Value,

sizeDCI-2-9-r18 INTEGER (1..maxDCI-2-9-Size-r18)

}

-- TAG-PHYSICALCELLGROUPCONFIG-STOP

-- ASN1STOP

|  |
| --- |
| *PhysicalCellGroupConfig* field descriptions |
| ***ackNackFeedbackMode***  Indicates which among the joint and separate ACK/NACK feedback modes to use within a slot as specified in TS 38.213 [13] (clause 9). |
| ***bdFactorR***  Parameter for determining and distributing the maximum numbers of BD/CCE for mPDCCH based mPDSCH transmission as specified in TS 38.213 [13] Clause 10.1. |
| ***cs-RNTI***  RNTI value for downlink SPS (see *SPS-Config*) and uplink configured grant (see *ConfiguredGrantConfig*). |
| ***downlinkAssignmentIndexDCI-0-2***  Indicates if "Downlink assignment index" is present or absent in DCI format 0\_2. If the field "*downlinkAssignmentIndexDCI-0-2*" is absent, then 0 bit for "Downlink assignment index" in DCI format 0\_2. If the field "*downlinkAssignmentIndexDCI-0-2*" is present, then the bitwidth of "Downlink assignment index" in DCI format 0\_2 is defined in the same was as that in DCI format 0\_1 (see TS 38.212 [17], clause 7.3.1 and TS 38.213 [13], clause 9.1). |
| ***downlinkAssignmentIndexDCI-1-2***  Configures the number of bits for "Downlink assignment index" in DCI format 1\_2. If the field is absent, then 0 bit is applied for "Downlink assignment index" in DCI format 1\_2. Note that 1 bit and 2 bits are applied if only one serving cell is configured in the DL and *pdsch-HARQ-ACK-Codebook* is set to *dynamic*. 4 bits is applied if more than one serving cell are configured in the DL and *pdsch-HARQ-ACK-Codebook* is set to *dynamic* (see TS 38.212 [17], clause 7.3.1 and TS 38.213 [13], clause 9.1). |
| ***enableDiffCB-Size***  This field indicates whether a different codebook size from the size determined based on HARQ-ACK information associated with PDSCH reception(s) scheduled before a UL grant, is determined or not to include HARQ-ACK information associated with PDSCH reception(s) scheduled after a UL grant scheduling a PUSCH transmission with repetitions and the HARQ-ACK information are multiplexed on a repetition of the PUSCH transmission other than a first repetition. If enabled, a different HARQ codebook size might be determined. See clause 9 in TS 38.213 [13]. |
| ***enableDiffPUCCH-Resource***  This field indicates whether a different PUCCH resource in time domain in a slot from the PUCCH resource indicated by the last DCI format before a UL grant in the slot, is determined or not to include HARQ-ACK information associated with PDSCH reception(s) scheduled after a UL grant scheduling a PUSCH transmission with repetitions and the HARQ-ACK information are multiplexed on a repetition of the PUSCH transmission other than a first repetition in the same slot. If enabled, a different PUCCH resource in time domain might be determined. See clause 9 in TS 38.213 [13]. |
| ***enableType1HARQ-ACK-MuxForDL-AssignmentAfterUL-Grant***  If enabled, UE multiplexes Type-1 HARQ-ACK codebook on a repetition of a PUSCH transmission other than a first repetition, where the HARQ-ACK codebook includes HARQ-ACK information associated with PDSCH reception(s) scheduled after the UL grant scheduling the PUSCH transmission. See clause 9 in TS 38.213 [13]. This feature is not simultaneously enabled with PUCCH cell switching. |
| ***enableType2HARQ-ACK-MuxForDL-AssignmentAfterUL-Grant***  If enabled, UE multiplexes Type-2 HARQ-ACK codebook on a repetition of a PUSCH transmission other than a first repetition, where the HARQ-ACK codebook includes HARQ-ACK information associated with PDSCH reception(s) scheduled after the UL grant scheduling the PUSCH transmission. See clause 9 in TS 38.213 [13]. This feature is not simultaneously enabled with PUCCH cell switching. |
| ***enableType3HARQ-ACK-MuxForDL-AssignmentAfterUL-Grant***  If enabled, UE multiplexes Type-3 HARQ-ACK codebook on a repetition of a PUSCH transmission other than a first repetition, where the HARQ-ACK codebook includes HARQ-ACK information associated with PDSCH reception(s) scheduled after the UL grant scheduling the PUSCH transmission. See clause 9 in TS 38.213 [13]. This feature is not simultaneously enabled with PUCCH cell switching. |
| ***harq-ACK-SpatialBundlingPUCCH***  Enables spatial bundling of HARQ ACKs. It is configured per cell group (i.e. for all the cells within the cell group) for PUCCH reporting of HARQ-ACK. It is only applicable when more than 4 layers are possible to schedule. When the field is absent, the spatial bundling of PUCCH HARQ ACKs for the primary PUCCH group is disabled (see TS 38.213 [13], clause 9.1.2.1). If the field *harq-ACK SpatialBundlingPUCCH-secondaryPUCCHgroup* is present, *harq-ACK-SpatialBundlingPUCCH* is only applied to primary PUCCH group. Network does not configure for a UE both spatial bundling of HARQ ACKs and *codeBlockGroupTransmission* within the same cell group. |
| ***harq-ACK-SpatialBundlingPUCCH-secondaryPUCCHgroup***  Indicates whether spatial bundling of PUCCH HARQ ACKs for the secondary PUCCH group is enabled or disabled. The field is only applicable when more than 4 layers are possible to schedule (see TS 38.213 [13], clause 9.1.2.1). When the field is absent, the use of spatial bundling of PUCCH HARQ ACKs for the secondary PUCCH group is indicated by *harq-ACK-SpatialBundlingPUCCH*. See TS 38.213 [13], clause 9.1.2.1. Network does not configure for a UE both spatial bundling of HARQ ACKs and *codeBlockGroupTransmission* within the same cell group. |
| ***harq-ACK-SpatialBundlingPUSCH***  Enables spatial bundling of HARQ ACKs. It is configured per cell group (i.e. for all the cells within the cell group) for PUSCH reporting of HARQ-ACK. It is only applicable when more than 4 layers are possible to schedule. When the field is absent, the spatial bundling of PUSCH HARQ ACKs for the primary PUCCH group is disabled (see TS 38.213 [13], clauses 9.1.2.2 and 9.1.3.2). If the field *harq-ACK SpatialBundlingPUSCH-secondaryPUCCHgroup* is present, *harq-ACK-SpatialBundlingPUSCH* is only applied to primary PUCCH group. Network does not configure for a UE both spatial bundling of HARQ ACKs and *codeBlockGroupTransmission* within the same cell group. |
| ***harq-ACK-SpatialBundlingPUSCH-secondaryPUCCHgroup***  Indicates whether spatial bundling of PUSCH HARQ ACKs for the secondary PUCCH group is enabled or disabled. The field is only applicable when more than 4 layers are possible to schedule (see TS 38.213 [13], clauses 9.1.2.2 and 9.1.3.2). When the field is absent, the use of spatial bundling of PUSCH HARQ ACKs for the secondary PUCCH group is indicated by *harq-ACK-SpatialBundlingPUSCH*. See TS 38.213 [13], clauses 9.1.2.2 and 9.1.3.2. Network does not configure for a UE both spatial bundling of HARQ ACKs and *codeBlockGroupTransmission* within the same cell group. |
| ***intraBandNC-PRACH-simulTx***  Enables parallel PRACH and SRS/PUCCH/PUSCH transmissions across CCs in intra-band non-contiguous CA (see TS 38.213 [13], clause 8.1 and TS 38.214 [19], clause 6.2.1). This field is absent in the IE *CellGroupConfig* when provided as part of *RRCSetup* message. |
| ***mcs-C-RNTI***  RNTI to indicate use of *qam64LowSE* for grant-based transmissions. When the *mcs*-*C-RNTI* is configured, RNTI scrambling of DCI CRC is used to choose the corresponding MCS table. |
| ***ncr-RNTI***  RNTI value for NCR-MT, used to scramble the PDCCHs carrying side control information (see TS 38.213 [13], clause 10.1). |
| ***nfi-TotalDAI-Included***  Indicates whether the NFI and total DAI fields of the non-scheduled PDSCH group is included in the non-fallback DL grant DCI (see TS 38.212 [17], clause 7.3.1). The network configures this only when enhanced dynamic codebook is configured (*pdsch-HARQ-ACK-Codebook* is set to *enhancedDynamic*). |
| ***nrdc-PCmode-FR1***  Indicates the uplink power sharing mode that the UE uses in NR-DC in frequency range 1 (FR1) (see TS 38.213 [13], clause 7.6). |
| ***nrdc-PCmode-FR2***  Indicates the uplink power sharing mode that the UE uses in NR-DC in frequency range 2 (FR2) (see TS 38.213 [13], clause 7.6). |
| ***pdcch-BlindDetection, pdcch-BlindDetection2, pdcch-BlindDetection3, pdcch-BlindDetection4***  Indicates the reference number of cells for PDCCH blind detection for the CG. Network configures the field for each CG when the UE is in NR DC and sets the value in accordance with the constraints specified in TS 38.213 [13]. The network configures *pdcch-BlindDetection* only if the UE is in NR-DC. The network configures *pdcch-BlindDetection2* only if the UE is in NR-DC with at least one downlink cell using Rel-16 PDCCH monitoring capability. The network configures *pdcch-BlindDetection3* only if the UE is in NR-DC with at least one downlink cell using Rel-15 PDCCH monitoring capability. The network configures *pdcch-BlindDetection4* only if the UE is in NR-DC with at least one downlink cell using Rel-17 PDCCH monitoring capability. |
| ***pdcch-BlindDetectionCA-CombIndicator***  Configure one combination of *pdcch-BlindDetectionCA1* (for R15) and *pdcch-BlindDetectionCA2* (for R16) for UE to use for scaling PDCCH monitoring capability if the number of serving cells configured to a UE is larger than the reported capability, and if UE reports more than one combination of *pdcch-BlindDetectionCA1* and *pdcch-BlindDetectionCA2* as UE capability. The combination of *pdcch-BlindDetectionCA1* and *pdcch-BlindDetectionCA2* configured by *pdcch-BlindDetectionCA-CombIndicator* is from the more than one combination of *pdcch-BlindDetectionCA1* and *pdcch-BlindDetectionCA2* reported by UE (see TS 38.213 [13], clause 10).  *pdcch-BlindDetectionCA-CombIndicator-r17* is used to configure one combination of *pdcch-BlindDetectionCA1* (for R15), *pdcch-BlindDetectionCA2* (for R16) and *pdcch-BlindDetectionCA3* (for R17) for UE to use for scaling PDCCH monitoring capability if the number of serving cells configured to a UE is larger than the reported capability, and if UE reports more than one combination of *pdcch-BlindDetectionCA1*, *pdcch-BlindDetectionCA2* and *pdcch-BlindDetectionCA3* as UE capability. The combination of *pdcch-BlindDetectionCA1*, *pdcch-BlindDetectionCA2* and *pdcch-BlindDetectionCA3* configured by *pdcch-BlindDetectionCA-CombIndicator-r17* is from the more than one combination of *pdcch-BlindDetectionCA1*, *pdcch-BlindDetectionCA2* and *pdcch-BlindDetectionCA3* reported by UE (see TS 38.213 [13], clause 10).  *pdcch-BlindDetectionCA-CombIndicator-r16* and *pdcch-BlindDetectionCA-CombIndicator-r17* are not configured simultaneously. |
| ***pdsch-HARQ-ACK-Codebook***  The PDSCH HARQ-ACK codebook is either semi-static or dynamic. This is applicable to both CA and non-CA operation (see TS 38.213 [13], clauses 9.1.2 and 9.1.3). If *pdsch-HARQ-ACK-Codebook-r16* is signalled, UE shall ignore the *pdsch-HARQ-ACK-Codebook* (without suffix). For the HARQ-ACK for sidelink, if *pdsch-HARQ-ACK-Codebook-r16* is signalled, the UE uses *pdsch-HARQ-ACK-Codebook* (without suffix) and ignores *pdsch-HARQ-ACK-Codebook-r16*. If the field *pdsch-HARQ-ACK-Codebook-secondaryPUCCHgroup* is present, *pdsch-HARQ-ACK-Codebook* is applied to primary PUCCH group. Otherwise, this field is applied to the cell group (i.e. for all the cells within the cell group). For the HARQ-ACK for sidelink, if the field *pdsch-HARQ-ACK-Codebook-secondaryPUCCHgroup* is present, *pdsch-HARQ-ACK-Codebook* is applied to primary and secondary PUCCH group and the UE ignores *pdsch-HARQ-ACK-Codebook-secondaryPUCCHgroup*. |
| ***pdsch-HARQ-ACK-CodebookList***  A list of configurations for one or two HARQ-ACK codebooks. Each configuration in the list is defined in the same way as *pdsch-HARQ-ACK-Codebook* (see TS 38.212 [17], clause 7.3.1.2.2 and TS 38.213 [13], clauses 7.2.1, 9.1.2, 9.1.3 and 9.2.1). If this field is present, the field *pdsch-HARQ-ACK-Codebook* is ignored. If this field is present, the value of this field is applied for primary PUCCH group and for secondary PUCCH group (if configured). For the HARQ-ACK for sidelink, the UE uses *pdsch-HARQ-ACK-Codebook* and ignores *pdsch-HARQ-ACK-CodebookList* if this field is present. |
| ***pdsch-HARQ-ACK-Codebook-secondaryPUCCHgroup***  The PDSCH HARQ-ACK codebook is either semi-static or dynamic. This is applicable to CA operation (see TS 38.213 [13], clauses 9.1.2 and 9.1.3). It is configured for secondary PUCCH group*.* |
| ***pdsch-HARQ-ACK-EnhType3DCI-Field, pdsch-HARQ-ACK-EnhType3DCI-FieldSecondaryPUCCHgroup***  Indicates the enhanced Type 3 codebook through a new DCI field to indicate the enhanced Type 3 HARQ-ACK codebook in the primary PUCCH group if the more than one enhanced Type 3 HARQ-ACK codebook is configured for the primary PUCCH group, or in the secondary PUCCH group if the more than one enhanced Type 3 HARQ-ACK code is configured for the secondary PUCCH group, respectively. |
| ***pdsch-HARQ-ACK-EnhType3ToAddModList, pdsch-HARQ-ACK-EnhType3SecondaryToAddModList***  Configure the list of enhanced Type 3 HARQ-ACK codebooks for the primary PUCCH group and the secondary PUCCH group, respectively. When configured, DCI format 1\_1 can request the UE to report A/N for one of the configured enhanced Type 3 HARQ-ACK codebooks in the corresponding PUCCH group (see TS 38.213 [13], clause 9.1.4). The network can configure *pdsch-HARQ-ACK-EnhType3SecondaryToAddModList* only if secondary PUCCH group is configured. |
| ***pdsch-HARQ-ACK-OneShotFeedback***  When configured, the DCI format 1\_1 can request the UE to report A/N for all HARQ processes and all CCs configured in the PUCCH group (see TS 38.212 [17], clause 7.3.1). |
| ***pdsch-HARQ-ACK-OneShotFeedbackCBG***  When configured, the DCI format 1\_1 can request the UE to include CBG level A/N for each CC with CBG level transmission configured. When not configured, the UE will report TB level A/N even if CBG level transmission is configured for a CC.The network configures this only when *pdsch-HARQ-ACK-OneShotFeedback* is configured. |
| ***pdsch-HARQ-ACK-OneShotFeedbackNDI***  When configured, the DCI format 1\_1 can request the UE to include NDI for each A/N reported.The network configures this only when *pdsch-HARQ-ACK-OneShotFeedback* is configured. |
| ***pdsch-HARQ-ACK-Retx, pdsch-HARQ-ACK-RetxSecondaryPUCCHgroup***  When configured, the DCI format 1\_1 can request the UE to perform a HARQ-ACK re-transmission on a PUCCH resource in the primary PUCCH group and the secondary PUCCH group, respectively (see TS 38.213 [13], clause 9.1.5). |
| ***prioLowDG-HighCG***  Enable PHY prioritization for the case where low-priority dynamic grant-PUSCH collides with high-priority configured grant-PUSCH on a BWP of a serving cell (see TS 38.213 [13], clause 9), when the UE has generated transport blocks for both DG-PUSCH and CG-PUSCH as described in TS 38.321 [3]. |
| ***prioHighDG-LowCG***  Enable PHY prioritization for the case where high-priority dynamic grant PUSCH collides with low-priority configured grant PUSCH on a BWP of a serving cell (see TS 38.213 [13], clause 9), when the UE has generated transport blocks for both DG-PUSCH and CG-PUSCH as described in TS 38.321 [3]. |
| ***ps-RNTI***  RNTI value for scrambling CRC of DCI format 2\_6 used for power saving (see TS 38.213 [13], clause 10.1). |
| ***ps-Offset***  The start of the search-time of DCI format 2\_6 with CRC scrambled by PS-RNTI relative to the start of the *drx-onDurationTimer* of Long DRX (see TS 38.213 [13], clause 10.3). Value in multiples of 0.125ms (milliseconds). 1 corresponds to 0.125 ms, 2corresponds to 0.25 ms, 3 corresponds to 0.375 ms and so on. |
| ***ps-WakeUp***  Indicates the UE to wake-up if DCI format 2\_6 is not detected outside active time (see TS 38.321 [3], clause 5.7). If the field is absent, the UE does not wake-up if DCI format 2-6 is not detected outside active time. |
| ***ps-PositionDCI-2-6***  Starting position of UE wakeup and SCell dormancy indication in DCI format 2\_6 (see TS 38.213 [13], clause 10.3). |
| ***ps-TransmitPeriodicL1-RSRP***  Indicates the UE to transmit periodic L1-RSRP report(s) when the *drx-onDurationTimer* does not start (see TS 38.321 [3], clause 5.7). If the field is absent, the UE does not transmit periodic L1-RSRP report(s) when the *drx-onDurationTimer* does not start. |
| ***ps-TransmitOtherPeriodicCSI***  Indicates the UE to transmit periodic CSI report(s) other than L1-RSRP reports when the *drx-onDurationTimer* does not start (see TS 38.321 [3], clause 5.7). If the field is absent, the UE does not transmit periodic CSI report(s) other than L1-RSRP reports when the *drx-onDurationTimer* does not start. |
| ***pucch-sSCell, pucch-sSCellSecondaryPUCCHgroup***  indictates the alternative PUCCH cells for PUCCH cell switching in the primary and the secondary PUCCH group, respectively. For the primary PUCCH group, it is configured for cells on top of SpCell. For the secondary PUCCH group, it is configured for cell on top of the PUCCH SCell. |
| ***pucch-sSCellDyn, pucch-sSCellDynsecondaryPUCCHgroup***  When configured, PUCCH cell switching based on dynamic indication in DCI format 1\_1 is enabled (see TS 38.213 [13], clause 9.A, clause 9.1.5), respectively for the primary PUCCH group and the secondary PUCCH group. |
| ***pucch-sSCellPattern, pucch-sSCellPatternSecondaryPUCCHgroup***  When configured, the UE applies the semi-static PUCCH cell switching (see TS 38.213 [13], clause 9.A) using the time domain pattern of applicable PUCCH cells indicated by this field, respectively for the primary PUCCH group and the secondary PUCCH group. |
| ***p-NR-FR1***  The maximum total transmit power to be used by the UE in this NR cell group across all serving cells in frequency range 1 (FR1). The maximum transmit power that the UE may use may be additionally limited by *p-Max* (configured in *FrequencyInfoUL*) and by *p-UE-FR1* (configured total for all serving cells operating on FR1). |
| ***p-NR-FR2***  The maximum total transmit power to be used by the UE in this NR cell group across all serving cells in frequency range 2 (FR2). The maximum transmit power that the UE may use may be additionally limited by *p-Max* (configured in *FrequencyInfoUL*) and by *p-UE-FR2* (configured total for all serving cells operating on FR2). This field is only used in NR-DC. A UE does not expect to be configured with this parameter in this release of the specification. |
| ***p-UE-FR1***  The maximum total transmit power to be used by the UE across all serving cells in frequency range 1 (FR1) across all cell groups. The maximum transmit power that the UE may use may be additionally limited by *p-Max* (configured in *FrequencyInfoUL*) and by *p-NR-FR1* (configured for the cell group). |
| ***p-UE-FR2***  The maximum total transmit power to be used by the UE across all serving cells in frequency range 2 (FR2) across all cell groups. The maximum transmit power that the UE may use may be additionally limited by *p-Max* (configured in *FrequencyInfoUL*) and by p-NR-FR2 (configured for the cell group). A UE does not expect to be configured with this parameter in this release of the specification. |
| ***simultaneousPUCCH-PUSCH, simultaneousPUCCH-PUSCH-SecondaryPUCCHgroup***  Enables simultaneous PUCCH and PUSCH transmissions with different priorities for the primary PUCCH group and the secondary PUCCH group, respectively. |
| ***simultaneousPUCCH-PUSCH-SamePriority, simultaneousPUCCH-PUSCH-SamePriority-SecondaryPUCCHgroup***  Enables simultaneous PUCCH and PUSCH transmissions on different cells in different bands with same priority for the primary PUCCH group and the secondary PUCCH group, respectively, as specified in clause 9 of TS 38.213 [13]. |
| ***simultaneousSR-PUSCH-diffPUCCH-Groups***  Enables simultaneous SR and PUSCH transmissions in different PUCCH groups (see TS 38.321 [3], clause 5.4.1, clause 5.4.4). |
| ***sizeDCI-2-6***  Size of DCI format 2\_6 (see TS 38.213 [13], clause 10.3). |
| ***sp-CSI-RNTI***  RNTI for Semi-Persistent CSI reporting on PUSCH (see *CSI-ReportConfig*) (see TS 38.214 [19], clause 5.2.1.5.2). Network always configures the UE with a value for this field when at least one *CSI-ReportConfig* with *reportConfigType* set to *semiPersistentOnPUSCH* is configured. |
| ***tpc-PUCCH-RNTI***  RNTI used for PUCCH TPC commands on DCI (see TS 38.213 [13], clause 10.1). |
| ***tpc-PUSCH-RNTI***  RNTI used for PUSCH TPC commands on DCI (see TS 38.213 [13], clause 10.1). |
| ***tpc-SRS-RNTI***  RNTI used for SRS TPC commands on DCI (see TS 38.213 [13], clause 10.1). |
| ***twoQCL-TypeD-ForMultiDCI***  Indicates whether a UE is expected to identify and monitor two QCL-TypeD properties for multiple overlapping CORESETs, where the first QCL-TypeD is associated with *coresetPoolIndex* value 0, and the second QCL-TypeD is associated with *coresetPoolIndex* value 1. (See TS 38,213 [13], clause 10). |
| ***twoQCLTypeDforPDCCHRepetition***  Indicates whether a UE is expected UE to identify and monitor two QCL-TypeD properties for multiple overlapping CORESETs in the case of PDCCH repetition. |
| ***uci-MuxWithDiffPrio, uci-MuxWithDiffPrio-secondaryPUCCHgroup***  When configured, enables multiplexing a high-priority (HP) HARQ-ACK UCI and a low-priority (LP) HARQ-ACK UCI into a PUCCH or PUSCH for the primary PUCCH group and the secondary PUCCH group, respectively. |
| ***ul-TotalDAI-Included***  Indicates whether the total DAI fields of the additional PDSCH group is included in the non-fallback UL grant DCI (see TS 38.212 [17], clause 7.3.1). The network configures this only when enhanced dynamic codebook is configured (*pdsch-HARQ-ACK-Codebook* is set to *enhancedDynamic*). |
| ***xScale***  The UE is allowed to drop NR only if the power scaling applied to NR results in a difference between scaled and unscaled NR UL of more than *xScale* dB (see TS 38.213 [13]). If the value is not configured for dynamic power sharing, the UE assumes default value of 6 dB. |

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| *MulticastConfig* field descriptions |
| ***pdsch-HARQ-ACK-CodebookListMulticast***  A list of configurations for one or two HARQ-ACK codebooks for MBS multicast. Each configuration in the list is defined in the same way as *pdsch-HARQ-ACK-Codebook* (see TS 38.212 [17], clause 7.3.1.2.2 and TS 38.213 [13], clauses 7.2.1, 9.1.2, 9.1.3 and 9.2.1). If this field is present, the field *pdsch-HARQ-ACK-Codebook* is ignored. If this field is present, the value of this field is applied for primary PUCCH group and for secondary PUCCH group (if configured). |
| ***type1CodebookGenerationMode***  Indicates the mode of Type-1 HARQ-ACK codebook generation, as specified in TS 38.213 [13]. Mode 1 is based on the k1 values that are in the intersection of K1 set for unicast and K1 set for multicast. Mode 2 is based on the k1 values that are in the union of K1 set for unicast and K1 set for multicast. |

|  |
| --- |
| *PDSCH-HARQ-ACK-EnhType3* field descriptions |
| ***pdsch-HARQ-ACK-EnhType3CBG***  When configured, the DCI format 1\_1 or DCI format 1\_2 can request the UE to include CBG level A/N for each CC with CBG level transmission configured of the enhanced Type 3 HARQ-ACK codebook. When not configured, the UE will report TB level A/N even if CBG level transmission is configured for a CC. |
| ***pdsch-HARQ-ACK-EnhType3NDI***  When configured, the DCI format 1\_1 or DCI format 1\_2 can request the UE to include NDI for each A/N reported of the enhanced Type 3 HARQ-ACK codebook. |
| ***perCC***  Configures enhanced Type 3 HARQ-ACK codebook using per CC configuration. |
| ***perHARQ, perHARQ-Ext***  Configures enhanced Type 3 HARQ-ACK codebook using per HARQ process and CC configuration. *perHARQ-Ext* is present only when *nrofHARQ-ProcessesForPDSCH-v1700* is present in *pdsch-ServingCellConfig* of at least one serving cell in the PUCCH group. If *perHARQ-Ext* is present, the UE ignores *perHARQ*. |

|  |
| --- |
| *CellDTRX-DCI-config* field descriptions |
| ***cellDTRX-RNTI***  The RNTI value for scrambling CRC of DCI format 2\_9 for activating and/or deactivating Cell DTX and/or Cell DRX and/or NES mode for CHO indication. |
| ***sizeDCI-2-9***  The size of DCI format 2\_9. |

|  |  |
| --- | --- |
| Conditional Presence | Explanation |
| *MCG-Only* | This field is optionally present, Need R, in the *PhysicalCellGroupConfig* of the MCG. It is absent otherwise. |
| *NCR* | This field is optionally present, Need M for NCR-MT. It is absent otherwise. |
| *SCG-Only* | This field is optionally present, Need S, in the *PhysicalCellGroupConfig* of the SCG in (NG)EN-DC as defined in TS 38.213 [13]. It is absent otherwise. |
| *twoPUCCHgroup* | This field is optionally present, Need R, if secondary PUCCH group is configured. It is absent otherwise, Need R. |

#### – *PLMN-Identity*

The IE *PLMN-Identity* identifies a Public Land Mobile Network. Further information regarding how to set the IE is specified in TS 23.003 [21].

*PLMN-Identity* information element

-- ASN1START

-- TAG-PLMN-IDENTITY-START

PLMN-Identity ::= SEQUENCE {

mcc MCC OPTIONAL, -- Cond MCC

mnc MNC

}

MCC ::= SEQUENCE (SIZE (3)) OF MCC-MNC-Digit

MNC ::= SEQUENCE (SIZE (2..3)) OF MCC-MNC-Digit

MCC-MNC-Digit ::= INTEGER (0..9)

-- TAG-PLMN-IDENTITY-STOP

-- ASN1STOP

|  |
| --- |
| *PLMN-Identity* field descriptions |
| ***mcc***  The first element contains the first MCC digit, the second element the second MCC digit and so on. If the field is absent, it takes the same value as the *mcc* of the immediately preceding IE PLMN-Identity. See TS 23.003 [21]. |
| ***mnc***  The first element contains the first MNC digit, the second element the second MNC digit and so on. See TS 23.003 [21]. |

|  |  |
| --- | --- |
| Conditional Presence | Explanation |
| *MCC* | This field is mandatory present when PLMN-Identity is not used in a list or if it is the first entry of PLMN-Identity in a list. Otherwise it is optionally present, Need S. |

#### – *PLMN-IdentityInfoList*

The IE *PLMN-IdentityInfoList* includes a list of PLMN identity information.

*PLMN-IdentityInfoList* information element

-- ASN1START

-- TAG-PLMN-IDENTITYINFOLIST-START

PLMN-IdentityInfoList ::= SEQUENCE (SIZE (1..maxPLMN)) OF PLMN-IdentityInfo

PLMN-IdentityInfo ::= SEQUENCE {

plmn-IdentityList SEQUENCE (SIZE (1..maxPLMN)) OF PLMN-Identity,

trackingAreaCode TrackingAreaCode OPTIONAL, -- Need R

ranac RAN-AreaCode OPTIONAL, -- Need R

cellIdentity CellIdentity,

cellReservedForOperatorUse ENUMERATED {reserved, notReserved},

...,

[[

iab-Support-r16 ENUMERATED {true} OPTIONAL -- Need S

]],

[[

trackingAreaList-r17 SEQUENCE (SIZE (1..maxTAC-r17)) OF TrackingAreaCode OPTIONAL, -- Need R

gNB-ID-Length-r17 INTEGER (22..32) OPTIONAL -- Cond eventID-TSS

]],

[[

mobileIAB-Support-r18 ENUMERATED {true} OPTIONAL -- Need S

]]

}

-- TAG-PLMN-IDENTITYINFOLIST-STOP

-- ASN1STOP

|  |
| --- |
| *PLMN-IdentityInfo* field descriptions |
| ***cellReservedForOperatorUse***  Indicates whether the cell is reserved for operator use (per PLMN), as defined in TS 38.304 [20]. This field is ignored by IAB-MT and NCR-MT. |
| ***gNB-ID-Length***  Indicates the length of the gNB ID out of the 36-bit long *cellIdentity*. This field is always present if the *mobileIAB-Support* is broadcasted. |
| ***iab-Support***  This field combines both the support of IAB and the cell status for IAB. If the field is present, the cell supports IAB and the cell is also considered as a candidate for cell (re)selection for IAB-node; if the field is absent, the cell does not support IAB and/or the cell is barred for IAB-node. This field is absent if *mobileIAB-Cell* is broadcasted in the cell. |
| ***mobileIAB-Support***  This field indicates the support of mobile IAB and whether the cell can be considered as a candidate for cell (re)selection for mobile IAB-node. This field is absent if *mobileIAB-Cell* is broadcasted in the cell. If the field is absent, the cell is barred for mobile IAB-node. |
| ***trackingAreaCode***  Indicates Tracking Area Code to which the cell indicated by *cellIdentity* field belongs. The absence of the field indicates that the cell only supports PSCell/SCell functionality (per PLMN) or is an NTN cell. |
| ***trackingAreaList***  List of Tracking Areas to which the cell indicated by *cellIdentity* field belongs. If this field is present, network does not configure *trackingAreaCode.* Total number of different TACs across different *PLMN-IdentityInfo*s shall not exceed *maxTAC*. This field is only present in an NTN cell. |

|  |  |
| --- | --- |
| Conditional Presence | Explanation |
| *eventID-TSS* | If *eventID-TSS* is present in SIB9, this field is mandatory present in the *PLMN-IdentityInfo* IE of *PLMN-IdentityInfoList* in *SIB1*. Otherwise, the field is optionally present, Need R. |

#### – *PLMN-IdentityList2*

Includes a list of PLMN identities.

*PLMN-IdentityList2* information element

-- ASN1START

-- TAG-PLMNIDENTITYLIST2-START

PLMN-IdentityList2-r16 ::= SEQUENCE (SIZE (1..16)) OF PLMN-Identity

-- TAG-PLMNIDENTITYLIST2-STOP

-- ASN1STOP

#### – *PRB-Id*

The IE *PRB-Id* identifies a Physical Resource Block (PRB) position within a carrier.

*PRB-Id* information element

-- ASN1START

-- TAG-PRB-ID-START

PRB-Id ::= INTEGER (0..maxNrofPhysicalResourceBlocks-1)

-- TAG-PRB-ID-STOP

-- ASN1STOP

#### – *PTRS-DownlinkConfig*

The IE *PTRS-DownlinkConfig* is used to configure downlink phase tracking reference signals (PTRS) (see TS 38.214 [19] clause 5.1.6.3)

*PTRS-DownlinkConfig* information element

-- ASN1START

-- TAG-PTRS-DOWNLINKCONFIG-START

PTRS-DownlinkConfig ::= SEQUENCE {

frequencyDensity SEQUENCE (SIZE (2)) OF INTEGER (1..276) OPTIONAL, -- Need S

timeDensity SEQUENCE (SIZE (3)) OF INTEGER (0..29) OPTIONAL, -- Need S

epre-Ratio INTEGER (0..3) OPTIONAL, -- Need S

resourceElementOffset ENUMERATED { offset01, offset10, offset11 } OPTIONAL, -- Need S

...,

[[

maxNrofPorts-r16 ENUMERATED {n1, n2} OPTIONAL -- Need R

]]

}

-- TAG-PTRS-DOWNLINKCONFIG-STOP

-- ASN1STOP

|  |
| --- |
| *PTRS-DownlinkConfig* field descriptions |
| ***epre-Ratio***  EPRE ratio between PTRS and PDSCH. Value 0 corresponds to the codepoint "00" in tables 4.1-2 and 4.1-2A. Value 1 corresponds to codepoint "01", and so on. If the field is not provided, the UE applies value 0 (see TS 38.214 [19], clause 4.1). |
| ***frequencyDensity***  Presence and frequency density of DL PT-RS as a function of Scheduled BW. If the field is absent, the UE uses K\_PT-RS = 2 (see TS 38.214 [19], clause 5.1.6.3, table 5.1.6.3-2). |
| ***maxNrofPorts***  The maximum number of DL PTRS ports specified in TS 38.214 [19] (clause 5.1.6.3). 2 PT-RS ports can only be configured for a DL BWP that is configured, as specified in TS 38.214 [19] clause 5.1, with a mode where a single PDSCH has association between the DM-RS ports and the TCI states as defined in TS 38.214 [19] clause 5.1.6.2. |
| ***resourceElementOffset***  Indicates the subcarrier offset for DL PTRS. If the field is absent, the UE applies the value offset00 (see TS 38.211 [16], clause 7.4.1.2.2). |
| ***timeDensity***  Presence and time density of DL PT-RS as a function of MCS. The value 29 is only applicable for MCS Table 5.1.3.1-1 (TS 38.214 [19]). If the field is absent, the UE uses L\_PT-RS = 1 (see TS 38.214 [19], clause 5.1.6.3, table 5.1.6.3-1). |

#### – *PTRS-UplinkConfig*

The IE *PTRS-UplinkConfig* is used to configure uplink Phase-Tracking-Reference-Signals (PTRS).

*PTRS-UplinkConfig* information element

-- ASN1START

-- TAG-PTRS-UPLINKCONFIG-START

PTRS-UplinkConfig ::= SEQUENCE {

transformPrecoderDisabled SEQUENCE {

frequencyDensity SEQUENCE (SIZE (2)) OF INTEGER (1..276) OPTIONAL, -- Need S

timeDensity SEQUENCE (SIZE (3)) OF INTEGER (0..29) OPTIONAL, -- Need S

maxNrofPorts ENUMERATED {n1, n2},

resourceElementOffset ENUMERATED {offset01, offset10, offset11 } OPTIONAL, -- Need S

ptrs-Power ENUMERATED {p00, p01, p10, p11}

} OPTIONAL, -- Need R

transformPrecoderEnabled SEQUENCE {

sampleDensity SEQUENCE (SIZE (5)) OF INTEGER (1..276),

timeDensityTransformPrecoding ENUMERATED {d2} OPTIONAL -- Need S

} OPTIONAL, -- Need R

...,

[[

maxNrofPorts-SDM-r18 ENUMERATED {n1, n2} OPTIONAL -- Need R

]]

}

-- TAG-PTRS-UPLINKCONFIG-STOP

-- ASN1STOP

|  |
| --- |
| *PTRS-UplinkConfig* field descriptions |
| ***frequencyDensity***  Presence and frequency density of UL PT-RS for CP-OFDM waveform as a function of scheduled BW If the field is absent, the UE uses K\_PT-RS = 2 (see TS 38.214 [19], clause 6.1). |
| ***maxNrofPorts,*** ***maxNrofPorts-SDM***  The maximum number of UL PTRS ports for CP-OFDM (see TS 38.214 [19], clause 6.2.3.1). |
| ***ptrs-Power***  UL PTRS power boosting factor per PTRS port (see TS 38.214 [19], clause 6.1, table 6.2.3.1.3). |
| ***resourceElementOffset***  Indicates the subcarrier offset for UL PTRS for CP-OFDM. If the field is absent, the UE applies the value offset00 (see TS 38.211 [16], clause 6.4.1.2.2). |
| ***sampleDensity***  Sample density of PT-RS for DFT-s-OFDM, pre-DFT, indicating a set of thresholds T={NRBn, n=0,1,2,3,4}, that indicates dependency between presence of PT-RS and scheduled BW and the values of X and K the UE should use depending on the scheduled BW, see TS 38.214 [19], clause 6.1, table 6.2.3.2-1. |
| ***timeDensity***  Presence and time density of UL PT-RS for CP-OFDM waveform as a function of MCS If the field is absent, the UE uses L\_PT-RS = 1 (see TS 38.214 [19], clause 6.1). |
| ***timeDensityTransformPrecoding***  Time density (OFDM symbol level) of PT-RS for DFT-s-OFDM. If the field is absent, the UE applies value d1 (see TS 38.214 [19], clause 6.1). |
| ***transformPrecoderDisabled***  Configuration of UL PTRS without transform precoder (with CP-OFDM). |
| ***transformPrecoderEnabled***  Configuration of UL PTRS with transform precoder (DFT-S-OFDM). |

#### – *PUCCH-Config*

The IE *PUCCH-Config* is used to configure UE specific PUCCH parameters (per BWP).

*PUCCH-Config* information element

-- ASN1START

-- TAG-PUCCH-CONFIG-START

PUCCH-Config ::= SEQUENCE {

resourceSetToAddModList SEQUENCE (SIZE (1..maxNrofPUCCH-ResourceSets)) OF PUCCH-ResourceSet OPTIONAL, -- Need N

resourceSetToReleaseList SEQUENCE (SIZE (1..maxNrofPUCCH-ResourceSets)) OF PUCCH-ResourceSetId OPTIONAL, -- Need N

resourceToAddModList SEQUENCE (SIZE (1..maxNrofPUCCH-Resources)) OF PUCCH-Resource OPTIONAL, -- Need N

resourceToReleaseList SEQUENCE (SIZE (1..maxNrofPUCCH-Resources)) OF PUCCH-ResourceId OPTIONAL, -- Need N

format1 SetupRelease { PUCCH-FormatConfig } OPTIONAL, -- Need M

format2 SetupRelease { PUCCH-FormatConfig } OPTIONAL, -- Need M

format3 SetupRelease { PUCCH-FormatConfig } OPTIONAL, -- Need M

format4 SetupRelease { PUCCH-FormatConfig } OPTIONAL, -- Need M

schedulingRequestResourceToAddModList SEQUENCE (SIZE (1..maxNrofSR-Resources)) OF SchedulingRequestResourceConfig

OPTIONAL, -- Need N

schedulingRequestResourceToReleaseList SEQUENCE (SIZE (1..maxNrofSR-Resources)) OF SchedulingRequestResourceId

OPTIONAL, -- Need N

multi-CSI-PUCCH-ResourceList SEQUENCE (SIZE (1..2)) OF PUCCH-ResourceId OPTIONAL, -- Need M

dl-DataToUL-ACK SEQUENCE (SIZE (1..8)) OF INTEGER (0..15) OPTIONAL, -- Need M

spatialRelationInfoToAddModList SEQUENCE (SIZE (1..maxNrofSpatialRelationInfos)) OF PUCCH-SpatialRelationInfo

OPTIONAL, -- Need N

spatialRelationInfoToReleaseList SEQUENCE (SIZE (1..maxNrofSpatialRelationInfos)) OF PUCCH-SpatialRelationInfoId

OPTIONAL, -- Need N

pucch-PowerControl PUCCH-PowerControl OPTIONAL, -- Need M

...,

[[

resourceToAddModListExt-v1610 SEQUENCE (SIZE (1..maxNrofPUCCH-Resources)) OF PUCCH-ResourceExt-v1610 OPTIONAL, -- Need N

dl-DataToUL-ACK-r16 SetupRelease { DL-DataToUL-ACK-r16 } OPTIONAL, -- Need M

ul-AccessConfigListDCI-1-1-r16 SetupRelease { UL-AccessConfigListDCI-1-1-r16 } OPTIONAL, -- Need M

subslotLengthForPUCCH-r16 CHOICE {

normalCP-r16 ENUMERATED {n2,n7},

extendedCP-r16 ENUMERATED {n2,n6}

} OPTIONAL, -- Need R

dl-DataToUL-ACK-DCI-1-2-r16 SetupRelease { DL-DataToUL-ACK-DCI-1-2-r16} OPTIONAL, -- Need M

numberOfBitsForPUCCH-ResourceIndicatorDCI-1-2-r16 INTEGER (0..3) OPTIONAL, -- Need R

dmrs-UplinkTransformPrecodingPUCCH-r16 ENUMERATED {enabled} OPTIONAL, -- Cond PI2-BPSK

spatialRelationInfoToAddModListSizeExt-v1610 SEQUENCE (SIZE (1..maxNrofSpatialRelationInfosDiff-r16)) OF PUCCH-SpatialRelationInfo

OPTIONAL, -- Need N

spatialRelationInfoToReleaseListSizeExt-v1610 SEQUENCE (SIZE (1..maxNrofSpatialRelationInfosDiff-r16)) OF PUCCH-SpatialRelationInfoId

OPTIONAL, -- Need N

spatialRelationInfoToAddModListExt-v1610 SEQUENCE (SIZE (1..maxNrofSpatialRelationInfos-r16)) OF PUCCH-SpatialRelationInfoExt-r16

OPTIONAL, -- Need N

spatialRelationInfoToReleaseListExt-v1610 SEQUENCE (SIZE (1..maxNrofSpatialRelationInfos-r16)) OF

PUCCH-SpatialRelationInfoId-r16 OPTIONAL, -- Need N

resourceGroupToAddModList-r16 SEQUENCE (SIZE (1..maxNrofPUCCH-ResourceGroups-r16)) OF PUCCH-ResourceGroup-r16

OPTIONAL, -- Need N

resourceGroupToReleaseList-r16 SEQUENCE (SIZE (1..maxNrofPUCCH-ResourceGroups-r16)) OF PUCCH-ResourceGroupId-r16

OPTIONAL, -- Need N

sps-PUCCH-AN-List-r16 SetupRelease { SPS-PUCCH-AN-List-r16 } OPTIONAL, -- Need M

schedulingRequestResourceToAddModListExt-v1610 SEQUENCE (SIZE (1..maxNrofSR-Resources)) OF SchedulingRequestResourceConfigExt-v1610

OPTIONAL -- Need N

]],

[[

format0-r17 SetupRelease { PUCCH-FormatConfig } OPTIONAL, -- Need M

format2Ext-r17 SetupRelease { PUCCH-FormatConfigExt-r17 } OPTIONAL, -- Need M

format3Ext-r17 SetupRelease { PUCCH-FormatConfigExt-r17 } OPTIONAL, -- Need M

format4Ext-r17 SetupRelease { PUCCH-FormatConfigExt-r17 } OPTIONAL, -- Need M

ul-AccessConfigListDCI-1-2-r17 SetupRelease { UL-AccessConfigListDCI-1-2-r17 } OPTIONAL, -- Need M

mappingPattern-r17 ENUMERATED {cyclicMapping, sequentialMapping} OPTIONAL, -- Need R

powerControlSetInfoToAddModList-r17 SEQUENCE (SIZE (1..maxNrofPowerControlSetInfos-r17)) OF PUCCH-PowerControlSetInfo-r17

OPTIONAL, -- Need N

powerControlSetInfoToReleaseList-r17 SEQUENCE (SIZE (1..maxNrofPowerControlSetInfos-r17)) OF PUCCH-PowerControlSetInfoId-r17

OPTIONAL, -- Need N

secondTPCFieldDCI-1-1-r17 ENUMERATED {enabled} OPTIONAL, -- Need R

secondTPCFieldDCI-1-2-r17 ENUMERATED {enabled} OPTIONAL, -- Need R

dl-DataToUL-ACK-r17 SetupRelease { DL-DataToUL-ACK-r17 } OPTIONAL, -- Need M

dl-DataToUL-ACK-DCI-1-2-r17 SetupRelease { DL-DataToUL-ACK-DCI-1-2-r17} OPTIONAL, -- Need M

ul-AccessConfigListDCI-1-1-r17 SetupRelease { UL-AccessConfigListDCI-1-1-r17 } OPTIONAL, -- Need M

schedulingRequestResourceToAddModListExt-v1700 SEQUENCE (SIZE (1..maxNrofSR-Resources)) OF SchedulingRequestResourceConfigExt-v1700

OPTIONAL, -- Need N

dmrs-BundlingPUCCH-Config-r17 SetupRelease { DMRS-BundlingPUCCH-Config-r17 } OPTIONAL, -- Need M

dl-DataToUL-ACK-v1700 SetupRelease { DL-DataToUL-ACK-v1700 } OPTIONAL, -- Need M

dl-DataToUL-ACK-MulticastDCI-Format4-1-r17 SetupRelease { DL-DataToUL-ACK-MulticastDCI-Format4-1-r17 } OPTIONAL, -- Need M

sps-PUCCH-AN-ListMulticast-r17 SetupRelease { SPS-PUCCH-AN-List-r16 } OPTIONAL -- Need M

]]

}

PUCCH-FormatConfig ::= SEQUENCE {

interslotFrequencyHopping ENUMERATED {enabled} OPTIONAL, -- Need R

additionalDMRS ENUMERATED {true} OPTIONAL, -- Need R

maxCodeRate PUCCH-MaxCodeRate OPTIONAL, -- Need R

nrofSlots ENUMERATED {n2,n4,n8} OPTIONAL, -- Need S

pi2BPSK ENUMERATED {enabled} OPTIONAL, -- Need R

simultaneousHARQ-ACK-CSI ENUMERATED {true} OPTIONAL -- Need R

}

PUCCH-FormatConfigExt-r17 ::= SEQUENCE {

maxCodeRateLP-r17 PUCCH-MaxCodeRate OPTIONAL, -- Need R

...

}

PUCCH-MaxCodeRate ::= ENUMERATED {zeroDot08, zeroDot15, zeroDot25, zeroDot35, zeroDot45, zeroDot60, zeroDot80}

-- A set with one or more PUCCH resources

PUCCH-ResourceSet ::= SEQUENCE {

pucch-ResourceSetId PUCCH-ResourceSetId,

resourceList SEQUENCE (SIZE (1..maxNrofPUCCH-ResourcesPerSet)) OF PUCCH-ResourceId,

maxPayloadSize INTEGER (4..256) OPTIONAL -- Need R

}

PUCCH-ResourceSetId ::= INTEGER (0..maxNrofPUCCH-ResourceSets-1)

PUCCH-Resource ::= SEQUENCE {

pucch-ResourceId PUCCH-ResourceId,

startingPRB PRB-Id,

intraSlotFrequencyHopping ENUMERATED { enabled } OPTIONAL, -- Need R

secondHopPRB PRB-Id OPTIONAL, -- Need R

format CHOICE {

format0 PUCCH-format0,

format1 PUCCH-format1,

format2 PUCCH-format2,

format3 PUCCH-format3,

format4 PUCCH-format4

}

}

PUCCH-ResourceExt-v1610 ::= SEQUENCE {

interlaceAllocation-r16 SEQUENCE {

rb-SetIndex-r16 INTEGER (0..4),

interlace0-r16 CHOICE {

scs15 INTEGER (0..9),

scs30 INTEGER (0..4)

}

} OPTIONAL, --Need R

format-v1610 CHOICE {

interlace1-v1610 INTEGER (0..9),

occ-v1610 SEQUENCE {

occ-Length-v1610 ENUMERATED {n2,n4} OPTIONAL, -- Need M

occ-Index-v1610 ENUMERATED {n0,n1,n2,n3} OPTIONAL -- Need M

}

} OPTIONAL, -- Need R

...,

[[

format-v1700 SEQUENCE {

nrofPRBs-r17 INTEGER (1..16)

} OPTIONAL, -- Need R

pucch-RepetitionNrofSlots-r17 ENUMERATED { n1,n2,n4,n8 } OPTIONAL -- Need R

]],

[[

applyIndicatedTCI-State-r18 ENUMERATED {first, second, both, spare1} OPTIONAL, -- Need R

multipanelSFN-Scheme-r18 ENUMERATED {enabled} OPTIONAL, -- Need R

dl-DataToUL-ACK-r18 SetupRelease { DL-DataToUL-ACK-r18 } OPTIONAL, -- Need M

dl-DataToUL-ACK-DCI-1-2-r18 SetupRelease { DL-DataToUL-ACK-DCI-1-2-r18} OPTIONAL -- Need M

]]

}

PUCCH-ResourceId ::= INTEGER (0..maxNrofPUCCH-Resources-1)

PUCCH-format0 ::= SEQUENCE {

initialCyclicShift INTEGER(0..11),

nrofSymbols INTEGER (1..2),

startingSymbolIndex INTEGER(0..13)

}

PUCCH-format1 ::= SEQUENCE {

initialCyclicShift INTEGER(0..11),

nrofSymbols INTEGER (4..14),

startingSymbolIndex INTEGER(0..10),

timeDomainOCC INTEGER(0..6)

}

PUCCH-format2 ::= SEQUENCE {

nrofPRBs INTEGER (1..16),

nrofSymbols INTEGER (1..2),

startingSymbolIndex INTEGER(0..13)

}

PUCCH-format3 ::= SEQUENCE {

nrofPRBs INTEGER (1..16),

nrofSymbols INTEGER (4..14),

startingSymbolIndex INTEGER(0..10)

}

PUCCH-format4 ::= SEQUENCE {

nrofSymbols INTEGER (4..14),

occ-Length ENUMERATED {n2,n4},

occ-Index ENUMERATED {n0,n1,n2,n3},

startingSymbolIndex INTEGER(0..10)

}

PUCCH-ResourceGroup-r16 ::= SEQUENCE {

pucch-ResourceGroupId-r16 PUCCH-ResourceGroupId-r16,

resourcePerGroupList-r16 SEQUENCE (SIZE (1..maxNrofPUCCH-ResourcesPerGroup-r16)) OF PUCCH-ResourceId

}

PUCCH-ResourceGroupId-r16 ::= INTEGER (0..maxNrofPUCCH-ResourceGroups-1-r16)

DL-DataToUL-ACK-r16 ::= SEQUENCE (SIZE (1..8)) OF INTEGER (-1..15)

DL-DataToUL-ACK-r17 ::= SEQUENCE (SIZE (1..8)) OF INTEGER (-1..127)

DL-DataToUL-ACK-v1700 ::= SEQUENCE (SIZE (1..8)) OF INTEGER (16..31)

DL-DataToUL-ACK-r18 ::= SEQUENCE (SIZE (1..8)) OF INTEGER (0..31)

DL-DataToUL-ACK-DCI-1-2-r16 ::= SEQUENCE (SIZE (1..8)) OF INTEGER (0..15)

DL-DataToUL-ACK-DCI-1-2-r17 ::= SEQUENCE (SIZE (1..8)) OF INTEGER (0..127)

DL-DataToUL-ACK-DCI-1-2-r18 ::= SEQUENCE (SIZE (1..8)) OF INTEGER (0..31)

UL-AccessConfigListDCI-1-1-r16 ::= SEQUENCE (SIZE (1..16)) OF INTEGER (0..15)

UL-AccessConfigListDCI-1-2-r17 ::= SEQUENCE (SIZE (1..16)) OF INTEGER (0..15)

UL-AccessConfigListDCI-1-1-r17 ::= SEQUENCE (SIZE (1..3)) OF INTEGER (0..2)

DL-DataToUL-ACK-MulticastDCI-Format4-1-r17 ::= SEQUENCE (SIZE (1..8)) OF INTEGER (0..15)

-- TAG-PUCCH-CONFIG-STOP

-- ASN1STOP

|  |
| --- |
| *PUCCH-Config* field descriptions |
| ***dl-DataToUL-ACK, dl-DataToUL-ACK-DCI-1-2***  List of timing for given PDSCH to the DL ACK (see TS 38.213 [13], clause 9.1.2). The field *dl-DataToUL-ACK* applies to DCI format 1\_1 and the field *dl-DataToUL-ACK-DCI-1-2* applies to DCI format 1\_2 (see TS 38.212 [17], clause 7.3.1 and TS 38.213 [13], clause 9.2.3). The *dl-DataToUL-ACK-v1700* is applicable for NTN and *dl-DataToUL-ACK-r17* is applicable for FR2-2. The *dl-DataToUL-ACK-r18* is applicable for ATG. If *dl-DataToUL-ACK-r16* *or dl-DataToUL-ACK-r17* or *dl-DataToUL-ACK-v1700* or *dl-DataToUL-ACK-r18* is signalled, UE shall ignore the *dl-DataToUL-ACK* (without suffix). The value -1 corresponds to "inapplicable value" for the case where the A/N feedback timing is not explicitly included at the time of scheduling PDSCH.The fields *dl-DataToUL-ACK-r17* and *dl-DataToUL-ACK-DCI-1-2-r17* are only applicable for SCS of 480 kHz or 960 kHz. The field *dl-DataToUL-ACK-r18* applies to DCI format 1\_1 and the field *dl-DataToUL-ACK-DCI-1-2-r18* applies to DCI format 1\_2 (see TS 38.212 [17], clause 7.3.1 and TS 38.213 [13], clause 9.2.3). |
| ***dl-DataToUL-ACK-MulticastDCI-Format4-1***  List of timing for given group-common PDSCH to the DL ACK (see TS 38.213 [13], clause 9.1.2). The field *dl-DataToUL-ACK-MulticastDciFormat4-1* applies to DCI format 4\_1 for MBS multicast (see TS 38.212 [17], clause 7.3.1 and TS 38.213 [13], clause 9.2.3). |
| ***dmrs-BundlingPUCCH-Config***  Configuration of the parameters for DMRS bundling for PUCCH (see TS 38.214 [19], clause 6.1.7). DMRS bundling for PUCCH is not supported for PUCCH format 0/2. In this release, this is not applicable to FR2-2. |
| ***dmrs-UplinkTransformPrecodingPUCCH***  This field is used for PUCCH formats 3 and 4 according to TS 38.211, Clause 6.4.1.3.3.1. |
| ***format0***  Parameters that are common for all PUCCH resources of format 0. |
| ***format1***  Parameters that are common for all PUCCH resources of format 1. |
| ***format2***  Parameters that are common for all PUCCH resources of format 2. |
| ***format3***  Parameters that are common for all PUCCH resources of format 3. |
| ***format4***  Parameters that are common for all PUCCH resources of format 4. |
| ***mappingPattern***  Indicates whether the UE should follow Cyclical mapping pattern or Sequential mapping pattern for when a PUCCH resource used for repetitions of a PUCCH transmission includes first and second spatial settings for FR2, or first and second sets of power control parameters for FR1 (see TS 38.213 [13], clause 9.2.6). |
| ***numberOfBitsForPUCCH-ResourceIndicatorDCI-1-2***  Configuration of the number of bits for "PUCCH resource indicator" in DCI format 1\_2 (see TS 38.212 [17], clause 7.3.1 and TS 38.213 [13], clause 9.2.3). |
| ***powerControlSetInfoToAddModList***  Configures power control sets for repetition of a PUCCH transmission in FR1. This field is not configured if *ul-powerControl* is configured in the *BWP-UplinkDedicated* in which the *PUCCH-Config* is included. |
| ***pucch-PowerControl***  Configures power control parameters PUCCH transmission. |
| ***resourceGroupToAddModList, resourceGroupToReleaseList***  Lists for adding and releasing groups of PUCCH resources that can be updated simultaneously for spatial relations with a MAC CE. |
| ***resourceSetToAddModList, resourceSetToReleaseList***  Lists for adding and releasing PUCCH resource sets (see TS 38.213 [13], clause 9.2). |
| ***resourceToAddModList, resourceToAddModListExt, resourceToReleaseList***  Lists for adding and releasing PUCCH resources applicable for the UL BWP and serving cell in which the *PUCCH-Config* is defined. The resources defined herein are referred to from other parts of the configuration to determine which resource the UE shall use for which report. If the network includes of *resourceToAddModListExt*, it includes the same number of entries, and listed in the same order, as in *resourceToAddModList*. |
| ***secondTPCFieldDCI-1-1, secondTPCFieldDCI-1-2***  A second TPC field can be configured via RRC for DCI-1-1 and DCI-1-2. Each TPC field is for each closed-loop index value respectively (i.e., 1st /2nd TPC fields correspond to "closedLoopIndex" value = 0 and 1. |
| ***spatialRelationInfoToAddModList, spatialRelationInfoToAddModListSizeExt , spatialRelationInfoToAddModListExt***  Configuration of the spatial relation between a reference RS and PUCCH. Reference RS can be SSB/CSI-RS/SRS. If the list has more than one element, MAC-CE selects a single element (see TS 38.321 [3], clause 5.18.8 and TS 38.213 [13], clause 9.2.2). The UE shall consider entries in *spatialRelationInfoToAddModList* and in *spatialRelationInfoToAddModListSizeExt* as a single list, i.e. an entry created using *spatialRelationInfoToAddModList* can be modified using *spatialRelationInfoToAddModListSizeExt* (or deleted using *spatialRelationInfoToReleaseListSizeExt*) and vice-versa. If the network includes *spatialRelationInfoToAddModListExt*, it includes the same number of entries, and listed in the same order, as in the concatenation of *spatialRelationInfoToAddModList* and of *spatialRelationInfoToAddModListSizeExt*. If *unifiedTCI-StateType* is configured for the serving cell, no element in this list is configured. |
| ***spatialRelationInfoToReleaseList, spatialRelationInfoToReleaseListSizeExt, spatialRelationInfoToReleaseListExt***  Lists of spatial relation configurations between a reference RS and PUCCH to be released by the UE. |
| ***sps-PUCCH-AN-List***  Indicates a list of PUCCH resources for DL SPS HARQ ACK. The field *maxPayloadSize* is absent for the first and the last *SPS-PUCCH-AN* in the list. If configured, this overrides *n1PUCCH-AN* in *SPS-config.* |
| ***sps-PUCCH-AN-ListMulticast***  The field is used to configure the list of PUCCH resources per HARQ ACK codebook for MBS multicast. |
| ***subslotLengthForPUCCH***  Indicates the sub-slot length for sub-slot based PUCCH feedback in number of symbols (see TS 38.213 [13], clause 9). Value *n2* corresponds to 2 symbols, value *n6* corresponds to 6 symbols, value *n7* corresponds to 7 symbols. For normal CP, the value is either *n2* or *n7*. For extended CP, the value is either *n2* or *n6*. |
| ***ul-AccessConfigListDCI-1-1, ul-AccessConfigListDCI-1-2***  List of the combinations of cyclic prefix extension and UL channel access type (see TS 38.212 [17], clause 7.3.1) applicable, respectively, to DCI format 1\_1 and DCI format 1\_2. The fields *ul-AccessConfigListDCI-1-1-r16* and *ul-AccessConfigListDCI-1-2-r17* are only applicable for FR1 (see TS 38.212 [17], Table 7.3.1.2.2-6). The field *ul-AccessConfigListDCI-1-1-r17* indicates a list which only contains UL channel access types and is only applicable for FR2-2 (see TS 38.212 [17], Table 7.3.1.2.2-6A). |

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| --- |
| *PUCCH-format3* field descriptions |
| ***nrofPRBs***  The supported values are 1,2,3,4,5,6,8,9,10,12,15 and 16. The UE shall ignore this field when *format-v1610* is configured. |

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| --- |
| *PUCCH-FormatConfig, PUCCH-FormatConfigExt* field descriptions |
| ***additionalDMRS***  If the field is present, the UE enables 2 DMRS symbols per hop of a PUCCH Format 3 or 4 if both hops are more than X symbols when FH is enabled (X=4). And it enables 4 DMRS symbols for a PUCCH Format 3 or 4 with more than 2X+1 symbols when FH is disabled (X=4). The field is not applicable for format 0, 1 and 2. See TS 38.213 [13], clause 9.2.2. |
| ***interslotFrequencyHopping***  If the field is present, the UE enables inter-slot frequency hopping when PUCCH Format 0, 1, 2, 3 or 4 is repeated over multiple slots. For a PUCCH over multiple slots, the intra and inter slot frequency hopping cannot be enabled at the same time for a UE. See TS 38.213 [13], clause 9.2.6. |
| ***maxCodeRate***  Max coding rate to determine how to feedback UCI on PUCCH for format 2, 3 or 4. The field is not applicable for format 0 and 1. See TS 38.213 [13], clause 9.2.5. |
| ***maxCodeRateLP***  Max coding rate to determine how to feedback UCI on PUCCH for format 2, 3 or 4. The field is not applicable for format 0 and 1. This field configures additional max code rate in the second entry of *PUCCH-ConfigurationList-r16* for multiplexing low-priority (LP) HARQ-ACK and high-priority (HP) UCI in a PUCCH as described Clause 9.2.5.3 of TS 38.213 [13]. The field is absent for the first entry of *PUCCH-ConfigurationList-r16*. |
| ***nrofSlots***  Number of slots with the same PUCCH. When the field is absent the UE applies the value *n1*. See TS 38.213 [13], clause 9.2.6. |
| ***pi2BPSK***  If the field is present, the UE uses pi/2 BPSK for UCI symbols instead of QPSK for PUCCH. The field is not applicable for format 0, 1 and 2. See TS 38.213 [13], clause 9.2.5. |
| ***rb-SetIndex***  Indicates the RB set where PUCCH resource is allocated. |
| ***simultaneousHARQ-ACK-CSI***  If the field is present, the UE uses simultaneous transmission of CSI and HARQ-ACK feedback with or without SR with PUCCH Format 2, 3 or 4. See TS 38.213 [13], clause 9.2.5. When the field is absent the UE applies the value *off.* The field is not applicable for format 0 and 1. |

|  |
| --- |
| *PUCCH-Resource, PUCCH-ResourceExt* field descriptions |
| ***applyIndicatedTCI-State***  This field indicates, for PUCCH transmission(s) corresponding to this PUCCH resource, if UE applies the first, the second or both "indicated" UL only TCI or joint TCI as specified in TS 38.213 9.2.2. For PUCCH resources belonging to a PUCCH group, network configures same value. |
| ***format***  Selection of the PUCCH format (format 0 – 4) and format-specific parameters, see TS 38.213 [13], clause 9.2. *format0* and *format1* are only allowed for a resource in a first PUCCH resource set. *format2*, *format3* and *format4* are only allowed for a resource in non-first PUCCH resource set. The network can only configure *format-v1610* when format is set to *format2* or *format3*. The network only configures *format-v1700* when format is set to *format0*, *format1* or *format4*. |
| ***interlace0***  This is the only interlace of interlaced PUCCH Format 0 and 1 and the first interlace for interlaced PUCCH Format 2 and 3. |
| ***interlace1***  A second interlace, in addition to interlace 0, as specified in TS 38.213 [13], clause 9.2.1. For 15kHz SCS, values {0..9} are applicable; for 30kHz SCS, values {0..4} are applicable. For 15kHz SCS, the values of *interlace1* shall satisfy *interlace1*=mod(*interlace0*+X,10) where X=1, -1, or 5. |
| ***intraSlotFrequencyHopping***  Enabling intra-slot frequency hopping, applicable for all types of PUCCH formats. For long PUCCH over multiple slots, the intra and inter slot frequency hopping cannot be enabled at the same time for a UE. See TS 38.213 [13], clause 9.2.1. |
| ***nrofPRBs***  Indicates the number of PRBs used per PUCCH resource for the PUCCH format, see TS 38.213 [13], clause 9.2.1. This field is applicable for PUCCH *format0*, *format1*, and *format4* in FR2-2. The supported values for *format4* are 1,2,3,4,5,6,8,9,10,12,15 and 16. |
| ***multipanelSFN-Scheme***  Parameter to configure multiple panel simultaneous uplink transmission SFN scheme for PUCCH resources, see TS 38.214 [19] clause 6.1.1. |
| ***occ-Index***  Indicates the orthogonal cover code index (see TS 38.213 [13], clause 9.2.1). This field is applicable when *useInterlacePUCCH-PUSCH-16* is configured. |
| ***occ-Length***  Indicates the orthogonal cover code length (see TS 38.213 [13], clause 9.2.1). This field is applicable when *useInterlacePUCCH-PUSCH-16* is configured. |
| ***pucch-RepetitionNrofSlots***  Configuration of PUCCH repetition factor per PUCCH resource with associated scheduling DCI corresponding to Rel-17 dynamic PUCCH repetition. For a PUCCH resource, if both the field *pucch-RepetitionNrofSlots* and the field *nrofSlots* are present, the field *nrofSlots* is ignored and apply the value of *pucch-RepetitionNrofSlots* corresponding to Rel-17 dynamic PUCCH repetition. If this field is absent in a PUCCH resource with associated scheduling DCI, the UE applies the value of field *nrofSlots*. |
| ***pucch-ResourceId***  Identifier of the PUCCH resource. |
| ***secondHopPRB***  Index of first PRB after frequency hopping of PUCCH. This value is applicable for intra-slot frequency hopping (see TS 38.213 [13], clause 9.2.1) or inter-slot frequency hopping (see TS 38.213 [13], clause 9.2.6). |

|  |
| --- |
| *PUCCH-ResourceSet* field descriptions |
| ***maxPayloadSize***  Maximum number of UCI information bits that the UE may transmit using this PUCCH resource set (see TS 38.213 [13], clause 9.2.1). In a PUCCH occurrence, the UE chooses the first of its *PUCCH-ResourceSet* which supports the number of bits that the UE wants to transmit. The field is absent in the first set (Set0) and in the last configured set since the UE derives the maximum number of UCI information bits as specified in TS 38.213 [13], clause 9.2.1. This field can take integer values that are multiples of 4. |
| ***resourceList***  PUCCH resources of *format0* and *format1* are only allowed in the first PUCCH resource set, i.e., in a PUCCH-ResourceSet with *pucch-ResourceSetId* = 0. This set may contain between 1 and 32 resources. PUCCH resources of *format2*, *format3* and *format4* are only allowed in a *PUCCH-ResourceSet* with *pucch-ResourceSetId* > 0. If present, these sets contain between 1 and 8 resources each. The UE chooses a *PUCCH-Resource* from this list as specified in TS 38.213 [13], clause 9.2.3. Note that this list contains only a list of resource IDs. The actual resources are configured in *PUCCH-Config*. |

|  |  |
| --- | --- |
| Conditional Presence | Explanation |
| *PI2-BPSK* | The field is optionally present, Need R, if *format3* and/or *format4* are configured and *pi2BPSK* is configured in each of them. It is absent, Need R otherwise. |

#### – *PUCCH-ConfigCommon*

The IE *PUCCH-ConfigCommon* is used to configure the cell specific PUCCH parameters.

*PUCCH-ConfigCommon* information element

-- ASN1START

-- TAG-PUCCH-CONFIGCOMMON-START

PUCCH-ConfigCommon ::= SEQUENCE {

pucch-ResourceCommon INTEGER (0..15) OPTIONAL, -- Cond InitialBWP-Only

pucch-GroupHopping ENUMERATED { neither, enable, disable },

hoppingId INTEGER (0..1023) OPTIONAL, -- Need R

p0-nominal INTEGER (-202..24) OPTIONAL, -- Need R

...,

[[

nrofPRBs INTEGER (1..16) OPTIONAL, -- Need R

intra-SlotFH-r17 ENUMERATED {fromLowerEdge, fromUpperEdge} OPTIONAL, -- Cond InitialBWP-RedCapOnly

pucch-ResourceCommonRedCap-r17 INTEGER (0..15) OPTIONAL, -- Cond InitialBWP-RedCap

additionalPRBOffset-r17 ENUMERATED {n2, n3, n4, n6, n8, n9, n10, n12} OPTIONAL -- Cond InitialBWP-RedCapOnly

]]

}

-- TAG-PUCCH-CONFIGCOMMON-STOP

-- ASN1STOP

|  |
| --- |
| *PUCCH-ConfigCommon* field descriptions |
| ***additionalPRBOffset***  When intra-slot PUCCH frequency hopping within RedCap-specific initial UL BWP is disabled, each common PUCCH resource is mapped to a single PRB on one side of the UL BWP. This parameter determines an additional PRB offset in the PRB mapping for the PUCCH resource. If the field is not configured, the UE shall assume an additional PRB offset of zero. |
| ***hoppingId***  Cell-specific scrambling ID for group hopping and sequence hopping if enabled, see TS 38.211 [16], clause 6.3.2.2. |
| ***intra-SlotFH-r17***  In case a separate initial UL BWP is configured for (e)RedCap UEs, the presence of this parameter indicates whether intra-slot PUCCH frequency hopping within the separate initial UL BWP in the common PUCCH resource is enabled for (e)RedCap UEs. If this field is absent, intra-slot PUCCH frequency hopping within RedCap-specific initial UL BWP is enabled. If this field is present, intra-slot PUCCH frequency hopping within RedCap-specific initial UL BWP is disabled and each PUCCH resource is mapped to a single PRB on one side of the UL BWP and this parameter determines whether the PRB index in the PRB mapping is counted in increasing order from the lower edge or in decreasing order from the upper edge of the UL BWP. |
| ***nrofPRBs***  Indicates the number of PRBs used per PUCCH resource for PUCCH format 0 and format 1 in FR2-2, see TS 38.213 [13], clause 9.2.1. |
| ***p0-nominal***  Power control parameter P0 for PUCCH transmissions. Value in dBm. Only even values (step size 2) allowed (see TS 38.213 [13], clause 7.2). |
| ***pucch-GroupHopping***  Configuration of group- and sequence hopping for all the PUCCH formats 0, 1, 3 and 4. Value *neither* implies neither group or sequence hopping is enabled. Value *enable* enables group hopping and disables sequence hopping. Value *disable* disables group hopping and enables sequence hopping (see TS 38.211 [16], clause 6.3.2.2). |
| ***pucch-ResourceCommon***  An entry into a 16-row table where each row configures a set of cell-specific PUCCH resources/parameters. The UE uses those PUCCH resources until it is provided with a dedicated *PUCCH-Config* (e.g. during initial access) on the initial uplink BWP. Once the network provides a dedicated *PUCCH-Config* for that bandwidth part the UE applies that one instead of the one provided in this field (see TS 38.213 [13], clause 9.2). |
| ***pucch-ResourceCommonRedCap***  An entry into a 16-row table where each row configures a set of cell-specific PUCCH resources/parameters for (e)RedCap UEs. The UE uses those PUCCH resources until it is provided with a dedicated *PUCCH-Config* (e.g. during initial access) on the initial uplink BWP. Once the network provides a dedicated *PUCCH-Config* for that bandwidth part the UE applies that one instead of the one provided in this field (see TS 38.213 [13], clause 9.2). |

|  |  |
| --- | --- |
| Conditional Presence | Explanation |
| *InitialBWP-Only* | The field is mandatory present in the *PUCCH-ConfigCommon* of the initial BWP (BWP#0) in SIB1. It is absent in other BWPs including the RedCap-specific initial uplink BWP, if configured. |
| *InitialBWP-RedCap* | The field is mandatory present in the *PUCCH-ConfigCommon* of the RedCap-specific initial BWP. It is optional present, Need R, in the *PUCCH-ConfigCommon* of the initial BWP configured by *initialUplinkBWP*. It is absent in other BWPs. |
| *InitialBWP-RedCapOnly* | The field is optional present, Need S, in the PUCCH-ConfigCommon of the RedCap-specific initial BWP. It is absent in other BWPs. |

#### – *PUCCH-ConfigurationList*

The IE *PUCCH-ConfigurationList* is used to configure UE specific PUCCH parameters (per BWP) for two simultaneously constructed HARQ-ACK codebooks. See TS 38.213 [13], clause 9.1.

PUCCH-ConfigurationList information element

-- ASN1START

-- TAG-PUCCH-CONFIGURATIONLIST-START

PUCCH-ConfigurationList-r16 ::= SEQUENCE (SIZE (1..2)) OF PUCCH-Config

-- TAG-PUCCH-CONFIGURATIONLIST-STOP

-- ASN1STOP

#### – *PUCCH-CSI-Resource*

The IE *PUCCH-CSI-Resource* is used to indicate a PUCCH resource to use for reporting on PUCCH.

*PUCCH-CSI-Resource* information element

-- ASN1START

-- TAG-PUCCH-CSI-RESOURCE-START

PUCCH-CSI-Resource ::= SEQUENCE {

uplinkBandwidthPartId BWP-Id,

pucch-Resource PUCCH-ResourceId

}

-- TAG-PUCCH-CSI-RESOURCE-STOP

-- ASN1STOP

|  |
| --- |
| *PUCCH-CSI-Resource* field descriptions |
| ***pucch-Resource***  PUCCH resource for the associated uplink BWP. Only PUCCH-Resource of format 2, 3 and 4 is supported. The actual PUCCH-Resource is configured in *PUCCH-Config* and referred to by its ID. When two *PUCCH-Config* are configured within *PUCCH-ConfigurationList*, *PUCCH-ResourceId* in a *PUCCH-CSI-Resource* refers to a PUCCH-Resource in the *PUCCH-Config* used for HARQ-ACK with low priority. |

#### – *PUCCH-PathlossReferenceRS-Id*

The IE *PUCCH-PathlossReferenceRS-Id* is an ID for a reference signal (RS) configured as PUCCH pathloss reference (see TS 38.213 [13], clause 7.2).

*PUCCH-PathlossReferenceRS-Id* information element

-- ASN1START

-- TAG-PUCCH-PATHLOSSREFERENCERS-ID-START

PUCCH-PathlossReferenceRS-Id ::= INTEGER (0..maxNrofPUCCH-PathlossReferenceRSs-1)

PUCCH-PathlossReferenceRS-Id-v1610 ::= INTEGER (maxNrofPUCCH-PathlossReferenceRSs..maxNrofPUCCH-PathlossReferenceRSs-1-r16)

PUCCH-PathlossReferenceRS-Id-r17 ::= INTEGER (0..maxNrofPUCCH-PathlossReferenceRSs-1-r17)

-- TAG-PUCCH-PATHLOSSREFERENCERS-ID-STOP

-- ASN1STOP

#### – *PUCCH-PowerControl*

The IE *PUCCH-PowerControl* is used to configure UE-specific parameters for the power control of PUCCH.

*PUCCH-PowerControl* information element

-- ASN1START

-- TAG-PUCCH-POWERCONTROL-START

PUCCH-PowerControl ::= SEQUENCE {

deltaF-PUCCH-f0 INTEGER (-16..15) OPTIONAL, -- Need R

deltaF-PUCCH-f1 INTEGER (-16..15) OPTIONAL, -- Need R

deltaF-PUCCH-f2 INTEGER (-16..15) OPTIONAL, -- Need R

deltaF-PUCCH-f3 INTEGER (-16..15) OPTIONAL, -- Need R

deltaF-PUCCH-f4 INTEGER (-16..15) OPTIONAL, -- Need R

p0-Set SEQUENCE (SIZE (1..maxNrofPUCCH-P0-PerSet)) OF P0-PUCCH OPTIONAL, -- Need M

pathlossReferenceRSs SEQUENCE (SIZE (1..maxNrofPUCCH-PathlossReferenceRSs)) OF PUCCH-PathlossReferenceRS

OPTIONAL, -- Need M

twoPUCCH-PC-AdjustmentStates ENUMERATED {twoStates} OPTIONAL, -- Need S

...,

[[

pathlossReferenceRSs-v1610 SetupRelease { PathlossReferenceRSs-v1610 } OPTIONAL -- Need M

]]

}

P0-PUCCH ::= SEQUENCE {

p0-PUCCH-Id P0-PUCCH-Id,

p0-PUCCH-Value INTEGER (-16..15)

}

P0-PUCCH-Id ::= INTEGER (1..8)

PathlossReferenceRSs-v1610 ::= SEQUENCE (SIZE (1..maxNrofPUCCH-PathlossReferenceRSsDiff-r16)) OF PUCCH-PathlossReferenceRS-r16

PUCCH-PathlossReferenceRS ::= SEQUENCE {

pucch-PathlossReferenceRS-Id PUCCH-PathlossReferenceRS-Id,

referenceSignal CHOICE {

ssb-Index SSB-Index,

csi-RS-Index NZP-CSI-RS-ResourceId

}

}

PUCCH-PathlossReferenceRS-r16 ::= SEQUENCE {

pucch-PathlossReferenceRS-Id-r16 PUCCH-PathlossReferenceRS-Id-v1610,

referenceSignal-r16 CHOICE {

ssb-Index-r16 SSB-Index,

csi-RS-Index-r16 NZP-CSI-RS-ResourceId

}

}

PUCCH-PowerControlSetInfo-r17 ::= SEQUENCE {

pucch-PowerControlSetInfoId-r17 PUCCH-PowerControlSetInfoId-r17,

p0-PUCCH-Id-r17 P0-PUCCH-Id,

pucch-ClosedLoopIndex-r17 ENUMERATED { i0, i1 },

pucch-PathlossReferenceRS-Id-r17 PUCCH-PathlossReferenceRS-Id-r17

}

PUCCH-PowerControlSetInfoId-r17 ::= INTEGER (1.. maxNrofPowerControlSetInfos-r17)

-- TAG-PUCCH-POWERCONTROL-STOP

-- ASN1STOP

|  |
| --- |
| *P0-PUCCH* field descriptions |
| ***p0-PUCCH-Value***  P0 value for PUCCH with 1dB step size. |

|  |
| --- |
| *PUCCH-PowerControl* field descriptions |
| ***deltaF-PUCCH-f0***  deltaF for PUCCH format 0 with 1dB step size (see TS 38.213 [13], clause 7.2). |
| ***deltaF-PUCCH-f1***  deltaF for PUCCH format 1 with 1dB step size (see TS 38.213 [13], clause 7.2). |
| ***deltaF-PUCCH-f2***  deltaF for PUCCH format 2 with 1dB step size (see TS 38.213 [13], clause 7.2). |
| ***deltaF-PUCCH-f3***  deltaF for PUCCH format 3 with 1dB step size (see TS 38.213 [13], clause 7.2). |
| ***deltaF-PUCCH-f4***  deltaF for PUCCH format 4 with 1dB step size (see TS 38.213 [13], clause 7.2). |
| ***p0-Set***  A set with dedicated P0 values for PUCCH, i.e., {P01, P02,... } (see TS 38.213 [13], clause 7.2). This field is not configured if *unifiedTCI-StateType* is configured for the serving cell. |
| ***pathlossReferenceRSs, pathlossReferenceRSs-v1610***  A set of Reference Signals (e.g. a CSI-RS config or a SS block) to be used for PUCCH pathloss estimation. Up to *maxNrofPUCCH-PathlossReference-RSs* may be configured. If the field is not configured, the UE uses the SSB as reference signal (see TS 38.213 [13], clause 7.2). The set includes Reference Signals indicated in pathlossReferenceRSs (without suffix) and in pathlossReferenceRSs-v1610. The UE maintains *pathlossReferenceRSs* and *pathlossReferenceRSs-v1610* separately: Receiving *pathlossReferenceRSs-v1610* set to *release* releases only the entries that were configured by *pathlossReferenceRSs-v1610*, and receiving *pathlossReferenceRSs-v1610* set to *setup* replaces only the entries that were configured by *pathlossReferenceRSs-v1610* with the newly signalled entries. Neither the field *pathlossReferenceRSs* (without suffix) nor *pathlossReferenceRSs-v1610* are configured if *unifiedTCI-StateType* is configured for the serving cell. |
| ***twoPUCCH-PC-AdjustmentStates***  Number of PUCCH power control adjustment states maintained by the UE (i.e., g(i)). If the field is present (n2) the UE maintains two power control states (i.e., g(i,0) and g(i,1)). If the field is absent, it maintains one power control state (i.e., g(i,0)) (see TS 38.213 [13], clause 7.2). |

#### – *PUCCH-SpatialRelationInfo*

The IE *PUCCH-SpatialRelationInfo* is used to configure the spatial setting for PUCCH transmission and the parameters for PUCCH power control, see TS 38.213, [13], clause 9.2.2.

*PUCCH-SpatialRelationInfo* information element

-- ASN1START

-- TAG-PUCCH-SPATIALRELATIONINFO-START

PUCCH-SpatialRelationInfo ::= SEQUENCE {

pucch-SpatialRelationInfoId PUCCH-SpatialRelationInfoId,

servingCellId ServCellIndex OPTIONAL, -- Need S

referenceSignal CHOICE {

ssb-Index SSB-Index,

csi-RS-Index NZP-CSI-RS-ResourceId,

srs PUCCH-SRS

},

pucch-PathlossReferenceRS-Id PUCCH-PathlossReferenceRS-Id,

p0-PUCCH-Id P0-PUCCH-Id,

closedLoopIndex ENUMERATED { i0, i1 }

}

PUCCH-SpatialRelationInfoExt-r16 ::= SEQUENCE {

pucch-SpatialRelationInfoId-v1610 PUCCH-SpatialRelationInfoId-v1610 OPTIONAL, -- Need S

pucch-PathlossReferenceRS-Id-v1610 PUCCH-PathlossReferenceRS-Id-v1610 OPTIONAL, --Need R

...

}

PUCCH-SRS ::= SEQUENCE {

resource SRS-ResourceId,

uplinkBWP BWP-Id

}

-- TAG-PUCCH-SPATIALRELATIONINFO-STOP

-- ASN1STOP

|  |
| --- |
| *PUCCH-SpatialRelationInfo* field descriptions |
| ***pucch-PathLossReferenceRS-Id***  When *pucch-PathLossReferenceRS-Id-v1610* is configured, the UE shall ignore *pucch-PathLossReferenceRS-Id* (without suffix). |
| ***pucch-SpatialRelationInfoId***  When *pucch-SpatialRelationInfoId-v1610* is configured, the UE shall ignore *pucch-SpatialRelationInfoId* (without suffix). If *pucch-SpatialRelationInfoId-v1610 is* absent, the UE shall use the *pucch-SpatialRelationInfoId* (without suffix). |
| ***servingCellId***  If the field is absent, the UE applies the *ServCellId* of the serving cell in which this *PUCCH-SpatialRelationInfo* is configured |

#### – *PUCCH-SpatialRelationInfo-Id*

The IE *PUCCH-SpatialRelationInfo-Id* is used to identify a *PUCCH-SpatialRelationInfo*

*PUCCH-SpatialRelationInfo-Id* information element

-- ASN1START

-- TAG-PUCCH-SPATIALRELATIONINFO-START

PUCCH-SpatialRelationInfoId ::= INTEGER (1..maxNrofSpatialRelationInfos)

PUCCH-SpatialRelationInfoId-r16 ::= INTEGER (1..maxNrofSpatialRelationInfos-r16)

PUCCH-SpatialRelationInfoId-v1610::= INTEGER (maxNrofSpatialRelationInfos-plus-1..maxNrofSpatialRelationInfos-r16)

-- TAG-PUCCH-SPATIALRELATIONINFO-STOP

-- ASN1STOP

#### – *PUCCH-TPC-CommandConfig*

The IE *PUCCH-TPC-CommandConfig* is used to configure the UE for extracting TPC commands for PUCCH from a group-TPC messages on DCI.

*PUCCH-TPC-CommandConfig* information element

-- ASN1START

-- TAG-PUCCH-TPC-COMMANDCONFIG-START

PUCCH-TPC-CommandConfig ::= SEQUENCE {

tpc-IndexPCell INTEGER (1..15) OPTIONAL, -- Cond PDCCH-OfSpcell

tpc-IndexPUCCH-SCell INTEGER (1..15) OPTIONAL, -- Cond PDCCH-ofSpCellOrPUCCH-SCell

...,

[[

tpc-IndexPUCCH-sSCell-r17 INTEGER (1..15) OPTIONAL, -- Need R

tpc-IndexPUCCH-sScellSecondaryPUCCHgroup-r17 INTEGER (1..15) OPTIONAL -- Cond twoPUCCHgroup

]]

}

-- TAG-PUCCH-TPC-COMMANDCONFIG-STOP

-- ASN1STOP

|  |
| --- |
| *PUCCH-TPC-CommandConfig* field descriptions |
| ***tpc-IndexPCell***  An index determining the position of the first bit of TPC command (applicable to the SpCell) inside the DCI format 2-2 payload. |
| ***tpc-IndexPUCCH-SCell***  An index determining the position of the first bit of TPC command (applicable to the PUCCH SCell) inside the DCI format 2-2 payload. |
| ***tpc-IndexPUCCH-sSCell, tpc-IndexPUCCH-sSCellSecondaryPUCCHgroup***  An index determining the position of the first bit of TPC command (applicable to the alternative PUCCH cell for PUCCH cell switching) inside the DCI format 2-2 payload, for the primary PUCCH group and the secondary PUCCH group respectively. |

|  |  |
| --- | --- |
| Conditional Presence | Explanation |
| *PDCCH-OfSpcell* | The field is mandatory present if the *PUCCH-TPC-CommandConfig* is provided in the *PDCCH-Config* for the SpCell. Otherwise, the field is absent, Need R. |
| *PDCCH-ofSpCellOrPUCCH-SCell* | The field is mandatory present if the *PUCCH-TPC-CommandConfig* is provided in the *PDCCH-Config* for the PUCCH-SCell.  The field is optionally present, need R, if the UE is configured with a PUCCH SCell in this cell group and if the *PUCCH-TPC-CommandConfig* is provided in the *PDCCH-Config* for the SpCell.  Otherwise, the field is absent, Need R. |
| *twoPUCCHgroup* | This field is optionally present, Need R, if secondary PUCCH group is configured. It is absent otherwise. |

#### – *PUSCH-Config*

The IE *PUSCH-Config* is used to configure the UE specific PUSCH parameters applicable to a particular BWP.

*PUSCH-Config* information element

-- ASN1START

-- TAG-PUSCH-CONFIG-START

PUSCH-Config ::= SEQUENCE {

dataScramblingIdentityPUSCH INTEGER (0..1023) OPTIONAL, -- Need S

txConfig ENUMERATED {codebook, nonCodebook} OPTIONAL, -- Need S

dmrs-UplinkForPUSCH-MappingTypeA SetupRelease { DMRS-UplinkConfig } OPTIONAL, -- Need M

dmrs-UplinkForPUSCH-MappingTypeB SetupRelease { DMRS-UplinkConfig } OPTIONAL, -- Need M

pusch-PowerControl PUSCH-PowerControl OPTIONAL, -- Need M

frequencyHopping ENUMERATED {intraSlot, interSlot} OPTIONAL, -- Need S

frequencyHoppingOffsetLists SEQUENCE (SIZE (1..4)) OF INTEGER (1.. maxNrofPhysicalResourceBlocks-1)

OPTIONAL, -- Need M

resourceAllocation ENUMERATED { resourceAllocationType0, resourceAllocationType1, dynamicSwitch},

pusch-TimeDomainAllocationList SetupRelease { PUSCH-TimeDomainResourceAllocationList } OPTIONAL, -- Need M

pusch-AggregationFactor ENUMERATED { n2, n4, n8 } OPTIONAL, -- Need S

mcs-Table ENUMERATED {qam256, qam64LowSE} OPTIONAL, -- Need S

mcs-TableTransformPrecoder ENUMERATED {qam256, qam64LowSE} OPTIONAL, -- Need S

transformPrecoder ENUMERATED {enabled, disabled} OPTIONAL, -- Need S

codebookSubset ENUMERATED {fullyAndPartialAndNonCoherent, partialAndNonCoherent,nonCoherent}

OPTIONAL, -- Cond codebookBased

maxRank INTEGER (1..4) OPTIONAL, -- Cond codebookBased

rbg-Size ENUMERATED { config2} OPTIONAL, -- Need S

uci-OnPUSCH SetupRelease { UCI-OnPUSCH} OPTIONAL, -- Need M

tp-pi2BPSK ENUMERATED {enabled} OPTIONAL, -- Need S

...,

[[

minimumSchedulingOffsetK2-r16 SetupRelease { MinSchedulingOffsetK2-Values-r16 } OPTIONAL, -- Need M

ul-AccessConfigListDCI-0-1-r16 SetupRelease { UL-AccessConfigListDCI-0-1-r16 } OPTIONAL, -- Need M

-- Start of the parameters for DCI format 0\_2 introduced in V16.1.0

harq-ProcessNumberSizeDCI-0-2-r16 INTEGER (0..4) OPTIONAL, -- Need R

dmrs-SequenceInitializationDCI-0-2-r16 ENUMERATED {enabled} OPTIONAL, -- Need S

numberOfBitsForRV-DCI-0-2-r16 INTEGER (0..2) OPTIONAL, -- Need R

antennaPortsFieldPresenceDCI-0-2-r16 ENUMERATED {enabled} OPTIONAL, -- Need S

dmrs-UplinkForPUSCH-MappingTypeA-DCI-0-2-r16 SetupRelease { DMRS-UplinkConfig } OPTIONAL, -- Need M

dmrs-UplinkForPUSCH-MappingTypeB-DCI-0-2-r16 SetupRelease { DMRS-UplinkConfig } OPTIONAL, -- Need M

frequencyHoppingDCI-0-2-r16 CHOICE {

pusch-RepTypeA ENUMERATED {intraSlot, interSlot},

pusch-RepTypeB ENUMERATED {interRepetition, interSlot}

} OPTIONAL, -- Need S

frequencyHoppingOffsetListsDCI-0-2-r16 SetupRelease { FrequencyHoppingOffsetListsDCI-0-2-r16} OPTIONAL, -- Need M

codebookSubsetDCI-0-2-r16 ENUMERATED {fullyAndPartialAndNonCoherent, partialAndNonCoherent,nonCoherent}

OPTIONAL, -- Cond codebookBased

invalidSymbolPatternIndicatorDCI-0-2-r16 ENUMERATED {enabled} OPTIONAL, -- Need S

maxRankDCI-0-2-r16 INTEGER (1..4) OPTIONAL, -- Cond codebookBased

mcs-TableDCI-0-2-r16 ENUMERATED {qam256, qam64LowSE} OPTIONAL, -- Need S

mcs-TableTransformPrecoderDCI-0-2-r16 ENUMERATED {qam256, qam64LowSE} OPTIONAL, -- Need S

priorityIndicatorDCI-0-2-r16 ENUMERATED {enabled} OPTIONAL, -- Need S

pusch-RepTypeIndicatorDCI-0-2-r16 ENUMERATED { pusch-RepTypeA, pusch-RepTypeB} OPTIONAL, -- Need R

resourceAllocationDCI-0-2-r16 ENUMERATED { resourceAllocationType0, resourceAllocationType1, dynamicSwitch}

OPTIONAL, -- Need M

resourceAllocationType1GranularityDCI-0-2-r16 ENUMERATED { n2,n4,n8,n16 } OPTIONAL, -- Need S

uci-OnPUSCH-ListDCI-0-2-r16 SetupRelease { UCI-OnPUSCH-ListDCI-0-2-r16} OPTIONAL, -- Need M

pusch-TimeDomainAllocationListDCI-0-2-r16 SetupRelease { PUSCH-TimeDomainResourceAllocationList-r16 }

OPTIONAL, -- Need M

-- End of the parameters for DCI format 0\_2 introduced in V16.1.0

-- Start of the parameters for DCI format 0\_1 introduced in V16.1.0

pusch-TimeDomainAllocationListDCI-0-1-r16 SetupRelease { PUSCH-TimeDomainResourceAllocationList-r16 }

OPTIONAL, -- Need M

invalidSymbolPatternIndicatorDCI-0-1-r16 ENUMERATED {enabled} OPTIONAL, -- Need S

priorityIndicatorDCI-0-1-r16 ENUMERATED {enabled} OPTIONAL, -- Need S

pusch-RepTypeIndicatorDCI-0-1-r16 ENUMERATED { pusch-RepTypeA, pusch-RepTypeB} OPTIONAL, -- Need R

frequencyHoppingDCI-0-1-r16 ENUMERATED {interRepetition, interSlot} OPTIONAL, -- Cond RepTypeB

uci-OnPUSCH-ListDCI-0-1-r16 SetupRelease { UCI-OnPUSCH-ListDCI-0-1-r16 } OPTIONAL, -- Need M

-- End of the parameters for DCI format 0\_1 introduced in V16.1.0

invalidSymbolPattern-r16 InvalidSymbolPattern-r16 OPTIONAL, -- Need S

pusch-PowerControl-v1610 SetupRelease {PUSCH-PowerControl-v1610} OPTIONAL, -- Need M

ul-FullPowerTransmission-r16 ENUMERATED {fullpower, fullpowerMode1, fullpowerMode2} OPTIONAL, -- Need R

pusch-TimeDomainAllocationListForMultiPUSCH-r16 SetupRelease { PUSCH-TimeDomainResourceAllocationList-r16 }

OPTIONAL, -- Need M

numberOfInvalidSymbolsForDL-UL-Switching-r16 INTEGER (1..4) OPTIONAL -- Cond RepTypeB2

]],

[[

ul-AccessConfigListDCI-0-2-r17 SetupRelease { UL-AccessConfigListDCI-0-2-r17 } OPTIONAL, -- Need M

betaOffsetsCrossPri0-r17 SetupRelease { BetaOffsetsCrossPriSel-r17 } OPTIONAL, -- Need M

betaOffsetsCrossPri1-r17 SetupRelease { BetaOffsetsCrossPriSel-r17 } OPTIONAL, -- Need M

betaOffsetsCrossPri0DCI-0-2-r17 SetupRelease { BetaOffsetsCrossPriSelDCI-0-2-r17 } OPTIONAL, -- Need M

betaOffsetsCrossPri1DCI-0-2-r17 SetupRelease { BetaOffsetsCrossPriSelDCI-0-2-r17 } OPTIONAL, -- Need M

mappingPattern-r17 ENUMERATED {cyclicMapping, sequentialMapping} OPTIONAL, -- Cond SRSsets

secondTPCFieldDCI-0-1-r17 ENUMERATED {enabled} OPTIONAL, -- Need R

secondTPCFieldDCI-0-2-r17 ENUMERATED {enabled} OPTIONAL, -- Need R

sequenceOffsetForRV-r17 INTEGER (0..3) OPTIONAL, -- Need R

ul-AccessConfigListDCI-0-1-r17 SetupRelease { UL-AccessConfigListDCI-0-1-r17 } OPTIONAL, -- Need M

minimumSchedulingOffsetK2-r17 SetupRelease { MinSchedulingOffsetK2-Values-r17 } OPTIONAL, -- Need M

availableSlotCounting-r17 ENUMERATED { enabled } OPTIONAL, -- Need S

dmrs-BundlingPUSCH-Config-r17 SetupRelease { DMRS-BundlingPUSCH-Config-r17 } OPTIONAL, -- Need M

harq-ProcessNumberSizeDCI-0-2-v1700 INTEGER (5) OPTIONAL, -- Need R

harq-ProcessNumberSizeDCI-0-1-r17 INTEGER (5) OPTIONAL, -- Need R

mpe-ResourcePoolToAddModList-r17 SEQUENCE (SIZE(1..maxMPE-Resources-r17)) OF MPE-Resource-r17 OPTIONAL, -- Need N

mpe-ResourcePoolToReleaseList-r17 SEQUENCE (SIZE(1..maxMPE-Resources-r17)) OF MPE-ResourceId-r17 OPTIONAL -- Need N

]],

[[

maxRank-v1810 INTEGER (5..8) OPTIONAL, -- Need R

sTx-2Panel-r18 ENUMERATED {enabled} OPTIONAL, -- Need R

multipanelSchemeSDM-r18 SDM-Scheme-r18 OPTIONAL, -- Need R

multipanelSchemeSFN-r18 SFN-Scheme-r18 OPTIONAL, -- Need R

codebookTypeUL-r18 SetupRelease { CodebookTypeUL-r18 } OPTIONAL, -- Need M

applyIndicatedTCI-State-r18 ENUMERATED {first, second} OPTIONAL, -- Need R

dynamicTransformPrecoderFieldPresenceDCI-0-1-r18 ENUMERATED {enabled} OPTIONAL, -- Need R

dynamicTransformPrecoderFieldPresenceDCI-0-2-r18 ENUMERATED {enabled} OPTIONAL, -- Need R

pusch-ConfigDCI-0-3-r18 SetupRelease { PUSCH-ConfigDCI-0-3-r18 } OPTIONAL -- Need M

]],

[[

pusch-TimeDomainAllocationListForMultiPUSCH-DCI-0-3-r19 SetupRelease { PUSCH-TimeDomainResourceAllocationList-r16 }

OPTIONAL -- Need M

]]

}

UCI-OnPUSCH ::= SEQUENCE {

betaOffsets CHOICE {

dynamic SEQUENCE (SIZE (4)) OF BetaOffsets,

semiStatic BetaOffsets

} OPTIONAL, -- Need M

scaling ENUMERATED { f0p5, f0p65, f0p8, f1 }

}

MinSchedulingOffsetK2-Values-r16 ::= SEQUENCE (SIZE (1..maxNrOfMinSchedulingOffsetValues-r16)) OF INTEGER (0..maxK2-SchedulingOffset-r16)

MinSchedulingOffsetK2-Values-r17 ::= SEQUENCE (SIZE (1..maxNrOfMinSchedulingOffsetValues-r16)) OF INTEGER (0..maxK2-SchedulingOffset-r17)

UCI-OnPUSCH-DCI-0-2-r16 ::= SEQUENCE {

betaOffsetsDCI-0-2-r16 CHOICE {

dynamicDCI-0-2-r16 CHOICE {

oneBit-r16 SEQUENCE (SIZE (2)) OF BetaOffsets,

twoBits-r16 SEQUENCE (SIZE (4)) OF BetaOffsets

},

semiStaticDCI-0-2-r16 BetaOffsets

} OPTIONAL, -- Need M

scalingDCI-0-2-r16 ENUMERATED { f0p5, f0p65, f0p8, f1 }

}

FrequencyHoppingOffsetListsDCI-0-2-r16 ::= SEQUENCE (SIZE (1..4)) OF INTEGER (1.. maxNrofPhysicalResourceBlocks-1)

UCI-OnPUSCH-ListDCI-0-2-r16 ::= SEQUENCE (SIZE (1..2)) OF UCI-OnPUSCH-DCI-0-2-r16

UCI-OnPUSCH-ListDCI-0-1-r16 ::= SEQUENCE (SIZE (1..2)) OF UCI-OnPUSCH

UL-AccessConfigListDCI-0-1-r16 ::= SEQUENCE (SIZE (1..64)) OF INTEGER (0..63)

UL-AccessConfigListDCI-0-1-r17 ::= SEQUENCE (SIZE (1..3)) OF INTEGER (0..2)

UL-AccessConfigListDCI-0-2-r17 ::= SEQUENCE (SIZE (1..64)) OF INTEGER (0..63)

BetaOffsetsCrossPriSel-r17 ::= CHOICE {

dynamic-r17 SEQUENCE (SIZE (4)) OF BetaOffsetsCrossPri-r17,

semiStatic-r17 BetaOffsetsCrossPri-r17

}

BetaOffsetsCrossPriSelDCI-0-2-r17 ::= CHOICE {

dynamicDCI-0-2-r17 CHOICE {

oneBit-r17 SEQUENCE (SIZE (2)) OF BetaOffsetsCrossPri-r17,

twoBits-r17 SEQUENCE (SIZE (4)) OF BetaOffsetsCrossPri-r17

},

semiStaticDCI-0-2-r17 BetaOffsetsCrossPri-r17

}

MPE-Resource-r17 ::= SEQUENCE {

mpe-ResourceId-r17 MPE-ResourceId-r17,

cell-r17 ServCellIndex OPTIONAL, -- Need R

additionalPCI-r17 AdditionalPCIIndex-r17 OPTIONAL, -- Need R

mpe-ReferenceSignal-r17 CHOICE {

csi-RS-Resource-r17 NZP-CSI-RS-ResourceId,

ssb-Resource-r17 SSB-Index

}

}

MPE-ResourceId-r17 ::= INTEGER (1..maxMPE-Resources-r17)

SDM-Scheme-r18 ::= SEQUENCE {

maxRankSDM-r18 INTEGER (1..2) OPTIONAL, -- Need R

maxRankSDM-DCI-0-2-r18 INTEGER (1..2) OPTIONAL -- Need R

}

SFN-Scheme-r18 ::= SEQUENCE {

maxRankSFN-r18 INTEGER (1..2) OPTIONAL, -- Need R

maxRankSFN-DCI-0-2-r18 INTEGER (1..2) OPTIONAL -- Need R

}

CodebookTypeUL-r18 ::= CHOICE {

codebook1-r18 ENUMERATED {ng1n4n1, ng1n2n2},

codebook2-r18 ENUMERATED {ng2},

codebook3-r18 ENUMERATED {ng4},

codebook4-r18 ENUMERATED {ng8}

}

PUSCH-ConfigDCI-0-3-r18 ::= SEQUENCE {

resourceAllocationDCI-0-3-r18 ENUMERATED {resourceAllocationType0, resourceAllocationType1, dynamicSwitch}

OPTIONAL, -- Need M

rbg-SizeDCI-0-3-r18 ENUMERATED {config2, config3} OPTIONAL, -- Need S

resourceAllocationType1GranularityDCI-0-3-r18 ENUMERATED {n2,n4,n8,n16} OPTIONAL, -- Need S

numberOfBitsForRV-DCI-0-3-r18 INTEGER (0..2) OPTIONAL, -- Need R

harq-ProcessNumberSizeDCI-0-3-r18 INTEGER (0..5) OPTIONAL, -- Need R

uci-OnPUSCH-ListDCI-0-3-r18 SetupRelease { UCI-OnPUSCH-ListDCI-0-1-r16 } OPTIONAL -- Need M

}

-- TAG-PUSCH-CONFIG-STOP

-- ASN1STOP

|  |
| --- |
| *PUSCH-Config* field descriptions |
| ***antennaPortsFieldPresenceDCI-0-2***  Configure the presence of "Antenna ports" field in DCI format 0\_2. When the field is configured, then the "Antenna ports" field is present in DCI format 0\_2. Otherwise, the field size is set to 0 for DCI format 0\_2 (See TS 38.212 [17], clause 7.3.1.1.3). If neither *dmrs-UplinkForPUSCH-MappingTypeA-DCI-0-2* nor *dmrs-UplinkForPUSCH-MappingTypeB-DCI-0-2* is configured, this field is absent. |
| ***applyIndicatedTCI-State***  This field indicates, for a PUSCH transmission, if UE applies the first or the second "indicated" UL only TCI or joint TCI as specified in TS 38.214 [19], clause 6.1. |
| ***availableSlotCounting***  Indicate whether PUSCH repetitions counted on the basis of available slots is enabled. If the field is absent, PUSCH repetitions counted on the basis of available slots is disabled. |
| ***betaOffsetsCrossPri0, betaOffsetsCrossPri1,*** ***betaOffsetsCrossPri0DCI-0-2, betaOffsetsCrossPri1DCI-0-2***  Selection between and configuration of dynamic and semi-static beta-offset for multiplexing HARQ-ACK on dynamically scheduled PUSCH with different priorities, see TS 38.213 [13], clause 9.3.  The field *betaOffsetsCrossPrio0* indicates multiplexing low priority (LP) HARQ-ACK on dynamically scheduled high priority (HP) PUSCH.  The field *betaOffsetsCrossPrio1* indicates multiplexing HP HARQ-ACK on dynamically scheduled LP PUSCH.  The field *betaOffsetsCrossPrio0DCI-0-2* indicates multiplexing LP HARQ-ACK on dynamically scheduled HP PUSCH by DCI format 0\_2.  The field *betaOffsetsCrossPrio1DCI-0-2* indicates multiplexing HP HARQ-ACK on dynamically scheduled LP PUSCH by DCI format 0\_2. |
| ***codebookSubset, codebookSubsetDCI-0-2***  Subset of PMIs addressed by TPMI, where PMIs are those supported by UEs with maximum coherence capabilities (see TS 38.214 [19], clause 6.1.1.1). The field *codebookSubset* applies to DCI formats 0\_1 and 0\_3, and the field *codebookSubsetDCI-0-2* applies to DCI format 0\_2 (see TS 38.214 [19], clause 6.1.1.1). |
| ***codebookTypeUL***  Configures a codebook and the corresponding number of antenna port groups for codebook-based transmission of PUSCH with 8 antenna ports, see TS 38.211 [16], tables 6.3.1.5-9 to 6.3.1.5-47, and table 6.3.1.5-8 respectively). The values *ng1n4n1* and *ng1n2n2* correspond to codebooks with one antenna port group (Ng=1), while *ng2, ng4*, and *ng8* correspond to codebooks with Ng=2, 4, and 8 antenna port groups, respectively. |
| ***dataScramblingIdentityPUSCH***  Identifier used to initialise data scrambling (c\_init) for PUSCH. If the field is absent, the UE applies the physical cell ID. (see TS 38.211 [16], clause 6.3.1.1). |
| ***dmrs-BundlingPUSCH-Config***  Configure the parameters for DMRS bundling for PUSCH (see TS 38.214 [19], clause 6.1.7). In this release, this is not applicable to FR2-2. |
| ***dmrs-SequenceInitializationDCI-0-2***  Configure whether the field "DMRS Sequence Initialization" is present or not in DCI format 0\_2. If the field is absent, then 0 bit for the field "DMRS Sequence Initialization" in DCI format 0\_2. If the field is present, then the number of bits is determined in the same way as DCI format 0\_1 (see TS 38.212 [17], clause 7.3.1). |
| ***dmrs-UplinkForPUSCH-MappingTypeA, dmrs-UplinkForPUSCH-MappingTypeA-DCI-0-2***  DMRS configuration for PUSCH transmissions using PUSCH mapping type A (chosen dynamically via *PUSCH-TimeDomainResourceAllocation*). Only the fields *dmrs-Type*, *dmrs-AdditionalPosition* and *maxLength* may be set differently for mapping type A and B. The field *dmrs-UplinkForPUSCH-MappingTypeA* applies to DCI formats 0\_1 and 0\_3, and the field *dmrs-UplinkForPUSCH-MappingTypeA-DCI-0-2* applies to DCI format 0\_2 (see TS 38.212 [17], clause 7.3.1). |
| ***dmrs-UplinkForPUSCH-MappingTypeB, dmrs-UplinkForPUSCH-MappingTypeB-DCI-0-2***  DMRS configuration for PUSCH transmissions using PUSCH mapping type B (chosen dynamically via *PUSCH-TimeDomainResourceAllocation*). Only the fields *dmrs-Type*, *dmrs-AdditionalPosition* and *maxLength* may be set differently for mapping type A and B. The field *dmrs-UplinkForPUSCH-MappingTypeB* applies to DCI formats 0\_1 and 0\_3, and the field *dmrs-UplinkForPUSCH-MappingTypeB-DCI-0-2* applies to DCI format 0\_2 (see TS 38.212 [17], clause 7.3.1). |
| ***dynamicTransformPrecoderFieldPresenceDCI-0-1***  Configure the presence of "Dynamic Transform Precoder" field in DCI format 0\_1. When the field is configured, then the "Dynamic Transform Precoder" field is present in DCI format 0\_1. Otherwise, the field size is set to 0 for DCI format 0\_1 (See TS 38.212 [17]). The network ensures *dynamicTransformPrecoderFieldPresenceDCI-0-1-r18* and *twoPHRMode-r17* cannot be configured at the same time for a UE. |
| ***dynamicTransformPrecoderFieldPresenceDCI-0-2***  Configure the presence of "Dynamic Transform Precoder" field in DCI format 0\_2. When the field is configured, then the "Dynamic Transform Precoder" field is present in DCI format 0\_2. Otherwise, the field size is set to 0 for DCI format 0\_2 (See TS 38.212 [17]). The network ensures *dynamicTransformPrecoderFieldPresenceDCI-0-2-r18* and *twoPHRMode*-r17 cannot be configured at the same time for a UE. |
| ***frequencyHopping***  The value *intraSlot* enables 'Intra-slot frequency hopping' and the value *interSlot* enables 'Inter-slot frequency hopping'. If the field is absent, frequency hopping is not configured for 'pusch-RepTypeA' (see TS 38.214 [19], clause 6.3). The field *frequencyHopping* applies to DCI formats 0\_0, 0\_1 and 0\_3 for 'pusch-RepTypeA'. |
| ***frequencyHoppingDCI-0-1***  Indicates the frequency hopping scheme for DCI format 0\_1 when *pusch-RepTypeIndicatorDCI-0-1* is set to 'pusch-RepTypeB', The value *interRepetition* enables 'Inter-repetition frequency hopping', and the value *interSlot* enables 'Inter-slot frequency hopping'. If the field is absent, frequency hopping is not configured for DCI format 0\_1 for 'pusch-RepTypeB' (see TS 38.214 [19], clause 6.1). |
| ***frequencyHoppingDCI-0-2***  Indicate the frequency hopping scheme for DCI format 0\_2. The value *intraSlot* enables 'intra-slot frequency hopping', and the value *interRepetition* enables 'Inter-repetition frequency hopping', and the value *interSlot* enables 'Inter-slot frequency hopping'. When *pusch-RepTypeIndicatorDCI-0-2* is not set to '*pusch-RepTypeB*', the frequency hopping scheme can be chosen between 'intra-slot frequency hopping and 'inter-slot frequency hopping' if enabled. When *pusch-RepTypeIndicatorDCI-0-2* is set to '*pusch-RepTypeB*', the frequency hopping scheme can be chosen between 'inter-repetition frequency hopping' and 'inter-slot frequency hopping' if enabled. If the field is absent, frequency hopping is not configured for DCI format 0\_2 (see TS 38.214 [19], clause 6.3). |
| ***frequencyHoppingOffsetLists, frequencyHoppingOffsetListsDCI-0-2***  Set of frequency hopping offsets used when frequency hopping is enabled for granted transmission (not msg3) and type 2 configured grant activation (see TS 38.214 [19], clause 6.3). The field *frequencyHoppingOffsetLists* applies to DCI formats 0\_0, 0\_1 and 0\_3, and the field *frequencyHoppingOffsetListsDCI-0-2* applies to DCI format 0\_2 (see TS 38.214 [19], clause 6.3). |
| ***harq-ProcessNumberSizeDCI-0-2***  Configure the number of bits for the field "HARQ process number" in DCI format 0\_2 (see TS 38.212 [17], clause 7.3.1). |
| ***invalidSymbolPattern***  Indicates one pattern for invalid symbols for PUSCH transmission repetition type B applicable to both DCI format 0\_1 and 0\_2. If *InvalidSymbolPattern* is not configured, semi-static flexible symbols are used for PUSCH. Segmentation occurs only around semi-static DL symbols (see TS 38.214 [19] clause 6.1). |
| ***invalidSymbolPatternIndicatorDCI-0-1, invalidSymbolPatternIndicatorDCI-0-2***  Indicates the presence of an additional bit in the DCI format 0\_1/0\_2. If *invalidSymbolPattern* is absent, then both *invalidSymbolPatternIndicatorDCI-0-1* and *invalidSymbolPatternIndicatorDCI-0-2* are absent. The field *invalidSymbolPatternIndicatorDCI-0-1* applies to the DCI format 0\_1 and the field *invalidSymbolPatternIndicatorDCI-0-2* applies to DCI format 0\_2 (see TS 38.214 [19] clause 6.1). If the field is absent, the UE behaviour is specified in TS 38.214 [19], clause 6.1.2.1. |
| ***mappingPattern***  Indicates whether the UE should follow Cyclical mapping pattern or Sequential mapping pattern for when two SRS resource sets are configured in *srs-ResourceSetToAddModList* or *srs-ResourceSetToAddModListDCI-0-2* with usage 'codebook' or 'noncodebook' for PUSCH transmission and the PUSCH transmission occasions are associated with both SRS resource sets. |
| ***maxRank, maxRankDCI-0-2***  Subset of PMIs addressed by TRIs from 1 to ULmaxRank (see TS 38.214 [19], clause 6.1.1.1). The field *maxRank* applies to DCI formats 0\_1 and 0\_3, and the field *maxRankDCI-0-2* applies to DCI format 0\_2 (see TS 38.214 [19], clause 6.1.1.1). If network configures *maxRank-v1810* UE ignores *maxRank* (without suffix). |
| ***mcs-Table, mcs-TableFormat0-2***  Indicates which MCS table the UE shall use for PUSCH without transform precoder (see TS 38.214 [19], clause 6.1.4.1). If the field is absent the UE applies the value 64QAM. The field *mcs-Table* applies to DCI formats 0\_0, 0\_1 and 0\_3, and the field *mcs-TableDCI-0-2* applies to DCI format 0\_2 (see TS 38.214 [19], clause 6.1.4.1). |
| ***mcs-TableTransformPrecoder, mcs-TableTransformPrecoderDCI-0-2***  Indicates which MCS table the UE shall use for PUSCH with transform precoding (see TS 38.214 [19], clause 6.1.4.1) If the field is absent the UE applies the value 64QAM. The field *mcs-TableTransformPrecoder* applies to DCI formats 0\_0, 0\_1 and 0\_3, and the field *mcs-TableTransformPrecoderDCI-0-2* applies to DCI format 0\_2 (see TS 38.214 [19], clause 6.1.4.1). |
| ***minimumSchedulingOffsetK2***  List of minimum K2 values. Minimum K2 parameter denotes minimum applicable value(s) for the *Time domain resource assignment* table for PUSCH (see TS 38.214 [19], clause 6.1.2.1). |
| ***mpe-ResourcePoolToAddModList***  List of SSB/CSI-RS resources for P-MPR reporting. Each resource is configured with serving cell index where the resource is configured for the UE. The *additionalPCI* is configured only if the resource is SSB. For each resource, if neither *cell* nor *additionalPCI* is present, the SSB/CSI-RS resource is from the serving cell where the *PUSCH-Config* is configured. |
| ***multipanelSchemeSDM***  Configures UE with a multiple panel simultaneous uplink transmission SDM scheme for PUSCH, as specified in TS 38.214 [19], clause 6.1. Network does not configure *multipanelSchemeSDM* with *multipanelSchemeSFN*. When this parameter is configured, two SRS resource sets with *usage* for *codebook* or *noncodebook* are configured in *srs-ResourceSetToAddModList* or *srs-ResourceSetToAddModListDCI-0-2*. |
| ***multipanelSchemeSFN***  Configures UE with a multiple panel simultaneous uplink transmission SFN scheme for PUSCH, as specified in TS 38.214 [19], clause 6.1. Network does not configure *multipanelSchemeSFN* with *multipanelSchemeSDM*. When this parameter is configured, two SRS resource sets with *usage* for *codebook* or *noncodebook* are configured in *srs-ResourceSetToAddModList* or *srs-ResourceSetToAddModListDCI-0-2*. |
| ***numberOfBitsForRV-DCI-0-2***  Configures the number of bits for "Redundancy version" in the DCI format 0\_2 (see TS 38.212 [17], clause 7.3.1 and TS 38.214 [19], clause 6.1.2.1). |
| ***numberOfInvalidSymbolsForDL-UL-Switching***  Indicates the number of symbols after the last semi-static DL symbol that are invalid symbols for PUSCH repetition Type B. If it is absent, no symbol is explicitly defined for DL-to-UL switching (see TS 38.214 [19], clause 6.1). |
| ***priorityIndicatorDCI-0-1, priorityIndicatorDCI-0-2***  Configures the presence of "priority indicator" in DCI format 0\_1/0\_2. When the field is absent in the IE, then the UE shall apply 0 bit for "Priority indicator" in DCI format 0\_1/0\_2. The field *priorityIndicatorDCI-0-1* applies to DCI format 0\_1 and the field *priorityIndicatorDCI-0-2* applies to DCI format 0\_2 (see TS 38.212 [17] clause 7.3.1 and TS 38.213 [13] clause 9). |
| ***pusch-AggregationFactor***  Number of repetitions for data (see TS 38.214 [19], clause 6.1.2.1). If the field is absent the UE applies the value 1. |
| ***pusch-PowerControl***  Configures power control parameters PUSCH transmission. |
| ***pusch-RepTypeIndicatorDCI-0-1, pusch-RepTypeIndicatorDCI-0-2***  Indicates whether UE follows the behavior for "PUSCH repetition type A" or the behavior for "PUSCH repetition type B" for the PUSCH scheduled by DCI format 0\_1/0\_2 and for Type 2 CG associated with the activating DCI format 0\_1/0\_2.The value *pusch-RepTypeA* enables the 'PUSCH repetition type A' and the value *pusch-RepTypeB* enables the 'PUSCH repetition type B'. The field *pusch-RepTypeIndicatorDCI-0-1* applies to DCI format 0\_1 and the field *pusch-RepTypeIndicatorDCI-0-2* applies to DCI format 0\_2 (see TS 38.214 [19], clause 6.1.2.1). |
| ***pusch-TimeDomainAllocationList***  List of time domain allocations for timing of UL assignment to UL data (see TS 38.214 [19], table 6.1.2.1.1-1). The field *pusch-TimeDomainAllocationList* applies to DCI format 0\_0, or DCI formats 0\_1 and 0\_3 when the field *pusch-TimeDomainAllocationListDCI-0-1* is not configured (see TS 38.214 [19], table 6.1.2.1.1-1 and tables 6.1.2.1.1-1A and 6.1.2.1.1-1C). The network does not configure the *pusch-TimeDomainAllocationList* (without suffix) simultaneously with the *pusch-TimeDomainAllocationListDCI-0-2-r16* or *pusch-TimeDomainAllocationListDCI-0-1-r16* or *pusch-TimeDomainAllocationListForMultiPUSCH-r16*. |
| ***pusch-TimeDomainAllocationListDCI-0-1***  Configuration of the time domain resource allocation (TDRA) table for DCI formats 0\_1 and 0\_3 (see TS 38.214 [19], clause 6.1, tables 6.1.2.1.1-1A and 6.1.2.1.1-1C). |
| ***pusch-TimeDomainAllocationListDCI-0-2***  Configuration of the time domain resource allocation (TDRA) table for DCI format 0\_2 (see TS 38.214 [19], clause 6.1.2, table 6.1.2.1.1-1B). |
| ***pusch-TimeDomainAllocationListForMultiPUSCH,*** ***pusch-TimeDomainAllocationListForMultiPUSCH-DCI-0-3***  Configuration of the time domain resource allocation (TDRA) table for multiple PUSCH (see TS 38.214 [19], clause 6.1.2). The network configures at most 64 rows in this TDRA table in *PUSCH-TimeDomainResourceAllocationList-r16* configured by this field. This field is not configured simultaneously with *pusch-AggregationFactor* if *extendedK2* is not configured. The network does not configure the *pusch-TimeDomainAllocationListForMultiPUSCH-r16* simultaneously with the *pusch-TimeDomainAllocationListDCI-0-1-r16*. The network does not configure the *pusch-TimeDomainAllocationListForMultiPUSCH-r16* simultaneously with the *numberOfSlotsTBoMS-r17*. For a cell within a cell set configured to be schedulable by a DCI format 0\_3, the network does not configure *pusch-TimeDomainAllocationListForMultiPUSCH-DCI-0-3* simultaneously with the *numberOfSlotsTBoMS-r17* and/or *pusch-AggregationFactor*. |
| ***rbg-Size***  Selection between configuration 1 and configuration 2 for RBG size for PUSCH except PUSCH scheduled by DCI format 0\_3. The UE does not apply this field if *resourceAllocation* is set to *resourceAllocationType1*. Otherwise, the UE applies the value *config1* when the field is absent (see TS 38.214 [19], clause 6.1.2.2.1). |
| ***resourceAllocation, resourceAllocationDCI-0-2***  Configuration of resource allocation type 0 and resource allocation type 1 for non-fallback DCI (see TS 38.214 [19], clause 6.1.2). The field *resourceAllocation* applies to DCI format 0\_1 and the field *resourceAllocationDCI-0-2* applies to DCI format 0\_2 (see TS 38.214 [19], clause 6.1.2). |
| ***resourceAllocationType1GranularityDCI-0-2***  Configures the scheduling granularity applicable for both the starting point and length indication for resource allocation type 1 in DCI format 0\_2. If this field is absent, the granularity is 1 PRB (see TS 38.214 [19], clause 6.1.2.2.2). |
| ***secondTPCFieldDCI-0-1, secondTPCFieldDCI-0-2***  A second TPC field can be configured via RRC for DCI-0-1 and DCI-0-2. Each TPC field is for each closed-loop index value respectively (i.e., 1st /2nd TPC fields correspond to "closedLoopIndex" value = 0 and 1, |
| ***sequenceOffsetForRV***  Configures the RV offset for the starting RV for the first repetition (first actual repetition in PUSCH repetition Type B) towards the second 'SRS resource set' for PUSCH configured in either *srs-ResourceSetToAddModList* or *srs-ResourceSetToAddModListDCI-0-2* with usage 'codebook' or 'noncodebook'. |
| ***sTx-2Panel***  Parameter to enable PUSCH+PUSCH multiple panel simultaneous uplink transmission, as specified in TS 38.214 [19], clause 6.1. |
| ***tp-pi2BPSK***  Enables pi/2-BPSK modulation with transform precoding if the field is present and disables it otherwise. |
| ***transformPrecoder***  The UE specific selection of transformer precoder for PUSCH (see TS 38.214 [19], clause 6.1.3). When the field is absent the UE applies the value of the field *msg3-transformPrecoder* from *rach-ConfigCommon* included directly within BWP configuration (i.e., not included in *additionalRACH-ConfigList*). |
| ***txConfig***  Whether UE uses codebook based or non-codebook based transmission (see TS 38.214 [19], clause 6.1.1). If the field is absent, the UE transmits PUSCH on one antenna port, see TS 38.214 [19], clause 6.1.1. |
| ***uci-OnPUSCH-ListDCI-0-1, uci-OnPUSCH-ListDCI-0-2***  Configuration for up to 2 HARQ-ACK codebooks specific to DCI format 0\_1/0\_2. The field uci-OnPUSCH-ListDCI-0-1 applies to DCI format 0\_1 and the field uci-OnPUSCH-ListDCI-0-2 applies to DCI format 0\_2 (see TS 38.212 [17], clause 7.3.1 and TS 38.213 [13] clause 9.3). |
| ***ul-AccessConfigListDCI-0-1, ul-AccessConfigListDCI-0-2***  List of the combinations of cyclic prefix extension, channel access priority class (CAPC), and UL channel access type (see TS 38.212 [17], clause 7.3.1) applicable for DCI format 0\_1 and DCI format 0\_2, respectively.The fields *ul-AccessConfigListDCI-0-1-r16* and *ul-AccessConfigListDCI-0-2-r17* are only applicable for FR1 (see TS 38.212 [17], Table 7.3.1.1.2-35). The field *ul-AccessConfigListDCI-0-1-r17* only contains a list of UL channel access types and is only applicable for FR2-2 (see TS 38.212 [17], Table 7.3.1.1.2-35A). |
| ***ul-FullPowerTransmission***  Configures the UE with UL full power transmission mode as specified in TS 38.213 [13]. This field is not configured if *ul-powerControl* is configured in the *BWP-UplinkDedicated* in which the *PUCCH-Config* is included. |

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| *PUSCH-ConfigDCI-0-3* field descriptions |
| ***harq-ProcessNumberSizeDCI-0-3***  Configure the number of bits for the field "HARQ process number" in DCI format 0\_3 (see TS 38.212 [17], clause 7.3.1). |
| ***numberOfBitsForRV-DCI-0-3***  Configures the number of bits for "Redundancy version" in the DCI format 0\_3 (see TS 38.212 [17], clause 7.3.1 and TS 38.214 [19], clause 6.1.2.1). |
| ***rbg-SizeDCI-0-3***  Selection among configuration 1, configuration 2 and configuration 3 for RBG size for PUSCH scheduled by DCI format 0\_3. The UE does not apply this field if *resourceAllocationDCI-0-3* is set to *resourceAllocationType1*. Otherwise, the UE applies the value *config1* when the field is absent (see TS 38.214 [19], clause 6.1.2.2.1). |
| ***resourceAllocationDCI-0-3***  Configuration of resource allocation type 0 and resource allocation type 1 for DCI format 0\_3 (see TS 38.214 [19], clause 6.1.2). |
| ***resourceAllocationType1GranularityDCI-0-3***  Configures the scheduling granularity applicable for both the starting point and length indication for resource allocation type 1 in DCI format 0\_3. If this field is absent, the granularity is 1 PRB (see TS 38.214 [19], clause 6.1.2.2.2). |
| ***uci-OnPUSCH-ListDCI-0-3***  Configuration for up to 2 HARQ-ACK codebooks specific to DCI format 0\_3 (see TS 38.212 [17], clause 7.3.1 and TS 38.213 [13] clause 9.3). |

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| *SDM-Scheme* field descriptions |
| ***maxRankSDM,*** ***maxRankSDM-DCI-0-2***  configure maximal number of MIMO layers of each panel in SDM scheme for codebook based PUSCH or for DCI 0\_2 for codebook based PUSCH. |

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| *SFN-Scheme* field descriptions |
| ***maxRankSFN,*** ***maxRankSFN-DCI-0-2***  configure maximal number of MIMO layers of each panel in SFN scheme for codebook based PUSCH or for DCI 0\_2 for codebook based PUSCH. |

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| *UCI-OnPUSCH* field descriptions |
| ***betaOffsets***  Selection between and configuration of dynamic and semi-static beta-offset for DCI formats other than DCI format 0\_2. If the field is not configured, the UE applies the value 'semiStatic' (see TS 38.213 [13], clause 9.3). |
| ***scaling***  Indicates a scaling factor to limit the number of resource elements assigned to UCI on PUSCH for DCI formats other than DCI format 0\_2. Value *f0p5* corresponds to 0.5, value *f0p65* corresponds to 0.65, and so on. The value configured herein is applicable for PUSCH with configured grant (see TS 38.212 [17], clause 6.3). |

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| *UCI-OnPUSCH-DCI-0-2* field descriptions |
| ***betaOffsetsDCI-0-2***  Configuration of beta-offset for DCI format 0\_2. If semiStaticDCI-0-2 is chosen, the UE shall apply the value of 0 bit for the field of beta offset indicator in DCI format 0\_2. If dynamicDCI-0-2 is chosen, the UE shall apply the value of 1 bit or 2 bits for the field of beta offset indicator in DCI format 0\_2 (see TS 38.212 [17], clause 7.3.1 and TS 38.213 [13] clause 9.3). |
| ***dynamicDCI-0-2***  Indicates the UE applies the value 'dynamic' for DCI format 0\_2 (see TS 38.212 [17], clause 7.3.1 and TS 38.213 [13], clause 9.3). |
| ***semiStaticDCI-0-2***  Indicates the UE applies the value 'semiStatic' for DCI format 0\_2. (see TS 38.212 [17], clause 7.3.1 and see TS 38.213 [13], clause 9.3). |
| ***scalingDCI-0-2***  Indicates a scaling factor to limit the number of resource elements assigned to UCI on PUSCH for DCI format 0\_2. Value f0p5 corresponds to 0.5, value *f0p65* corresponds to 0.65, and so on (see TS 38.212 [17], clause 6.3). |

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| Conditional Presence | Explanation |
| *codebookBased* | The field is mandatory present if *txConfig* is set to codebook and absent otherwise. |
| *RepTypeB* | The field is optionally present, Need S, if *pusch-RepTypeIndicatorDCI-0-1* is set to pusch-RepTypeB. It is absent otherwise. |
| *RepTypeB2* | The field is optionally present, Need S, if *pusch-RepTypeIndicatorDCI-0-1* or *pusch-RepTypeIndicatorDCI-0-2* is set to pusch-RepTypeB. It is absent otherwise. |
| *SRSsets* | This field is mandatory present when UE is configured with two SRS sets in either *srs-ResourceSetToAddModList* or *srs-ResourceSetToAddModListDCI-0-2* with usage codebook or non-codebook and none of *multipanelSchemeSDM* or *multipanelSchemeSFN* or *sTx-2Panel* is configured. It is absent otherwise. |

#### – *PUSCH-ConfigCommon*

The IE *PUSCH-ConfigCommon* is used to configure the cell specific PUSCH parameters.

*PUSCH-ConfigCommon* information element

-- ASN1START

-- TAG-PUSCH-CONFIGCOMMON-START

PUSCH-ConfigCommon ::= SEQUENCE {

groupHoppingEnabledTransformPrecoding ENUMERATED {enabled} OPTIONAL, -- Need R

pusch-TimeDomainAllocationList PUSCH-TimeDomainResourceAllocationList OPTIONAL, -- Need R

msg3-DeltaPreamble INTEGER (-1..6) OPTIONAL, -- Need R

p0-NominalWithGrant INTEGER (-202..24) OPTIONAL, -- Need R

...

}

-- TAG-PUSCH-CONFIGCOMMON-STOP

-- ASN1STOP

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| *PUSCH-ConfigCommon* field descriptions |
| ***groupHoppingEnabledTransformPrecoding***  For DMRS transmission with transform precoder, the NW may configure group hopping by this cell-specific parameter, see TS 38.211 [16], clause 6.4.1.1.1.2. |
| ***msg3-DeltaPreamble***  Power offset between msg3 and RACH preamble transmission. Actual value = field value \* 2 [dB] (see TS 38.213 [13], clause 7.1) |
| ***p0-NominalWithGrant***  P0 value for PUSCH with grant (except msg3). Value in dBm. Only even values (step size 2) allowed (see TS 38.213 [13], clause 7.1) This field is cell specific |
| ***pusch-TimeDomainAllocationList***  List of time domain allocations for timing of UL assignment to UL data (see TS 38.214 [19], table 6.1.2.1.1-1). |

#### – *PUSCH-PowerControl*

The IE *PUSCH-PowerControl* is used to configure UE specific power control parameter for PUSCH.

*PUSCH-PowerControl* information element

-- ASN1START

-- TAG-PUSCH-POWERCONTROL-START

PUSCH-PowerControl ::= SEQUENCE {

tpc-Accumulation ENUMERATED { disabled } OPTIONAL, -- Need S

msg3-Alpha Alpha OPTIONAL, -- Need S

p0-NominalWithoutGrant INTEGER (-202..24) OPTIONAL, -- Need M

p0-AlphaSets SEQUENCE (SIZE (1..maxNrofP0-PUSCH-AlphaSets)) OF P0-PUSCH-AlphaSet OPTIONAL, -- Need M

pathlossReferenceRSToAddModList SEQUENCE (SIZE (1..maxNrofPUSCH-PathlossReferenceRSs)) OF PUSCH-PathlossReferenceRS

OPTIONAL, -- Need N

pathlossReferenceRSToReleaseList SEQUENCE (SIZE (1..maxNrofPUSCH-PathlossReferenceRSs)) OF PUSCH-PathlossReferenceRS-Id

OPTIONAL, -- Need N

twoPUSCH-PC-AdjustmentStates ENUMERATED {twoStates} OPTIONAL, -- Need S

deltaMCS ENUMERATED {enabled} OPTIONAL, -- Need S

sri-PUSCH-MappingToAddModList SEQUENCE (SIZE (1..maxNrofSRI-PUSCH-Mappings)) OF SRI-PUSCH-PowerControl

OPTIONAL, -- Need N

sri-PUSCH-MappingToReleaseList SEQUENCE (SIZE (1..maxNrofSRI-PUSCH-Mappings)) OF SRI-PUSCH-PowerControlId

OPTIONAL -- Need N

}

P0-PUSCH-AlphaSet ::= SEQUENCE {

p0-PUSCH-AlphaSetId P0-PUSCH-AlphaSetId,

p0 INTEGER (-16..15) OPTIONAL, -- Need S

alpha Alpha OPTIONAL -- Need S

}

P0-PUSCH-AlphaSetId ::= INTEGER (0..maxNrofP0-PUSCH-AlphaSets-1)

PUSCH-PathlossReferenceRS ::= SEQUENCE {

pusch-PathlossReferenceRS-Id PUSCH-PathlossReferenceRS-Id,

referenceSignal CHOICE {

ssb-Index SSB-Index,

csi-RS-Index NZP-CSI-RS-ResourceId

}

}

PUSCH-PathlossReferenceRS-r16 ::= SEQUENCE {

pusch-PathlossReferenceRS-Id-r16 PUSCH-PathlossReferenceRS-Id-v1610,

referenceSignal-r16 CHOICE {

ssb-Index-r16 SSB-Index,

csi-RS-Index-r16 NZP-CSI-RS-ResourceId

}

}

DummyPathlossReferenceRS-v1710 ::= SEQUENCE {

pusch-PathlossReferenceRS-Id-r17 PUSCH-PathlossReferenceRS-Id-r17,

additionalPCI-r17 AdditionalPCIIndex-r17 OPTIONAL -- Need R

}

PUSCH-PathlossReferenceRS-Id ::= INTEGER (0..maxNrofPUSCH-PathlossReferenceRSs-1)

PUSCH-PathlossReferenceRS-Id-v1610 ::= INTEGER (maxNrofPUSCH-PathlossReferenceRSs..maxNrofPUSCH-PathlossReferenceRSs-1-r16)

PUSCH-PathlossReferenceRS-Id-r17 ::= INTEGER (0..maxNrofPUSCH-PathlossReferenceRSs-1-r16)

SRI-PUSCH-PowerControl ::= SEQUENCE {

sri-PUSCH-PowerControlId SRI-PUSCH-PowerControlId,

sri-PUSCH-PathlossReferenceRS-Id PUSCH-PathlossReferenceRS-Id,

sri-P0-PUSCH-AlphaSetId P0-PUSCH-AlphaSetId,

sri-PUSCH-ClosedLoopIndex ENUMERATED { i0, i1 }

}

SRI-PUSCH-PowerControlId ::= INTEGER (0..maxNrofSRI-PUSCH-Mappings-1)

PUSCH-PowerControl-v1610 ::= SEQUENCE {

pathlossReferenceRSToAddModListSizeExt-v1610 SEQUENCE (SIZE (1..maxNrofPUSCH-PathlossReferenceRSsDiff-r16)) OF PUSCH-PathlossReferenceRS-r16

OPTIONAL, -- Need N

pathlossReferenceRSToReleaseListSizeExt-v1610 SEQUENCE (SIZE (1..maxNrofPUSCH-PathlossReferenceRSsDiff-r16)) OF PUSCH-PathlossReferenceRS-Id-v1610

OPTIONAL, -- Need N

p0-PUSCH-SetList-r16 SEQUENCE (SIZE (1..maxNrofSRI-PUSCH-Mappings)) OF P0-PUSCH-Set-r16 OPTIONAL, -- Need R

olpc-ParameterSet SEQUENCE {

olpc-ParameterSetDCI-0-1-r16 INTEGER (1..2) OPTIONAL, -- Need R

olpc-ParameterSetDCI-0-2-r16 INTEGER (1..2) OPTIONAL -- Need R

} OPTIONAL, -- Need M

...,

[[

sri-PUSCH-MappingToAddModList2-r17 SEQUENCE (SIZE (1..maxNrofSRI-PUSCH-Mappings)) OF SRI-PUSCH-PowerControl

OPTIONAL, -- Need N

sri-PUSCH-MappingToReleaseList2-r17 SEQUENCE (SIZE (1..maxNrofSRI-PUSCH-Mappings)) OF SRI-PUSCH-PowerControlId OPTIONAL, -- Need N

p0-PUSCH-SetList2-r17 SEQUENCE (SIZE (1..maxNrofSRI-PUSCH-Mappings)) OF P0-PUSCH-Set-r16 OPTIONAL, -- Need R

dummy SEQUENCE (SIZE (1..maxNrofPUSCH-PathlossReferenceRSs-r16)) OF DummyPathlossReferenceRS-v1710 OPTIONAL -- Need N

]]

}

P0-PUSCH-Set-r16 ::= SEQUENCE {

p0-PUSCH-SetId-r16 P0-PUSCH-SetId-r16,

p0-List-r16 SEQUENCE (SIZE (1..maxNrofP0-PUSCH-Set-r16)) OF P0-PUSCH-r16 OPTIONAL, -- Need R

...

}

P0-PUSCH-SetId-r16 ::= INTEGER (0..maxNrofSRI-PUSCH-Mappings-1)

P0-PUSCH-r16 ::= INTEGER (-16..15)

-- TAG-PUSCH-POWERCONTROL-STOP

-- ASN1STOP

|  |
| --- |
| *P0-PUSCH-AlphaSet* field descriptions |
| ***alpha***  alpha value for PUSCH with grant (except msg3) (see TS 38.213 [13], clause 7.1). When the field is absent the UE applies the value 1. |
| ***p0***  P0 value for PUSCH with grant (except msg3) in steps of 1dB (see TS 38.213 [13], clause 7.1). When the field is absent the UE applies the value 0. |

|  |
| --- |
| *P0-PUSCH-Set* field descriptions |
| ***p0-List***  Configuration of {p0-PUSCH, p0-PUSCH} sets for PUSCH. If SRI is present in the DCI, then one p0-PUSCH can be configured in P0-PUSCH-Set. If SRI is not present in the DCI, and both *olpc-ParameterSetDCI-0-1* and *olpc-ParameterSetDCI-0-2* are configured to be 1 bit, then one p0-PUSCH can be configured in P0-PUSCH-Set. If SRI is not present in the DCI, and if any of *olpc-ParameterSetDCI-0-1* and *olpc-ParameterSetDCI-0-2* is configured to be 2 bits, then two p0-PUSCH values can be configured in P0-PUSCH-Set (see TS 38.213 [13] clause 7 and TS 38.212 [17] clause 7.3.1). |
| ***p0-PUSCH-SetId***  Configure the index of a p0-PUSCH-Set (see TS 38.213 [13] clause 7 and TS 38.212 [17] clause 7.3.1). |

|  |
| --- |
| *PUSCH-PowerControl* field descriptions |
| ***deltaMCS***  Indicates whether to apply delta MCS. When the field is absent, the UE applies Ks = 0 in delta\_TFC formula for PUSCH (see TS 38.213 [13], clause 7.1). |
| ***dummy***  This field is not used in the specification. If received it shall be ignored by the UE. |
| ***msg3-Alpha***  Dedicated alpha value for msg3 PUSCH (see TS 38.213 [13], clause 7.1). When the field is absent the UE applies the value 1. |
| ***olpc-ParameterSetDCI-0-1, olpc-ParameterSetDCI-0-2***  Configures the number of bits for Open-loop power control parameter set indication for DCI format 0\_1/0\_2 in case SRI is not configured in the DCI. 2 bits is applicable only if SRI is not present in the DCI format 0\_1. The field *olpc-ParameterSetDCI-0-1* applies to DCI format 0\_1 and the field *olpc-ParameterSetDCI-0-2* applies to DCI format 0\_2 (see TS 38.212 [17], clause 7.3.1 and TS 38.213 [13], clause 11). |
| ***p0-AlphaSets***  Configuration {p0-pusch, alpha} sets for PUSCH (except msg3 and msgA PUSCH), i.e., { {p0,alpha,index1}, {p0,alpha,index2},...} (see TS 38.213 [13], clause 7.1). When no set is configured, the UE uses the P0-nominal for msg3/msgA PUSCH, P0-UE is set to 0 and alpha is set according to either msg3-Alpha or msgA-Alpha (see TS 38.213 [13], clause 7.1). This field is not configured if *unifiedTCI-StateType* is configured for the serving cell. |
| ***p0-NominalWithoutGrant***  P0 value for UL grant-free/SPS based PUSCH. Value in dBm. Only even values (step size 2) allowed (see TS 38.213 [13], clause 7.1). |
| ***p0-PUSCH-SetList***  Configure one additional *P0-PUSCH-Set* per SRI. If present, the one bit or 2 bits in the DCI is used to dynamically indicate among the P0 value from the existing *P0-PUSCH-AlphaSet* and the P0 value(s) from the *P0-PUSCH-Set* (See TS 38.212 [17], clause 7.3.1 and TS 38.213 [13], clause 17). |
| ***p0-PUSCH-SetList2***  For indicating per-TRP OLPC set in DCI format 0\_1/0\_2 with the open-loop power control parameter set indication field, a second *p0-PUSCH-SetList-r16* is used. When this field is present the *p0-PUSCH-SetList-r16* corresponds to the first SRS resource set (see TS 38.213 [13]). |
| ***pathlossReferenceRSToAddModList, pathlossReferenceRSToAddModListSizeExt***  A set of Reference Signals (e.g. a CSI-RS config or a SS block) to be used for PUSCH path loss estimation. The set consists of Reference Signals configured using *pathLossReferenceRSToAddModList* and *Reference* Signals configured using *pathlossReferenceRSToAddModListSizeExt*. Up to *maxNrofPUSCH-PathlossReferenceRSs* may be configured (see TS 38.213 [13], clause 7.1). No elements in the list *pathLossReferenceRSToAddModList* nor *pathlossReferenceRSToAddModListSizeExt* are configured if *unifiedTCI-StateType* is configured for the serving cell. |
| ***pathlossReferenceRSToReleaseList, pathlossReferenceRSToReleaseListSizeExt***  Lists of reference signals for PUSCH path loss estimation to be released by the UE. |
| ***sri-PUSCH-MappingToAddModList***  A list of *SRI-PUSCH-PowerControl* elements among which one is selected by the SRI field in DCI (see TS 38.213 [13], clause 7.1). No elements in this list are configured if *unifiedTCI-StateType* is configured for the serving cell. |
| ***sri-PUSCH-MappingToAddModList2***  A list of *SRI-PUSCH-PowerControl* elements for second SRS-resource set, among which one is selected by the SRI field in DCI (see TS 38.213 [13], clause 7.1). When this field is present the *sri-PUSCH-MappingToAddModList* corresponds to the first SRS resource set for PUSCH. No elements in this list are configured if *unifiedTCI-StateType* is configured for the serving cell. |
| ***tpc-Accumulation***  If enabled, UE applies TPC commands via accumulation. If not enabled, UE applies the TPC command without accumulation. If the field is absent, TPC accumulation is enabled (see TS 38.213 [13], clause 7.1). |
| ***twoPUSCH-PC-AdjustmentStates***  Number of PUSCH power control adjustment states maintained by the UE (i.e., fc(i)). If the field is present (*n2*) the UE maintains two power control states (i.e., fc(i,0) and fc(i,1)). If the field is absent, it maintains one power control state (i.e., fc(i,0)) (see TS 38.213 [13], clause 7.1). |

|  |
| --- |
| *SRI-PUSCH-PowerControl* field descriptions |
| ***sri-P0-PUSCH-AlphaSetId***  The ID of a *P0-PUSCH-AlphaSet* as configured in *p0-AlphaSets* *in PUSCH-PowerControl*. |
| ***sri-PUSCH-ClosedLoopIndex***  The index of the closed power control loop associated with this *SRI-PUSCH-PowerControl.* |
| ***sri-PUSCH-PathlossReferenceRS-Id***  The ID of *PUSCH-PathlossReferenceRS* as configured in the *pathlossReferenceRSToAddModList* in *PUSCH-PowerControl*. |
| ***sri-PUSCH-PowerControlId***  The ID of this *SRI-PUSCH-PowerControl* configuration. It is used as the codepoint (payload) in the SRI DCI field. |

#### – *PUSCH-ServingCellConfig*

The IE *PUSCH-ServingCellConfig* is used to configure UE specific PUSCH parameters that are common across the UE's BWPs of one serving cell.

*PUSCH-ServingCellConfig* information element

-- ASN1START

-- TAG-PUSCH-SERVINGCELLCONFIG-START

PUSCH-ServingCellConfig ::= SEQUENCE {

codeBlockGroupTransmission SetupRelease { PUSCH-CodeBlockGroupTransmission } OPTIONAL, -- Need M

rateMatching ENUMERATED {limitedBufferRM} OPTIONAL, -- Need S

xOverhead ENUMERATED {xoh6, xoh12, xoh18} OPTIONAL, -- Need S

...,

[[

maxMIMO-Layers INTEGER (1..4) OPTIONAL, -- Need M

processingType2Enabled BOOLEAN OPTIONAL -- Need M

]],

[[

maxMIMO-LayersDCI-0-2-r16 SetupRelease { MaxMIMO-LayersDCI-0-2-r16} OPTIONAL -- Need M

]],

[[

nrofHARQ-ProcessesForPUSCH-r17 ENUMERATED {n32} OPTIONAL, -- Need R

uplinkHARQ-mode-r17 SetupRelease { UplinkHARQ-mode-r17} OPTIONAL -- Need M

]],

[[

maxMIMO-Layers-v1810 INTEGER (5..8) OPTIONAL, -- Need R

maxMIMO-LayersforSDM-r18 INTEGER (1..2) OPTIONAL, -- Need R

maxMIMO-LayersforSDM-DCI-0-2-r18 INTEGER (1..2) OPTIONAL, -- Need R

maxMIMO-LayersforSFN-r18 INTEGER (1..2) OPTIONAL, -- Need R

maxMIMO-LayersforSFN-DCI-0-2-r18 INTEGER (1..2) OPTIONAL -- Need R

]]

}

PUSCH-CodeBlockGroupTransmission ::= SEQUENCE {

maxCodeBlockGroupsPerTransportBlock ENUMERATED {n2, n4, n6, n8},

...

}

MaxMIMO-LayersDCI-0-2-r16 ::= INTEGER (1..4)

UplinkHARQ-mode-r17 ::= BIT STRING (SIZE (32))

-- TAG-PUSCH-SERVINGCELLCONFIG-STOP

-- ASN1STOP

|  |
| --- |
| *PUSCH-CodeBlockGroupTransmission* field descriptions |
| ***maxCodeBlockGroupsPerTransportBlock***  Maximum number of code-block-groups (CBGs) per TB (see TS 38.213 [13], clause 9.1). |

|  |
| --- |
| *PUSCH-ServingCellConfig* field descriptions |
| ***codeBlockGroupTransmission***  Enables and configures code-block-group (CBG) based transmission (see TS 38.214 [19], clause 6.1.5).  The network does not configure this field if the SCS of at least one UL BWP configured in the cell is 480 or 960 kHz. |
| ***maxMIMO-Layers***  Indicates the maximum MIMO layer to be used for PUSCH in all BWPs of the corresponding UL of this serving cell (see TS 38.212 [17], clause 5.4.2.1). If present, the network sets *maxRank* to the same value. The field *maxMIMO-Layers* refers to DCI format 0\_1. If network configures *maxMIMO-Layers-v1810* the UE ignores *maxMIMO-Layers* (without suffix). |
| ***maxMIMO-LayersforSDM***  Parameter to indicate maximal number of MIMO layers of each panel for PUSCH with SDM scheme for NCB PUSCH |
| ***maxMIMO-LayersforSDM-DCI-0-2***  Parameter to indicate maximal number of MIMO layers of each panel for PUSCH with SDM scheme for DCI format 0\_2 for NCB PUSCH |
| ***maxMIMO-LayersforSFN***  Parameter to indicate maximal number of MIMO layers of each panel for PUSCH with SFN scheme for NCB PUSCH |
| ***maxMIMO-LayersforSFN-DCI-0-2***  Parameter to indicate maximal number of MIMO layers of each panel for PUSCH with SFN scheme for DCI format 0\_2 for NCB PUSCH |
| ***nrofHARQ-ProcessesForPUSCH***  The number of HARQ processes to be used on the PUSCH of a serving cell. Value *n32* corresponds to 32 HARQ processes. If the field is absent, the UE uses 16 HARQ processes (see TS 38.214 [19], clause 6.1). |
| ***processingType2Enabled***  Enables configuration of advanced processing time capability 2 for PUSCH (see 38.214 [19], clause 6.4). |
| ***rateMatching***  Enables LBRM (Limited buffer rate-matching). When the field is absent the UE applies FBRM (Full buffer rate-matchingLBRM) (see TS 38.212 [17], clause 5.4.2). |
| ***xOverhead***  If the field is absent, the UE applies the value 0 (see TS 38.214 [19], clause 6.1.4.2). |
| ***maxMIMO-LayersDCI-0-2***  Indicates the maximum MIMO layer to be used for PUSCH for DCI format 0\_2 in all BWPs of the corresponding UL of this serving cell (see TS 38.212 [17], clause 5.4.2.1). If present, the network sets *maxRankDCI-0-2* to the same value. |
| ***uplinkHARQ-mode***  Used to set the HARQ mode per HARQ process ID, see TS 38.321 [3]. The first/leftmost bit corresponds to HARQ process ID 0, the next bit to HARQ process ID 1 and so on. Bits corresponding to HARQ process IDs that are not configured shall be ignored. A bit set to one identifies a HARQ process with *HARQmodeA* and a bit set to zero identifies a HARQ process with *HARQ modeB*. This field applies for SRBs and DRBs. |

#### – *PUSCH-TimeDomainResourceAllocationList*

The IE *PUSCH-TimeDomainResourceAllocation* is used to configure a time domain relation between PDCCH and PUSCH. *PUSCH-TimeDomainResourceAllocationList* contains one or more of such *PUSCH-TimeDomainResourceAllocations*. The network indicates in the UL grant which of the configured time domain allocations the UE shall apply for that UL grant. The UE determines the bit width of the DCI field based on the number of entries in the *PUSCH-TimeDomainResourceAllocationList*. Value 0 in the DCI field refers to the first element in this list, value 1 in the DCI field refers to the second element in this list, and so on.

*PUSCH-TimeDomainResourceAllocation* information element

-- ASN1START

-- TAG-PUSCH-TIMEDOMAINRESOURCEALLOCATIONLIST-START

PUSCH-TimeDomainResourceAllocationList ::= SEQUENCE (SIZE(1..maxNrofUL-Allocations)) OF PUSCH-TimeDomainResourceAllocation

PUSCH-TimeDomainResourceAllocation ::= SEQUENCE {

k2 INTEGER(0..32) OPTIONAL, -- Need S

mappingType ENUMERATED {typeA, typeB},

startSymbolAndLength INTEGER (0..127)

}

PUSCH-TimeDomainResourceAllocationList-r16 ::= SEQUENCE (SIZE(1..maxNrofUL-Allocations-r16)) OF PUSCH-TimeDomainResourceAllocation-r16

PUSCH-TimeDomainResourceAllocation-r16 ::= SEQUENCE {

k2-r16 INTEGER(0..32) OPTIONAL, -- Need S

puschAllocationList-r16 SEQUENCE (SIZE(1..maxNrofMultiplePUSCHs-r16)) OF PUSCH-Allocation-r16,

...

}

PUSCH-Allocation-r16 ::= SEQUENCE {

mappingType-r16 ENUMERATED {typeA, typeB} OPTIONAL, -- Cond NotFormat01-02-Or-TypeA

startSymbolAndLength-r16 INTEGER (0..127) OPTIONAL, -- Cond NotFormat01-02-Or-TypeA

startSymbol-r16 INTEGER (0..13) OPTIONAL, -- Cond RepTypeB

length-r16 INTEGER (1..14) OPTIONAL, -- Cond RepTypeB

numberOfRepetitions-r16 ENUMERATED {n1, n2, n3, n4, n7, n8, n12, n16} OPTIONAL, -- Cond Format01-02

...,

[[

numberOfRepetitionsExt-r17 ENUMERATED {n1, n2, n3, n4, n7, n8, n12, n16, n20, n24, n28, n32, spare4, spare3, spare2,

spare1} OPTIONAL, -- Cond Format01-02-For-TypeA

numberOfSlotsTBoMS-r17 ENUMERATED {n1, n2, n4, n8, spare4, spare3, spare2, spare1} OPTIONAL, -- Need R

extendedK2-r17 INTEGER (0..128) OPTIONAL -- Cond MultiPUSCH

]]

}

-- TAG-PUSCH-TIMEDOMAINRESOURCEALLOCATIONLIST-STOP

-- ASN1STOP

|  |
| --- |
| *PUSCH-TimeDomainResourceAllocationList* field descriptions |
| ***extendedK2***  Corresponds to L1 parameter 'K2' (see TS 38.214 [19], clause 6.1.2.1) configurable per PUSCH allocation. Only values {0..32} are applicable for PUSCH SCS of 120 kHz and for FR1.  When the field is absent for the first PUSCH if multiple PUSCH are configured per PDCCH and *k2-r16* is absent, or when the field is absent and only one PUSCH is configured per PDCCH and *k2-r16* is absent, the UE applies the value 1 when PUSCH SCS is 15/30 kHz; the value 2 when PUSCH SCS is 60 kHz, the value 3 when PUSCH SCS is 120 kHz, the value 11 when PUSCH SCS is 480 kHz, and the value 21 when PUSCH SCS is 960 kHz. If multiple contiguous PUSCHs are configured per PDCCH, when the field *extendedK2(n)* corresponding to k2 of the PUSCH(s) in the n-th slot (n>1), or of the PUSCH(s) except the first PUSCH in the first slot (n=1), is absent, the UE applies k2 of the first PUSCH plus n-1. |
| ***k2***  Corresponds to L1 parameter 'K2' (see TS 38.214 [19], clause 6.1.2.1). When the field is absent the UE applies the value 1 when PUSCH SCS is 15/30 kHz; the value 2 when PUSCH SCS is 60 kHz, and the value 3 when PUSCH SCS is 120 kHz. k2 is absent/ignored if *extendedK2* is present. |
| ***length***  Indicates the length allocated for PUSCH for DCI format 0\_1/0\_2 (see TS 38.214 [19], clause 6.1.2.1). |
| ***mappingType***  Mapping type (see TS 38.214 [19], clause 6.1.2.1). |
| ***numberOfRepetitions***  Number of repetitions for DCI format 0\_1/0\_2 (see TS 38.214 [19], clause 6.1.2.1). When *numberOfSlotsTBoMS-r17* is set to 2, 4 or 8 (i.e. TB processing over multi-slot (TBoMS) PUSCH is enabled), it indicates the number of repetitions of a single TBoMS. |
| ***numberOfRepetitionsExt***  Number of repetitions for DCI format 0\_1/0\_2 if *pusch-RepTypeIndicatorDCI-0-1*/*pusch-RepTypeIndicatorDCI-0-2* is not set to *pusch-RepTypeB* (see TS 38.214 [19], clause 6.1.2.1). If this field is present, the field *numberOfRepeitions-r16* is ignored for PUSCH repetition Type A. |
| ***numberOfSlotsTBoMS***  Number of slots allocated for TB processing over multi-slot PUSCH for DCI format 0\_1/0\_2. If a number of repetitions K is configured by *numberOfRepetitions* or *numberOfRepetitionsExt*, the network configures *numberOfSlotsTBoMS* (N) and K such that N\*K ≤ 32 (see TS 38.214 [19], clause 6.1.2.1). The network does not configure the *numberOfSlotsTBoMS-r17* simultaneously with the *pusch-TimeDomainAllocationListForMultiPUSCH-r16*. The network does not configure *numberOfSlotsTBoMS-r17* together with *enhancedSkipUplinkTxDynamic* or *enhancedSkipUplinkTxConfigured* with value *true*. |
| ***puschAllocationList***  The field *puschAllocationList-r16* indicates one or multiple PUSCH continuous in time domain which share a common k2 (see TS 38.214 [19], clause 6.1.2.1). In this release, this field configures one or multiple PUSCH that may be in consecutive or non-consecutive slots (see TS 38.214 [19], clause 6.1.2.1). The *puschAllocationList-r16* only has one element in *pusch-TimeDomainAllocationListDCI-0-1-r16* and in *pusch-TimeDomainAllocationListDCI-0-2-r16*. |
| ***startSymbol***  Indicates the index of start symbol for PUSCH for DCI format 0\_1/0\_2 (see TS 38.214 [19], clause 6.1.2.1). |
| ***startSymbolAndLength***  An index giving valid combinations of start symbol and length (jointly encoded) as start and length indicator (SLIV). The network configures the field so that the allocation does not cross the slot boundary. (see TS 38.214 [19], clause 6.1.2.1). |

|  |  |
| --- | --- |
| Conditional Presence | Explanation |
| *Format01-02* | In *pusch-TimeDomainAllocationListForMultiPUSCH-r16*, the field is absent.  In *pusch-TimeDomainAllocationListDCI-0-1* and in *pusch-TimeDomainAllocationListDCI-0-2*, the field is mandatory present. |
| *Format01-02-For-TypeA* | In *pusch-TimeDomainAllocationListForMultiPUSCH-r16*, the field is absent.  In *pusch-TimeDomainAllocationListDCI-0-1*, the field is optionally present if *pusch-RepTypeIndicatorDCI-0-1* is not set to pusch-RepTypeB, Need R. It is absent otherwise, Need R.  In *pusch-TimeDomainAllocationListDCI-0-2*, the field is optionally present if *pusch-RepTypeIndicatorDCI-0-2* is not set to pusch-RepTypeB, Need R. It is absent otherwise, Need R. |
| *NotFormat01-02-Or-TypeA* | In *pusch-TimeDomainAllocationListForMultiPUSCH-r16*, the field is mandatory present.  In *pusch-TimeDomainAllocationListDCI-0-1*, the field is mandatory present if *pusch-RepTypeIndicatorDCI-0-1* is not set to pusch-RepTypeB. It is absent otherwise, Need R.  In *pusch-TimeDomainAllocationListDCI-0-2*, the field is mandatory present if *pusch-RepTypeIndicatorDCI-0-2* is not set to pusch-RepTypeB. It is absent otherwise, Need R. |
| *RepTypeB* | In *pusch-TimeDomainAllocationListForMultiPUSCH-r16*, the field is absent.  In *pusch-TimeDomainAllocationListDCI-0-1*, the field is mandatory present if *pusch-RepTypeIndicatorDCI-0-1* is set to pusch-RepTypeB. It is absent otherwise, Need R.  In *pusch-TimeDomainAllocationListDCI-0-2*, the field is mandatory present if *pusch-RepTypeIndicatorDCI-0-2* is set to pusch-RepTypeB. It is absent otherwise, Need R. |
| *MultiPUSCH* | In case size of *puschAllocationList* is higher than 1, the field *extendedK2(n)* corresponding to k2 of the n-th PUSCH, n>1, is mandatory present for all n, if any two consecutive PUSCHs are non-contiguous. Otherwise, it is optionally present, Need S. |

#### – *PUSCH-TPC-CommandConfig*

The IE *PUSCH-TPC-CommandConfig* is used to configure the UE for extracting TPC commands for PUSCH from a group-TPC messages on DCI.

*PUSCH-TPC-CommandConfig* information element

-- ASN1START

-- TAG-PUSCH-TPC-COMMANDCONFIG-START

PUSCH-TPC-CommandConfig ::= SEQUENCE {

tpc-Index INTEGER (1..15) OPTIONAL, -- Cond SUL

tpc-IndexSUL INTEGER (1..15) OPTIONAL, -- Cond SUL-Only

targetCell ServCellIndex OPTIONAL, -- Need S

...

}

-- TAG-PUSCH-TPC-COMMANDCONFIG-STOP

-- ASN1STOP

|  |
| --- |
| *PUSCH-TPC-CommandConfig* field descriptions |
| ***targetCell***  The serving cell to which the acquired power control commands are applicable. If the value is absent, the UE applies the TPC commands to the serving cell on which the command has been received. |
| ***tpc-Index***  An index determining the position of the first bit of TPC command inside the DCI format 2-2 payload. |
| ***tpc-IndexSUL***  An index determining the position of the first bit of TPC command inside the DCI format 2-2 payload. |

|  |  |
| --- | --- |
| Conditional Presence | Explanation |
| *SUL-Only* | The field is optionally present, Need R, if *supplementaryUplink* is configured within S*ervingCellConfig*. It is absent otherwise. |
| *SUL* | The field is optionally present, Need R, if *supplementaryUplink* is configured within S*ervingCellConfig*. It is mandatory present otherwise. |

#### *– QFI*

The IE *QFI* is used to indicate the QoS Flow Identifier.

*QFI* information element

-- ASN1START

-- TAG-QFI-START

QFI ::= INTEGER (0..maxQFI)

-- TAG-QFI-STOP

-- ASN1STOP

#### *– Q-OffsetRange*

The IE *Q-OffsetRange* is used to indicate a cell, beam or measurement object specific offset to be applied when evaluating candidates for cell re-selection or when evaluating triggering conditions for measurement reporting. The value is in dB. Value *dB-24* corresponds to -24 dB, *dB-22* corresponds to -22 dB and so on.

*Q-OffsetRange* information element

-- ASN1START

-- TAG-Q-OFFSETRANGE-START

Q-OffsetRange ::= ENUMERATED {

dB-24, dB-22, dB-20, dB-18, dB-16, dB-14,

dB-12, dB-10, dB-8, dB-6, dB-5, dB-4, dB-3,

dB-2, dB-1, dB0, dB1, dB2, dB3, dB4, dB5,

dB6, dB8, dB10, dB12, dB14, dB16, dB18,

dB20, dB22, dB24}

-- TAG-Q-OFFSETRANGE-STOP

-- ASN1STOP

#### – *Q-QualMin*

The IE *Q-QualMin* is used to indicate for cell selection/ re-selection the required minimum received RSRQ level in the (NR) cell. Corresponds to parameter Qqualmin in TS 38.304 [20]. Actual value Qqualmin = field value [dB].

*Q-QualMin* information element

-- ASN1START

-- TAG-Q-QUALMIN-START

Q-QualMin ::= INTEGER (-43..-12)

-- TAG-Q-QUALMIN-STOP

-- ASN1STOP

#### – *Q-RxLevMin*

The IE *Q-RxLevMin* is used to indicate for cell selection/ re-selection the required minimum received RSRP level in the (NR) cell. Corresponds to parameter Qrxlevmin in TS 38.304 [20]. Actual value Qrxlevmin = field value \* 2 [dBm].

*Q-RxLevMin* information element

-- ASN1START

-- TAG-Q-RXLEVMIN-START

Q-RxLevMin ::= INTEGER (-70..-22)

-- TAG-Q-RXLEVMIN-STOP

-- ASN1STOP

#### – *QuantityConfig*

The IE *QuantityConfig* specifies the measurement quantities and layer 3 filtering coefficients for NR and inter-RAT measurements.

QuantityConfig information element

-- ASN1START

-- TAG-QUANTITYCONFIG-START

QuantityConfig ::= SEQUENCE {

quantityConfigNR-List SEQUENCE (SIZE (1..maxNrofQuantityConfig)) OF QuantityConfigNR OPTIONAL, -- Need M

...,

[[

quantityConfigEUTRA FilterConfig OPTIONAL -- Need M

]],

[[

quantityConfigUTRA-FDD-r16 QuantityConfigUTRA-FDD-r16 OPTIONAL, -- Need M

quantityConfigCLI-r16 FilterConfigCLI-r16 OPTIONAL -- Need M

]]

}

QuantityConfigNR::= SEQUENCE {

quantityConfigCell QuantityConfigRS,

quantityConfigRS-Index QuantityConfigRS OPTIONAL -- Need M

}

QuantityConfigRS ::= SEQUENCE {

ssb-FilterConfig FilterConfig,

csi-RS-FilterConfig FilterConfig

}

FilterConfig ::= SEQUENCE {

filterCoefficientRSRP FilterCoefficient DEFAULT fc4,

filterCoefficientRSRQ FilterCoefficient DEFAULT fc4,

filterCoefficientRS-SINR FilterCoefficient DEFAULT fc4

}

FilterConfigCLI-r16 ::= SEQUENCE {

filterCoefficientSRS-RSRP-r16 FilterCoefficient DEFAULT fc4,

filterCoefficientCLI-RSSI-r16 FilterCoefficient DEFAULT fc4

}

QuantityConfigUTRA-FDD-r16 ::= SEQUENCE {

filterCoefficientRSCP-r16 FilterCoefficient DEFAULT fc4,

filterCoefficientEcNO-r16 FilterCoefficient DEFAULT fc4

}

-- TAG-QUANTITYCONFIG-STOP

-- ASN1STOP

|  |
| --- |
| *QuantityConfigNR* field descriptions |
| ***quantityConfigCell***  Specifies L3 filter configurations for cell measurement results for the configurable RS Types (e.g. SS/PBCH block and CSI-RS) and the configurable measurement quantities (e.g. RSRP, RSRQ and SINR). |
| ***quantityConfigRS-Index***  Specifies L3 filter configurations for measurement results per RS index for the configurable RS Types (e.g. SS/PBCH block and CSI-RS) and the configurable measurement quantities (e.g. RSRP, RSRQ and SINR). |

|  |
| --- |
| *QuantityConfigRS* field descriptions |
| ***csi-RS-FilterConfig***  CSI-RS based L3 filter configurations:  Specifies L3 filter configurations for CSI-RSRP, CSI-RSRQ and CSI-SINR measurement results from the L1 filter(s), as defined in TS 38.215 [9]. |
| ***ssb-FilterConfig***  SS Block based L3 filter configurations:  Specifies L3 filter configurations for SS-RSRP, SS-RSRQ and SS-SINR measurement results from the L1 filter(s), as defined in TS 38.215 [9]. |

|  |
| --- |
| *QuantityConfigUTRA-FDD field descriptions* |
| ***filterCoefficientRSCP***  Specifies L3 filter coefficient for FDD UTRAN CPICH\_RSCP measuement results from L1 filter. |
| ***filterCoefficientEcN0***  Specifies L3 filter coefficient for FDD UTRAN CPICH\_EcN0 measuement results from L1 filter. |

#### – *RACH-ConfigCommon*

The IE *RACH-ConfigCommon* is used to specify the cell specific random-access parameters.

*RACH-ConfigCommon* information element

-- ASN1START

-- TAG-RACH-CONFIGCOMMON-START

RACH-ConfigCommon ::= SEQUENCE {

rach-ConfigGeneric RACH-ConfigGeneric,

totalNumberOfRA-Preambles INTEGER (1..63) OPTIONAL, -- Need S

ssb-perRACH-OccasionAndCB-PreamblesPerSSB CHOICE {

oneEighth ENUMERATED {n4,n8,n12,n16,n20,n24,n28,n32,n36,n40,n44,n48,n52,n56,n60,n64},

oneFourth ENUMERATED {n4,n8,n12,n16,n20,n24,n28,n32,n36,n40,n44,n48,n52,n56,n60,n64},

oneHalf ENUMERATED {n4,n8,n12,n16,n20,n24,n28,n32,n36,n40,n44,n48,n52,n56,n60,n64},

one ENUMERATED {n4,n8,n12,n16,n20,n24,n28,n32,n36,n40,n44,n48,n52,n56,n60,n64},

two ENUMERATED {n4,n8,n12,n16,n20,n24,n28,n32},

four INTEGER (1..16),

eight INTEGER (1..8),

sixteen INTEGER (1..4)

} OPTIONAL, -- Need M

groupBconfigured SEQUENCE {

ra-Msg3SizeGroupA ENUMERATED {b56, b144, b208, b256, b282, b480, b640,

b800, b1000, b72, spare6, spare5,spare4, spare3, spare2, spare1},

messagePowerOffsetGroupB ENUMERATED { minusinfinity, dB0, dB5, dB8, dB10, dB12, dB15, dB18},

numberOfRA-PreamblesGroupA INTEGER (1..64)

} OPTIONAL, -- Need R

ra-ContentionResolutionTimer ENUMERATED { sf8, sf16, sf24, sf32, sf40, sf48, sf56, sf64},

rsrp-ThresholdSSB RSRP-Range OPTIONAL, -- Need R

rsrp-ThresholdSSB-SUL RSRP-Range OPTIONAL, -- Cond SUL

prach-RootSequenceIndex CHOICE {

l839 INTEGER (0..837),

l139 INTEGER (0..137)

},

msg1-SubcarrierSpacing SubcarrierSpacing OPTIONAL, -- Cond L139

restrictedSetConfig ENUMERATED {unrestrictedSet, restrictedSetTypeA, restrictedSetTypeB},

msg3-transformPrecoder ENUMERATED {enabled} OPTIONAL, -- Need R

...,

[[

ra-PrioritizationForAccessIdentity-r16 SEQUENCE {

ra-Prioritization-r16 RA-Prioritization,

ra-PrioritizationForAI-r16 BIT STRING (SIZE (2))

} OPTIONAL, -- Cond InitialBWP-Only

prach-RootSequenceIndex-r16 CHOICE {

l571 INTEGER (0..569),

l1151 INTEGER (0..1149)

} OPTIONAL -- Need R

]],

[[

ra-PrioritizationForSlicing-r17 RA-PrioritizationForSlicing-r17 OPTIONAL, -- Cond InitialBWP-Only

featureCombinationPreamblesList-r17 SEQUENCE (SIZE(1..maxFeatureCombPreamblesPerRACHResource-r17)) OF FeatureCombinationPreambles-r17 OPTIONAL -- Cond AdditionalRACH

]]

}

-- TAG-RACH-CONFIGCOMMON-STOP

-- ASN1STOP

|  |
| --- |
| *RACH-ConfigCommon* field descriptions |
| ***featureCombinationPreamblesList***  Specifies a series of preamble partitions each associated to a combination of features and 4-step RA. The network does not configure this list to have more than 16 entries. |
| ***messagePowerOffsetGroupB***  Threshold for preamble selection. Value is in dB. Value *minusinfinity* corresponds to –infinity. Value *dB0* corresponds to 0 dB, *dB5* corresponds to 5 dB and so on (see TS 38.321 [3], clause 5.1.2). This field is set to the same value for different repetition numbers associated with a specific *FeatureCombination*. |
| ***msg1-SubcarrierSpacing***  Subcarrier spacing of PRACH (see TS 38.211 [16], clause 5.3.2).  Only the following values are applicable depending on the used frequency:  FR1: 15 or 30 kHz  FR2-1/FR2-NTN: 60 or 120 kHz  FR2-2: 120, 480, or 960 kHz  If absent, the UE applies the SCS as derived from the *prach-ConfigurationIndex* in *RACH-ConfigGeneric* (see tables Table 6.3.3.1-1, Table 6.3.3.1-2, Table 6.3.3.2-2 and Table 6.3.3.2-3, TS 38.211 [16]). The value also applies to contention free random access (*RACH-ConfigDedicated*), to SI-request and to contention-based beam failure recovery (CB-BFR). But it does not apply for contention free beam failure recovery (CF-BFR) (see *BeamFailureRecoveryConfig*). |
| ***msg3-transformPrecoder***  Enables the transform precoder for Msg3 transmission according to clause 6.1.3 of TS 38.214 [19]. If the field is absent, the UE disables the transformer precoder (see TS 38.213 [13], clause 8.3). |
| ***numberOfRA-PreamblesGroupA***  The number of CB preambles per SSB in group A. This determines implicitly the number of CB preambles per SSB available in group B. (see TS 38.321 [3], clause 5.1.1). The setting should be consistent with the setting of *ssb-perRACH-OccasionAndCB-PreamblesPerSSB*. |
| ***prach-RootSequenceIndex***  PRACH root sequence index (see TS 38.211 [16], clause 6.3.3.1). The value range depends on whether L=839 or L=139 or L=571 or L=1151. The length of the root sequence corresponding with the index indicated in this IE should be consistent with the one indicated in *prach-ConfigurationIndex* in the *RACH-ConfigDedicated* (if configured). If *prach-RootSequenceIndex-r16* is signalled, UE shall ignore the *prach-RootSequenceIndex* (without suffix).  For FR2-2, only the following values are applicable depending on the used subcarrier spacing:  120 kHz: L=139, L=571, and L=1151  480 kHz: L=139, and L=571  960 kHz: L=139 |
| ***ra-ContentionResolutionTimer***  The initial value for the contention resolution timer (see TS 38.321 [3], clause 5.1.5). Value *sf8* corresponds to 8 subframes, value *sf16* corresponds to 16 subframes, and so on. |
| ***ra-Msg3SizeGroupA***  Transport Blocks size threshold in bits below which the UE shall use a contention-based RA preamble of group A (see TS 38.321 [3], clause 5.1.2). This field is set to the same value for different repetition numbers associated with a specific *FeatureCombination*. |
| ***ra-Prioritization***  Parameters which apply for prioritized random access procedure on any UL BWP of SpCell for specific Access Identities (see TS 38.321 [3], clause 5.1.1a). |
| ***ra-PrioritizationForAI***  Indicates whether the field *ra-Prioritization-r16* applies for Access Identities. The first/leftmost bit corresponds to Access Identity 1, the next bit corresponds to Access Identity 2. Value 1 indicates that the field *ra-Prioritization-r16* applies otherwise the field does not apply (see TS 23.501 [32]). |
| ***ra-PrioritizationForSlicing***  Parameters which apply to configure prioritized CBRA 4-step random access type for slicing. |
| ***rach-ConfigGeneric***  RACH parameters for both regular random access and beam failure recovery. |
| ***restrictedSetConfig***  Configuration of an unrestricted set or one of two types of restricted sets, see TS 38.211 [16], clause 6.3.3.1. |
| ***rsrp-ThresholdSSB***  UE may select the SS block and corresponding PRACH resource for path-loss estimation and (re)transmission based on SS blocks that satisfy the threshold (see TS 38.213 [13]). |
| ***rsrp-ThresholdSSB-SUL***  The UE selects SUL carrier to perform random access based on this threshold (see TS 38.321 [3], clause 5.1.1). The value applies to all the BWPs and all RACH configurations. |
| ***ssb-perRACH-OccasionAndCB-PreamblesPerSSB***  The meaning of this field is twofold: the CHOICE conveys the information about the number of SSBs per RACH occasion. Value *oneEighth* corresponds to one SSB associated with 8 RACH occasions, value *oneFourth* corresponds to one SSB associated with 4 RACH occasions, and so on. The ENUMERATED part indicates the number of Contention Based preambles per SSB. Value *n4* corresponds to 4 Contention Based preambles per SSB, value *n8* corresponds to 8 Contention Based preambles per SSB, and so on. The total number of CB preambles in a RACH occasion is given by *CB-preambles-per-SSB* \* max(1, *SSB-per-rach-occasion*). See TS 38.213 [13]. |
| ***totalNumberOfRA-Preambles***  Total number of preambles used for contention based and contention free 4-step or 2-step random access in the RACH resources defined in *RACH-ConfigCommon*, excluding preambles used for other purposes (e.g. for SI request). If the field is absent, all 64 preambles are available for RA. The setting should be consistent with the setting of *ssb-perRACH-OccasionAndCB-PreamblesPerSSB*, i.e. it should be a multiple of the number of SSBs per RACH occasion. |

|  |  |
| --- | --- |
| Conditional Presence | Explanation |
| *AdditionalRACH* | The field is mandatory present if the *RACH-ConfigCommon* is included in an *AdditionalRACH-Config*. When included in *initialUplinkBWP-RedCap* to indicate other feature(s) than *redcap and eRedCap,* this field is mandatory present with at least *FeatureCombinationPreambles* list entries: the list entry/entries indicating only *redcap* or *eRedCap* and the other(s) indicating both *redcap* or *eRedCap* and one or multiple other feature(s) (e.g., *smallData, nsag* or *msg3-Repetitions*). When included in *initialUplinkBWP-RedCap* to indicate eRedCap and RedCap separately, this field is mandatory present with at least two *FeatureCombinationPreambles* list entries: one list entry indicating only *redcap* and the other list entry indicating only *eRedCap*.  Otherwise, it is optional, Need R. |
| *InitialBWP-Only* | This field is optionally present, Need R, if this BWP is the initial BWP of SpCell. Otherwise, the field is absent. |
| *L139* | The field is mandatory present if *prach-RootSequenceIndex* L=139, or if L=571 for FR2-2, otherwise the field is absent, Need S. |
| *SUL* | The field is mandatory present in *rach-ConfigCommon* in *initialUplinkBWP* if *supplementaryUplink* is configured in *ServingCellConfigCommonSIB* or if *supplementaryUplinkConfig* is configured in *ServingCellConfigCommon*; otherwise, the field is absent. This field is not configured in *additionalRACH-Config*. |

#### – *RACH-ConfigCommonTwoStepRA*

The IE *RACH-ConfigCommonTwoStepRA* is used to specify cell specific 2-step random-access type parameters.

*RACH-ConfigCommonTwoStepRA* information element

-- ASN1START

-- TAG-RACH-CONFIGCOMMONTWOSTEPRA-START

RACH-ConfigCommonTwoStepRA-r16 ::= SEQUENCE {

rach-ConfigGenericTwoStepRA-r16 RACH-ConfigGenericTwoStepRA-r16,

msgA-TotalNumberOfRA-Preambles-r16 INTEGER (1..63) OPTIONAL, -- Need S

msgA-SSB-PerRACH-OccasionAndCB-PreamblesPerSSB-r16 CHOICE {

oneEighth ENUMERATED {n4,n8,n12,n16,n20,n24,n28,n32,n36,n40,n44,n48,n52,n56,n60,n64},

oneFourth ENUMERATED {n4,n8,n12,n16,n20,n24,n28,n32,n36,n40,n44,n48,n52,n56,n60,n64},

oneHalf ENUMERATED {n4,n8,n12,n16,n20,n24,n28,n32,n36,n40,n44,n48,n52,n56,n60,n64},

one ENUMERATED {n4,n8,n12,n16,n20,n24,n28,n32,n36,n40,n44,n48,n52,n56,n60,n64},

two ENUMERATED {n4,n8,n12,n16,n20,n24,n28,n32},

four INTEGER (1..16),

eight INTEGER (1..8),

sixteen INTEGER (1..4)

} OPTIONAL, -- Cond 2StepOnly

msgA-CB-PreamblesPerSSB-PerSharedRO-r16 INTEGER (1..60) OPTIONAL, -- Cond SharedRO

msgA-SSB-SharedRO-MaskIndex-r16 INTEGER (1..15) OPTIONAL, -- Need S

groupB-ConfiguredTwoStepRA-r16 GroupB-ConfiguredTwoStepRA-r16 OPTIONAL, -- Need S

msgA-PRACH-RootSequenceIndex-r16 CHOICE {

l839 INTEGER (0..837),

l139 INTEGER (0..137),

l571 INTEGER (0..569),

l1151 INTEGER (0..1149)

} OPTIONAL, -- Cond 2StepOnly

msgA-TransMax-r16 ENUMERATED {n1, n2, n4, n6, n8, n10, n20, n50, n100, n200} OPTIONAL, -- Need R

msgA-RSRP-Threshold-r16 RSRP-Range OPTIONAL, -- Cond 2Step4Step

msgA-RSRP-ThresholdSSB-r16 RSRP-Range OPTIONAL, -- Need R

msgA-SubcarrierSpacing-r16 SubcarrierSpacing OPTIONAL, -- Cond 2StepOnlyL139

msgA-RestrictedSetConfig-r16 ENUMERATED {unrestrictedSet, restrictedSetTypeA,

restrictedSetTypeB} OPTIONAL, -- Cond 2StepOnly

ra-PrioritizationForAccessIdentityTwoStep-r16 SEQUENCE {

ra-Prioritization-r16 RA-Prioritization,

ra-PrioritizationForAI-r16 BIT STRING (SIZE (2))

} OPTIONAL, -- Cond InitialBWP-Only

ra-ContentionResolutionTimer-r16 ENUMERATED {sf8, sf16, sf24, sf32, sf40, sf48, sf56, sf64} OPTIONAL, -- Cond 2StepOnly

...,

[[

ra-PrioritizationForSlicingTwoStep-r17 RA-PrioritizationForSlicing-r17 OPTIONAL, -- Cond InitialBWP-Only

featureCombinationPreamblesList-r17 SEQUENCE (SIZE(1..maxFeatureCombPreamblesPerRACHResource-r17)) OF FeatureCombinationPreambles-r17 OPTIONAL -- Cond AdditionalRACH

]]

}

GroupB-ConfiguredTwoStepRA-r16 ::= SEQUENCE {

ra-MsgA-SizeGroupA-r16 ENUMERATED {b56, b144, b208, b256, b282, b480, b640, b800,

b1000, b72, spare6, spare5, spare4, spare3, spare2, spare1},

messagePowerOffsetGroupB-r16 ENUMERATED {minusinfinity, dB0, dB5, dB8, dB10, dB12, dB15, dB18},

numberOfRA-PreamblesGroupA-r16 INTEGER (1..64)

}

-- TAG-RACH-CONFIGCOMMONTWOSTEPRA-STOP

-- ASN1STOP

|  |
| --- |
| *RACH-ConfigCommonTwoStepRA* field descriptions |
| ***featureCombinationPreamblesList***  Specifies a series of preamble partitions each associated to a combination of features and 2-step RA. The network does not configure this list to have more than 16 entries. |
| ***groupB-ConfiguredTwoStepRA***  Preamble grouping for 2-step random access type. If the field is absent then there is only one preamble group configured and only one msgA PUSCH configuration. |
| ***msgA-CB-PreamblesPerSSB-PerSharedRO***  Number of contention-based preambles used for 2-step RA type from the non-CBRA 4-step type preambles associated with each SSB for RO shared with 4-step type RA. The number of preambles for 2-step RA type shall not exceed the number of preambles per SSB minus the number of contention-based preambles per SSB for 4-step type RA. The possible value range for this parameter needs to be aligned with value range for the configured SSBs per RACH occasion in *ssb-perRACH-OccasionAndCB-PreamblesPerSSB* in *RACH-ConfigCommon*. The field is only applicable for the case of shared ROs with 4-step type random access. |
| ***msgA-PRACH-RootSequenceIndex***  PRACH root sequence index. If the field is not configured in *RACH-ConfigCommonTwoStepRA* which is configured directly within a BWP (i.e., not within *AdditionalRACH-Config*), the UE applies the value in field *prach-RootSequenceIndex* in *RACH-ConfigCommon* in the configured BWP. If the field is absent in *RACH-ConfigCommonTwoStepRA* in *AdditionalRACH-Config*, the UE applies the corresponding value of *prach-RootSequenceIndex* in *RACH-ConfigCommon* in the same *AdditionalRACH-Config*. When both 2-step and 4-step type random access is configured, this field is only configured for the case of separate ROs between 2-step and 4-step type random access.  For FR2-2, only the following values are applicable depending on the used subcarrier spacing:  120 kHz: L=139, L=571, and L=1151  480 kHz: L=139, and L=571  960 kHz: L=139 |
| ***msgA-RestrictedSetConfig***  Configuration of an unrestricted set or one of two types of restricted sets for 2-step random access type preamble. If the field is not configured in *RACH-ConfigCommonTwoStepRA* which is configured directly within a BWP (i.e. not within *AdditionalRACH-Config*), the UE applies the value in field *restrictedSetConfig* in *RACH-ConfigCommon* in the configured BWP. If the field is absent in *RACH-ConfigCommonTwoStepRA* in *AdditionalRACH-Config*, the UE applies the value of *restrictedSetConfig* in *RACH-ConfigCommon* in the same *AdditionalRACH-Config*. When both 2-step and 4-step type random access is configured, this field is only configured for the case of separate ROs between 2-step and 4-step type random access. |
| ***msgA-RSRP-Threshold***  The UE selects 2-step random access type to perform random access based on this threshold (see TS 38.321 [3], clause 5.1.1). This field is only present if both 2-step and 4-step RA type are configured for the BWP. |
| ***msgA-RSRP-ThresholdSSB***  UE may select the SS block and corresponding PRACH resource for path-loss estimation and (re)transmission based on SS blocks that satisfy the threshold (see TS 38.213 [13]). |
| ***msgA-SSB-PerRACH-OccasionAndCB-PreamblesPerSSB***  The meaning of this field is twofold: the CHOICE conveys the information about the number of SSBs per RACH occasion. Value *oneEight* corresponds to one SSB associated with 8 RACH occasions, value *oneFourth* corresponds to one SSB associated with 4 RACH occasions, and so on. The ENUMERATED part indicates the number of Contention Based preambles per SSB. Value *n4* corresponds to 4 Contention Based preambles per SSB, value *n8* corresponds to 8 Contention Based preambles per SSB, and so on. The total number of CB preambles in a RACH occasion is given by *CB-preambles-per-SSB* \* max(1, *SSB-per-rach-occasion*). If the field is not configured in *RACH-ConfigCommonTwoStepRA* which is configured directly within a BWP (i.e. not within *AdditionalRACH-Config*) and both 2-step and 4-step are configured for the BWP, the UE applies the value in the field *ssb-perRACH-OccasionAndCB-PreamblesPerSSB* in *RACH-ConfigCommon.* If the field is not configured in *AdditionalRACH-Config* and both 2-step and 4-step are configured in *AdditionalRACH-Config*, the UE applies the value in the field *ssb-perRACH-OccasionAndCB-PreamblesPerSSB* in *RACH-ConfigCommon* in the same *AdditionalRACH-Config*. The field is not present when RACH occasions are shared between 2-step and 4-step type random access in the BWP. |
| ***msgA-SSB-SharedRO-MaskIndex***  Indicates the subset of 4-step type ROs shared with 2-step random access type for each SSB. This field is configured when there is more than one RO per SSB. If the field is absent, and 4-step and 2-step has shared ROs, then all ROs are shared. |
| ***msgA-SubcarrierSpacing***  Subcarrier spacing of PRACH (see TS 38.211 [16], clause 5.3.2).  Only the following values are applicable depending on the used frequency:  FR1: 15 or 30 kHz  FR2-1/FR2-NTN: 60 or 120 kHz  FR2-2: 120, 480, or 960 kHz.  If the field is absent, the UE applies the SCS as derived from the *msgA-PRACH-ConfigurationIndex* in *RACH-ConfigGenericTwoStepRA* (see tables Table 6.3.3.1-1, Table 6.3.3.1-2, Table 6.3.3.2-2 and Table 6.3.3.2-3, TS 38.211 [16]) in case of 2-step only BWP, otherwise the UE applies the same SCS as Msg1 derived from *RACH-ConfigCommon*. The value also applies to contention free 2-step random access type (*RACH-ConfigDedicated*). |
| ***msgA-TotalNumberOfRA-Preambles***  Indicates the total number of preambles used for contention-based and contention-free 2-step random access type when ROs for 2-step are not shared with 4-step. If the field is absent, and 2-step and 4-step does not have shared ROs, all 64 preambles are available for 2-step random access type. |
| ***msgA-TransMax***  Max number of MsgA preamble transmissions performed before switching to 4-step random access (see TS 38.321 [3], clauses 5.1.1). This field is only applicable when 2-step and 4-step RA type are configured and switching to 4-step type RA is supported. If the field is absent, switching from 2-step RA type to 4-step RA type is not allowed. |
| ***ra-ContentionResolutionTimer***  The initial value for the contention resolution timer for fallback RAR in case no 4-step random access type is configured (see TS 38.321 [3], clause 5.1.5). Value *sf8* corresponds to 8 subframes, value *sf16* corresponds to 16 subframes, and so on. If both 2-step and 4-step random access type resources are configured on the BWP, then this field is absent. If the field is absent in *RACH-ConfigCommonTwoStepRA* in *AdditionalRACH-Config*, the UE shall apply the corresponding value in *RACH-ConfigCommon* in the same *AdditionalRACH-Config.* |
| ***ra-Prioritization***  Parameters which apply for prioritized random access procedure on any UL BWP of SpCell for specific Access Identities (see TS 38.321 [3], clause 5.1.1a). |
| ***ra-PrioritizationForAI***  Indicates whether the field *ra-Prioritization-r16* applies for Access Identities. The first/leftmost bit corresponds to Access Identity 1, the next bit corresponds to Access Identity 2. Value *1* for an Access Identity indicates that the field *ra-Prioritization-r16* applies, otherwise the field does not apply. |
| ***ra-PrioritizationForSlicingTwoStep***  Parameters which apply to configure prioritized CBRA 2-step random access type for slicing. |
| ***rach-ConfigGenericTwoStepRA***  2-step random access type parameters for both regular random access and beam failure recovery. |

|  |
| --- |
| *GroupB-ConfiguredTwoStepRA* field descriptions |
| ***messagePowerOffsetGroupB***  Threshold for preamble selection. Value is in dB. Value *minusinfinity* corresponds to –infinity. Value *dB0* corresponds to 0 dB, *dB5* corresponds to 5 dB and so on. (see TS 38.321 [3], clause 5.1.1). |
| ***numberOfRA-PreamblesGroupA***  The number of CB preambles per SSB in group A for idle/inactive or connected mode. The setting of the number of preambles for each group should be consistent with *msgA-SSB-PerRACH-OccasionAndCB-PreamblesPerSSB* or *msgA-CB-PreamblesPerSSB-PerSharedRO* if configured. |
| ***ra-MsgA-SizeGroupA***  Transport block size threshold in bits below which the UE shall use a contention-based RA preamble of group A. (see TS 38.321 [3], clause 5.1.1). |

|  |  |
| --- | --- |
| Conditional Presence | Explanation |
| *2Step4Step* | The field is mandatory present if both 2-step random access type and 4-step random access type are configured in the BWP, otherwise the field is not present.  The field is mandatory present in *msgA-ConfigCommon* field in *AdditionalRACH-Config* if both 2-step random access type and 4-step random access type are configured for the same feature combination in the BWP. |
| *2StepOnlyL139* | The field is mandatory present if *msgA-PRACH-RootSequenceIndex* L=139 and no 4-step random access type is configured, or if L=571 for FR2-2 and no 4-step random access type is configured, otherwise the field is absent, Need S. |
| *2StepOnly* | The field is mandatory present in *msgA-ConfigCommon* field in B*WP-UplinkCommon* if *rach-ConfigCommon* field is absent in this *BWP-UplinkCommon*, otherwise the field is optionally present in *msgA-ConfigCommon* field in *BWP-UplinkCommon*, Need S.  The field is mandatory present in *msgA-ConfigCommon* field in *AdditionalRACH-Config* if *rach-ConfigCommon* field is absent in this *AdditionalRACH-Config*, otherwise the field is optionally present in *msgA-ConfigCommon* field in *AdditionalRACH-Config*, Need S. |
| *AdditionalRACH* | The field is mandatory present if the *msgA-ConfigCommon* is included in an *AdditionalRACH-Config*. When included in *initialUplinkBWP-RedCap* to indicate other feature(s) than *redcap,* this field is mandatory present with at least two *FeatureCombinationPreambles* list entries: one list entry indicating only *redcap* and the other(s) indicating both *redcap* and one or multiple other feature(s) (e.g. *smallData, nsag* or *msg3-Repetitions*).  Otherwise, it is optional, Need R. |
| *InitialBWP-Only* | This field is optionally present, Need R, if this BWP is the initial BWP of SpCell. Otherwise, the field is absent. |
| *SharedRO* | The field is mandatory present if the 2-step random access type occasions are shared with 4-step random access type, otherwise the field is not present. |

#### – *RACH-ConfigDedicated*

The IE *RACH-ConfigDedicated* is used to specify the dedicated random access parameters.

*RACH-ConfigDedicated* information element

-- ASN1START

-- TAG-RACH-CONFIGDEDICATED-START

RACH-ConfigDedicated ::= SEQUENCE {

cfra CFRA OPTIONAL, -- Need S

ra-Prioritization RA-Prioritization OPTIONAL, -- Need N

...,

[[

ra-PrioritizationTwoStep-r16 RA-Prioritization OPTIONAL, -- Need N

cfra-TwoStep-r16 CFRA-TwoStep-r16 OPTIONAL -- Need S

]]

}

CFRA ::= SEQUENCE {

occasions SEQUENCE {

rach-ConfigGeneric RACH-ConfigGeneric,

ssb-perRACH-Occasion ENUMERATED {oneEighth, oneFourth, oneHalf, one, two, four, eight, sixteen}

OPTIONAL -- Cond Mandatory

} OPTIONAL, -- Need S

resources CHOICE {

ssb SEQUENCE {

ssb-ResourceList SEQUENCE (SIZE(1..maxRA-SSB-Resources)) OF CFRA-SSB-Resource,

ra-ssb-OccasionMaskIndex INTEGER (0..15)

},

csirs SEQUENCE {

csirs-ResourceList SEQUENCE (SIZE(1..maxRA-CSIRS-Resources)) OF CFRA-CSIRS-Resource,

rsrp-ThresholdCSI-RS RSRP-Range

}

},

...,

[[

totalNumberOfRA-Preambles INTEGER (1..63) OPTIONAL -- Cond Occasions

]],

[[

msg1-RepetitionNum-r18 ENUMERATED {n2, n4, n8, spare1} OPTIONAL -- Cond 4StepCFRArep

]]

}

CFRA-TwoStep-r16 ::= SEQUENCE {

occasionsTwoStepRA-r16 SEQUENCE {

rach-ConfigGenericTwoStepRA-r16 RACH-ConfigGenericTwoStepRA-r16,

ssb-PerRACH-OccasionTwoStepRA-r16 ENUMERATED {oneEighth, oneFourth, oneHalf, one,

two, four, eight, sixteen}

} OPTIONAL, -- Need S

msgA-CFRA-PUSCH-r16 MsgA-PUSCH-Resource-r16,

msgA-TransMax-r16 ENUMERATED {n1, n2, n4, n6, n8, n10, n20, n50, n100, n200} OPTIONAL, -- Need S

resourcesTwoStep-r16 SEQUENCE {

ssb-ResourceList SEQUENCE (SIZE(1..maxRA-SSB-Resources)) OF CFRA-SSB-Resource,

ra-ssb-OccasionMaskIndex INTEGER (0..15)

},

...

}

CFRA-SSB-Resource ::= SEQUENCE {

ssb SSB-Index,

ra-PreambleIndex INTEGER (0..63),

...,

[[

msgA-PUSCH-Resource-Index-r16 INTEGER (0..3071) OPTIONAL -- Cond 2StepCFRA

]]

}

CFRA-CSIRS-Resource ::= SEQUENCE {

csi-RS CSI-RS-Index,

ra-OccasionList SEQUENCE (SIZE(1..maxRA-OccasionsPerCSIRS)) OF INTEGER (0..maxRA-Occasions-1),

ra-PreambleIndex INTEGER (0..63),

...

}

-- TAG-RACH-CONFIGDEDICATED-STOP

-- ASN1STOP

|  |
| --- |
| *CFRA-CSIRS-Resource* field descriptions |
| ***csi-RS***  The ID of a CSI-RS resource defined in the measurement object associated with this serving cell. |
| ***ra-OccasionList***  RA occasions that the UE shall use when performing CF-RA upon selecting the candidate beam identified by this CSI-RS. The network ensures that the RA occasion indexes provided herein are also configured by prach-ConfigurationIndex and msg1-FDM. Each RACH occasion is sequentially numbered, first, in increasing order of frequency resource indexes for frequency multiplexed PRACH occasions; second, in increasing order of time resource indexes for time multiplexed PRACH occasions within a PRACH slot and Third, in increasing order of indexes for PRACH slots. |
| ***ra-PreambleIndex***  The RA preamble index to use in the RA occasions associated with this CSI-RS. |

|  |
| --- |
| *CFRA* field descriptions |
| ***msg1-RepetitionNum***  Indicates the MSG1 repetition number used for contention free 4-step random access type in TS 38.321 [3]. If this field is absent, the UE performs contention free 4-step random access without MSG1-Repetitions. |
| ***occasions***  RA occasions for contention free random access. If the field is absent, the UE uses the RA occasions configured in *RACH-ConfigCommon* in the first active UL BWP. |
| ***ra-ssb-OccasionMaskIndex***  Explicitly signalled PRACH Mask Index for RA Resource selection in TS 38.321 [3]. The mask is valid for all SSB resources signalled in *ssb-ResourceList*. The UE shall ignore this field if the field *msg1-RepetitionNum* included in *CFRA* is configured. |
| ***rach-ConfigGeneric***  Configuration of contention free random access occasions for CFRA. The UE shall ignore *preambleReceivedTargetPower*, *preambleTransMax*, *powerRampingStep*, *ra-ResponseWindow* signaled within this field and use the corresponding values provided in *RACH-ConfigCommon*. |
| ***ssb-perRACH-Occasion***  Number of SSBs per RACH occasion. |
| ***totalNumberOfRA-Preambles***  Total number of preambles used for contention free random access in the RACH resources defined in CFRA, excluding preambles used for other purposes (e.g. for SI request). If the field is absent but the field *occasions* is present, the UE may assume all the 64 preambles are for RA. The setting should be consistent with the setting of *ssb-perRACH-Occasion*, if present, i.e. it should be a multiple of the number of SSBs per RACH occasion. |

|  |
| --- |
| *CFRA-SSB-Resource* field descriptions |
| ***msgA-PUSCH-Resource-Index***  Identifies the index of the PUSCH resource used for MSGA CFRA. The PUSCH resource index indicates a valid PUSCH occasion (as specified in TS 38.213 [13], clause 8.1A) and the associated DMRS resources corresponding to a PRACH slot. The PUSCH resource indexes are sequentially numbered and are mapped to valid PUSCH occasions corresponding to a PRACH slot which are ordered, first, in increasing order of frequency resource indexes for frequency multiplexed PUSCH occasions; second, in increasing order of DMRS resource indexes within a PUSCH occasion, where a *DMR* resource index is determined first in an ascending order of a DMRS port index and then in an ascending order of a DMRS sequence index, third in increasing order of time resource indexes for time multiplexed PUSCH occasions within a PUSCH slot and fourth, in increasing order of indexes for PUSCH slots. For the case of contention free 2-step random access type, if this field is absent, the UE shall use the value 0. |
| ***ra-PreambleIndex***  The preamble index that the UE shall use when performing CF-RA upon selecting the candidate beams identified by this SSB. |
| ***ssb***  The ID of an SSB transmitted by this serving cell. |

|  |
| --- |
| *CFRA-TwoStep* field descriptions |
| ***msgA-CFRA-PUSCH***  PUSCH resource configuration(s) for msgA CFRA. |
| ***msgA-TransMax***  Max number of MsgA preamble transmissions performed before switching to 4-step type random access (see TS 38.321 [3], clauses 5.1.1). This field is only applicable when 2-step and 4-step RA type are configured and switching to 4-step type RA is supported. If the field is absent in *cfra-TwoStep*, switching from 2-step RA type to 4-step RA type is not allowed. |
| ***occasionsTwoStepRA***  RA occasions for contention free random access. If the field is absent, the UE uses the RA occasions configured in *RACH-ConfigCommonTwoStepRA* in the first active UL BWP. |
| ***ra-SSB-OccasionMaskIndex***  Explicitly signalled PRACH Mask Index for RA Resource selection in TS 38.321 [3]. The mask is valid for all SSB resources signalled in *ssb-ResourceList*. |
| ***rach-ConfigGenericTwoStepRA***  Configuration of contention free random access occasions for CFRA 2-step random access type. |
| ***ssb-PerRACH-OccasionTwoStep***  Number of SSBs per RACH occasion for 2-step random access type. |

|  |
| --- |
| *RACH-ConfigDedicated* field descriptions |
| ***cfra***  Parameters for contention free random access to a given target cell. If this field and *cfra-TwoStep* are absent, the UE performs contention based random access. |
| ***cfra-TwoStep***  Parameters for contention free 2-step random access type to a given target cell. Network ensures that *cfra* and *cfra-TwoStep* are not configured at the same time. If this field and *cfra* are absent, the UE performs contention based random access. |
| ***ra-prioritization***  Parameters which apply for prioritized random access procedure to a given target cell (see TS 38.321 [3], clause 5.1.1). |
| ***ra-PrioritizationTwoStep***  Parameters which apply for prioritized 2-step random access type procedure to a given target cell (see TS 38.321 [3], clause 5.1.1). |

|  |  |
| --- | --- |
| Conditional Presence | Explanation |
| *Mandatory* | The field is mandatory present. |
| *Occasions* | The field is optionally present, Need S, if the field *occasions* is present, otherwise it is absent. |
| *2StepCFRA* | The field is optionally present for the case of 2-step RA type contention free random access, Need S, otherwise it is absent. |
| *4StepCFRArep* | For non-(e)RedCap UEs, the field is optionally present, Need S, if *resources* is set to *ssb* and there is one *FeatureCombinationPreambles* entry indicating only *msg1-Repetitions* which is associated with the same Msg1 repetition number.  For RedCap UEs or if RedCap is considered to be applicable for this Random Access procedure for eRedCap UEs, the field is optionally present, Need S, if *resources* is set to *ssb* and there is one *FeatureCombinationPreambles* entry indicating only *redCap* and *msg1-Repetitions* which is associated with the same Msg1 repetition number.  For eRedCap UEs, if eRedCap is considered to be applicable for this Random Access procedure, the field is optional present, Need S, if *resource* is set to *ssb* and there is one *FeatureCombinationPreambles* entry indicating only *eRedCap* and *msg1-Repetitions* which is associated with the same Msg1 repetition number.  Otherwise, it is absent. |

#### – *RACH-ConfigGeneric*

The IE *RACH-ConfigGeneric* is used to specify the random-access parameters both for regular random access as well as for beam failure recovery.

*RACH-ConfigGeneric* information element

-- ASN1START

-- TAG-RACH-CONFIGGENERIC-START

RACH-ConfigGeneric ::= SEQUENCE {

prach-ConfigurationIndex INTEGER (0..255),

msg1-FDM ENUMERATED {one, two, four, eight},

msg1-FrequencyStart INTEGER (0..maxNrofPhysicalResourceBlocks-1),

zeroCorrelationZoneConfig INTEGER(0..15),

preambleReceivedTargetPower INTEGER (-202..-60),

preambleTransMax ENUMERATED {n3, n4, n5, n6, n7, n8, n10, n20, n50, n100, n200},

powerRampingStep ENUMERATED {dB0, dB2, dB4, dB6},

ra-ResponseWindow ENUMERATED {sl1, sl2, sl4, sl8, sl10, sl20, sl40, sl80},

...,

[[

prach-ConfigurationPeriodScaling-IAB-r16 ENUMERATED {scf1,scf2,scf4,scf8,scf16,scf32,scf64} OPTIONAL, -- Need R

prach-ConfigurationFrameOffset-IAB-r16 INTEGER (0..63) OPTIONAL, -- Need R

prach-ConfigurationSOffset-IAB-r16 INTEGER (0..39) OPTIONAL, -- Need R

ra-ResponseWindow-v1610 ENUMERATED { sl60, sl160} OPTIONAL, -- Need R

prach-ConfigurationIndex-v1610 INTEGER (256..262) OPTIONAL -- Need R

]],

[[

ra-ResponseWindow-v1700 ENUMERATED {sl240, sl320, sl640, sl960, sl1280, sl1920, sl2560} OPTIONAL -- Need R

]]

}

-- TAG-RACH-CONFIGGENERIC-STOP

-- ASN1STOP

|  |
| --- |
| *RACH-ConfigGeneric* field descriptions |
| ***msg1-FDM***  The number of PRACH transmission occasions FDMed in one time instance. (see TS 38.211 [16], clause 6.3.3.2). |
| ***msg1-FrequencyStart***  Offset of lowest PRACH transmission occasion in frequency domain with respective to PRB 0. The value is configured so that the corresponding RACH resource is entirely within the bandwidth of the UL BWP. (see TS 38.211 [16], clause 6.3.3.2). |
| ***powerRampingStep***  Power ramping steps for PRACH (see TS 38.321 [3],5.1.3). This field is set to the same value for different repetition numbers associated with a specific *FeatureCombination.* |
| ***prach-ConfigurationFrameOffset-IAB***  Frame offset for ROs defined in the baseline configuration indicated by *prach-ConfigurationIndex* and is used only by the IAB-MT. (see TS 38.211 [16], clause 6.3.3.2). |
| ***prach-ConfigurationIndex***  PRACH configuration index. For *prach-ConfigurationIndex* configured under *beamFailureRecoveryConfig*, the *prach-ConfigurationIndex* can only correspond to the short preamble format, (see TS 38.211 [16], clause 6.3.3.2). If the field *prach-ConfigurationIndex-v1610* is present, the UE shall ignore the value provided in *prach-ConfigurationIndex* (without suffix). |
| ***prach-ConfigurationPeriodScaling-IAB***  Scaling factor to extend the periodicity of the baseline configuration indicated by *prach-ConfigurationIndex* and is used only by the IAB-MT*.* Value scf1 corresponds to scaling factor of 1 and so on. (see TS 38.211 [16], clause 6.3.3.2). |
| ***prach-ConfigurationSOffset-IAB***  Subframe/Slot offset for ROs defined in the baseline configuration indicated by *prach-ConfigurationIndex* and is used only by the IAB-MT*.* (see TS 38.211 [16], clause 6.3.3.2). |
| ***preambleReceivedTargetPower***  The target power level at the network receiver side (see TS 38.213 [13], clause 7.4, TS 38.321 [3], clauses 5.1.2, 5.1.3). Only multiples of 2 dBm may be chosen (e.g. -202, -200, -198, ...). This field is set to the same value for different repetition numbers associated with a specific *FeatureCombination*. |
| ***preambleTransMax***  Max number of RA preamble transmission performed before declaring a failure (see TS 38.321 [3], clauses 5.1.4, 5.1.5). The UE shall ignore this field in case *rach-ConfigGeneric* is included within an *EarlyUL-SyncConfig* IE. |
| ***ra-ResponseWindow***  Msg2 (RAR) window length in number of slots. The network configures a value lower than or equal to 10 ms when Msg2 is transmitted in licensed spectrum and a value lower than or equal to 40 ms when Msg2 is transmitted with shared spectrum channel access (see TS 38.321 [3], clause 5.1.4). UE ignores the field if included in *SCellConfig*. If *ra-ResponseWindow-v1610* or *ra-ResponseWindow-v1700* is signalled, UE shall ignore the *ra-ResponseWindow* (without suffix). The field *ra-ResponseWindow-v1700* is applicable to SCS 480 kHz and SCS 960 kHz. The UE shall ignore this field in case *rach-ConfigGeneric* is included within an *EarlyUL-SyncConfig* IE. |
| ***zeroCorrelationZoneConfig***  N-CS configuration, see Table 6.3.3.1-5 in TS 38.211 [16]. |

#### – *RACH-ConfigGenericTwoStepRA*

The IE *RACH-ConfigGenericTwoStepRA* is used to specify the 2-step random access type parameters.

*RACH-ConfigGenericTwoStepRA* information element

-- ASN1START

-- TAG-RACH-CONFIGGENERICTWOSTEPRA-START

RACH-ConfigGenericTwoStepRA-r16 ::= SEQUENCE {

msgA-PRACH-ConfigurationIndex-r16 INTEGER (0..262) OPTIONAL, -- Cond 2StepOnly

msgA-RO-FDM-r16 ENUMERATED {one, two, four, eight} OPTIONAL, -- Cond 2StepOnly

msgA-RO-FrequencyStart-r16 INTEGER (0..maxNrofPhysicalResourceBlocks-1) OPTIONAL, -- Cond 2StepOnly

msgA-ZeroCorrelationZoneConfig-r16 INTEGER (0..15) OPTIONAL, -- Cond 2StepOnly

msgA-PreamblePowerRampingStep-r16 ENUMERATED {dB0, dB2, dB4, dB6} OPTIONAL, -- Cond 2StepOnlyNoCFRA

msgA-PreambleReceivedTargetPower-r16 INTEGER (-202..-60) OPTIONAL, -- Cond 2StepOnlyNoCFRA

msgB-ResponseWindow-r16 ENUMERATED {sl1, sl2, sl4, sl8, sl10, sl20, sl40, sl80, sl160, sl320}

OPTIONAL, -- Cond NoCFRA

preambleTransMax-r16 ENUMERATED {n3, n4, n5, n6, n7, n8, n10, n20, n50, n100, n200} OPTIONAL, -- Cond 2StepOnlyNoCFRA

...,

[[

msgB-ResponseWindow-v1700 ENUMERATED {sl240, sl640, sl960, sl1280, sl1920, sl2560} OPTIONAL -- Cond NoCFRA2

]]

}

-- TAG-RACH-CONFIGGENERICTWOSTEPRA-STOP

-- ASN1STOP

|  |
| --- |
| *RACH-ConfigGenericTwoStepRA* field descriptions |
| ***msgA-PreamblePowerRampingStep***  Power ramping steps for msgA PRACH. If the field is absent in *RACH-ConfigCommonTwoStepRA* in *AdditionalRACH-Config*, the UE shall apply the corresponding value in *RACH-ConfigCommon* in the same *AdditionalRACH-Config*. If the field is absent in other cases, UE shall use the value of *powerRampingStep* in *RACH-ConfigGeneric* in the configured BWP (see TS 38.321 [3], 5.1.3). This field may only be present if no 4-step type RA is configured in the BWP or in the case of separate ROs with 4-step type RA. The field is absent if *RACH-ConfigGenericTwoStepRA* is included in *CFRA-TwoStep* in *RACH-ConfigDedicated* and thenthe UE uses the value of *msgA-PreamblePowerRampingStep* in *RACH-ConfigGenericTwoStepRA* configured forCBRA. |
| ***msgA-PreambleReceivedTargetPower***  The target power level at the network receiver side (see TS 38.213 [13], clause 7.1.1 and TS 38.321 [3], clause 5.1.1). Only multiples of 2 dBm may be chosen (e.g -202, -200, -198, …). If the field is absent, UE shall use the value of *preambleReceivedTargetPower* in *RACH-ConfigGeneric* in the configured BWP. This field may only be present if no 4-step type RA is configured in the BWP. The field is absent if *RACH-ConfigGenericTwoStepRA* is included in *CFRA-TwoStep* in *RACH-ConfigDedicated* and thenthe UE uses the value of *msgA-PreambleReceivedTargetPower*in *RACH-ConfigGenericTwoStepRA* configured forCBRA*.* |
| ***msgA-PRACH-ConfigurationIndex***  Cell-specific PRACH configuration index for 2-step RA type. If the field is absent in *RACH-ConfigCommonTwoStepRA* which is configured directly within a BWP (i.e. not within *AdditionalRACH-Config*), the UE shall use the value of corresponding 4-step random access parameter in the configured BWP. If the field is absent in *RACH-ConfigCommonTwoStepRA* in *AdditionalRACH-Config*, the UE shall apply the corresponding value in *RACH-ConfigCommon* in the same *AdditionalRACH-Config*. If the value is in the range of 256 to 262, the field *prach-ConfigurationIndex-v1610* should be considered configured (see TS 38.211 [16], clause 6.3.3.2). This field may only be present if no 4-step type RA is configured in the BWP or in the case of separate ROs with 4-step type RA. |
| ***msgA-RO-FDM***  The number of msgA PRACH transmission occasions Frequency-Division Multiplexed in one time instance. If the field is absent in *RACH-ConfigCommonTwoStepRA* which is configured directly within a BWP (i.e. not within *AdditionalRACH-Config*), UE shall use value of *msg1-FDM* in *RACH-ConfigGeneric* in the configured BWP. If the field is absent in *RACH-ConfigCommonTwoStepRA* in *AdditionalRACH-Config*, the UE shall apply the value of *msg1-FDM* in *RACH-ConfigCommon* in the same *AdditionalRACH-Config* (see TS 38.211 [16], clause 6.3.3.2). This field may only be present if no 4-step type RA is configured in the BWP or in the case of separate ROs with 4-step type RA. |
| ***msgA-RO-FrequencyStart***  Offset of lowest PRACH transmissions occasion in frequency domain with respect to PRB 0. If the field is absent in *RACH-ConfigCommonTwoStepRA* which is configured directly within a BWP (i.e. not within *AdditionalRACH-Config*), UE shall use value of *msg1-FrequencyStart* in *RACH-ConfigGeneric* in the configured BWP. If the field is absent in *RACH-ConfigCommonTwoStepRA* in *AdditionalRACH-Config*, the UE shall apply the value of *msg1-FrequencyStart* in *RACH-ConfigCommon* in the same *AdditionalRACH-Config* (see TS 38.211 [16], clauses 5.3.2 and 6.3.3.2). This field may only be present if no 4-step type RA is configured in the BWP or in the case of separate ROs with 4-step type RA. |
| ***msgA-ZeroCorrelationZoneConfig***  N-CS configuration for msgA preamble, see Table 6.3.3.1-5 in TS 38.211 [16]. If the field is absent in *RACH-ConfigCommonTwoStepRA* in *AdditionalRACH-Config*, the UE shall apply the corresponding value in *RACH-ConfigCommon* in the same *AdditionalRACH-Config*. If the field is absent in other cases, UE shall use value *zeroCorrelationZoneConfig* in *RACH-ConfigGeneric* in the configured BWP. This field may only be present if no 4-step type RA is configured in the BWP or in the case of separate ROs with 4-step type RA. |
| ***msgB-ResponseWindow***  MsgB monitoring window length in number of slots. The network configures a value lower than or equal to 40ms (see TS 38.321 [3], clause 5.1.1). The network does not configure *msgB-ResponseWindow-r16* simultaneously with *msgB-ResponseWindow-v1700*, and if both fields are absent,the UE uses the value of *msgB-ResponseWindow* in *RACH-ConfigGenericTwoStepRA* configured for CBRA. |
| ***preambleTransMax***  Max number of RA preamble transmission performed before declaring a failure (see TS 38.321 [3], clauses 5.1.4, 5.1.5). If the field is absent in *RACH-ConfigCommonTwoStepRA* in *AdditionalRACH-Config*, the UE shall apply the corresponding value in *RACH-ConfigCommon* in the same *AdditionalRACH-Config*. If the field is absent in other cases, UE shall use the value of *preambleTransMax* in *RACH-ConfigGeneric* in the configured BWP. The field is absent if *RACH-ConfigGenericTwoStepRA* is included in *CFRA-TwoStep* in *RACH-ConfigDedicated* and thenthe UE uses the value of *preambleTransMax*in *RACH-ConfigGenericTwoStepRA* configured forCBRA*.* |

|  |  |
| --- | --- |
| Conditional Presence | Explanation |
| *2StepOnly* | The field is mandatory present in *msgA-ConfigCommon* fieldin *BWP-UplinkCommon* if *rach-ConfigCommon* field is absent in this *BWP-UplinkCommon*, otherwise the field is optionally present in *msgA-ConfigCommon* fieldin *BWP-UplinkCommon*, Need S.  The field is mandatory present in *msgA-ConfigCommon* in *AdditionalRACH-Config* if *rach-ConfigCommon* field is absent in this *AdditionalRACH-Config,* otherwise the field is optionally present in *msgA-ConfigCommon* fieldin *AdditionalRACH-Config*, Need S. |
| *2StepOnlyNoCFRA* | The field is mandatory present if *RACH-ConfigGenericTwoStepRA* is included in the *RACH-ConfigCommonTwoStepRA* and there are no 4-step random access configurations configured in the BWP (i.e only 2-step random access type configured in the BWP), otherwise (i.e. 4-step random access configuration also exists in the BWP) the field is optionally present, Need S. When *RACH-ConfigGenericTwoStepRA* is included in the *RACH-ConfigDedicated*, this field is absent. |
| *NoCFRA* | The field is mandatory present if *msgB-ResponseWindow-r17* is absent and *RACH-ConfigGenericTwoStepRA* is not included in *CFRA-TwoStep* in *RACH-ConfigDedicated,* otherwise the field is absent, Need S. |
| *NoCFRA2* | The field is mandatory present if *msgB-ResponseWindow-r16* is absent and *RACH-ConfigGenericTwoStepRA* is not included in *CFRA-TwoStep* in *RACH-ConfigDedicated*, otherwise the field is absent, Need S. |

#### – *RACH-ConfigTwoTA*

The IE *RACH-ConfigTwoTA* is used to specify random access parameters for each additional PCI configured for the serving cell.

*RACH-ConfigTwoTA* information element

-- ASN1START

-- TAG-RACH-CONFIGTWOTA-START

RACH-ConfigTwoTA-r18 ::= SEQUENCE {

additionalPCI-andRACH-Index-r18 AdditionalPCIIndex-r17,

rach-ConfigGeneric-r18 RACH-ConfigGeneric,

ssb-perRACH-Occasion-r18 ENUMERATED {oneEighth, oneFourth, oneHalf, one, two, four, eight, sixteen} OPTIONAL, -- Need M

prach-RootSequenceIndex-r18 CHOICE {

l839 INTEGER (0..837),

l139 INTEGER (0..137),

l571 INTEGER (0..569),

l1151 INTEGER (0..1149)

},

msg1-SubcarrierSpacing-r18 SubcarrierSpacing OPTIONAL, -- Cond L139

...,

[[

twoTA-restrictedSetConfig-r18 ENUMERATED {unrestrictedSet, restrictedSetTypeA, restrictedSetTypeB} OPTIONAL -- Need R

]]

}

-- TAG-RACH-CONFIGTWOTA-STOP

-- ASN1STOP

|  |
| --- |
| *RACH-ConfigTwoTA* field descriptions |
| ***additionalPCI-andRACH-Index***  Indicates the associated PCI to this random access configuration. |
| ***msg1-SubcarrierSpacing***  Subcarrier spacing of PRACH when prach-RootSequenceIndex has value set to l139 (see TS 38.211 [16], clause 5.3.2). Only the following values are applicable depending on the used frequency: FR1: 15 or 30 kHz FR2-1: 60 or 120 kHz FR2-2: 120, 480, or 960 kHz. If absent, the UE applies the SCS as derived from the *prach-ConfigurationIndex* in *RACH-ConfigGeneric* (see tables Table 6.3.3.1-1, Table 6.3.3.1-2, Table 6.3.3.2-2 and Table 6.3.3.2-3, TS 38.211 [16]). |
| ***prach-RootSequenceIndex***  PRACH root sequence index (see TS 38.211 [16], clause 6.3.3.1). The value range depends on whether L=839, L=139, L=571 or L=1151.  For FR2-2, only the following values are applicable depending on the used subcarrier spacing:  120 kHz: L=139, L=571, and L=1151  480 kHz: L=139, and L=571  960 kHz: L=139 |
| ***rach-ConfigGeneric***  RACH parameters for contention free random access occasions for CFRA. |
| ***ssb-perRACH-Occasion***  Number of SSBs per RACH occasion. |
| ***twoTA-restrictedSetConfig***  Configuration of an unrestricted set or one of two types of restricted sets associated with additional PCI, see TS 38.211 [16], clause 6.3.3.1. |

|  |  |
| --- | --- |
| Conditional Presence | Explanation |
| *L139* | The field is mandatory present if *prach-RootSequenceIndex* L=139, or if L=571 for FR2-2, otherwise the field is absent, Need S. |

#### – *RA-Prioritization*

The IE *RA-Prioritization* is used to configure prioritized random access.

*RA-Prioritization* information element

-- ASN1START

-- TAG-RA-PRIORITIZATION-START

RA-Prioritization ::= SEQUENCE {

powerRampingStepHighPriority ENUMERATED {dB0, dB2, dB4, dB6},

scalingFactorBI ENUMERATED {zero, dot25, dot5, dot75} OPTIONAL, -- Need R

...

}

-- TAG-RA-PRIORITIZATION-STOP

-- ASN1STOP

|  |
| --- |
| *RA-Prioritization* field descriptions |
| ***powerRampingStepHighPriority***  Power ramping step applied for prioritized random access procedure. |
| ***scalingFactorBI***  Scaling factor for the backoff indicator (BI) for the prioritized random access procedure. (see TS 38.321 [3], clause 5.1.4). Value *zero* corresponds to 0, value *dot25* corresponds to 0.25 and so on. |

#### – *RA-PrioritizationForSlicing*

The IE *RA-PrioritizationForSlicing* is used to configure prioritized random access for slicing.

*RA-PrioritizationForSlicing* information element

-- ASN1START

-- TAG-RA-PRIORITIZATIONFORSLICING-START

RA-PrioritizationForSlicing-r17 ::= SEQUENCE {

ra-PrioritizationSliceInfoList-r17 RA-PrioritizationSliceInfoList-r17,

...

}

RA-PrioritizationSliceInfoList-r17 ::= SEQUENCE (SIZE (1..maxSliceInfo-r17)) OF RA-PrioritizationSliceInfo-r17

RA-PrioritizationSliceInfo-r17 ::= SEQUENCE {

nsag-ID-List-r17 SEQUENCE (SIZE (1..maxSliceInfo-r17)) OF NSAG-ID-r17,

ra-Prioritization-r17 RA-Prioritization,

...

}

-- TAG-RA-PRIORITIZATIONFORSLICING-STOP

-- ASN1STOP

#### – *RadioBearerConfig*

The IE *RadioBearerConfig* is used to add, modify and release signalling, multicast MRBs and/or data radio bearers. Specifically, this IE carries the parameters for PDCP and, if applicable, SDAP entities for the radio bearers.

*RadioBearerConfig* information element

-- ASN1START

-- TAG-RADIOBEARERCONFIG-START

RadioBearerConfig ::= SEQUENCE {

srb-ToAddModList SRB-ToAddModList OPTIONAL, -- Cond HO-Conn

srb3-ToRelease ENUMERATED{true} OPTIONAL, -- Need N

drb-ToAddModList DRB-ToAddModList OPTIONAL, -- Cond HO-toNR

drb-ToReleaseList DRB-ToReleaseList OPTIONAL, -- Need N

securityConfig SecurityConfig OPTIONAL, -- Need M

...,

[[

mrb-ToAddModList-r17 MRB-ToAddModList-r17 OPTIONAL, -- Need N

mrb-ToReleaseList-r17 MRB-ToReleaseList-r17 OPTIONAL, -- Need N

srb4-ToAddMod-r17 SRB-ToAddMod OPTIONAL, -- Need N

srb4-ToRelease-r17 ENUMERATED{true} OPTIONAL -- Need N

]],

[[

srb5-ToAddMod-r18 SRB-ToAddMod OPTIONAL, -- Need N

srb5-ToRelease-r18 ENUMERATED{true} OPTIONAL -- Need N

]]

}

SRB-ToAddModList ::= SEQUENCE (SIZE (1..2)) OF SRB-ToAddMod

SRB-ToAddMod ::= SEQUENCE {

srb-Identity SRB-Identity,

reestablishPDCP ENUMERATED{true} OPTIONAL, -- Need N

discardOnPDCP ENUMERATED{true} OPTIONAL, -- Need N

pdcp-Config PDCP-Config OPTIONAL, -- Cond PDCP

...,

[[

srb-Identity-v1700 SRB-Identity-v1700 OPTIONAL -- Need M

]],

[[

srb-Identity-v1800 SRB-Identity-v1800 OPTIONAL, -- Need M

n3c-BearerAssociated-r18 ENUMERATED{true} OPTIONAL -- Cond N3C MP

]]

}

DRB-ToAddModList ::= SEQUENCE (SIZE (1..maxDRB)) OF DRB-ToAddMod

DRB-ToAddMod ::= SEQUENCE {

cnAssociation CHOICE {

eps-BearerIdentity INTEGER (0..15),

sdap-Config SDAP-Config

} OPTIONAL, -- Cond DRBSetup

drb-Identity DRB-Identity,

reestablishPDCP ENUMERATED{true} OPTIONAL, -- Need N

recoverPDCP ENUMERATED{true} OPTIONAL, -- Need N

pdcp-Config PDCP-Config OPTIONAL, -- Cond PDCP

...,

[[

daps-Config-r16 ENUMERATED{true} OPTIONAL -- Cond DAPS

]],

[[

n3c-BearerAssociated-r18 ENUMERATED{true} OPTIONAL -- Cond N3C MP

]]

}

DRB-ToReleaseList ::= SEQUENCE (SIZE (1..maxDRB)) OF DRB-Identity

SecurityConfig ::= SEQUENCE {

securityAlgorithmConfig SecurityAlgorithmConfig OPTIONAL, -- Cond RBTermChange1

keyToUse ENUMERATED{master, secondary} OPTIONAL, -- Cond RBTermChange

...

}

MRB-ToAddModList-r17 ::= SEQUENCE (SIZE (1..maxMRB-r17)) OF MRB-ToAddMod-r17

MRB-ToAddMod-r17 ::= SEQUENCE {

mbs-SessionId-r17 TMGI-r17 OPTIONAL, -- Cond MRBSetup

mrb-Identity-r17 MRB-Identity-r17,

mrb-IdentityNew-r17 MRB-Identity-r17 OPTIONAL, -- Need N

reestablishPDCP-r17 ENUMERATED{true} OPTIONAL, -- Need N

recoverPDCP-r17 ENUMERATED{true} OPTIONAL, -- Need N

pdcp-Config-r17 PDCP-Config OPTIONAL, -- Cond PDCP

...

}

MRB-ToReleaseList-r17 ::= SEQUENCE (SIZE (1..maxMRB-r17)) OF MRB-Identity-r17

-- TAG-RADIOBEARERCONFIG-STOP

-- ASN1STOP

|  |
| --- |
| *DRB-ToAddMod* and *MRB-ToAddMod* field descriptions |
| ***cnAssociation***  Indicates if the bearer is associated with the *eps-bearerIdentity* (when connected to EPC) or *sdap-Config* (when connected to 5GC). |
| ***daps-Config***  Indicates that the bearer is configured as DAPS bearer. The network does not include this field in an *RRCReconfiguration* message contained within a *LTM-Config* IE*.* |
| ***drb-Identity***  In case of DC, the DRB identity is unique within the scope of the UE, i.e. an MCG DRB cannot use the same value as a split DRB. For a split DRB the same identity is used for the MCG and SCG parts/indirect path of the configuration. |
| ***eps-BearerIdentity***  The EPS bearer ID determines the EPS bearer. |
| ***mbs-SessionId***  Indicates which multicast MBS session the bearer is associated with. |
| ***mrb-Identity***  Identification of the multicast MRB. |
| ***mrb-IdentityNew***  New identity of the multicast MRB when *mrb-Identity* needs to be changed, e.g. as a result of a handover. |
| ***n3c-BearerAssociated***  Indicates that the radio bearer is associated with the N3C indirect path. |
| ***reestablishPDCP***  Indicates that PDCP should be re-established. Network sets this to *true* whenever the security key used for this radio bearer changes. Key change could for example be due to termination point change for the bearer, reconfiguration with sync, resuming an RRC connection, or the first reconfiguration after reestablishment. It is also applicable for LTE procedures when NR PDCP is configured. Network doesn't include this field for DRB if the bearer is configured as DAPS bearer, if the *RadioBearerConfig* IE is part of an *RRCReconfiguration* message within the *LTM-Config* IE, or if the *RadioBearerConfig* IE is part of an *RRCReconfiguration* message associated with subsequent CPAC within the *ConditionalReconfiguration* IE |
| ***recoverPDCP***  Indicates that PDCP should perform recovery according to TS 38.323 [5]. Network doesn't include this field if the bearer is configured as DAPS bearer, if the *RadioBearerConfig* IE is part of an *RRCReconfiguration* message within the *LTM-Config* IE, or if the *RadioBearerConfig* IE is part of an *RRCReconfiguration* message associated with subsequent CPAC within the *ConditionalReconfiguration* IE. |
| ***sdap-Config***  The SDAP configuration determines how to map QoS flows to DRBs when NR or E-UTRA connects to the 5GC and presence/absence of UL/DL SDAP headers. |

|  |
| --- |
| *RadioBearerConfig* field descriptions |
| ***securityConfig***  Indicates the security algorithm and key to use for the signalling and data radio bearers configured with the list in this IE *RadioBearerConfig*. When the field is not included after AS security has been activated, the UE shall continue to use the currently configured *keyToUse* and security algorithm for the radio bearers reconfigured with the lists in this IE *RadioBearerConfig*. The field is not included when configuring SRB1 before AS security is activated. |
| ***srb3-ToRelease***  Release SRB3. SRB3 release can only be done over SRB1 and only at SCG release and reconfiguration with sync. |

|  |
| --- |
| *SecurityConfig* field descriptions |
| ***keyToUse***  Indicates if the bearers configured with the list in this IE *RadioBearerConfig* are using the master key or the secondary key for deriving ciphering and/or integrity protection keys. For MR-DC, network should not configure SRB1 and SRB2 with secondary key and SRB3 with the master key. When the field is not included, the UE shall continue to use the currently configured *keyToUse* for the radio bearers reconfigured with the lists in this IE *RadioBearerConfig*. |
| ***securityAlgorithmConfig***  Indicates the security algorithm for the signalling and data radio bearers configured with the list in this IE *RadioBearerConfig*. When the field is not included, the UE shall continue to use the currently configured security algorithm for the radio bearers reconfigured with the lists in this IE *RadioBearerConfig*. |

|  |
| --- |
| *SRB-ToAddMod* field descriptions |
| ***discardOnPDCP***  Indicates that PDCP should discard stored SDU and PDU according to TS 38.323 [5]. Network doesn't include this field if the *RadioBearerConfig* IE is part of an *RRCReconfiguration* message associated with subsequent CPAC within the *ConditionalReconfiguration* IE which is received within a MCG *RRCReconfiguration* message via SRB1. |
| ***reestablishPDCP***  Indicates that PDCP should be re-established. Network sets this to *true* whenever the security key used for this radio bearer changes. Key change could for example be due to reconfiguration with sync, for SRB2 when resuming an RRC connection, or at the first reconfiguration after RRC connection reestablishment in NR. For SRB1, when resuming an RRC connection, or at the first reconfiguration after RRC connection reestablishment in NR, the network does not set this field to *true*. For LTE SRBs using NR PDCP, it could be for handover, RRC connection reestablishment or resume. Network doesn't include this field if any DAPS bearer is configured or if the *RadioBearerConfig* IE is part of an *RRCReconfiguration* message within the *LTM-Config* IE. For SRB3, network doesn't include this field if the *RadioBearerConfig* IE is part of an *RRCReconfiguration* message associated with subsequent CPAC within the *ConditionalReconfiguration* IE. |
| ***srb-Identity, srb-Identity-v1700, srb-Identity-v1800***  Value 1 is applicable for SRB1 only. Value 2 is applicable for SRB2 only. Value 3 is applicable for SRB3 only. Value 4 is applicable for SRB4 only. Value 5 is applicable for SRB5 only. If *srb-Identity-v1700* or *srb-Identity-v1800* is received for an SRB, the UE shall ignore *srb-Identity* (i.e. without suffix) for this SRB. |

|  |  |
| --- | --- |
| Conditional Presence | Explanation |
| *RBTermChange* | The field is mandatory present in case of:  - set up of signalling and data radio bearer,  - change of termination point for the radio bearer between MN and SN.  It is optionally present otherwise, Need S. |
| *RBTermChange1* | The field is mandatory present in case of:  - set up of signalling and data radio bearer,  - change of termination point for the radio bearer between MN and SN,  - handover from E-UTRA/EPC or E-UTRA/5GC to NR,  - handover from NR or E-UTRA/EPC to E-UTRA/5GC if the UE supports NGEN-DC.  It is optionally present otherwise, Need S. |
| *PDCP* | The field is mandatory present if the corresponding DRB/multicast MRB is being setup or corresponding DRB/multicast MRB is reconfigured with NR PDCP or corresponding SRB associated with two RLC entities is being setup or if the number of RLC bearers associated with the DRB/multicast MRB or SRB is changed. The field is optionally present, Need S, if the corresponding SRB associated with one RLC entity is being setup or corresponding SRB is reconfigured with NR PDCP; otherwise the field is optionally present, need M. |
| *DRBSetup* | The field is mandatory present if the corresponding DRB is being setup; otherwise the field is optionally present, need M. |
| *HO-Conn* | The field is mandatory present  - in case of inter-system handover from E-UTRA/EPC to E-UTRA/5GC or NR,  - or when the *fullConfig* is included in the *RRCReconfiguration* message and NE-DC/NR-DC is not configured,  - or in case of *RRCSetup*.  Otherwise the field is optionally present, need N.  Upon *RRCSetup*, only SRB1 can be present. |
| *HO-toNR* | If *mrb-ToAddModList* is not included, the field is mandatory present for UEs other than NCR-MT  - in case of inter-system handover from E-UTRA/EPC to E-UTRA/5GC or NR,  - or when the *fullConfig* is included in the *RRCReconfiguration* message and NE-DC/NR-DC is not configured.  In case of *RRCSetup*, the field is absent; otherwise the field is optionally present, need N. |
| *DAPS* | The field is optionally present, need N, in case masterCellGroup includes ReconfigurationWithSync, SCell(s) and SCG are not configured, multi-DCI/single-DCI based multi-TRP are not configured in any DL BWP, *supplementaryUplink* is not configured, ethernetHeaderCompression is not configured for the DRB, *conditionalReconfiguration* is not configured, and NR sidelink and V2X sidelink are not configured. Otherwise the field is absent. |
| *MRBSetup* | The field is mandatory present if the corresponding multicast MRB is being setup; otherwise the field is optionally present, need M. |
| *N3C MP* | The field is optionally present if the corresponding radio bearer is being setup for MP with N3C indirect path, need R. It is absent otherwise. |

#### – *RadioLinkMonitoringConfig*

The IE *RadioLinkMonitoringConfig* is used to configure radio link monitoring for detection of beam- and/or cell radio link failure. See also TS 38.321 [3], clause 5.1.1.

*RadioLinkMonitoringConfig* information element

-- ASN1START

-- TAG-RADIOLINKMONITORINGCONFIG-START

RadioLinkMonitoringConfig ::= SEQUENCE {

failureDetectionResourcesToAddModList SEQUENCE (SIZE(1..maxNrofFailureDetectionResources)) OF RadioLinkMonitoringRS

OPTIONAL, -- Need N

failureDetectionResourcesToReleaseList SEQUENCE (SIZE(1..maxNrofFailureDetectionResources)) OF RadioLinkMonitoringRS-Id

OPTIONAL, -- Need N

beamFailureInstanceMaxCount ENUMERATED {n1, n2, n3, n4, n5, n6, n8, n10} OPTIONAL, -- Need R

beamFailureDetectionTimer ENUMERATED {pbfd1, pbfd2, pbfd3, pbfd4, pbfd5, pbfd6, pbfd8, pbfd10} OPTIONAL, -- Need R

...,

[[

beamFailure-r17 BeamFailureDetection-r17 OPTIONAL -- Need R

]]

}

BeamFailureDetection-r17 ::= SEQUENCE {

failureDetectionSet1-r17 BeamFailureDetectionSet-r17 OPTIONAL, -- Need R

failureDetectionSet2-r17 BeamFailureDetectionSet-r17 OPTIONAL, -- Need R

additionalPCI-r17 AdditionalPCIIndex-r17 OPTIONAL -- Need R

}

RadioLinkMonitoringRS ::= SEQUENCE {

radioLinkMonitoringRS-Id RadioLinkMonitoringRS-Id,

purpose ENUMERATED {beamFailure, rlf, both},

detectionResource CHOICE {

ssb-Index SSB-Index,

csi-RS-Index NZP-CSI-RS-ResourceId

},

...

}

BeamFailureDetectionSet-r17 ::= SEQUENCE {

bfdResourcesToAddModList-r17 SEQUENCE (SIZE(1..maxNrofBFDResourcePerSet-r17)) OF BeamLinkMonitoringRS-r17

OPTIONAL, -- Need N

bfdResourcesToReleaseList-r17 SEQUENCE (SIZE(1..maxNrofBFDResourcePerSet-r17)) OF BeamLinkMonitoringRS-Id-r17

OPTIONAL, -- Need N

beamFailureInstanceMaxCount-r17 ENUMERATED {n1, n2, n3, n4, n5, n6, n8, n10} OPTIONAL, -- Need R

beamFailureDetectionTimer-r17 ENUMERATED {pbfd1, pbfd2, pbfd3, pbfd4, pbfd5, pbfd6, pbfd8, pbfd10} OPTIONAL, -- Need R

...

}

BeamLinkMonitoringRS-r17 ::= SEQUENCE {

beamLinkMonitoringRS-Id-r17 BeamLinkMonitoringRS-Id-r17,

detectionResource-r17 CHOICE {

ssb-Index SSB-Index,

csi-RS-Index NZP-CSI-RS-ResourceId

},

...

}

BeamLinkMonitoringRS-Id-r17 ::= INTEGER (0..maxNrofFailureDetectionResources-1-r17)

-- TAG-RADIOLINKMONITORINGCONFIG-STOP

-- ASN1STOP

|  |
| --- |
| *RadioLinkMonitoringConfig* field descriptions |
| ***additionalPCI***  Indicates the physical cell IDs (PCI) of the SSBs in the *failureDetectionSet2*. If *candidateBeamRS-List2* is configured in IE *BeamFailureRecoveryRSConfig* the field indicates the physical cell IDs (PCI) of the SSBs in the *candidateBeamRS-List2*. |
| ***beamFailureDetectionTimer***  Timer for beam failure detection (see TS 38.321 [3], clause 5.17). See also the *BeamFailureRecoveryConfig* IE. Value in number of "Qout,LR reporting periods of Beam Failure Detection" Reference Signal (see TS 38.213 [13], clause 6). Value *pbfd1* corresponds to 1 Qout,LR reporting period of Beam Failure Detection Reference Signal, value *pbfd2* corresponds to 2 Qout,LR reporting periods of Beam Failure Detection Reference Signal and so on. |
| ***beamFailureInstanceMaxCount***  This field determines after how many beam failure events the UE triggers beam failure recovery (see TS 38.321 [3], clause 5.17). Value n1 corresponds to 1 beam failure instance, value n2 corresponds to 2 beam failure instances and so on. |
| ***failureDetectionResourcesToAddModList***  A list of reference signals for detecting beam failure and/or cell level radio link failure (RLF). The limits of the reference signals that the network can configure are specified in TS 38.213 [13], table 5-1. The network configures at most two detectionResources per BWP for the purpose *beamFailure* or *both*. If no RSs are provided for the purpose of beam failure detection, the UE performs beam monitoring based on the activated *TCI-State* for PDCCH as described in TS 38.213 [13], clause 6. If no RSs are provided in this list for the purpose of RLF detection, the UE performs Cell-RLM based on the activated *TCI-State* of PDCCH as described in TS 38.213 [13], clause 5. The network ensures that the UE has a suitable set of reference signals for performing cell-RLM. If *failureDetectionSet1-r17* and *failureDetectionSet2-r17* are present, the *purpose* of *RadioLinkMonitoringRS* in *failureDetectionResourcesToAddModList* only can be set to *rlf*. |
| ***failureDetectionSet1, failureDetectionSet2***  Configures parameters for beamfailure detection towards beam failure detection resources configured in the set. If additional PCIs are configured using *additionalPCI-ToAddModList* for the serving cell, each RS in one set can be associated only with one PCI. Network always configures the *failureDetectionSet1* and *failureDetectionSet2* together. *failureDetectionSetN* is present if and only if *candidateBeamRS-List2-r17* is configured. When a *failureDetectionSetN* is present, after the reconfiguration, the UE shall consider all the reference signals for this failure detection set as activated if at most *maxBFD-RS-resourcesPerSetPerBWP-r17* reference signals are configured for each failure detection set, otherwise the UE shall consider all the reference signals in this failure detection set as deactivated. If *bfdResourcesToAddModList-r17* in *failureDetectionSetN* is not present, the UE determines the RS(es) in each *failureDetectionSetN* as described in TS 38.213 [13], clause 6. |

|  |
| --- |
| *RadioLinkMonitoringRS* field descriptions |
| ***detectionResource***  A reference signal that the UE shall use for radio link monitoring or beam failure detection (depending on the indicated *purpose*). Only periodic 1-port CSI-RS can be configured on SCell for beam failure detection purpose. |
| ***purpose***  Determines whether the UE shall monitor the associated reference signal for the purpose of cell- and/or beam failure detection. For SCell, network only configures the value to beamFailure. |

#### – *RadioLinkMonitoringRS-Id*

The IE *RadioLinkMonitoringRS-Id* is used to identify one *RadioLinkMonitoringRS*.

*RadioLinkMonitoringRS-Id* information element

-- ASN1START

-- TAG-RADIOLINKMONITORINGRS-ID-START

RadioLinkMonitoringRS-Id ::= INTEGER (0..maxNrofFailureDetectionResources-1)

-- TAG-RADIOLINKMONITORINGRS-ID-STOP

-- ASN1STOP

#### – *RAN-AreaCode*

The IE *RAN-AreaCode* is used to identify a RAN area within the scope of a tracking area.

*RAN-AreaCode* information element

-- ASN1START

-- TAG-RAN-AREACODE-START

RAN-AreaCode ::= INTEGER (0..255)

-- TAG-RAN-AREACODE-STOP

-- ASN1STOP

#### – *RateMatchPattern*

The IE *RateMatchPattern* is used to configure one rate matching pattern for PDSCH, see TS 38.214 [19], clause 5.1.4.1.

*RateMatchPattern* information element

-- ASN1START

-- TAG-RATEMATCHPATTERN-START

RateMatchPattern ::= SEQUENCE {

rateMatchPatternId RateMatchPatternId,

patternType CHOICE {

bitmaps SEQUENCE {

resourceBlocks BIT STRING (SIZE (275)),

symbolsInResourceBlock CHOICE {

oneSlot BIT STRING (SIZE (14)),

twoSlots BIT STRING (SIZE (28))

},

periodicityAndPattern CHOICE {

n2 BIT STRING (SIZE (2)),

n4 BIT STRING (SIZE (4)),

n5 BIT STRING (SIZE (5)),

n8 BIT STRING (SIZE (8)),

n10 BIT STRING (SIZE (10)),

n20 BIT STRING (SIZE (20)),

n40 BIT STRING (SIZE (40))

} OPTIONAL, -- Need S

...

},

controlResourceSet ControlResourceSetId

},

subcarrierSpacing SubcarrierSpacing OPTIONAL, -- Cond CellLevel

dummy ENUMERATED { dynamic, semiStatic },

...,

[[

controlResourceSet-r16 ControlResourceSetId-r16 OPTIONAL -- Need R

]]

}

-- TAG-RATEMATCHPATTERN-STOP

-- ASN1STOP

|  |
| --- |
| *RateMatchPattern* field descriptions |
| ***bitmaps***  Indicates rate matching pattern by a pair of bitmaps *resourceBlocks* and *symbolsInResourceBlock* to define the rate match pattern within one or two slots, and a third bitmap *periodicityAndPattern* to define the repetition pattern with which the pattern defined by the above bitmap pair occurs. |
| ***controlResourceSet***  This ControlResourceSet is used as a PDSCH rate matching pattern, i.e., PDSCH reception rate matches around it. In frequency domain, the resource is determined by the frequency domain resource of the CORESET with the corresponding CORESET ID. Time domain resource is determined by the parameters of the associated search space of the CORESET.  If the field *controlResourceSetId-r16* is present, UE shall ignore the *controlResourceSetId* (without suffix). |
| ***periodicityAndPattern***  A time domain repetition pattern at which the pattern defined by *symbolsInResourceBlock* and *resourceBlocks* recurs. This slot pattern repeats itself continuously. Absence of this field indicates the value *n1* (see TS 38.214 [19], clause 5.1.4.1). |
| ***resourceBlocks***  A resource block level bitmap in the frequency domain. A bit in the bitmap set to 1 indicates that the UE shall apply rate matching in the corresponding resource block in accordance with the *symbolsInResourceBlock* bitmap. If used as cell-level rate matching pattern, the bitmap identifies "common resource blocks (CRB)". If used for MBS broadcast CFR, the bitmap identifies "physical resource blocks" inside the MBS broadcast CFR. If used as BWP-level rate matching pattern, the bitmap identifies "physical resource blocks" inside the BWP or MBS multicast CFR. The first/ leftmost bit corresponds to resource block 0, and so on (see TS 38.214 [19], clause 5.1.4.1). |
| ***subcarrierSpacing***  The SubcarrierSpacing for this resource pattern. If the field is absent, the UE applies the SCS of the associated BWP. The value *kHz15* corresponds to µ=0, the value *kHz30* corresponds to µ=1, and so on.  Only the following values are applicable depending on the used frequency (see TS 38.214 [19], clause 5.1.4.1):  FR1: 15, 30 or 60 kHz  FR2-1/FR2-NTN: 60 or 120 kHz  FR2-2: 120, 480, or 960 kHz |
| ***symbolsInResourceBlock***  A symbol level bitmap in time domain. It indicates with a bit set to true that the UE shall rate match around the corresponding symbol. This pattern recurs (in time domain) with the configured periodicityAndPattern (see TS 38.214 [19], clause 5.1.4.1).  For *oneSlot*, if ECP is configured, the first 12 bits represent the symbols within the slot and the last two bits within the bitstring are ignored by the UE; Otherwise, the 14 bits represent the symbols within the slot.  For *twoSlots*, if ECP is configured, the first 12 bits represent the symbols within the first slot and the next 12 bits represent the symbols in the second slot and the last four bits within the bit string are ignored by the UE; Otherwise, the first 14 bits represent the symbols within the first slot and the next 14 bits represent the symbols in the second slot.  For the bits representing symbols in a slot, the most significant bit of the bit string represents the first symbol in the slot and the second most significant bit represents the second symbol in the slot and so on. |

|  |  |
| --- | --- |
| Conditional Presence | Explanation |
| *CellLevel* | The field is mandatory present if the *RateMatchPattern* is defined on cell level. The field is absent when the *RateMatchPattern* is defined on BWP level or defined for MBS broadcast CFR. If the *RateMatchPattern* is defined on BWP level, the UE applies the SCS of the BWP and if *RateMatchPattern* is defined for MBS broadcast CFR, the UE applies the SCS of the initial BWP or RedCap-specific initial BWP (if configured) for (e)RedCap UEs. |

#### – *RateMatchPatternId*

The IE *RateMatchPatternId* identifies one *RateMatchPattern* (see TS 38.214 [19], clause 5.1.4.1).

*RateMatchPatternId* information element

-- ASN1START

-- TAG-RATEMATCHPATTERNID-START

RateMatchPatternId ::= INTEGER (0..maxNrofRateMatchPatterns-1)

-- TAG-RATEMATCHPATTERNID-STOP

-- ASN1STOP

#### – *RateMatchPatternLTE-CRS*

The IE *RateMatchPatternLTE-CRS* is used to configure a pattern to rate match around LTE CRS. See TS 38.214 [19], clause 5.1.4.2.

*RateMatchPatternLTE-CRS* information element

-- ASN1START

-- TAG-RATEMATCHPATTERNLTE-CRS-START

RateMatchPatternLTE-CRS ::= SEQUENCE {

carrierFreqDL INTEGER (0..16383),

carrierBandwidthDL ENUMERATED {n6, n15, n25, n50, n75, n100, spare2, spare1},

mbsfn-SubframeConfigList EUTRA-MBSFN-SubframeConfigList OPTIONAL, -- Need M

nrofCRS-Ports ENUMERATED {n1, n2, n4},

v-Shift ENUMERATED {n0, n1, n2, n3, n4, n5}

}

LTE-CRS-PatternList-r16 ::= SEQUENCE (SIZE (1..maxLTE-CRS-Patterns-r16)) OF RateMatchPatternLTE-CRS

-- TAG-RATEMATCHPATTERNLTE-CRS-STOP

-- ASN1STOP

|  |
| --- |
| *RateMatchPatternLTE-CRS* field descriptions |
| ***carrierBandwidthDL***  BW of the LTE carrier in number of PRBs (see TS 38.214 [19], clause 5.1.4.2). |
| ***carrierFreqDL***  Center of the LTE carrier (see TS 38.214 [19], clause 5.1.4.2). |
| ***mbsfn-SubframeConfigList***  LTE MBSFN subframe configuration (see TS 38.214 [19], clause 5.1.4.2). |
| ***nrofCRS-Ports***  Number of LTE CRS antenna port to rate-match around (see TS 38.214 [19], clause 5.1.4.2). |
| ***v-Shift***  Shifting value v-shift in LTE to rate match around LTE CRS (see TS 38.214 [19], clause 5.1.4.2). |

#### – *ReferenceConfiguration*

The IE *ReferenceConfiguration* is used provide a configuration that is common, within the same cell group, to all configured non-complete candidate configurations.

*ReferenceConfiguration* information element

-- ASN1START

-- TAG-REFERENCECONFIGURATION-START

ReferenceConfiguration-r18 ::= OCTET STRING (CONTAINING RRCReconfiguration)

-- TAG-REFERENCECONFIGURATION-STOP

-- ASN1STOP

#### – *ReferenceLocation*

The IE *ReferenceLocation* contains location information used as a reference location. The value of the field is same as *Ellipsoid-Point* defined in TS37.355 [49]. The first/leftmost bit of the first octet contains the most significant bit.

*ReferenceLocation* information element

-- ASN1START

-- TAG-REFERENCELOCATION-START

ReferenceLocation-r17 ::= OCTET STRING

-- TAG-REFERENCELOCATION-STOP

-- ASN1STOP

#### – *ReferenceTimeInfo*

The IE *ReferenceTimeInfo* contains timing information for 5G internal system clock used for, e.g., time stamping, see TS 23.501 [32], clause 5.27.1.2.

*ReferenceTimeInfo* information element

-- ASN1START

-- TAG-REFERENCETIMEINFO-START

ReferenceTimeInfo-r16 ::= SEQUENCE {

time-r16 ReferenceTime-r16,

uncertainty-r16 INTEGER (0..32767) OPTIONAL, -- Need S

timeInfoType-r16 ENUMERATED {localClock} OPTIONAL, -- Need S

referenceSFN-r16 INTEGER (0..1023) OPTIONAL -- Cond RefTime

}

ReferenceTime-r16 ::= SEQUENCE {

refDays-r16 INTEGER (0..72999),

refSeconds-r16 INTEGER (0..86399),

refMilliSeconds-r16 INTEGER (0..999),

refTenNanoSeconds-r16 INTEGER (0..99999)

}

-- TAG-REFERENCETIMEINFO-STOP

-- ASN1STOP

|  |
| --- |
| *ReferenceTimeInfo* field descriptions |
| ***referenceSFN***  This field indicates the reference SFN corresponding to the reference time information. If *referenceTimeInfo* field is received in *DLInformationTransfer* message, this field indicates the SFN of PCell. |
| ***time***  This field indicates time reference with 10ns granularity. If included in *DLInformationTransfer* and if UE-side TA PDC is de-activated, the indicated time may not be referenced at the network, i.e., gNB may pre-compensate for RF propagation delay. If included in *DLInformationTransfer* and if UE is requested to transmit UE Rx-Tx time difference measurement, the indicated time may not be referenced at the network, i.e., gNB may pre-compensate for RF propagation delay. Otherwise, the indicated time is referenced at the network, i.e., without compensating for RF propagation delay. In an NTN cell, the indicated time is referenced at the uplink time synchronization reference point (RP), i.e., UE should take into account the propagation delay between UE and RP when determining the UTC time at the UE.  The indicated time in 10ns unit from the origin is *refDays*\*86400\*1000\*100000 + *refSeconds*\*1000\*100000 + *refMilliSeconds*\*100000 + *refTenNanoSeconds*. The *refDays* field specifies the sequential number of days (with day count starting at 0) from the origin of the *time* field.  If the *referenceTimeInfo* field is received in *DLInformationTransfer* message, the time field indicates the *time* at the ending boundary of the system frame indicated by *referenceSFN*. The UE considers this frame (indicated by *referenceSFN*) to be the frame which is nearest to the frame where the message is received (which can be either in the past or in the future).  If the *referenceTimeInfo* field is received in *SIB9*, the *time* field indicates the time at the SFN boundary at or immediately after the ending boundary of the SI-window in which *SIB9* is transmitted.  If *referenceTimeInfo* field is received in *SIB9*, this field is excluded when determining changes in system information, i.e. changes of time should neither result in system information change notifications nor in a modification of *valueTag* in *SIB1*.  NOTE: The estimated time in an NTN-cell may be less accurate than the estimated time in a TN-cell. |
| ***timeInfoType***  If *timeInfoType* is not included, the *time* indicates the GPS time and the origin of the *time* field is 00:00:00 on Gregorian calendar date 6 January, 1980 (start of GPS time). If *timeInfoType* is set to *localClock*, the origin of the *time* is unspecified. |
| ***uncertainty***  This field indicates the uncertainty of the reference time information provided by the time field. The uncertainty is 25ns multiplied by this field*.* If this field is absent, the uncertainty is unspecified. |

|  |  |
| --- | --- |
| Conditional Presence | Explanation |
| *RefTime* | The field is mandatory present if *referenceTimeInfo* is included in *DLInformationTransfer* message; otherwise the field is absent. |

#### – *RejectWaitTime*

The IE *RejectWaitTime* is used to provide the value in seconds for timer T302.

*RejectWaitTime* information element

-- ASN1START

-- TAG-REJECTWAITTIME-START

RejectWaitTime ::= INTEGER (1..16)

-- TAG-REJECTWAITTIME-STOP

-- ASN1STOP

#### – *RepetitionSchemeConfig*

The IE *RepetitionSchemeConfig* is used to configure the UE with repetition schemes as specified in TS 38.214 [19] clause 5.1.

*RepetitionSchemeConfig* information element

-- ASN1START

-- TAG-REPETITIONSCHEMECONFIG-START

RepetitionSchemeConfig-r16 ::= CHOICE {

fdm-TDM-r16 SetupRelease { FDM-TDM-r16 },

slotBased-r16 SetupRelease { SlotBased-r16 }

}

RepetitionSchemeConfig-v1630 ::= SEQUENCE {

slotBased-v1630 SetupRelease { SlotBased-v1630 }

}

FDM-TDM-r16 ::= SEQUENCE {

repetitionScheme-r16 ENUMERATED {fdmSchemeA, fdmSchemeB,tdmSchemeA },

startingSymbolOffsetK-r16 INTEGER (0..7) OPTIONAL -- Need R

}

SlotBased-r16 ::= SEQUENCE {

tciMapping-r16 ENUMERATED {cyclicMapping, sequentialMapping},

sequenceOffsetForRV-r16 INTEGER (1..3)

}

SlotBased-v1630 ::= SEQUENCE {

tciMapping-r16 ENUMERATED {cyclicMapping, sequentialMapping},

sequenceOffsetForRV-r16 INTEGER (0)

}

-- TAG-REPETITIONSCHEMECONFIG-STOP

-- ASN1STOP

|  |
| --- |
| *RepetitionSchemeConfig* field descriptions |
| ***fdm-TDM***  Configures UE with a repetition scheme among fdmSchemeA, fdmSchemeB and tdmSchemeA as specified in clause 5.1 of TS 38.214 [19]. The network does not set this field to *release*. Upon reception of this field in *RepetitionSchemeConfig-r16*, the UE shall release *slotBased* if previously configured in the same instance of *RepetitionSchemeConfig-r16*. |
| ***sequenceOffsetForRV***  For slot-based repetition scheme, selected RV sequence is applied to transmission occasions associated to the first TCI state. The RV sequence associated to the second TCI state is determined by a RV offset from that selected RV sequence. |
| ***slotBased***  Configures UE with slot-based repetition scheme. Network always configures this field when the parameter *repetitionNumber* is present in IE *PDSCH-TimeDomainResourceAllocationList.* The network does not set this field to *release*. Upon reception of this field in *RepetitionSchemeConfig-r16*, the UE shall release *fdm-TDM* if previously configured in the same instance of *RepetitionSchemeConfig-r16*. |
| ***startingSymbolOffsetK***  The starting symbol of the second transmission occasion has K symbol offset relative to the last symbol of the first transmission occasion. When UE is configured with *tdmSchemeA,* the parameter *startingSymbolOffsetK* is present, otherwise absent. |
| ***tciMapping***  Enables TCI state mapping method to PDSCH transmission occasions. |

#### – *ReportConfigId*

The IE *ReportConfigId* is used to identify a measurement reporting configuration.

*ReportConfigId* information element

-- ASN1START

-- TAG-REPORTCONFIGID-START

ReportConfigId ::= INTEGER (1..maxReportConfigId)

-- TAG-REPORTCONFIGID-STOP

-- ASN1STOP

#### *– ReportConfigInterRAT*

The IE *ReportConfigInterRAT* specifies criteria for triggering of an inter-RAT measurement reporting event, or an L2 U2N relay measurement reporting event. The inter-RAT measurement reporting events for E-UTRA and UTRA-FDD are labelled B*N* with *N* equal to 1, 2 and so on. The measurement reporting events for L2 U2N relay UE are labelled Y*N* with *N* equal to 1, 2 and so on, and Z1.

Event B1: Neighbour becomes better than absolute threshold;

Event B2: PCell becomes worse than absolute threshold1 AND Neighbour becomes better than another absolute threshold2;

Event Y1: PCell becomes worse than absolute threshold1 AND candidate L2 U2N Relay UE becomes better than another absolute threshold2;

Event Y2: Candidate L2 U2N Relay UE becomes better than absolute threshold;

Event Z1: Serving L2 U2N Relay UE becomes worse than absolute threshold1 AND candidate L2 U2N Relay UE becomes better than another absolute threshold2;

*ReportConfigInterRAT* information element

-- ASN1START

-- TAG-REPORTCONFIGINTERRAT-START

ReportConfigInterRAT ::= SEQUENCE {

reportType CHOICE {

periodical PeriodicalReportConfigInterRAT,

eventTriggered EventTriggerConfigInterRAT,

reportCGI ReportCGI-EUTRA,

...,

reportSFTD ReportSFTD-EUTRA

}

}

ReportCGI-EUTRA ::= SEQUENCE {

cellForWhichToReportCGI EUTRA-PhysCellId,

...,

[[

useAutonomousGaps-r16 ENUMERATED {setup} OPTIONAL -- Need R

]]

}

ReportSFTD-EUTRA ::= SEQUENCE {

reportSFTD-Meas BOOLEAN,

reportRSRP BOOLEAN,

...

}

EventTriggerConfigInterRAT ::= SEQUENCE {

eventId CHOICE {

eventB1 SEQUENCE {

b1-ThresholdEUTRA MeasTriggerQuantityEUTRA,

reportOnLeave BOOLEAN,

hysteresis Hysteresis,

timeToTrigger TimeToTrigger,

...

},

eventB2 SEQUENCE {

b2-Threshold1 MeasTriggerQuantity,

b2-Threshold2EUTRA MeasTriggerQuantityEUTRA,

reportOnLeave BOOLEAN,

hysteresis Hysteresis,

timeToTrigger TimeToTrigger,

...

},

...,

[[

eventB1-UTRA-FDD-r16 SEQUENCE {

b1-ThresholdUTRA-FDD-r16 MeasTriggerQuantityUTRA-FDD-r16,

reportOnLeave-r16 BOOLEAN,

hysteresis-r16 Hysteresis,

timeToTrigger-r16 TimeToTrigger,

...

},

eventB2-UTRA-FDD-r16 SEQUENCE {

b2-Threshold1-r16 MeasTriggerQuantity,

b2-Threshold2UTRA-FDD-r16 MeasTriggerQuantityUTRA-FDD-r16,

reportOnLeave-r16 BOOLEAN,

hysteresis-r16 Hysteresis,

timeToTrigger-r16 TimeToTrigger,

...

}

]],

[[

eventY1-Relay-r17 SEQUENCE {

y1-Threshold1-r17 MeasTriggerQuantity,

y1-Threshold2-Relay-r17 SL-MeasTriggerQuantity-r16,

reportOnLeave-r17 BOOLEAN,

hysteresis-r17 Hysteresis,

timeToTrigger-r17 TimeToTrigger,

...

},

eventY2-Relay-r17 SEQUENCE {

y2-Threshold-Relay-r17 SL-MeasTriggerQuantity-r16,

reportOnLeave-r17 BOOLEAN,

hysteresis-r17 Hysteresis,

timeToTrigger-r17 TimeToTrigger,

...

}

]],

[[

eventZ1-Relay-r18 SEQUENCE {

z1-Threshold1-Relay-r18 SEQUENCE {

sl-RSRP-r18 SL-MeasTriggerQuantity-r16,

sd-RSRP-r18 SL-MeasTriggerQuantity-r16 OPTIONAL -- Need S

},

z1-Threshold2-Relay-r18 SL-MeasTriggerQuantity-r16,

reportOnLeave-r18 BOOLEAN,

hysteresis-r18 Hysteresis,

timeToTrigger-r18 TimeToTrigger,

...

}

]]

},

rsType NR-RS-Type,

reportInterval ReportInterval,

reportAmount ENUMERATED {r1, r2, r4, r8, r16, r32, r64, infinity},

reportQuantity MeasReportQuantity,

maxReportCells INTEGER (1..maxCellReport),

...,

[[

reportQuantityUTRA-FDD-r16 MeasReportQuantityUTRA-FDD-r16 OPTIONAL -- Need R

]],

[[

includeCommonLocationInfo-r16 ENUMERATED {true} OPTIONAL, -- Need R

includeBT-Meas-r16 SetupRelease {BT-NameList-r16} OPTIONAL, -- Need M

includeWLAN-Meas-r16 SetupRelease {WLAN-NameList-r16} OPTIONAL, -- Need M

includeSensor-Meas-r16 SetupRelease {Sensor-NameList-r16} OPTIONAL -- Need M

]],

[[

reportQuantityRelay-r17 SL-MeasReportQuantity-r16 OPTIONAL -- Need R

]],

[[

cellIndividualOffsetList-r18 SEQUENCE (SIZE (1..maxCellMeasEUTRA)) OF CellIndividualOffsetList-EUTRA-r18 OPTIONAL -- Need R

]]

}

PeriodicalReportConfigInterRAT ::= SEQUENCE {

reportInterval ReportInterval,

reportAmount ENUMERATED {r1, r2, r4, r8, r16, r32, r64, infinity},

reportQuantity MeasReportQuantity,

maxReportCells INTEGER (1..maxCellReport),

...,

[[

reportQuantityUTRA-FDD-r16 MeasReportQuantityUTRA-FDD-r16 OPTIONAL -- Need R

]],

[[

includeCommonLocationInfo-r16 ENUMERATED {true} OPTIONAL, -- Need R

includeBT-Meas-r16 SetupRelease {BT-NameList-r16} OPTIONAL, -- Need M

includeWLAN-Meas-r16 SetupRelease {WLAN-NameList-r16} OPTIONAL, -- Need M

includeSensor-Meas-r16 SetupRelease {Sensor-NameList-r16} OPTIONAL -- Need M

]],

[[

reportQuantityRelay-r17 SL-MeasReportQuantity-r16 OPTIONAL -- Need R

]]

}

MeasTriggerQuantityUTRA-FDD-r16 ::= CHOICE{

utra-FDD-RSCP-r16 INTEGER (-5..91),

utra-FDD-EcN0-r16 INTEGER (0..49)

}

MeasReportQuantityUTRA-FDD-r16 ::= SEQUENCE {

cpich-RSCP BOOLEAN,

cpich-EcN0 BOOLEAN

}

CellIndividualOffsetList-EUTRA-r18 ::= SEQUENCE {

physCellId-r18 EUTRA-PhysCellId,

cellIndividualOffset-r18 EUTRA-Q-OffsetRange,

carrierFreq-r18 ARFCN-ValueEUTRA OPTIONAL -- Need R

}

-- TAG-REPORTCONFIGINTERRAT-STOP

-- ASN1STOP

|  |
| --- |
| *ReportConfigInterRAT field descriptions* |
| ***reportType***  Type of the configured measurement report. In (NG)EN-DC, and NR-DC, network does not configure report of type *ReportCGI-EUTRA* for SCG. |

|  |
| --- |
| *ReportCGI-EUTRA field descriptions* |
| ***useAutonomousGaps***  Indicates whether or not the UE is allowed to use autonomous gaps in acquiring system information from the E-UTRAN neighbour cell. When the field is included, the UE applies the corresponding value for T321. |

|  |
| --- |
| *EventTriggerConfigInterRAT* field descriptions |
| ***b2-Threshold1***  NR threshold to be used in inter RAT measurement report triggering condition for event B2. |
| ***bN-ThresholdEUTRA***  E-UTRA threshold value associated with the selected trigger quantity (RSRP, RSRQ, SINR) to be used in inter RAT measurement report triggering condition for event number bN. In the same *eventB2*, the network configures the same CHOICE name (*rsrp*, *rsrq* or *sinr*) for the *MeasTriggerQuantity* of the *b2-Threshold1* and for the *MeasTriggerQuantityEUTRA* of the *b2-Threshold2EUTRA*. |
| ***eventId***  Choice of inter RAT event triggered reporting criteria. |
| ***maxReportCells***  Max number of non-serving cells/candidate L2 U2N Relay UEs to include in the measurement report. |
| ***reportAmount***  *Number* of measurement reports applicable for *eventTriggered* as well as for *periodical* report types |
| ***reportOnLeave***  Indicates whether or not the UE shall initiate the measurement reporting procedure when the leaving condition is met for a cell in *cellsTriggeredList* or for a L2 U2N Relay UE in *relaysTriggeredList*, as specified in 5.5.4.1. |
| ***reportQuantity, reportQuantityUTRA-FDD***  The cell measurement quantities to be included in the measurement report. If the field *eventB1-UTRA-FDD* or *eventB2-UTRA-FDD* is present, the UE shall ignore the value(s) provided in *reportQuantity*. |
| ***reportQuantityRelay***  The L2 U2N Relay UE measurement quantity to be included in measuremet report. |
| ***timeToTrigger***  Time during which specific criteria for the event needs to be met in order to trigger a measurement report. |
| ***bN-ThresholdUTRA-FDD***  UTRA-FDD threshold value associated with the selected trigger quantity (RSCP, EcN0) to be used in inter RAT measurement report triggering condition for event number bN.  *utra-FDD-RSCP* corresponds to CPICH\_RSCP in TS 25.133 [46] for FDD. *utra-FDD-EcN0* corresponds to CPICH\_Ec/No in TS 25.133 [46] for FDD.  For *utra-FDD-RSCP*: The actual value is field value – 115 dBm.  For *utra-FDD-EcN0*: The actual value is (field value – 49)/2 dB. |
| ***y1-Threshold1***  NR threshold to be used in measurement report triggering condition for event Y1. |
| ***y1-Threshold2-Relay***  L2 U2N Relay threshold value associated with the selected trigger quantity (i.e. RSRP) to be used in measurement report triggering condition for event Y1. |
| ***y2-Threshold-Relay***  L2 U2N Relay threshold value associated with the selected trigger quantity (i.e. RSRP) to be used in measurement report triggering condition for event Y2. |
| ***z1-Threshold1-Relay***  L2 U2N Relay threshold value associated with the selected trigger quantity (i.e. SL-RSRP and/or SD-RSRP) to be used in measurement report triggering condition for serving Relay UE in event Z1. If the field sd-RSRP is not included, the UE considers it to be equal to sl-RSRP. |
| ***z1-Threshold2-Relay***  L2 U2N Relay threshold value associated with the selected trigger quantity (i.e. SD-RSRP) to be used in measurement report triggering condition for candidate Relay UE in event Z1. |

|  |
| --- |
| *PeriodicalReportConfigInterRAT* field descriptions |
| ***maxReportCells***  Max number of non-serving cells/candidate L2 U2N Relay UEs to include in the measurement report. |
| ***reportAmount***  Number of measurement reports applicable for *eventTriggered* as well as for *periodical* report types |
| ***reportQuantity, reportQuantityUTRA-FDD***  The cell measurement quantities to be included in the measurement report. If the field *reportQuantityUTRA-FDD* is present, the UE shall ignore the value(s) provided in *reportQuantity*. |

|  |
| --- |
| *CellIndividualOffsetList-EUTRA* field descriptions |
| ***carrierFreq***  Indicates the EUTRA frequency for which *cellIndividualOffset* is applicable. If the field is not configured, the EUTRA frequency indicated by *carrierFreq* within the *MeasObjectEUTRA* of the *measID* associated with this *ReportConfigInterRAT* applies. |
| ***cellIndividualOffset***  Cell individual offsets applicable to a specific measurement event. If this field is present, the UE, for the same cell, shall ignore the cell individual offset configured within the *MeasObjectEUTRA* of the *measID* associated with this *ReportConfigInterRAT*. |
| ***physCellId***  Physical cell identity of a E-UTRAN cell in the cell list. |

#### – *ReportConfigNR*

The IE *ReportConfigNR* specifies criteria for triggering of an NR measurement reporting event or of a CHO, CPA or CPC event or of an L2 U2N relay measurement reporting event. For events labelled AN with N equal to 1, 2 and so on, measurement reporting events and CHO, CPA or CPC events are based on cell measurement results, which can either be derived based on SS/PBCH block or CSI-RS.

Event A1: Serving becomes better than absolute threshold;

Event A2: Serving becomes worse than absolute threshold;

Event A3: Neighbour becomes amount of offset better than PCell/PSCell;

Event A4: Neighbour becomes better than absolute threshold;

Event A5: PCell/PSCell becomes worse than absolute threshold1 AND Neighbour/SCell becomes better than another absolute threshold2;

Event A6: Neighbour becomes amount of offset better than SCell;

Event D1: Distance between UE and a reference location *referenceLocation1* becomes larger than configured threshold *distanceThreshFromReference1* and distance between UE and a reference location *referenceLocation2* becomes shorter than configured threshold *distanceThreshFromReference2*;

Event D2: Distance between UE and the serving cell moving reference location determined based on *movingReferenceLocation* and its corresponding satellite ephemeris and epoch time broadcast in *SIB19* becomes larger than configured threshold *distanceThreshFromReference1* and distance between UE and a moving reference location determined based on *referenceLocation* and its corresponding satellite ephemeris and epoch time for the neighbor cell provided in the associated *MeasObjectNR* becomes shorter than configured threshold *distanceThreshFromReference2*;

CondEvent A3: Conditional reconfiguration candidate becomes amount of offset better than PCell/PSCell;

CondEvent A4: Conditional reconfiguration candidate becomes better than absolute threshold where *condEventA4* can also be used for current PSCell (i.e., in case it is configured as candidate PSCell for CondEvent A4 evaluation) for CHO with candidate SCG(s) case;

CondEvent A5: PCell/PSCell becomes worse than absolute threshold1 AND Conditional reconfiguration candidate becomes better than another absolute threshold2;

CondEvent D1: Distance between UE and a reference location *referenceLocation1* becomes larger than configured threshold *distanceThreshFromReference1* and distance between UE and a reference location *referenceLocation2* of conditional reconfiguration candidate becomes shorter than configured threshold *distanceThreshFromReference2*;

CondEvent D2: Distance between UE and the serving cell moving reference location determined based on *movingReferenceLocation* and its corresponding satellite ephemeris and epoch time broadcast in *SIB19* becomes larger than configured threshold *distanceThreshFromReference1* and distance between UE and a moving reference location determined based on *referenceLocation* and its corresponding satellite ephemeris and epoch time for the conditional reconfiguration candidate provided in the associated *MeasObjectNR* becomes shorter than configured threshold *distanceThreshFromReference2*;

CondEvent T1: Time measured at UE becomes more than configured threshold *t1-Threshold* but is less than *t1-Threshold + duration*;

Event X1: Serving L2 U2N Relay UE becomes worse than absolute threshold1 AND NR Cell becomes better than another absolute threshold2;

Event X2: Serving L2 U2N Relay UE becomes worse than absolute threshold;

For event I1, measurement reporting event is based on CLI measurement results, which can either be derived based on SRS-RSRP or CLI-RSSI.

Event I1: Interference becomes higher than absolute threshold;

The reporting events concerning Aerial UE altitude are labelled H*N* with *N* equal to 1 and 2. Additionally, the reporting events concerning Aerial UE altitude and the neighboring cell measurements simultaneously are labelled A*M*H*N* with *M* equal to 3, 4, 5 and *N* equal to 1, 2.

Event H1: Aerial UE altitude becomes higher than a threshold;

Event H2: Aerial UE altitude becomes lower than a threshold;

Event A3H1: Neighbour becomes offset better than SpCell and the Aerial UE altitude becomes higher than a threshold;

Event A3H2: Neighbour becomes offset better than SpCell and the Aerial UE altitude becomes lower than a threshold;

Event A4H1: Neighbour becomes better than threshold1 and the Aerial UE altitude becomes higher than a threshold2;

Event A4H2: Neighbour becomes better than threshold1 and the Aerial UE altitude becomes lower than a threshold2;

Event A5H1: SpCell becomes worse than threshold1 and neighbour becomes better than threshold2 and the Aerial UE altitude becomes higher than a threshold3;

Event A5H2: SpCell becomes worse than threshold1 and neighbour becomes better than threshold2 and the Aerial UE altitude becomes lower than a threshold3.

*ReportConfigNR* information element

-- ASN1START

-- TAG-REPORTCONFIGNR-START

ReportConfigNR ::= SEQUENCE {

reportType CHOICE {

periodical PeriodicalReportConfig,

eventTriggered EventTriggerConfig,

...,

reportCGI ReportCGI,

reportSFTD ReportSFTD-NR,

condTriggerConfig-r16 CondTriggerConfig-r16,

cli-Periodical-r16 CLI-PeriodicalReportConfig-r16,

cli-EventTriggered-r16 CLI-EventTriggerConfig-r16,

rxTxPeriodical-r17 RxTxPeriodical-r17,

reportOnScellActivation-r18 ReportOnScellActivation-r18

}

}

ReportCGI ::= SEQUENCE {

cellForWhichToReportCGI PhysCellId,

...,

[[

useAutonomousGaps-r16 ENUMERATED {setup} OPTIONAL -- Need R

]]

}

ReportSFTD-NR ::= SEQUENCE {

reportSFTD-Meas BOOLEAN,

reportRSRP BOOLEAN,

...,

[[

reportSFTD-NeighMeas ENUMERATED {true} OPTIONAL, -- Need R

drx-SFTD-NeighMeas ENUMERATED {true} OPTIONAL, -- Need R

cellsForWhichToReportSFTD SEQUENCE (SIZE (1..maxCellSFTD)) OF PhysCellId OPTIONAL -- Need R

]]

}

CondTriggerConfig-r16 ::= SEQUENCE {

condEventId CHOICE {

condEventA3 SEQUENCE {

a3-Offset MeasTriggerQuantityOffset,

hysteresis Hysteresis,

timeToTrigger TimeToTrigger

},

condEventA5 SEQUENCE {

a5-Threshold1 MeasTriggerQuantity,

a5-Threshold2 MeasTriggerQuantity,

hysteresis Hysteresis,

timeToTrigger TimeToTrigger

},

...,

condEventA4-r17 SEQUENCE {

a4-Threshold-r17 MeasTriggerQuantity,

hysteresis-r17 Hysteresis,

timeToTrigger-r17 TimeToTrigger

},

condEventD1-r17 SEQUENCE {

distanceThreshFromReference1-r17 INTEGER(0.. 65525),

distanceThreshFromReference2-r17 INTEGER(0.. 65525),

referenceLocation1-r17 ReferenceLocation-r17,

referenceLocation2-r17 ReferenceLocation-r17,

hysteresisLocation-r17 HysteresisLocation-r17,

timeToTrigger-r17 TimeToTrigger

},

condEventT1-r17 SEQUENCE {

t1-Threshold-r17 INTEGER (0..549755813887),

duration-r17 INTEGER (1..6000)

},

condEventD2-r18 SEQUENCE {

distanceThreshFromReference1-r18 INTEGER(0.. 65535),

distanceThreshFromReference2-r18 INTEGER(0.. 65535),

hysteresisLocation-r18 HysteresisLocation-r17,

timeToTrigger-r18 TimeToTrigger

}

},

rsType-r16 NR-RS-Type,

...,

[[

nesEvent-r18 ENUMERATED {true} OPTIONAL -- Need R

]]

}

EventTriggerConfig ::= SEQUENCE {

eventId CHOICE {

eventA1 SEQUENCE {

a1-Threshold MeasTriggerQuantity,

reportOnLeave BOOLEAN,

hysteresis Hysteresis,

timeToTrigger TimeToTrigger

},

eventA2 SEQUENCE {

a2-Threshold MeasTriggerQuantity,

reportOnLeave BOOLEAN,

hysteresis Hysteresis,

timeToTrigger TimeToTrigger

},

eventA3 SEQUENCE {

a3-Offset MeasTriggerQuantityOffset,

reportOnLeave BOOLEAN,

hysteresis Hysteresis,

timeToTrigger TimeToTrigger,

useAllowedCellList BOOLEAN

},

eventA4 SEQUENCE {

a4-Threshold MeasTriggerQuantity,

reportOnLeave BOOLEAN,

hysteresis Hysteresis,

timeToTrigger TimeToTrigger,

useAllowedCellList BOOLEAN

},

eventA5 SEQUENCE {

a5-Threshold1 MeasTriggerQuantity,

a5-Threshold2 MeasTriggerQuantity,

reportOnLeave BOOLEAN,

hysteresis Hysteresis,

timeToTrigger TimeToTrigger,

useAllowedCellList BOOLEAN

},

eventA6 SEQUENCE {

a6-Offset MeasTriggerQuantityOffset,

reportOnLeave BOOLEAN,

hysteresis Hysteresis,

timeToTrigger TimeToTrigger,

useAllowedCellList BOOLEAN

},

...,

[[

eventX1-r17 SEQUENCE {

x1-Threshold1-Relay-r17 SL-MeasTriggerQuantity-r16,

x1-Threshold2-r17 MeasTriggerQuantity,

reportOnLeave-r17 BOOLEAN,

hysteresis-r17 Hysteresis,

timeToTrigger-r17 TimeToTrigger,

useAllowedCellList-r17 BOOLEAN

},

eventX2-r17 SEQUENCE {

x2-Threshold-Relay-r17 SL-MeasTriggerQuantity-r16,

reportOnLeave-r17 BOOLEAN,

hysteresis-r17 Hysteresis,

timeToTrigger-r17 TimeToTrigger

},

eventD1-r17 SEQUENCE {

distanceThreshFromReference1-r17 INTEGER(1.. 65525),

distanceThreshFromReference2-r17 INTEGER(1.. 65525),

referenceLocation1-r17 ReferenceLocation-r17,

referenceLocation2-r17 ReferenceLocation-r17,

reportOnLeave-r17 BOOLEAN,

hysteresisLocation-r17 HysteresisLocation-r17,

timeToTrigger-r17 TimeToTrigger

}

]],

[[

eventH1-r18 SEQUENCE {

h1-Threshold-r18 Altitude-r18,

h1-Hysteresis-r18 HysteresisAltitude-r18,

reportOnLeave-r18 BOOLEAN,

timeToTrigger-r18 TimeToTrigger,

includeAltitudeUE-r18 BOOLEAN,

simulMultiTriggerSingleMeasReport-r18 BOOLEAN

},

eventH2-r18 SEQUENCE {

h2-Threshold-r18 Altitude-r18,

h2-Hysteresis-r18 HysteresisAltitude-r18,

reportOnLeave-r18 BOOLEAN,

timeToTrigger-r18 TimeToTrigger,

includeAltitudeUE-r18 BOOLEAN,

simulMultiTriggerSingleMeasReport-r18 BOOLEAN

},

eventA3H1-r18 SEQUENCE {

a3-Offset-r18 MeasTriggerQuantityOffset,

reportOnLeave-r18 BOOLEAN,

a3-Hysteresis-r18 Hysteresis,

timeToTrigger-r18 TimeToTrigger,

useAllowedCellList-r18 BOOLEAN,

h1-Threshold-r18 Altitude-r18,

h1-Hysteresis-r18 HysteresisAltitude-r18,

includeAltitudeUE-r18 BOOLEAN,

simulMultiTriggerSingleMeasReport-r18 BOOLEAN

},

eventA3H2-r18 SEQUENCE {

a3-Offset-r18 MeasTriggerQuantityOffset,

reportOnLeave-r18 BOOLEAN,

a3-Hysteresis-r18 Hysteresis,

timeToTrigger-r18 TimeToTrigger,

useAllowedCellList-r18 BOOLEAN,

h2-Threshold-r18 Altitude-r18,

h2-Hysteresis-r18 HysteresisAltitude-r18,

includeAltitudeUE-r18 BOOLEAN,

simulMultiTriggerSingleMeasReport-r18 BOOLEAN

},

eventA4H1-r18 SEQUENCE {

a4-Threshold-r18 MeasTriggerQuantity,

reportOnLeave-r18 BOOLEAN,

a4-Hysteresis-r18 Hysteresis,

timeToTrigger-r18 TimeToTrigger,

useAllowedCellList-r18 BOOLEAN,

h1-Threshold-r18 Altitude-r18,

h1-Hysteresis-r18 HysteresisAltitude-r18,

includeAltitudeUE-r18 BOOLEAN,

simulMultiTriggerSingleMeasReport-r18 BOOLEAN

},

eventA4H2-r18 SEQUENCE {

a4-Threshold-r18 MeasTriggerQuantity,

reportOnLeave-r18 BOOLEAN,

a4-Hysteresis-r18 Hysteresis,

timeToTrigger-r18 TimeToTrigger,

useAllowedCellList-r18 BOOLEAN,

h2-Threshold-r18 Altitude-r18,

h2-Hysteresis-r18 HysteresisAltitude-r18,

includeAltitudeUE-r18 BOOLEAN,

simulMultiTriggerSingleMeasReport-r18 BOOLEAN

},

eventA5H1-r18 SEQUENCE {

a5-Threshold1-r18 MeasTriggerQuantity,

a5-Threshold2-r18 MeasTriggerQuantity,

reportOnLeave-r18 BOOLEAN,

a5-Hysteresis-r18 Hysteresis,

timeToTrigger-r18 TimeToTrigger,

useAllowedCellList-r18 BOOLEAN,

h1-Threshold-r18 Altitude-r18,

h1-Hysteresis-r18 HysteresisAltitude-r18,

includeAltitudeUE-r18 BOOLEAN,

simulMultiTriggerSingleMeasReport-r18 BOOLEAN

},

eventA5H2-r18 SEQUENCE {

a5-Threshold1-r18 MeasTriggerQuantity,

a5-Threshold2-r18 MeasTriggerQuantity,

reportOnLeave-r18 BOOLEAN,

a5-Hysteresis-r18 Hysteresis,

timeToTrigger-r18 TimeToTrigger,

useAllowedCellList-r18 BOOLEAN,

h2-Threshold-r18 Altitude-r18,

h2-Hysteresis-r18 HysteresisAltitude-r18,

includeAltitudeUE-r18 BOOLEAN,

simulMultiTriggerSingleMeasReport-r18 BOOLEAN

},

eventD2-r18 SEQUENCE {

distanceThreshFromReference1-r18 INTEGER(1.. 65535),

distanceThreshFromReference2-r18 INTEGER(1.. 65535),

reportOnLeave-r18 BOOLEAN,

hysteresisLocation-r18 HysteresisLocation-r17,

timeToTrigger-r18 TimeToTrigger

}

]]

},

rsType NR-RS-Type,

reportInterval ReportInterval,

reportAmount ENUMERATED {r1, r2, r4, r8, r16, r32, r64, infinity},

reportQuantityCell MeasReportQuantity,

maxReportCells INTEGER (1..maxCellReport),

reportQuantityRS-Indexes MeasReportQuantity OPTIONAL, -- Need R

maxNrofRS-IndexesToReport INTEGER (1..maxNrofIndexesToReport) OPTIONAL, -- Need R

includeBeamMeasurements BOOLEAN,

reportAddNeighMeas ENUMERATED {setup} OPTIONAL, -- Need R

...,

[[

measRSSI-ReportConfig-r16 MeasRSSI-ReportConfig-r16 OPTIONAL, -- Need R

useT312-r16 BOOLEAN OPTIONAL, -- Need M

includeCommonLocationInfo-r16 ENUMERATED {true} OPTIONAL, -- Need R

includeBT-Meas-r16 SetupRelease {BT-NameList-r16} OPTIONAL, -- Need M

includeWLAN-Meas-r16 SetupRelease {WLAN-NameList-r16} OPTIONAL, -- Need M

includeSensor-Meas-r16 SetupRelease {Sensor-NameList-r16} OPTIONAL -- Need M

]],

[[

coarseLocationRequest-r17 ENUMERATED {true} OPTIONAL, -- Need R

reportQuantityRelay-r17 SL-MeasReportQuantity-r16 OPTIONAL -- Need R

]],

[[

numberOfTriggeringCells-r18 INTEGER (2..maxCellReport) OPTIONAL, -- Need R

cellIndividualOffsetList-r18 SEQUENCE (SIZE (1..maxNrofCellMeas)) OF CellIndividualOffsetList-r18 OPTIONAL, -- Need R

eventX1-SD-Threshold1-r18 SL-MeasTriggerQuantity-r16 OPTIONAL, -- Need S

eventX2-SD-Threshold-r18 SL-MeasTriggerQuantity-r16 OPTIONAL, -- Need S

reportOnBestCellChange-r18 ENUMERATED {n1, n2} OPTIONAL, -- Need R

enteringLeavingReport-r18 ENUMERATED {true} OPTIONAL -- Need R

]]

}

PeriodicalReportConfig ::= SEQUENCE {

rsType NR-RS-Type,

reportInterval ReportInterval,

reportAmount ENUMERATED {r1, r2, r4, r8, r16, r32, r64, infinity},

reportQuantityCell MeasReportQuantity,

maxReportCells INTEGER (1..maxCellReport),

reportQuantityRS-Indexes MeasReportQuantity OPTIONAL, -- Need R

maxNrofRS-IndexesToReport INTEGER (1..maxNrofIndexesToReport) OPTIONAL, -- Need R

includeBeamMeasurements BOOLEAN,

useAllowedCellList BOOLEAN,

...,

[[

measRSSI-ReportConfig-r16 MeasRSSI-ReportConfig-r16 OPTIONAL, -- Need R

includeCommonLocationInfo-r16 ENUMERATED {true} OPTIONAL, -- Need R

includeBT-Meas-r16 SetupRelease {BT-NameList-r16} OPTIONAL, -- Need M

includeWLAN-Meas-r16 SetupRelease {WLAN-NameList-r16} OPTIONAL, -- Need M

includeSensor-Meas-r16 SetupRelease {Sensor-NameList-r16} OPTIONAL, -- Need M

ul-DelayValueConfig-r16 SetupRelease { UL-DelayValueConfig-r16 } OPTIONAL, -- Need M

reportAddNeighMeas-r16 ENUMERATED {setup} OPTIONAL -- Need R

]],

[[

ul-ExcessDelayConfig-r17 SetupRelease { UL-ExcessDelayConfig-r17 } OPTIONAL, -- Need M

coarseLocationRequest-r17 ENUMERATED {true} OPTIONAL, -- Need R

reportQuantityRelay-r17 SL-MeasReportQuantity-r16 OPTIONAL -- Need R

]]

}

NR-RS-Type ::= ENUMERATED {ssb, csi-rs}

MeasTriggerQuantity ::= CHOICE {

rsrp RSRP-Range,

rsrq RSRQ-Range,

sinr SINR-Range

}

MeasTriggerQuantityOffset ::= CHOICE {

rsrp INTEGER (-30..30),

rsrq INTEGER (-30..30),

sinr INTEGER (-30..30)

}

MeasReportQuantity ::= SEQUENCE {

rsrp BOOLEAN,

rsrq BOOLEAN,

sinr BOOLEAN

}

MeasRSSI-ReportConfig-r16 ::= SEQUENCE {

channelOccupancyThreshold-r16 RSSI-Range-r16 OPTIONAL -- Need R

}

CLI-EventTriggerConfig-r16 ::= SEQUENCE {

eventId-r16 CHOICE {

eventI1-r16 SEQUENCE {

i1-Threshold-r16 MeasTriggerQuantityCLI-r16,

reportOnLeave-r16 BOOLEAN,

hysteresis-r16 Hysteresis,

timeToTrigger-r16 TimeToTrigger

},

...

},

reportInterval-r16 ReportInterval,

reportAmount-r16 ENUMERATED {r1, r2, r4, r8, r16, r32, r64, infinity},

maxReportCLI-r16 INTEGER (1..maxCLI-Report-r16),

...

}

CLI-PeriodicalReportConfig-r16 ::= SEQUENCE {

reportInterval-r16 ReportInterval,

reportAmount-r16 ENUMERATED {r1, r2, r4, r8, r16, r32, r64, infinity},

reportQuantityCLI-r16 MeasReportQuantityCLI-r16,

maxReportCLI-r16 INTEGER (1..maxCLI-Report-r16),

...

}

RxTxPeriodical-r17 ::= SEQUENCE {

rxTxReportInterval-r17 RxTxReportInterval-r17 OPTIONAL, -- Need R

reportAmount-r17 ENUMERATED {r1, infinity, spare6, spare5, spare4, spare3, spare2, spare1},

...

}

RxTxReportInterval-r17 ::= ENUMERATED {ms80,ms120,ms160,ms240,ms320,ms480,ms640,ms1024,ms1280,ms2048,ms2560,ms5120,spare4,spare3,spare2,spare1}

MeasTriggerQuantityCLI-r16 ::= CHOICE {

srs-RSRP-r16 SRS-RSRP-Range-r16,

cli-RSSI-r16 CLI-RSSI-Range-r16

}

MeasReportQuantityCLI-r16 ::= ENUMERATED {srs-rsrp, cli-rssi}

ReportOnScellActivation-r18 ::= SEQUENCE {

rsType-r18 NR-RS-Type,

reportQuantityRS-Indexes-r18 MeasReportQuantity,

maxNrofRS-IndexesToReport-r18 INTEGER (1..maxNrofIndexesToReport),

includeBeamMeasurements-r18 BOOLEAN

}

CellIndividualOffsetList-r18 ::= SEQUENCE {

physCellId-r18 PhysCellId,

cellIndividualOffset-r18 Q-OffsetRangeList,

ssbFrequency-r18 ARFCN-ValueNR OPTIONAL -- Need R

}

-- TAG-REPORTCONFIGNR-STOP

-- ASN1STOP

|  |
| --- |
| *CondTriggerConfig* field descriptions |
| ***a3-Offset***  Offset value(s) to be used in NR conditional reconfiguration triggering condition for cond event a3. The actual value is field value \* 0.5 dB. |
| ***a4-Threshold***  Threshold value associated to the selected trigger quantity (e.g. RSRP, RSRQ, SINR) per RS Type (e.g. SS/PBCH block, CSI-RS) to be used in NR conditional reconfiguration triggering condition for cond event a4. |
| ***a5-Threshold1/ a5-Threshold2***  Threshold value associated to the selected trigger quantity (e.g. RSRP, RSRQ, SINR) per RS Type (e.g. SS/PBCH block, CSI-RS) to be used in NR conditional reconfiguration triggering condition for cond event a5. In the same *condeventA5*, the network configures the same quantity for the *MeasTriggerQuantity* of the *a5-Threshold1* and for the *MeasTriggerQuantity* of the *a5-Threshold2*. |
| ***condEventId***  Choice of NR conditional reconfiguration event triggered criteria. |
| ***distanceThreshFromReference1, distanceThreshFromReference2***  Distance from a fixed reference location configured with *referenceLocation1* or *referenceLocation2* for *condEventD1*. Distance from a moving reference location determined by the UE based on the serving cell *movingReferenceLocation* broadcast in *SIB19* or *referenceLocation* and the corresponding epoch time and satellite ephemeris configured within the *MeasObjectNR* associated to the event for *condEventD2*. Each step represents 50m. |
| ***duration***  This field is used for defining the leaving condition T1-2 for conditional HO event *condEventT1*. Each step represents 100ms. |
| ***nesEvent***  Indicates the event is a NES-specific CHO event and the event is only considered to be satisfied if indication from lower layers is received indicating the applicability of NES-specific CHO event and the related entry condition(s) is fulfilled. This field can only be configured for *condEventA3*, *condEventA4* or *condEventA5*. This field cannot be configured for CPAC. |
| ***referenceLocation1, referenceLocation2***  The r*eferenceLocation1* is associated to serving cell and *referenceLocation2* is associated to candidate target cell. |
| ***t1-Threshold***  The field counts the number of UTC seconds in 10 ms units since 00:00:00 on Gregorian calendar date 1 January, 1900 (midnight between Sunday, December 31, 1899 and Monday, January 1, 1900). |
| ***timeToTrigger***  Time during which specific criteria for the event needs to be met in order to execute the conditional reconfiguration evaluation. |

|  |
| --- |
| *ReportConfigNR* field descriptions |
| ***reportType***  Type of the configured measurement report. In MR-DC, network does not configure report of type *reportCGI* using SRB3. The *condTriggerConfig is* used for CHO, CPA or CPC configuration. |

|  |
| --- |
| *ReportCGI* field descriptions |
| ***useAutonomousGaps***  Indicates whether or not the UE is allowed to use autonomous gaps in acquiring system information from the NR neighbour cell. When the field is included, the UE applies the corresponding value for T321. |

|  |
| --- |
| *EventTriggerConfig* field descriptions |
| ***a3-Offset/a6-Offset***  Offset value(s) to be used in NR measurement report triggering condition for event a3/a6. The actual value is field value \* 0.5 dB. |
| ***aN-ThresholdM***  Threshold value associated to the selected trigger quantity (e.g. RSRP, RSRQ, SINR) per RS Type (e.g. SS/PBCH block, CSI-RS) to be used in NR measurement report triggering condition for event number aN. If multiple thresholds are defined for event number aN, the thresholds are differentiated by M. In the same *eventA5*, *eventA5H1, eventA5H2,* the network configures the same quantity for the *MeasTriggerQuantity* of the *a5-Threshold1* and for the *MeasTriggerQuantity* of the *a5-Threshold2*. |
| ***channelOccupancyThreshold***  RSSI threshold which is used for channel occupancy evaluation. |
| ***coarseLocationRequest***  This field is used to request UE to report coarse location information. |
| ***distanceThreshFromReference1, distanceThreshFromReference2***  Distance from a fixed reference location configured with *referenceLocation1* or *referenceLocation2* for *eventD1*. Distance from a moving reference location determined by the UE based on the serving cell *movingReferenceLocation* broadcast in *SIB19* or *referenceLocation* and the corresponding epoch time and satellite ephemeris configured within the *MeasObjectNR* associated to the event for *eventD2*. Each step represents 50m. |
| ***eventId***  Choice of NR event triggered reporting criteria. |
| ***eventXN-SD-Threshold***  Indicates the SD-RSRP threshold value for the serving L2 U2N Relay UE in event *XN* (*N* equals 1 or 2). If this field is not included, the UE considers the SD-RSRP threshold value equals to the one indicated by *x1-Threshold1-Relay*/ *x2-Threshold-Relay*. |
| ***includeAltitudeUE***  This field is used to request UE to report altitude information. |
| ***maxNrofRS-IndexesToReport***  Max number of RS indexes to include in the measurement report for A1-A6 events. |
| ***maxReportCells***  Max number of non-serving cells to include in the measurement report. |
| ***numberOfTriggeringCells***  Indicates the number of cells detected that are required to fulfill an event for a measurement report to be triggered. This field is applicable only for the events concerning neighbor cells, i.e. *eventA3*, *eventA4, eventA5, eventA3H1, eventA3H2, eventA4H1, eventA4H2, eventA5H1, eventA5H2*. |
| ***referenceLocation1, referenceLocation2***  The *referenceLocation1* is associated to serving cell and *referenceLocation2* is associated to neighbour cell. |
| ***reportAddNeighMeas***  Indicates that the UE shall include the best neighbour cells per serving frequency. |
| ***reportAmount***  Number of measurement reports applicable for *eventTriggered* as well as for *periodical* report types. |
| ***reportOnBestCellChange***  Indicates whether the UE shall only send measurement report if the measured best cell (when configured to *n1*) or two best cells (when configured to *n2*) have changed. In this release of the specification, this field is applicable only for the events concerning neighbor cells. This field can only be configured when the value of the field *reportAmount* is set to any other value than *r1*. |
| ***reportOnLeave***  Indicates whether or not the UE shall initiate the measurement reporting procedure when the leaving condition is met for a cell in *cellsTriggeredList* or for a L2 U2N Relay UE in *relaysTriggeredList*, as specified in 5.5.4.1.  Indicates whether or not the UE shall initiate the measurement reporting procedure when the leaving condition is met if configured in *eventD1*, *eventD2*, *eventH1*, *eventH2* as specified in 5.5.4.1. |
| ***reportQuantityCell***  The cell measurement quantities to be included in the measurement report. |
| ***reportQuantityRS-Indexes***  Indicates which measurement information per RS index the UE shall include in the measurement report. |
| ***simulMultiTriggerSingleMeasReport***  Indicates when multiple events with the same *eventID* satisfy the measurement report triggering condition(s), whether to consider only the event with the smallest value between the altitude of the UE and the configured altitude threshold. |
| ***timeToTrigger***  Time during which specific criteria for the event needs to be met in order to trigger a measurement report. |
| ***useAllowedCellList***  Indicates whether only the cells included in the allow-list of the associated measObject are applicable as specified in 5.5.4.1. |
| ***useT312***  If value *TRUE* is configured, the UE shall use the timer T312 with the value *t312* as specified in the corresponding *measObjectNR*. If value FALSE is configured, the timer T312 is considered as disabled. Network configures value *TRUE* only if *reportType* is set to *eventTriggered*. |
| ***xN-ThresholdM***  Threshold value associated to the selected trigger quantity (e.g. RSRP, RSRQ, SINR) per RS Type (e.g. SS/PBCH block, CSI-RS) to be used in NR measurement report triggering condition for event xN. If multiple thresholds are defined for event number xN, the thresholds are differentiated by M. *x1-Threshold1* and *x2-Threshold* indicates the threshold value for the serving L2 U2N Relay UE, *x1-Threshold2* indicates the threshold value for the NR Cells. |

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| --- |
| *CLI-EventTriggerConfig* field descriptions |
| ***i1-Threshold***  Threshold value associated to the selected trigger quantity (e.g. SRS-RSRP, CLI-RSSI) to be used in CLI measurement report triggering condition for event i1. |
| ***eventId***  Choice of CLI event triggered reporting criteria. |
| ***maxReportCLI***  Max number of CLI measurement resource to include in the measurement report. |
| ***reportAmount***  *Number* of measurement reports. |
| ***reportOnLeave***  Indicates whether or not the UE shall initiate the measurement reporting procedure when the leaving condition is met for a CLI measurement resource in *srsTriggeredList* or *rssiTriggeredList*, as specified in 5.5.4.1. |
| ***timeToTrigger***  Time during which specific criteria for the event needs to be met in order to trigger a measurement report. |

|  |
| --- |
| *CLI-PeriodicalReportConfig* field descriptions |
| ***maxReportCLI***  Max number of CLI measurement resource to include in the measurement report. |
| ***reportAmount***  *Number* of measurement reports. |
| ***reportQuantityCLI***  The CLI measurement quantities to be included in the measurement report. |

|  |
| --- |
| *PeriodicalReportConfig* field descriptions |
| ***coarseLocationRequest***  This field is used to request UE to report coarse location information. |
| ***maxNrofRS-IndexesToReport***  Max number of RS indexes to include in the measurement report. |
| ***maxReportCells***  Max number of non-serving cells to include in the measurement report. |
| ***reportAddNeighMeas***  Indicates that the UE shall include the best neighbour cells per serving frequency. |
| ***reportAmount***  *Number* of measurement reports applicable for *eventTriggered* as well as for *periodical* report types |
| ***reportQuantityCell***  The cell measurement quantities to be included in the measurement report. |
| ***reportQuantityRS-Indexes***  Indicates which measurement information per RS index the UE shall include in the measurement report. |
| ***ul-DelayValueConfig***  Indicates that the UE shall perform the actual UL PDCP Packet Average Delay measurement per DRB as specified in TS 38.314 [53] and the UE shall ignore the fields *reportQuantityCell* and *maxReportCells*. The applicable values for the corresponding *reportInterval* are (one of the) {ms120, ms240, ms480, ms640, ms1024, ms2048, ms5120, ms10240, ms20480, ms40960, min1,min6, min12, min30}. The *reportInterval* indicates the periodicity for performing and reporting of UL PDCP Packet Average Delay per DRB measurement as specified in TS 38.314 [53]. |
| ***ul-ExcessDelayConfig***  Indicates that the UE shall perform the actual UL PDCP Excess Packet Delay per DRB measurement as specified in TS 38.314 [53] and the UE shall ignore the fields *reportQuantityCell* and *maxReportCells*. The applicable values for the corresponding *reportInterval* are (one of the) {ms120, ms240, ms480, ms640, ms1024, ms2048, ms5120, ms10240, ms20480, ms40960, min1,min6, min12, min30}. The *reportInterval* indicates the periodicity for performing and reporting of UL PDCP Excess Packet Delay per DRB measurement as specified in TS 38.314 [53]. |
| ***useAllowedCellList***  Indicates whether only the cells included in the allow-list of the associated measObject are applicable as specified in 5.5.4.1. |

|  |
| --- |
| *ReportSFTD-NR* field descriptions |
| ***cellForWhichToReportSFTD***  Indicates the target NR neighbour cells for SFTD measurement between PCell and NR neighbour cells. |
| ***drx-SFTD-NeighMeas***  Indicates that the UE shall use available idle periods (i.e. DRX off periods) for the SFTD measurement in NR standalone. The network only includes *drx-SFTD-NeighMeas* field when *reprtSFTD-NeighMeas* is set to true. |
| ***reportSFTD-Meas***  Indicates whether UE is required to perform SFTD measurement between PCell and NR PSCell in NR-DC. |
| ***reportSFTD-NeighMeas***  Indicates whether UE is required to perform SFTD measurement between PCell and NR neighbour cells in NR standalone. The network does not include this field if *reportSFTD-Meas* is set to *true*. |
| ***reportRSRP***  Indicates whether UE is required to include RSRP result of NR PSCell or NR neighbour cells in SFTD measurement result, derived based on SSB. If it is set to true, the network should ensure that *ssb-ConfigMobility* is included in the measurement object for NR PSCell or NR neighbour cells. |

|  |
| --- |
| *RxTxPeriodical field descriptions* |
| ***reportAmount***  This field indicates the number of UE Rx-Tx time difference measurement reports. If configured to *r1,* the network does not configure *rxTxReportInterval* and only one measurement is reported. If configured to *infinity*, UE periodically reports measurements according to the periodicity configured by *rxTxReportInterval*. |
| ***rxTxReportInterval***  This field indicates the measurement reporting periodicity of UE Rx-Tx time difference. |

|  |
| --- |
| otherfield descriptions |
| ***MeasTriggerQuantity***  SINR is applicable only for CONNECTED mode events. |

|  |
| --- |
| *ReportOnScellActivation* field descriptions |
| ***rsType***  Indicates which RS is used to provide the measurement result. Only value *ssb* can be set in this release. |
| ***reportQuantityRS-Indexes***  Indicates which measurement information per RS index is used to sort the reported measurement results and is included in the measurement report. |
| ***maxNrofRS-IndexesToReport***  Max number of RS indexes to include in the measurement report. |
| ***includeBeamMeasurements***  Indicates whether to include the measurement result per RS index in the measurement report. |

|  |
| --- |
| *CellIndividualOffsetList* field descriptions |
| ***cellIndividualOffset***  Cell individual offsets applicable to a specific measurement event. If this field is present, the UE, for the same cell, shall ignore the cell individual offset configured within the *MeasObjectNR* of the *measID* associated with this *ReportConfigNR*. |
| ***physCellId***  Physical cell identity of a cell in the cell list. |
| ***ssbFrequency***  Indicates the NR frequency of SS for which *cellIndividualOffset* is applicable. If the field is not configured, the NR frequency of SS indicated by *ssbFrequency* indicated within the *MeasObjectNR* of the *measID* associated with this *ReportConfigNR* applies. |

#### – *ReportConfigNR-SL*

The IE *ReportConfigNR-SL* specifies criteria for triggering of a CBR measurement reporting event for NR sidelink communication/discovery. Measurement reporting events are based on CBR measurement results on the corresponding transmission resource pools. These events are labelled CN with N equal to 1 and 2.

Event C1: CBR of NR sidelink communication/discovery is above a threshold;

Event C2: CBR of NR sidelink communication/discovery is below a threshold;

*ReportConfigNR-SL* information element

-- ASN1START

-- TAG-REPORTCONFIGNR-SL-START

ReportConfigNR-SL-r16 ::= SEQUENCE {

reportType-r16 CHOICE {

periodical-r16 PeriodicalReportConfigNR-SL-r16,

eventTriggered-r16 EventTriggerConfigNR-SL-r16

}

}

EventTriggerConfigNR-SL-r16::= SEQUENCE {

eventId-r16 CHOICE {

eventC1 SEQUENCE {

c1-Threshold-r16 SL-CBR-r16,

hysteresis-r16 Hysteresis,

timeToTrigger-r16 TimeToTrigger

},

eventC2-r16 SEQUENCE {

c2-Threshold-r16 SL-CBR-r16,

hysteresis-r16 Hysteresis,

timeToTrigger-r16 TimeToTrigger

},

...

},

reportInterval-r16 ReportInterval,

reportAmount-r16 ENUMERATED {r1, r2, r4, r8, r16, r32, r64, infinity},

reportQuantity-r16 MeasReportQuantity-r16,

...

}

PeriodicalReportConfigNR-SL-r16 ::= SEQUENCE {

reportInterval-r16 ReportInterval,

reportAmount-r16 ENUMERATED {r1, r2, r4, r8, r16, r32, r64, infinity},

reportQuantity-r16 MeasReportQuantity-r16,

...

}

MeasReportQuantity-r16 ::= SEQUENCE {

cbr-r16 BOOLEAN,

...

}

-- TAG-REPORTCONFIGNR-SL-STOP

-- ASN1STOP

|  |
| --- |
| *ReportConfigNR-SL* field descriptions |
| ***reportType***  Type of the configured CBR measurement report for NR sidelink communication/discovery. |

|  |
| --- |
| *EventTriggerConfigNR-SL* field descriptions |
| ***cN-Threshold***  Threshold used for events C1 and C2 specified in clauses 5.5.4.11 and 5.5.4.12, respectively. |
| ***eventId***  Choice of NR event triggered reporting criteria. |
| ***reportAmoun***  Number of measurement reports applicable for *eventTriggered* as well as for *periodical* report types. |
| ***reportQuantity***  The sidelink measurement quantities to be included in the measurement report. In this release, this is set as the CBR measurement result. |
| ***timeToTrigger***  Time during which specific criteria for the event needs to be met in order to trigger a measurement report. |

|  |
| --- |
| *PeriodicalReportConfigNR-SL* field descriptions |
| ***reportAmount***  Number of measurement reports applicable for *eventTriggered* as well as for *periodical* report types. |
| ***reportQuantity***  The sidelink measurement quantities to be included in the measurement report. In this release, this is set as the CBR measurement result. |

#### – *ReportConfigToAddModList*

The IE *ReportConfigToAddModList* concerns a list of reporting configurations to add or modify.

ReportConfigToAddModList information element

-- ASN1START

-- TAG-REPORTCONFIGTOADDMODLIST-START

ReportConfigToAddModList ::= SEQUENCE (SIZE (1..maxReportConfigId)) OF ReportConfigToAddMod

ReportConfigToAddMod ::= SEQUENCE {

reportConfigId ReportConfigId,

reportConfig CHOICE {

reportConfigNR ReportConfigNR,

...,

reportConfigInterRAT ReportConfigInterRAT,

reportConfigNR-SL-r16 ReportConfigNR-SL-r16

}

}

-- TAG-REPORTCONFIGTOADDMODLIST-STOP

-- ASN1STOP

#### – *ReportInterval*

The IE *ReportInterval* indicates the interval between periodical reports. The *ReportInterval* is applicable if the UE performs periodical reporting (i.e. when *reportAmount* exceeds 1) when *reportType* is set to either *eventTriggered*, *periodical*, *cli-EventTriggered* or *cli-Periodical*. Value *ms120* corresponds to 120 ms, value *ms240* corresponds to 240 ms and so on, while value *min1* corresponds to 1 min, *min6* corresponds to 6 min and so on.

*ReportInterval* information element

-- ASN1START

-- TAG-REPORTINTERVAL-START

ReportInterval ::= ENUMERATED {ms120, ms240, ms480, ms640, ms1024, ms2048, ms5120, ms10240, ms20480, ms40960,

min1,min6, min12, min30 }

-- TAG-REPORTINTERVAL-STOP

-- ASN1STOP

#### – *ReselectionThreshold*

The IE *ReselectionThreshold* is used to indicate an Rx level threshold for cell reselection. Actual value of threshold = field value \* 2 [dB].

*ReselectionThreshold* information element

-- ASN1START

-- TAG-RESELECTIONTHRESHOLD-START

ReselectionThreshold ::= INTEGER (0..31)

-- TAG-RESELECTIONTHRESHOLD-STOP

-- ASN1STOP

#### – *ReselectionThresholdQ*

The IE *ReselectionThresholdQ* is used to indicate a quality level threshold for cell reselection. Actual value of threshold = field value [dB].

*ReselectionThresholdQ* information element

-- ASN1START

-- TAG-RESELECTIONTHRESHOLDQ-START

ReselectionThresholdQ ::= INTEGER (0..31)

-- TAG-RESELECTIONTHRESHOLDQ-STOP

-- ASN1STOP

#### – *ResumeCause*

The IE *ResumeCause* is used to indicate the resume cause in *RRCResumeRequest*, *RRCResumeRequest1* and *UEAssistanceInformation*.

*ResumeCause* information element

-- ASN1START

-- TAG-RESUMECAUSE-START

ResumeCause ::= ENUMERATED {emergency, highPriorityAccess, mt-Access, mo-Signalling,

mo-Data, mo-VoiceCall, mo-VideoCall, mo-SMS, rna-Update, mps-PriorityAccess,

mcs-PriorityAccess, mt-SDT-v1810, srs-PosConfigOrActivationReq-v1800, spare3, spare2, spare1 }

-- TAG-RESUMECAUSE-STOP

-- ASN1STOP

#### – *RLC-BearerConfig*

The IE *RLC-BearerConfig* is used to configure an RLC entity, a corresponding logical channel in MAC and the linking to a PDCP entity (served radio bearer).

*RLC-BearerConfig* information element

-- ASN1START

-- TAG-RLC-BEARERCONFIG-START

RLC-BearerConfig ::= SEQUENCE {

logicalChannelIdentity LogicalChannelIdentity,

servedRadioBearer CHOICE {

srb-Identity SRB-Identity,

drb-Identity DRB-Identity

} OPTIONAL, -- Cond LCH-SetupOnly

reestablishRLC ENUMERATED {true} OPTIONAL, -- Need N

rlc-Config RLC-Config OPTIONAL, -- Cond LCH-Setup

mac-LogicalChannelConfig LogicalChannelConfig OPTIONAL, -- Cond LCH-Setup

...,

[[

rlc-Config-v1610 RLC-Config-v1610 OPTIONAL -- Need R

]],

[[

rlc-Config-v1700 RLC-Config-v1700 OPTIONAL, -- Need R

logicalChannelIdentityExt-r17 LogicalChannelIdentityExt-r17 OPTIONAL, -- Cond LCH-SetupModMRB

multicastRLC-BearerConfig-r17 MulticastRLC-BearerConfig-r17 OPTIONAL, -- Cond LCH-SetupOnlyMRB

servedRadioBearerSRB4-r17 SRB-Identity-v1700 OPTIONAL -- Cond LCH-SetupOnlySRB4

]],

[[

servedRadioBearerSRB5-r18 SRB-Identity-v1800 OPTIONAL -- Cond LCH-SetupOnlySRB5

]]

}

MulticastRLC-BearerConfig-r17 ::= SEQUENCE {

servedMBS-RadioBearer-r17 MRB-Identity-r17,

isPTM-Entity-r17 ENUMERATED {true} OPTIONAL -- Need S

}

LogicalChannelIdentityExt-r17 ::= INTEGER (320..65855)

-- TAG-RLC-BEARERCONFIG-STOP

-- ASN1STOP

|  |
| --- |
| *RLC-BearerConfig* field descriptions |
| ***isPTM-Entity***  If configured, indicates that the RLC entity is used for PTM reception. When the field is absent the RLC entity is used for PTP transmission/reception. |
| ***logicalChannelIdentity***  ID used commonly for the MAC logical channel and for the RLC bearer. |
| ***logicalChannelIdentityExt***  Extended logical channel ID used commonly for the MAC logical channel and for the RLC bearer for PTM reception. If this field is configured, the UE shall ignore *logicalChannelIdentity*. |
| ***reestablishRLC***  Indicates that RLC should be re-established. Network sets this to *true* at least whenever the security key used for the radio bearer associated with this RLC entity changes. For SRB2, multicast MRBs and DRBs, unless full configuration is used, it is also set to *true* during the resumption of the RRC connection or the first reconfiguration after reestablishment. For SRB1, when resuming an RRC connection, or at the first reconfiguration after RRC connection reestablishment, the network does not set this field to *true.* The network does not include this field if *servedRadioBearer* is set to *drb-Identity* and the *RLC-BearerConfig* IE is part of an *RRCReconfiguration* message within the *LTM-Config* IE. For DRBs, network doesn't include this field if the *RLC-BearerConfig* IE is part of an *RRCReconfiguration* message associated with subsequent CPAC within the *ConditionalReconfiguration* IE. Network doesn't include this field if the *RadioBearerConfig* IE is part of an *RRCReconfiguration* message associated with subsequent CPAC within the *ConditionalReconfiguration* IE which is received within a MCG *RRCReconfiguration* message via SRB1. |
| ***rlc-Config***  Determines the RLC mode (UM, AM) and provides corresponding parameters. RLC mode reconfiguration can only be performed by DRB/multicast MRB release/addition or full configuration. The network may configure *rlc-Config-v1610* only when *rlc-Config* (without suffix) is set to *am*. |
| ***servedMBS-RadioBearer***  Associates the RLC Bearer with a multicast MRB. The UE shall deliver DL RLC SDUs received via the RLC entity of this RLC bearer to the PDCP entity of the *servedMBS-RadioBearer*. |
| ***servedRadioBearer, servedRadioBearerSRB4, servedRadioBearerSRB5***  Associates the RLC Bearer with an SRB or a DRB. The UE shall deliver DL RLC SDUs received via the RLC entity of this RLC bearer to the PDCP entity of the *servedRadioBearer*. Furthermore, the UE shall advertise and deliver uplink PDCP PDUs of the uplink PDCP entity of the *servedRadioBearer* to the uplink RLC entity of this RLC bearer unless the uplink scheduling restrictions (*moreThanOneRLC* in *PDCP-Config* and the restrictions in *LogicalChannelConfig*) forbid it to do so. |

|  |  |
| --- | --- |
| Conditional Presence | Explanation |
| *LCH-Setup* | This field is mandatory present upon creation of a new logical channel for a DRB or a multicast MRB or SRB4 or SRB5. This field is optionally present, Need S, upon creation of a new logical channel for an SRB except SRB4 and SRB5. It is optionally present, Need M, otherwise. |
| *LCH-SetupModMRB* | This field is optionally present upon creation of a new logical channel for PTM reception for a multicast MRB. If this field is included upon creation of a new logical channel for PTM reception for a multicast MRB, it shall be present when modifying this logical channel. The field is absent for logical channels configured for an SRB and a DRB. |
| *LCH-SetupOnly* | This field is mandatory present upon creation of a new logical channel for a DRB or an SRB (*servedRadioBearer*). It is absent, Need M otherwise. |
| *LCH-SetupOnlyMRB* | This field is mandatory present upon creation of a new logical channel for a multicast MRB and upon modification of *MRB-Identity* of the served MRB. It is absent, Need M otherwise. |
| *LCH-SetupOnlySRB4* | This field is mandatory present upon creation of a new logical channel for SRB4 (*servedRadioBearerSRB4*). It is absent, Need M otherwise. |
| *LCH-SetupOnlySRB5* | This field is mandatory present upon creation of a new logical channel for SRB5 (*servedRadioBearerSRB5*). It is absent, Need M otherwise. |

#### – *RLC-Config*

The IE *RLC-Config* is used to specify the RLC configuration of SRBs, multicast MRBs and DRBs.

*RLC-Config* information element

-- ASN1START

-- TAG-RLC-CONFIG-START

RLC-Config ::= CHOICE {

am SEQUENCE {

ul-AM-RLC UL-AM-RLC,

dl-AM-RLC DL-AM-RLC

},

um-Bi-Directional SEQUENCE {

ul-UM-RLC UL-UM-RLC,

dl-UM-RLC DL-UM-RLC

},

um-Uni-Directional-UL SEQUENCE {

ul-UM-RLC UL-UM-RLC

},

um-Uni-Directional-DL SEQUENCE {

dl-UM-RLC DL-UM-RLC

},

...

}

UL-AM-RLC ::= SEQUENCE {

sn-FieldLength SN-FieldLengthAM OPTIONAL, -- Cond Reestab

t-PollRetransmit T-PollRetransmit,

pollPDU PollPDU,

pollByte PollByte,

maxRetxThreshold ENUMERATED { t1, t2, t3, t4, t6, t8, t16, t32 }

}

DL-AM-RLC ::= SEQUENCE {

sn-FieldLength SN-FieldLengthAM OPTIONAL, -- Cond Reestab

t-Reassembly T-Reassembly,

t-StatusProhibit T-StatusProhibit

}

UL-UM-RLC ::= SEQUENCE {

sn-FieldLength SN-FieldLengthUM OPTIONAL -- Cond Reestab

}

DL-UM-RLC ::= SEQUENCE {

sn-FieldLength SN-FieldLengthUM OPTIONAL, -- Cond Reestab

t-Reassembly T-Reassembly

}

T-PollRetransmit ::= ENUMERATED {

ms5, ms10, ms15, ms20, ms25, ms30, ms35,

ms40, ms45, ms50, ms55, ms60, ms65, ms70,

ms75, ms80, ms85, ms90, ms95, ms100, ms105,

ms110, ms115, ms120, ms125, ms130, ms135,

ms140, ms145, ms150, ms155, ms160, ms165,

ms170, ms175, ms180, ms185, ms190, ms195,

ms200, ms205, ms210, ms215, ms220, ms225,

ms230, ms235, ms240, ms245, ms250, ms300,

ms350, ms400, ms450, ms500, ms800, ms1000,

ms2000, ms4000, ms1-v1610, ms2-v1610, ms3-v1610,

ms4-v1610, spare1}

PollPDU ::= ENUMERATED {

p4, p8, p16, p32, p64, p128, p256, p512, p1024, p2048, p4096, p6144, p8192, p12288, p16384,p20480,

p24576, p28672, p32768, p40960, p49152, p57344, p65536, infinity, spare8, spare7, spare6, spare5, spare4,

spare3, spare2, spare1}

PollByte ::= ENUMERATED {

kB1, kB2, kB5, kB8, kB10, kB15, kB25, kB50, kB75,

kB100, kB125, kB250, kB375, kB500, kB750, kB1000,

kB1250, kB1500, kB2000, kB3000, kB4000, kB4500,

kB5000, kB5500, kB6000, kB6500, kB7000, kB7500,

mB8, mB9, mB10, mB11, mB12, mB13, mB14, mB15,

mB16, mB17, mB18, mB20, mB25, mB30, mB40, infinity,

spare20, spare19, spare18, spare17, spare16,

spare15, spare14, spare13, spare12, spare11,

spare10, spare9, spare8, spare7, spare6, spare5,

spare4, spare3, spare2, spare1}

T-Reassembly ::= ENUMERATED {

ms0, ms5, ms10, ms15, ms20, ms25, ms30, ms35,

ms40, ms45, ms50, ms55, ms60, ms65, ms70,

ms75, ms80, ms85, ms90, ms95, ms100, ms110,

ms120, ms130, ms140, ms150, ms160, ms170,

ms180, ms190, ms200, spare1}

T-StatusProhibit ::= ENUMERATED {

ms0, ms5, ms10, ms15, ms20, ms25, ms30, ms35,

ms40, ms45, ms50, ms55, ms60, ms65, ms70,

ms75, ms80, ms85, ms90, ms95, ms100, ms105,

ms110, ms115, ms120, ms125, ms130, ms135,

ms140, ms145, ms150, ms155, ms160, ms165,

ms170, ms175, ms180, ms185, ms190, ms195,

ms200, ms205, ms210, ms215, ms220, ms225,

ms230, ms235, ms240, ms245, ms250, ms300,

ms350, ms400, ms450, ms500, ms800, ms1000,

ms1200, ms1600, ms2000, ms2400, spare2, spare1}

SN-FieldLengthUM ::= ENUMERATED {size6, size12}

SN-FieldLengthAM ::= ENUMERATED {size12, size18}

RLC-Config-v1610 ::= SEQUENCE {

dl-AM-RLC-v1610 DL-AM-RLC-v1610

}

RLC-Config-v1700 ::= SEQUENCE {

dl-AM-RLC-v1700 DL-AM-RLC-v1700,

dl-UM-RLC-v1700 DL-UM-RLC-v1700

}

DL-AM-RLC-v1610 ::= SEQUENCE {

t-StatusProhibit-v1610 T-StatusProhibit-v1610 OPTIONAL, -- Need R

...

}

DL-AM-RLC-v1700 ::= SEQUENCE {

t-ReassemblyExt-r17 T-ReassemblyExt-r17 OPTIONAL -- Need R

}

DL-UM-RLC-v1700 ::= SEQUENCE {

t-ReassemblyExt-r17 T-ReassemblyExt-r17 OPTIONAL -- Need R

}

T-StatusProhibit-v1610 ::= ENUMERATED { ms1, ms2, ms3, ms4, spare4, spare3, spare2, spare1}

T-ReassemblyExt-r17 ::= ENUMERATED {ms210, ms220, ms340, ms350, ms550, ms1100, ms1650, ms2200}

-- TAG-RLC-CONFIG-STOP

-- ASN1STOP

| *RLC-Config* field descriptions |
| --- |
| ***maxRetxThreshold***  Parameter for RLC AM in TS 38.322 [4]. Value *t1* corresponds to 1 retransmission, value *t2* corresponds to 2 retransmissions and so on. |
| ***pollByte***  Parameter for RLC AM in TS 38.322 [4]. Value *kB25* corresponds to 25 kBytes, value *kB50* corresponds to 50 kBytes and so on. *infinity* corresponds to an infinite amount of kBytes. |
| ***pollPDU***  Parameter for RLC AM in TS 38.322 [4]. Value *p4* corresponds to 4 PDUs, value *p8* corresponds to 8 PDUs and so on. *infinity* corresponds to an infinite number of PDUs. |
| ***sn-FieldLength***  Indicates the RLC SN field size, see TS 38.322 [4], in bits. Value *size6* means 6 bits, value *size12* means 12 bits, value *size18* means 18 bits. The value of *sn-FieldLength* of an RLC entity for the DRB/multicast MRB shall be changed only using reconfiguration with sync. The network configures only value *size12* in *SN-FieldLengthAM* for SRB. |
| ***t-PollRetransmit***  Timer for RLC AM in TS 38.322 [4], in milliseconds. Value *ms5* means 5 ms, value *ms10* means 10 ms and so on. |
| ***t-Reassembly, t-ReassemblyExt***  Timer for reassembly in TS 38.322 [4], in milliseconds. Value *ms0* means 0 ms, value *ms5* means 5 ms and so on. If *t-ReassemblyExt-r17* is configured, the UE shall ignore *t-Reassembly* (without suffix). |
| ***t-StatusProhibit***  Timer for status reporting in TS 38.322 [4], in milliseconds. Value *ms0* means 0 ms, value *ms5* means 5 ms and so on. If *t-StatusProhibit-v1610* is present, the UE shall ignore *t-StatusProhibit* (without suffix). |

|  |  |
| --- | --- |
| Conditional Presence | Explanation |
| *Reestab* | The field is mandatory present at RLC bearer setup. It is optionally present, need M, at RLC re-establishment. Otherwise it is absent. Need M. |

#### – *RLF-TimersAndConstants*

The IE *RLF-TimersAndConstants* is used to configure UE specific timers and constants.

*RLF-TimersAndConstants* information element

-- ASN1START

-- TAG-RLF-TIMERSANDCONSTANTS-START

RLF-TimersAndConstants ::= SEQUENCE {

t310 ENUMERATED {ms0, ms50, ms100, ms200, ms500, ms1000, ms2000, ms4000, ms6000},

n310 ENUMERATED {n1, n2, n3, n4, n6, n8, n10, n20},

n311 ENUMERATED {n1, n2, n3, n4, n5, n6, n8, n10},

...,

[[

t311 ENUMERATED {ms1000, ms3000, ms5000, ms10000, ms15000, ms20000, ms30000}

]]

}

-- TAG-RLF-TIMERSANDCONSTANTS-STOP

-- ASN1STOP

| *RLF-TimersAndConstants* field descriptions |
| --- |
| ***n3xy***  Constants are described in clause 7.3. Value *n1* corresponds to 1, value *n2* corresponds to 2 and so on. |
| ***t3xy***  Timers are described in clause 7.1. Value *ms0* corresponds to 0 ms, value *ms50* corresponds to 50 ms and so on. |

#### – *RNTI-Value*

The IE *RNTI-Value* represents a Radio Network Temporary Identity.

*RNTI-Value* information element

-- ASN1START

-- TAG-RNTI-VALUE-START

RNTI-Value ::= INTEGER (0..65535)

-- TAG-RNTI-VALUE-STOP

-- ASN1STOP

#### – *RSRP-Range*

The IE *RSRP-Range* specifies the value range used in RSRP measurements and thresholds. For measurements, integer value for RSRP measurements is according to Table 10.1.6.1-1 in TS 38.133 [14]. For thresholds, the actual value is (IE value – 156) dBm, except for the IE value 127, in which case the actual value is infinity.

*RSRP-Range* information element

-- ASN1START

-- TAG-RSRP-RANGE-START

RSRP-Range ::= INTEGER(0..127)

-- TAG-RSRP-RANGE-STOP

-- ASN1STOP

#### – *RSRQ-Range*

The IE *RSRQ-Range* specifies the value range used in RSRQ measurements and thresholds. For measurements, integer value for RSRQ measurements is according to Table 10.1.11.1-1 in TS 38.133 [14]. For thresholds, the actual value is (IE value – 87) / 2 dB.

*RSRQ-Range* information element

-- ASN1START

-- TAG-RSRQ-RANGE-START

RSRQ-Range ::= INTEGER(0..127)

-- TAG-RSRQ-RANGE-STOP

-- ASN1STOP

#### – *RSSI-Range*

The IE *RSSI-Range* specifies the value range used in RSSI measurements and thresholds for NR operation with shared spectrum channel access. The integer value for RSSI measurements is according to Table 10.1.34.3-1 in TS 38.133 [14].

*RSSI-Range* information element

-- ASN1START

-- TAG-RSSI-RANGE-START

RSSI-Range-r16 ::= INTEGER(0..76)

-- TAG-RSSI-RANGE-STOP

-- ASN1STOP

#### – *RxTxTimeDiff*

The IE *RxTxTimeDiff* contains the Rx-Tx time difference measurement at either the UE or the gNB.

*RxTxTimeDiff* information element

-- ASN1START

-- TAG-RXTXTIMEDIFF-START

RxTxTimeDiff-r17 ::= SEQUENCE {

result-k5-r17 INTEGER (0..61565) OPTIONAL, -- Need N

...

}

-- TAG-RXTXTIMEDIFF-STOP

-- ASN1STOP

|  |
| --- |
| *RxTxTimeDiff field descriptions* |
| ***result-k5***  This field indicates the Rx-Tx time difference measurement, see TS 38.215 [9], clause 10.1.25.3.1 of TS 38.133 [14] for UE Rx-Tx time difference and clause 13.2.1 of TS 38.133 [14] for gNB Rx-Tx time difference. |

#### – *SCellActivationRS-Config*

The IE *SCellActivationRS-Config* is used to configure a Reference Signal for fast activation of the SCell where the IE is included (see TS 38.214 [19], clause 5.2.1.5.3. Usage of an *SCellActivationRS-Config* is indicated by including its *scellActivationRS-Id* in the Enhanced SCell activation MAC CE (see TS 38.321 [3] clause 6.1.3.55).

*SCellActivationRS-Config* information element

-- ASN1START

-- TAG-SCELLACTIVATIONRS-CONFIG-START

SCellActivationRS-Config-r17 ::= SEQUENCE {

scellActivationRS-Id-r17 SCellActivationRS-ConfigId-r17,

resourceSet-r17 NZP-CSI-RS-ResourceSetId,

gapBetweenBursts-r17 INTEGER (2..31) OPTIONAL, -- Need R

qcl-Info-r17 TCI-StateId,

...

}

-- TAG-SCELLACTIVATIONRS-CONFIG-STOP

-- ASN1STOP

|  |
| --- |
| *SCellActivationRS-Config* field descriptions |
| ***gapBetweenBursts***  When this field is present, there are two bursts and it indicates the gap between the two bursts in number of slots. When this field is absent, there is a single burst. |
| ***qcl-Info***  Reference to TCI-State for providing the QCL source and QCL type for each *NZP-CSI-RS-Resource* listed in *nzp-CSI-RS-Resources* of the *NZP-CSI-RS-ResourceSet* indicated by *resourceSet* (see TS 38.214 [19], clause 5.1.6.1.1.1). *TCI-StateId* refers to the *TCI-State* which has this value for *tci-StateId* and is defined in *tci-StatesToAddModList* or *dl-OrJointTCI-StateList* in the *PDSCH-Config* included in the *BWP-Downlink* of this serving cell indicated by *firstActiveDownlinkBWP-Id* in the *ServingCellConfig* in which this IE is included. |
| ***resourceSet***  *nzp-CSI-ResourceSetId* of the *NZP-CSI-RS-ResourceSet* of this serving cell used as resource configuration for one or two bursts for SCell activation. This NZP-CSI-RS-ResourceSet consists of four NZP CSI-RS resources in two consecutive slots with two NZP CSI-RS resources in each slot (see TS 38.214 [19], clause 5.1.6.1.1.1). The CSI-RS associated with this NZP-CSI-RS-ResourceSet are located in the BWP addressed by firstActiveDownlinkBWP-Id. |

#### – *SCellActivationRS-ConfigId*

The IE *SCellActivationRS-ConfigId* is used to identify one *SCellActivationRS-Config*.

*SCellActivationRS-ConfigId* information element

-- ASN1START

-- TAG-SCELLACTIVATIONRS-CONFIGID-START

SCellActivationRS-ConfigId-r17 ::= INTEGER (1.. maxNrofSCellActRS-r17)

-- TAG-SCELLACTIVATIONRS-CONFIGID-STOP

-- ASN1STOP

#### – *SCellIndex*

The IE *SCellIndex* concerns a short identity, used to identify an SCell. The value range is shared across the Cell Groups.

*SCellIndex* information element

-- ASN1START

-- TAG-SCELLINDEX-START

SCellIndex ::= INTEGER (1..31)

-- TAG-SCELLINDEX-STOP

-- ASN1STOP

#### – *SchedulingRequestConfig*

The IE *SchedulingRequestConfig* is used to configure the parameters, for the dedicated scheduling request (SR) resources.

*SchedulingRequestConfig* information element

-- ASN1START

-- TAG-SCHEDULINGREQUESTCONFIG-START

SchedulingRequestConfig ::= SEQUENCE {

schedulingRequestToAddModList SEQUENCE (SIZE (1..maxNrofSR-ConfigPerCellGroup)) OF SchedulingRequestToAddMod

OPTIONAL, -- Need N

schedulingRequestToReleaseList SEQUENCE (SIZE (1..maxNrofSR-ConfigPerCellGroup)) OF SchedulingRequestId

OPTIONAL -- Need N

}

SchedulingRequestToAddMod ::= SEQUENCE {

schedulingRequestId SchedulingRequestId,

sr-ProhibitTimer ENUMERATED {ms1, ms2, ms4, ms8, ms16, ms32, ms64, ms128} OPTIONAL, -- Need S

sr-TransMax ENUMERATED { n4, n8, n16, n32, n64, spare3, spare2, spare1}

}

SchedulingRequestConfig-v1700 ::= SEQUENCE {

schedulingRequestToAddModListExt-v1700 SEQUENCE (SIZE (1..maxNrofSR-ConfigPerCellGroup)) OF SchedulingRequestToAddModExt-v1700

OPTIONAL -- Need N

}

SchedulingRequestToAddModExt-v1700 ::= SEQUENCE {

sr-ProhibitTimer-v1700 ENUMERATED { ms192, ms256, ms320, ms384, ms448, ms512, ms576, ms640, ms1082, spare7, spare6, spare5, spare4, spare3, spare2, spare1}

OPTIONAL -- Need R

}

-- TAG-SCHEDULINGREQUESTCONFIG-STOP

-- ASN1STOP

|  |
| --- |
| *SchedulingRequestConfig* field descriptions |
| ***schedulingRequestToAddModList, schedulingRequestToAddModListExt***  List of Scheduling Request configurations to add or modify. If *schedulingRequestToAddModListExt* is configured, it contains the same number of entries, and in the same order, as *schedulingRequestToAddModList.* |
| ***schedulingRequestToReleaseList***  List of Scheduling Request configurations to release. |

|  |
| --- |
| *SchedulingRequestToAddMod* field descriptions |
| ***schedulingRequestId***  Used to modify a SR configuration and to indicate, in *LogicalChannelConfig*, the SR configuration to which a logical channel is mapped and to indicate, in *SchedulingRequestresourceConfig*, the SR configuration for which a scheduling request resource is used. |
| ***sr-ProhibitTimer***  Timer for SR transmission on PUCCH in TS 38.321 [3]. Value is in ms. Value *ms1* corresponds to 1ms, value *ms2* corresponds to 2ms, and so on. If sr*-ProhibitTimer-v1700* is configured, UE shall ignore *sr-ProhibitTimer* (without suffix). If both sr-ProhibitTimer (without suffix) and sr-ProhibitTimer-v1700 are absent, the UE applies the value 0. |
| ***sr-TransMax***  Maximum number of SR transmissions as described in TS 38.321 [3]. Value *n4* corresponds to 4, value *n8* corresponds to 8, and so on. |

#### – *SchedulingRequestId*

The IE *SchedulingRequestId* is used to identify a Scheduling Request instance in the MAC layer.

*SchedulingRequestId* information element

-- ASN1START

-- TAG-SCHEDULINGREQUESTID-START

SchedulingRequestId ::= INTEGER (0..7)

-- TAG-SCHEDULINGREQUESTID-STOP

-- ASN1STOP

#### – *SchedulingRequestResourceConfig*

The IE *SchedulingRequestResourceConfig* determines physical layer resources on PUCCH where the UE may send the dedicated scheduling request (D-SR) (see TS 38.213 [13], clause 9.2.4).

*SchedulingRequestResourceConfig* information element

-- ASN1START

-- TAG-SCHEDULINGREQUESTRESOURCECONFIG-START

SchedulingRequestResourceConfig ::= SEQUENCE {

schedulingRequestResourceId SchedulingRequestResourceId,

schedulingRequestID SchedulingRequestId,

periodicityAndOffset CHOICE {

sym2 NULL,

sym6or7 NULL,

sl1 NULL, -- Recurs in every slot

sl2 INTEGER (0..1),

sl4 INTEGER (0..3),

sl5 INTEGER (0..4),

sl8 INTEGER (0..7),

sl10 INTEGER (0..9),

sl16 INTEGER (0..15),

sl20 INTEGER (0..19),

sl40 INTEGER (0..39),

sl80 INTEGER (0..79),

sl160 INTEGER (0..159),

sl320 INTEGER (0..319),

sl640 INTEGER (0..639)

} OPTIONAL, -- Need M

resource PUCCH-ResourceId OPTIONAL -- Need M

}

SchedulingRequestResourceConfigExt-v1610 ::= SEQUENCE {

phy-PriorityIndex-r16 ENUMERATED {p0, p1} OPTIONAL, -- Need M

...

}

SchedulingRequestResourceConfigExt-v1700 ::= SEQUENCE {

periodicityAndOffset-r17 CHOICE {

sl1280 INTEGER (0..1279),

sl2560 INTEGER (0..2559),

sl5120 INTEGER (0..5119)

} OPTIONAL -- Need M

}

-- TAG-SCHEDULINGREQUESTRESOURCECONFIG-STOP

-- ASN1STOP

|  |
| --- |
| *SchedulingRequestResourceConfig* field descriptions |
| ***periodicityAndOffset***  SR periodicity and offset in number of symbols or slots (see TS 38.213 [13], clause 9.2.4) The following periodicities may be configured depending on the chosen subcarrier spacing:  SCS = 15 kHz: 2sym, 7sym, 1sl, 2sl, 4sl, 5sl, 8sl, 10sl, 16sl, 20sl, 40sl, 80sl  SCS = 30 kHz: 2sym, 7sym, 1sl, 2sl, 4sl, 5sl, 8sl, 10sl, 16sl, 20sl, 40sl, 80sl, 160sl  SCS = 60 kHz: 2sym, 7sym/6sym, 1sl, 2sl, 4sl, 8sl, 16sl, 20sl, 40sl, 80sl, 160sl, 320sl  SCS = 120 kHz: 2sym, 7sym, 1sl, 2sl, 4sl, 5sl, 8sl, 10sl, 16sl, 40sl, 80sl, 160sl, 320sl, 640sl  SCS = 480 kHz: 1sl, 2sl, 4sl, 8sl, 16sl, 40sl, 80sl, 160sl, 320sl, 640sl, 1280sl, 2560sl  SCS = 960 kHz: 1sl, 2sl, 4sl, 8sl, 16sl, 40sl, 80sl, 160sl, 320sl, 640sl, 1280sl, 2560sl, 5120sl  sym6or7 corresponds to 6 symbols if extended cyclic prefix and a SCS of 60 kHz are configured, otherwise it corresponds to 7 symbols.  For periodicities 2sym, 7sym and sl1 the UE assumes an offset of 0 slots.  If *periodicityAndOffset-r17* is present, any previously configured *periodicityAndOffset* (without suffix) is released, and vice versa.  UE indicates support of the following SR periodicities in *additionalSR-Periodicities* (see TS 38.306, clause 4.2.6):  SCS = 30 kHz: 5sl  SCS = 120 kHz: 5sl, 10sl |
| ***phy-PriorityIndex***  Indicates whether this scheduling request resource is *high* or *low* priority in PHY prioritization/multiplexing handling (see TS 38.213 [13], clause 9.2.4). Value *p0* indicates low priority and value *p1* indicates high priority. |
| ***resource***  ID of the PUCCH resource in which the UE shall send the scheduling request. The actual *PUCCH-Resource* is configured in *PUCCH-Config* of the same UL BWP and serving cell as this *SchedulingRequestResourceConfig*. The network configures a *PUCCH-Resource* of *PUCCH-format0* or *PUCCH-format1* (other formats not supported) (see TS 38.213 [13], clause 9.2.4) |
| ***schedulingRequestID***  The ID of the *SchedulingRequestConfig* that uses this scheduling request resource. |

#### – *SchedulingRequestResourceId*

The IE *SchedulingRequestResourceId* is used to identify scheduling request resources on PUCCH.

*SchedulingRequestResourceId* information element

-- ASN1START

-- TAG-SCHEDULINGREQUESTRESOURCEID-START

SchedulingRequestResourceId ::= INTEGER (1..maxNrofSR-Resources)

-- TAG-SCHEDULINGREQUESTRESOURCEID-STOP

-- ASN1STOP

#### – *ScramblingId*

The IE *ScramblingID* is used for scrambling channels and reference signals.

*ScramblingId* information element

-- ASN1START

-- TAG-SCRAMBLINGID-START

ScramblingId ::= INTEGER(0..1023)

-- TAG-SCRAMBLINGID-STOP

-- ASN1STOP

#### – *SCS-SpecificCarrier*

The IE *SCS-SpecificCarrier* provides parameters determining the location and width of the actual carrier or the carrier bandwidth. It is defined specifically for a numerology (subcarrier spacing (SCS)) and in relation (frequency offset) to Point A.

*SCS-SpecificCarrier* information element

-- ASN1START

-- TAG-SCS-SPECIFICCARRIER-START

SCS-SpecificCarrier ::= SEQUENCE {

offsetToCarrier INTEGER (0..2199),

subcarrierSpacing SubcarrierSpacing,

carrierBandwidth INTEGER (1..maxNrofPhysicalResourceBlocks),

...,

[[

txDirectCurrentLocation INTEGER (0..4095) OPTIONAL -- Need S

]]

}

-- TAG-SCS-SPECIFICCARRIER-STOP

-- ASN1STOP

|  |
| --- |
| *SCS-SpecificCarrier* field descriptions |
| ***carrierBandwidth***  Width of this carrier in number of PRBs (using the *subcarrierSpacing* defined for this carrier) (see TS 38.211 [16], clause 4.4.2). For the case that 12PRB/20 PRB transmission bandwidth is used as specified in TS 38.101-1 [15], TS 38.211[16] and TS 38.213[13], the network shall configure the *carrierBandwidth* to 15 PRB (for the 12 PRB case) and 25 PRB (for the 20 PRB case) respectively and the UE shall use 12PRB/20 PRB as the transmission bandwidth respectively. |
| ***offsetToCarrier***  Offset in frequency domain between Point A (lowest subcarrier of common RB 0) and the lowest usable subcarrier on this carrier in number of PRBs (using the subcarrierSpacing defined for this carrier). The maximum value corresponds to 275\*8-1. See TS 38.211 [16], clause 4.4.2. |
| ***txDirectCurrentLocation***  Indicates the downlink Tx Direct Current location for the carrier. A value in the range 0..3299 indicates the subcarrier index within the carrier. The values in the value range 3301..4095 are reserved and ignored by the UE. If this field is absent for downlink within *ServingCellConfigCommon* and *ServingCellConfigCommonSIB*, the UE assumes the default value of 3300 (i.e. "Outside the carrier"). (see TS 38.211 [16], clause 4.4.2). Network does not configure this field via *ServingCellConfig* or for uplink carriers. |
| ***subcarrierSpacing***  Subcarrier spacing of this carrier. It is used to convert the offsetToCarrier into an actual frequency.  Only the following values are applicable depending on the used frequency:  FR1: 15 or 30 kHz  FR2-1/FR2-NTN: 60 or 120 kHz  FR2-2: 120, 480, or 960 kHz |

#### – *SDAP-Config*

The IE *SDAP-Config* is used to set the configurable SDAP parameters for a data radio bearer. All configured instances of SDAP-Config with the same value of pdu-Session correspond to the same SDAP entity as specified in TS 37.324 [24].

*SDAP-Config* information element

-- ASN1START

-- TAG-SDAP-CONFIG-START

SDAP-Config ::= SEQUENCE {

pdu-Session PDU-SessionID,

sdap-HeaderDL ENUMERATED {present, absent},

sdap-HeaderUL ENUMERATED {present, absent},

defaultDRB BOOLEAN,

mappedQoS-FlowsToAdd SEQUENCE (SIZE (1..maxNrofQFIs)) OF QFI OPTIONAL, -- Need N

mappedQoS-FlowsToRelease SEQUENCE (SIZE (1..maxNrofQFIs)) OF QFI OPTIONAL, -- Need N

...

}

-- TAG-SDAP-CONFIG-STOP

-- ASN1STOP

|  |
| --- |
| *SDAP-Config* field descriptions |
| ***defaultDRB***  Indicates whether or not this is the default DRB for this PDU session. Among all configured instances of *SDAP-Config* with the same value of *pdu-Session*, this field shall be set to *true* in at most one instance of SDAP-Config and to *false* in all other instances. |
| ***mappedQoS-FlowsToAdd***  Indicates the list of QFIs of UL QoS flows of the PDU session to be additionally mapped to this DRB. A QFI value can be included at most once in all configured instances of *SDAP-Config* with the same value of *pdu-Session*. For QoS flow remapping, the QFI value of the remapped QoS flow is only included in *mappedQoS-FlowsToAdd* in *sdap-Config* corresponding to the new DRB and not included in *mappedQoS-FlowsToRelease* in *sdap-Config* corresponding to the old DRB. |
| ***mappedQoS-FlowsToRelease***  Indicates the list of QFIs of QoS flows of the PDU session to be released from existing QoS flow to DRB mapping of this DRB. |
| ***pdu-Session***  Identity of the PDU session whose QoS flows are mapped to the DRB. |
| ***sdap-HeaderUL***  Indicates whether or not a SDAP header is present for UL data on this DRB. The field cannot be changed after a DRB is established. The network sets this field to *present* if the field *defaultDRB* is set to *true*. |
| ***sdap-HeaderDL***  Indicates whether or not a SDAP header is present for DL data on this DRB. The field cannot be changed after a DRB is established. |

#### – *SearchSpace*

The IE *SearchSpace* defines how/where to search for PDCCH candidates. Each search space is associated with one *ControlResourceSet*. For a scheduled SCell in the case of cross carrier scheduling, except for *nrofCandidates*, all the optional fields are absent (regardless of their presence conditions). For a scheduled SpCell in the case of the cross carrier scheduling, if the search space is linked to another search space in the scheduling SCell, all the optional fields of this search space in the scheduled SpCell are absent (regardless of their presence conditions) except for *nrofCandidates*.

*SearchSpace* information element

-- ASN1START

-- TAG-SEARCHSPACE-START

SearchSpace ::= SEQUENCE {

searchSpaceId SearchSpaceId,

controlResourceSetId ControlResourceSetId OPTIONAL, -- Cond SetupOnly

monitoringSlotPeriodicityAndOffset CHOICE {

sl1 NULL,

sl2 INTEGER (0..1),

sl4 INTEGER (0..3),

sl5 INTEGER (0..4),

sl8 INTEGER (0..7),

sl10 INTEGER (0..9),

sl16 INTEGER (0..15),

sl20 INTEGER (0..19),

sl40 INTEGER (0..39),

sl80 INTEGER (0..79),

sl160 INTEGER (0..159),

sl320 INTEGER (0..319),

sl640 INTEGER (0..639),

sl1280 INTEGER (0..1279),

sl2560 INTEGER (0..2559)

} OPTIONAL, -- Cond Setup4

duration INTEGER (2..2559) OPTIONAL, -- Need S

monitoringSymbolsWithinSlot BIT STRING (SIZE (14)) OPTIONAL, -- Cond Setup

nrofCandidates SEQUENCE {

aggregationLevel1 ENUMERATED {n0, n1, n2, n3, n4, n5, n6, n8},

aggregationLevel2 ENUMERATED {n0, n1, n2, n3, n4, n5, n6, n8},

aggregationLevel4 ENUMERATED {n0, n1, n2, n3, n4, n5, n6, n8},

aggregationLevel8 ENUMERATED {n0, n1, n2, n3, n4, n5, n6, n8},

aggregationLevel16 ENUMERATED {n0, n1, n2, n3, n4, n5, n6, n8}

} OPTIONAL, -- Cond Setup

searchSpaceType CHOICE {

common SEQUENCE {

dci-Format0-0-AndFormat1-0 SEQUENCE {

...

} OPTIONAL, -- Need R

dci-Format2-0 SEQUENCE {

nrofCandidates-SFI SEQUENCE {

aggregationLevel1 ENUMERATED {n1, n2} OPTIONAL, -- Need R

aggregationLevel2 ENUMERATED {n1, n2} OPTIONAL, -- Need R

aggregationLevel4 ENUMERATED {n1, n2} OPTIONAL, -- Need R

aggregationLevel8 ENUMERATED {n1, n2} OPTIONAL, -- Need R

aggregationLevel16 ENUMERATED {n1, n2} OPTIONAL -- Need R

},

...

} OPTIONAL, -- Need R

dci-Format2-1 SEQUENCE {

...

} OPTIONAL, -- Need R

dci-Format2-2 SEQUENCE {

...

} OPTIONAL, -- Need R

dci-Format2-3 SEQUENCE {

dummy1 ENUMERATED {sl1, sl2, sl4, sl5, sl8, sl10, sl16, sl20} OPTIONAL, -- Cond Setup

dummy2 ENUMERATED {n1, n2},

...

} OPTIONAL -- Need R

},

ue-Specific SEQUENCE {

dci-Formats ENUMERATED {formats0-0-And-1-0, formats0-1-And-1-1},

...,

[[

dci-Formats-MT-r16 ENUMERATED {formats2-5} OPTIONAL, -- Need R

dci-FormatsSL-r16 ENUMERATED {formats0-0-And-1-0, formats0-1-And-1-1, formats3-0, formats3-1,

formats3-0-And-3-1} OPTIONAL, -- Need R

dci-FormatsExt-r16 ENUMERATED {formats0-2-And-1-2, formats0-1-And-1-1And-0-2-And-1-2}

OPTIONAL -- Need R

]],

[[

dci-FormatsNCR-r18 ENUMERATED {formats2-8} OPTIONAL, -- Need R

dci-FormatsSL-PRS-r18 ENUMERATED {formats3-2, formats3-0-And-3-2, formats3-0-And-3-1-And-3-2,

formats3-1-And-3-2} OPTIONAL -- Need R

]]

}

} OPTIONAL -- Cond Setup2

}

SearchSpaceExt-r16 ::= SEQUENCE {

controlResourceSetId-r16 ControlResourceSetId-r16 OPTIONAL, -- Cond SetupOnly2

searchSpaceType-r16 SEQUENCE {

common-r16 SEQUENCE {

dci-Format2-4-r16 SEQUENCE {

nrofCandidates-CI-r16 SEQUENCE {

aggregationLevel1-r16 ENUMERATED {n1, n2} OPTIONAL, -- Need R

aggregationLevel2-r16 ENUMERATED {n1, n2} OPTIONAL, -- Need R

aggregationLevel4-r16 ENUMERATED {n1, n2} OPTIONAL, -- Need R

aggregationLevel8-r16 ENUMERATED {n1, n2} OPTIONAL, -- Need R

aggregationLevel16-r16 ENUMERATED {n1, n2} OPTIONAL -- Need R

},

...

} OPTIONAL, -- Need R

dci-Format2-5-r16 SEQUENCE {

nrofCandidates-IAB-r16 SEQUENCE {

aggregationLevel1-r16 ENUMERATED {n1, n2} OPTIONAL, -- Need R

aggregationLevel2-r16 ENUMERATED {n1, n2} OPTIONAL, -- Need R

aggregationLevel4-r16 ENUMERATED {n1, n2} OPTIONAL, -- Need R

aggregationLevel8-r16 ENUMERATED {n1, n2} OPTIONAL, -- Need R

aggregationLevel16-r16 ENUMERATED {n1, n2} OPTIONAL -- Need R

},

...

} OPTIONAL, -- Need R

dci-Format2-6-r16 SEQUENCE {

...

} OPTIONAL, -- Need R

...

}

} OPTIONAL, -- Cond Setup3

searchSpaceGroupIdList-r16 SEQUENCE (SIZE (1.. 2)) OF INTEGER (0..1) OPTIONAL, -- Need R

freqMonitorLocations-r16 BIT STRING (SIZE (5)) OPTIONAL -- Need R

}

SearchSpaceExt-v1700 ::= SEQUENCE {

monitoringSlotPeriodicityAndOffset-v1710 CHOICE {

sl32 INTEGER (0..31),

sl64 INTEGER (0..63),

sl128 INTEGER (0..127),

sl5120 INTEGER (0..5119),

sl10240 INTEGER (0..10239),

sl20480 INTEGER (0..20479)

} OPTIONAL, -- Cond Setup5

monitoringSlotsWithinSlotGroup-r17 CHOICE {

slotGroupLength4-r17 BIT STRING (SIZE (4)),

slotGroupLength8-r17 BIT STRING (SIZE (8))

} OPTIONAL, -- Need R

duration-r17 INTEGER (4..20476) OPTIONAL, -- Need R

searchSpaceType-r17 SEQUENCE{

common-r17 SEQUENCE {

dci-Format4-0-r17 SEQUENCE {

...

} OPTIONAL, -- Need R

dci-Format4-1-r17 SEQUENCE {

...

} OPTIONAL, -- Need R

dci-Format4-2-r17 SEQUENCE {

...

} OPTIONAL, -- Need R

dci-Format4-1-AndFormat4-2-r17 SEQUENCE {

...

} OPTIONAL, -- Need R

dci-Format2-7-r17 SEQUENCE {

nrofCandidates-PEI-r17 SEQUENCE {

aggregationLevel4-r17 ENUMERATED {n0, n1, n2, n3, n4} OPTIONAL, -- Need R

aggregationLevel8-r17 ENUMERATED {n0, n1, n2} OPTIONAL, -- Need R

aggregationLevel16-r17 ENUMERATED {n0, n1} OPTIONAL -- Need R

},

...

} OPTIONAL -- Need R

}

} OPTIONAL, -- Need R

searchSpaceGroupIdList-r17 SEQUENCE (SIZE (1.. 3)) OF INTEGER (0.. maxNrofSearchSpaceGroups-1-r17) OPTIONAL, -- Cond DedicatedOnly

searchSpaceLinkingId-r17 INTEGER (0..maxNrofSearchSpacesLinks-1-r17) OPTIONAL -- Cond DedicatedOnly

}

SearchSpaceExt-v1800 ::= SEQUENCE {

searchSpaceType-r18 CHOICE {

common-r18 SEQUENCE {

dci-Format2-9-r18 SEQUENCE {

...

} OPTIONAL, -- Need R

...

},

ue-Specific-r18 SEQUENCE {

dci-FormatsMC-r18 ENUMERATED {formats0-3, formats1-3, formats0-3-And-1-3} OPTIONAL, -- Need R

...

}

} OPTIONAL -- Need R

}

-- TAG-SEARCHSPACE-STOP

-- ASN1STOP

|  |
| --- |
| *SearchSpace* field descriptions |
| ***common***  Configures this search space as common search space (CSS) and DCI formats to monitor. |
| ***controlResourceSetId***  The CORESET applicable for this SearchSpace. Value 0 identifies the common CORESET#0 configured in MIB and in *ServingCellConfigCommon*. Values 1..*maxNrofControlResourceSets-1* identify CORESETs configured in System Information or by dedicated signalling. The CORESETs with *non-zero controlResourceSetId* are configured in the same BWP as this *SearchSpace* except *commonControlResourceSetExt* which is configured by SIB20. If the field *controlResourceSetId-r16* is present, UE shall ignore the *controlResourceSetId* (without suffix). |
| ***dummy1, dummy2***  This field is not used in the specification. If received it shall be ignored by the UE. |
| ***dci-Format0-0-AndFormat1-0***  If configured, the UE monitors the DCI formats 0\_0 and 1\_0 according to TS 38.213 [13], clause 10.1. |
| ***dci-Format2-0***  If configured, UE monitors the DCI format 2\_0 according to TS 38.213 [13], clause 10.1, 11.1.1. |
| ***dci-Format2-1***  If configured, UE monitors the DCI format 2\_1 according to TS 38.213 [13], clause 10.1, 11.2. |
| ***dci-Format2-2***  If configured, UE monitors the DCI format 2\_2 according to TS 38.213 [13], clause 10.1, 11.3. |
| ***dci-Format2-3***  If configured, UE monitors the DCI format 2\_3 according to TS 38.213 [13], clause 10.1, 11.4 |
| ***dci-Format2-4***  If configured, UE monitors the DCI format 2\_4 according to TS 38.213 [13], clause 11.2A. |
| ***dci-Format2-5***  If configured, IAB-MT monitors the DCI format 2\_5 according to TS 38.213 [13], clause 14. |
| ***dci-Format2-6***  If configured, UE monitors the DCI format 2\_6 according to TS 38.213 [13], clause 10.1, 10.3. DCI format 2\_6 can only be configured on the SpCell. |
| ***dci-Format2-7***  If configured, UE monitors the DCI format 2\_7 according to TS 38.213 [13], clause 10.1, 10.4A. |
| ***dci-Format2-9***  If configured, UE monitors the DCI format 2\_9 according to TS 38.213 [13], clause 10.1, 11.5. DCI format 2\_9 can be configured on only one cell in the cell group. |
| ***dci-Format4-0***  If configured, the UE monitors the DCI format 4\_0 with CRC scrambled by MCCH-RNTI/G-RNTI according to TS 38.213 [13], clause [10.1]. |
| ***dci-Format4-1-AndFormat4-2***  If configured, the UE monitors the DCI format 4\_1 and 4\_2 with CRC scrambled by G-RNTI/G-CS-RNTI according to TS 38.213 [13], clause [11.1]. |
| ***dci-Format4-1***  If configured, the UE monitors the DCI format 4\_1 with CRC scrambled by G-RNTI/G-CS-RNTI according to TS 38.213 [13], clause [10.1]. |
| ***dci-Format4-2***  If configured, the UE monitors the DCI format 4\_2 with CRC scrambled by G-RNTI/G-CS-RNTI according to TS 38.213 [13], clause [10.1]. |
| ***dci-Formats***  Indicates whether the UE monitors in this USS for DCI formats 0-0 and 1-0 or for formats 0-1 and 1-1. |
| ***dci-FormatsExt***  If this field is present, the field *dci-Formats* is ignored and *dci-FormatsExt* is used instead to indicate whether the UE monitors in this USS for DCI format 0\_2 and 1\_2 or formats 0\_1 and 1\_1 and 0\_2 and 1\_2 (see TS 38.212 [17], clause 7.3.1 and TS 38.213 [13], clause 10.1). This field is not configured for operation with shared spectrum channel access in this release*.* |
| ***dci-FormatsMC***  Indicates whether the UE monitors in this USS for DCI format 0\_3 or for format 1\_3 or for formats 0\_3 and 1\_3. Separate search space sets for DCI formats in this field and the DCI formats in *ue-Specific* (without suffix) are independently configured.  NOTE: This parameter is used only for *SearchSpace* configured to the scheduling cell, while another *SearchSpace* configured to the reference scheduled cell (if any) configures only *nrofCandidates* (i.e., all other optional fields are absent) with same *searchSpaceId* with that for scheduling cell. |
| ***dci-Formats-MT***  Indicates whether the IAB-MT monitors the DCI formats 2-5 according to TS 38.213 [13], clause 14. |
| ***dci-FormatsNCR***  Indicates whether the NCR-MT monitors the DCI formats 2-8 according to TS 38.213 [13], clause 20. |
| ***dci-FormatsSL***  Indicates whether the UE monitors in this USS for DCI formats 0-0 and 1-0 or for formats 0-1 and 1-1 or for format 3-0 or for format 3-1 or for formats 3-0 and 3-1. If this field is present, the field *dci-Formats* is ignored and *dci-FormatsSL* is used. |
| ***dci-FormatsSL-PRS***  Indicates whether the UE monitors in this USS for DCI formats 3-2 or for formats 3-0 and 3-2 or for formats 3-0 and 3-1 and 3-2 or for formats3-1 and 3-2. If this field is present, the field *dci-Formats* is ignored and *dci-FormatsSL-PRS* is used. |
| ***duration***  Number of consecutive slots that a SearchSpace lasts in every occasion, i.e., upon every period as given in the *periodicityAndOffset*. If the field is absent, the UE applies the value 1 slot, except for DCI format 2\_0. The UE ignores this field for DCI format 2\_0. The maximum valid duration is periodicity-1 (periodicity as given in the *monitoringSlotPeriodicityAndOffset*).  For SCS 480 kHz and SCS 960 kHz, duration-r17 is used, and the configured duration is restricted to be an integer multiple of L slots and smaller than periodicity, where L is the configured length of the bitmap *monitoringSlotsWithinSlotGroup-r17*. If *duration-r17* is absent, the UE assumes the duration in slots is equal to L. The maximum valid duration is periodicity-L.  For IAB-MT, duration indicates number of consecutive slots that a SearchSpace lasts in every occasion, i.e., upon every period as given in the *periodicityAndOffset*. If the field is absent, the IAB-MT applies the value 1 slot, except for DCI format 2\_0 and DCI format 2\_5. The IAB-MT ignores this field for DCI format 2\_0 and DCI format 2\_5. The maximum valid duration is periodicity-1 (periodicity as given in the *monitoringSlotPeriodicityAndOffset*). |
| ***freqMonitorLocations***  Defines an association of the search space to multiple monitoring locations in the frequency domain and indicates whether the pattern configured in the associated CORESET is replicated to a specific RB set, see TS 38.213, clause 10.1. Each bit in the bitmap corresponds to one RB set, and the leftmost (most significant) bit corresponds to RB set 0 in the BWP. A bit set to 1 indicates that a frequency domain resource allocation replicated from the pattern configured in the associated CORESET is mapped to the RB set. |
| ***monitoringSlotPeriodicityAndOffset***  Slots for PDCCH Monitoring configured as periodicity and offset.  For SCS 15, 30, 60, and 120 kHz and if the UE is configured to monitor:  - DCI format 2\_1, only the values 'sl1', 'sl2' or 'sl4' are applicable.  - DCI format 2\_0, only the values ′sl1′, ′sl2′, ′sl4′, ′sl5′, ′sl8′, ′sl10′, ′sl16′, and ′sl20′ are applicable (see TS 38.213 [13], clause 10).  - DCI format 2\_4, only the values 'sl1', 'sl2', 'sl4', 'sl5', 'sl8' and 'sl10' are applicable.  For SCS 480 kHz and if the UE is configured to monitor:  - DCI format 2\_0, only the values 'sl4', 'sl8', 'sl16', 'sl20', 'sl32', 'sl40', 'sl64', and 'sl80' are applicable.  - DCI format 2\_1, only the values ′sl4′, ′sl8′, and ′sl16′ are applicable.  - DCI format 2\_4, only the values 'sl4', 'sl8', 'sl16', 'sl20', 'sl32', 'sl40' are applicable.  For SCS 960 kHz and if the UE is configured to monitor:  - DCI format 2\_0, only the values 'sl8', 'sl16', 'sl32', 'sl40', 'sl64', 'sl80', 'sl128', and 'sl160' are applicable.  - DCI format 2\_1, only the values ′sl8′, ′sl16′, and 'sl32' are applicable.  - DCI format 2\_4, only the values 'sl8', 'sl16', 'sl32', 'sl40', 'sl64', 'sl80' are applicable.  For SCS 480 kHz and SCS 960 kHz, and the configured periodicity and offset are restricted to be an integer multiple of L slots, where L is the configured length of the bitmap provided by *monitoringSlotsWithinSlotGroup-r17*, i.e. for a given periodicity, the offset has a range of {0, L, 2\*L, …, L\*FLOOR(1/L\*(periodicity-1))}.  For IAB-MT, If the IAB-MT is configured to monitor DCI format 2\_1, only the values 'sl1', 'sl2' or 'sl4' are applicable. If the IAB-MT is configured to monitor DCI format 2\_0 or DCI format 2\_5, only the values ′sl1′, ′sl2′, ′sl4′, ′sl5′, ′sl8′, ′sl10′, ′sl16′, and ′sl20′ are applicable (see TS 38.213, clause 10).  If *monitoringSlotPeriodicityAndOffset-v1710* is present, any previously configured *monitoringSlotPeriodicityAndOffset* is released, and if *monitoringSlotPeriodicityAndOffset* is present, any previously configured *monitoringSlotPeriodicityAndOffset-v1710* is released. |
| ***monitoringSlotsWithinSlotGroup***  Indicates which slot(s) within a slot group are configured for multi-slot PDCCH monitoring. The first (leftmost, most significant) bit represents the first slot in the slot group, the second bit represents the second slot in the slot group, and so on. A bit set to '1' indicates that the corresponding slot is configured for multi-slot PDCCH monitoring (see TS 38.213 [13], clause 10). The number of slots for multi-slot PDCCH monitoring is configured according to clause 10 in TS 38.213 [13]. |
| ***monitoringSymbolsWithinSlot***  The first symbol(s) for PDCCH monitoring in the slots configured for (multi-slot) PDCCH monitoring (see *monitoringSlotPeriodicityAndOffset* and *duration*). The most significant (left) bit represents the first OFDM in a slot, and the second most significant (left) bit represents the second OFDM symbol in a slot and so on. The bit(s) set to one identify the first OFDM symbol(s) of the control resource set within a slot. If the cyclic prefix of the BWP is set to extended CP, the last two bits within the bit string shall be ignored by the UE or IAB-MT.  For DCI format 2\_0, the first one symbol applies if the *duration* of CORESET (in the IE *ControlResourceSet*) identified by *controlResourceSetId* indicates 3 symbols, the first two symbols apply if the *duration* of CORESET identified by *controlResourceSetId* indicates 2 symbols, and the first three symbols apply if the *duration* of CORESET identified by *controlResourceSetId* indicates 1 symbol.  See TS 38.213 [13], clause 10.  For IAB-MT: For DCI format 2\_0 or DCI format 2\_5, the first one symbol applies if the duration of CORESET (in the IE *ControlResourceSet*) identified by *controlResourceSetId* indicates 3 symbols, the first two symbols apply if the *duration* of CORESET identified by *controlResourceSetId* indicates 2 symbols, and the first three symbols apply if the *duration* of CORESET identified by *controlResourceSetId* indicates 1 symbol.  See TS 38.213 [13], clause 10. |
| ***nrofCandidates-CI***  The number of PDCCH candidates specifically for format 2-4 for the configured aggregation level. If an aggregation level is absent, the UE does not search for any candidates with that aggregation level. The network configures only one aggregationLevel and the corresponding number of candidates (see TS 38.213 [13], clause 10.1). In this release of the specification, only value *n1* is valid. |
| ***nrofCandidates-PEI***  The number of PDCCH candidates specifically for format 2-7 for the configured aggregation level. |
| ***nrofCandidates-SFI***  The number of PDCCH candidates specifically for format 2-0 for the configured aggregation level. If an aggregation level is absent, the UE does not search for any candidates with that aggregation level. The network configures only one aggregationLevel and the corresponding number of candidates (see TS 38.213 [13], clause 11.1.1). For a search space configured with *freqMonitorLocations-r16*, only value ′n1′ is valid. |
| ***nrofCandidates***  Number of PDCCH candidates per aggregation level. The number of candidates and aggregation levels configured here applies to all formats unless a particular value is specified or a format-specific value is provided (see inside *searchSpaceType*). If configured in the *SearchSpace* of a cross carrier scheduled cell, this field determines the number of candidates and aggregation levels to be used on the linked scheduling cell (see TS 38.213 [13], clause 10). |
| ***searchSpaceGroupIdList-r16, searchSpaceGroupIdList-r17***  List of search space group IDs which the search space is associated with. The network configures at most 2 search space groups per BWP where the group ID is either 0 or 1 if *searchSpaceGroupIdList-r16* is included. The network configures at most 3 search space groups per BWP where the group ID is either 0, 1 or 2 if *searchSpaceGroupIdList-r17* is included. And if *searchSpaceGroupIdList-r17* is included, *searchSpaceGroupIdList-r16* is ignored. |
| ***searchSpaceId***  Identity of the search space. SearchSpaceId = 0 identifies the *searchSpaceZero* configured via PBCH (MIB) or *ServingCellConfigCommon* and may hence not be used in the *SearchSpace* IE. The *searchSpaceId* is unique among the BWPs of a Serving Cell. In case of cross carrier scheduling, search spaces with the same *searchSpaceId* in scheduled cell and scheduling cell are linked to each other. The UE applies the search space for the scheduled cell only if the DL BWPs in which the linked search spaces are configured in scheduling cell and scheduled cell are both active.  For an IAB-MT, the search space defines how/where to search for PDCCH candidates for an IAB-MT where each search space is associated with one ControlResearchSet and for a scheduled cell in the case of cross carrier scheduling, except for nrofCandidates, all the optional fields are absent. |
| ***SearchSpaceLinkingId***  This parameter is used to link two search spaces of same type in the same BWP. If two search spaces have the same SearchSpaceLinkingId UE assumes these search spaces are linked to PDCCH repetition REF. When PDCCH repetition is monitored in two linked search space (SS) sets, the UE does not expect a third monitored SS set to be linked with any of the two linked SS sets. The two linked SS sets have the same SS set type (USS/CSS). The two linked SS sets have the same DCI formats to monitor. For intra-slot PDCCH repetition: The two SS sets should have the same periodicity and offset (monitoringSlotPeriodicityAndOffset), and the same duration. For linking monitoring occasions across the two SS sets that exist in the same slot: The two SS sets have the same number of monitoring occasions within a slot and n-th monitoring occasion of one SS set is linked to n-th monitoring occasion of the other SS set. The following SS sets cannot be linked with another SS set for PDCCH repetition: SS set 0, *searchSpaceSIB1*, *searchSpaceOtherSystemInformation*, *pagingSearchSpace*, *ra-SearchSpace*, *searchSpaceMCCH*, *searchSpaceMTCH*, *peiSearchSpace*, and *sdt-SearchSpace*. SS set configured by *recoverySearchSpaceId* cannot be linked to another SS set for PDCCH repetition. When a scheduled serving cell is configured to be cross-carrier scheduled by a scheduling serving cell, two PDCCH candidates (with the same AL and candidate index associated with the scheduled serving cell) are linked only if the corresponding two SS sets in the scheduling serving cell are linked and two SS sets in the scheduled serving cell with the same SS set IDs are also linked.  This parameter is not applicable to search space configured with *dci-FormatsSL* for monitoring format 3-0 or format 3-1 or for monitoring formats 3-0 and format 3-1.  This parameter is not applicable to search space configured with *dci-FormatsSL-PRS* for monitoring format 3-2 or for monitoring formats 3-0 and 3-2 or for monitoring formats 3-0 and 3-1 and 3-2 or for monitoring formats 3-1 and 3-2. |
| ***searchSpaceType***  Indicates whether this is a common search space (present) or a UE specific search space as well as DCI formats to monitor for. |
| ***ue-Specific***  Configures this search space as UE specific search space (USS). The UE monitors the DCI format with CRC scrambled by C-RNTI, CS-RNTI (if configured), and SP-CSI-RNTI (if configured) |

|  |  |
| --- | --- |
| Conditional Presence | Explanation |
| *DedicatedOnly* | In PDCCH-Config, the field is optionally present, Need R. Otherwise it is absent, Need R. |
| *Setup* | This field is mandatory present upon creation of a new *SearchSpace*. It is optionally present, Need M, otherwise. |
| *Setup2* | This field is mandatory present when a new *SearchSpace* is set up, if the same *SearchSpace* ID is not included in *searchSpacesToAddModListExt-r16*/*searchSpacesToAddModListExt-v1700*/*searchSpacesToAddModListExt-v1800* of the parent IE with the field *searchSpaceType-r16* or *searchSpaceType-r17* or *searchSpaceType-r18* included. This field is absent if the same *SearchSpace* ID is included in *searchSpacesToAddModListExt-v1800* of the parent IE with the field *searchSpaceType-r18* included and set to *dci-FormatsMC-r18*. Otherwise it is optionally present, Need M. |
| *Setup3* | This field is mandatory present when a new *SearchSpace* is set up, if the same *SearchSpace* ID is not included in *searchSpacesToAddModListExt* (without suffix) of the parent IE with the field *searchSpaceType* (without suffix) included. Otherwise it is optionally present, Need M. |
| *Setup4* | This field is mandatory present upon creation of a new *SearchSpace* if *monitoringSlotPeriodicityAndOffset-v1710* is not included. It is optionally present, Need M, otherwise. |
| *Setup5* | This field is mandatory present upon creation of a new *SearchSpace* if *monitoringSlotPeriodicityAndOffset* (without suffix) is not included. It is optionally present, Need M, otherwise. |
| *SetupOnly* | This field is mandatory present upon creation of a new *SearchSpace*. It is absent, Need M, otherwise. |
| *SetupOnly2* | In PDCCH-Config, the field is optionally present upon creation of a new SearchSpace and absent, Need M upon reconfiguration of an existing SearchSpace.  In PDCCH-ConfigCommon, the field is absent. |

#### – *SearchSpaceId*

The IE *SearchSpaceId* is used to identify Search Spaces. The ID space is used across the BWPs of a Serving Cell. The search space with the *SearchSpaceId* = 0 identifies the search space configured via PBCH (MIB) and in *ServingCellConfigCommon* (*searchSpaceZero*). The number of Search Spaces per BWP is limited to 10 including the common and UE specific Search Spaces.

*SearchSpaceId* information element

-- ASN1START

-- TAG-SEARCHSPACEID-START

SearchSpaceId ::= INTEGER (0..maxNrofSearchSpaces-1)

-- TAG-SEARCHSPACEID-STOP

-- ASN1STOP

#### – *SearchSpaceZero*

The IE *SearchSpaceZero* is used to configure SearchSpace#0 of the initial BWP (see TS 38.213 [13], clause 13).

*SearchSpaceZero* information element

-- ASN1START

-- TAG-SEARCHSPACEZERO-START

SearchSpaceZero ::= INTEGER (0..15)

-- TAG-SEARCHSPACEZERO-STOP

-- ASN1STOP

#### – *SecurityAlgorithmConfig*

The IE *SecurityAlgorithmConfig* is used to configure AS integrity protection algorithm and AS ciphering algorithm for SRBs and DRBs.

*SecurityAlgorithmConfig* information element

-- ASN1START

-- TAG-SECURITYALGORITHMCONFIG-START

SecurityAlgorithmConfig ::= SEQUENCE {

cipheringAlgorithm CipheringAlgorithm,

integrityProtAlgorithm IntegrityProtAlgorithm OPTIONAL, -- Need R

...

}

IntegrityProtAlgorithm ::= ENUMERATED {

nia0, nia1, nia2, nia3, spare4, spare3,

spare2, spare1, ...}

CipheringAlgorithm ::= ENUMERATED {

nea0, nea1, nea2, nea3, spare4, spare3,

spare2, spare1, ...}

-- TAG-SECURITYALGORITHMCONFIG-STOP

-- ASN1STOP

| *SecurityAlgorithmConfig* field descriptions |
| --- |
| ***cipheringAlgorithm***  Indicates the ciphering algorithm to be used for SRBs and DRBs, as specified in TS 33.501 [11]. The algorithms *nea0*-*nea3* are identical to the LTE algorithms eea0-3. The algorithms configured for all bearers using master key shall be the same, and the algorithms configured for all bearers using secondary key, if any, shall be the same. If UE is connected to E-UTRA/EPC, this field indicates the ciphering algorithm to be used for RBs configured with NR PDCP, as specified in TS 33.501 [11]. |
| ***integrityProtAlgorithm***  Indicates the integrity protection algorithm to be used for SRBs and DRBs, as specified in TS 33.501 [11]. The algorithms *nia0-nia3* are identical to the E-UTRA algorithms *eia0-3*. The algorithms configured for all bearers using master key shall be the same and the algorithms configured for all bearers using secondary key, if any, shall be the same. The network does not configure *nia0* except for unauthenticated emergency sessions for unauthenticated UEs in LSM (limited service mode).  If UE is connected to E-UTRA/EPC, this field indicates the integrity protection algorithm to be used for SRBs configured with NR PDCP as specified in TS 33.501 [11], and DRBs configured with integrity protection as specified in TS 33.401 [30]. The network does not configure *nia0* for SRB3. |

#### – *SelectedPSCellForCHO-WithSCG*

The IE *SelectedPSCellForCHO-WithSCG* is used to indicate the information of the selected target PSCell to target MN at execution of a conditional reconfiguration for CHO with candidate SCG(s).

*SelectedPSCellForCHO-WithSCG* information element

-- ASN1START

-- TAG-SELECTEDPSCELLFORCHO-WITHSCG-START

SelectedPSCellForCHO-WithSCG-r18 ::= SEQUENCE {

ssbFrequency-r18 ARFCN-ValueNR,

physCellId-r18 PhysCellId

}

-- TAG-SELECTEDPSCELLFORCHO-WITHSCG-STOP

-- ASN1STOP

#### – *SemiStaticChannelAccessConfig*

The IE *SemiStaticChannelAccessConfig* is used to configure channel access parameters when the network is operating in semi-static channel access mode (see clause 4.3 in TS 37.213 [48].

*SemiStaticChannelAccessConfig* information element

-- ASN1START

-- TAG-SEMISTATICCHANNELACCESSCONFIG-START

SemiStaticChannelAccessConfig-r16 ::= SEQUENCE {

period-r16 ENUMERATED {ms1, ms2, ms2dot5, ms4, ms5, ms10}

}

-- TAG-SEMISTATICCHANNELACCESSCONFIG-STOP

-- ASN1STOP

|  |
| --- |
| *SemiStaticChannelAccessConfig* field descriptions |
| ***period***  Indicates the periodicity of the semi-static channel access mode (see TS 37.213 [48], clause 4.3). Value ms1 corresponds to 1 ms, value ms2 corresponds to 2 ms, value ms2dot5 corresponds to 2.5 ms, and so on. |

#### – *SemiStaticChannelAccessConfigUE*

The IE *SemiStaticChannelAccessConfigUE* is used to configure channel access parameters for UE initiated semi-static channel access.

*SemiStaticChannelAccessConfigUE* information element

-- ASN1START

-- TAG-SEMISTATICCHANNELACCESSCONFIGUE-START

SemiStaticChannelAccessConfigUE-r17 ::= SEQUENCE {

periodUE-r17 ENUMERATED {ms1, ms2, ms2dot5, ms4, ms5, ms10, spare2, spare1},

offsetUE-r17 INTEGER (0..559)

}

-- TAG-SEMISTATICCHANNELACCESSCONFIGUE-STOP

-- ASN1STOP

|  |
| --- |
| *SemiStaticChannelAccessConfigUE* field descriptions |
| ***periodUE***  Indicates the period of a channel occupancy that the UE can initiate as described in TS 37.213 [48], clause 4.3. Value ms1 corresponds to 1 ms, value ms2 corresponds to 2 ms, value ms2dot5 corresponds to 2.5 ms, and so on. |
| ***offsetUE***  Indicates the number of symbols from the beginning of the even indexed radio frame to the start of the first period within that radio frame that the UE can initiate a channel occupancy (see TS 37.213 [48], clause 4.3), based on the smallest SCS among the configured SCSs in the serving cell. The offset duration indicated by this field is less than the period duration indicated by *periodUE*. The maximum value is 139, 279 and 559 for 15, 30 and 60 kHz subcarrier spacing, respectively. |

#### – *Sensor-LocationInfo*

The IE *Sensor-LocationInfo* is used by the UE to provide sensor information.

*Sensor-LocationInfo* information element

-- ASN1START

-- TAG-SENSORLOCATIONINFO-START

Sensor-LocationInfo-r16 ::= SEQUENCE {

sensor-MeasurementInformation-r16 OCTET STRING OPTIONAL,

sensor-MotionInformation-r16 OCTET STRING OPTIONAL,

...

}

-- TAG-SENSORLOCATIONINFO-STOP

-- ASN1STOP

|  |
| --- |
| *Sensor-LocationInfo* field descriptions |
| ***sensor-MeasurementInformation***  This field provides barometric pressure measurements as *Sensor-MeasurementInformation* defined in TS 37.355 [49]. The first/leftmost bit of the first octet contains the most significant bit. |
| ***sensor-MotionInformation***  This field provides motion sensor measurements as *Sensor-MotionInformation* defined in TS 37.355 [49]. The first/leftmost bit of the first octet contains the most significant bit. |

#### *– ServingCellAndBWP-Id*

The IE *ServingCellAndBWP-Id* is used to indicate a serving cell and an uplink or a downlink BWP.

*ServingCellAndBWP-Id* information element

-- ASN1START

-- TAG-SERVINGCELLANDBWP-ID-START

ServingCellAndBWP-Id-r17 ::= SEQUENCE {

servingcell-r17 ServCellIndex,

bwp-r17 BWP-Id

}

-- TAG-SERVINGCELLANDBWP-ID-STOP

-- ASN1STOP

#### – *ServCellIndex*

The IE *ServCellIndex* concerns a short identity, used to uniquely identify a serving cell (i.e. the PCell, the PSCell or an SCell) across the cell groups. Value 0 applies for the PCell, while the *SCellIndex* that has previously been assigned applies for SCells.

*ServCellIndex* information element

-- ASN1START

-- TAG-SERVCELLINDEX-START

ServCellIndex ::= INTEGER (0..maxNrofServingCells-1)

-- TAG-SERVCELLINDEX-STOP

-- ASN1STOP

#### – *ServingCellConfig*

The IE *ServingCellConfig* is used to configure (add or modify) the UE with a serving cell, which may be the SpCell or an SCell of an MCG or SCG. The parameters herein are mostly UE specific but partly also cell specific (e.g. in additionally configured bandwidth parts). Reconfiguration between a PUCCH and PUCCHless SCell is only supported using an SCell release and add.

*ServingCellConfig* information element

-- ASN1START

-- TAG-SERVINGCELLCONFIG-START

ServingCellConfig ::= SEQUENCE {

tdd-UL-DL-ConfigurationDedicated TDD-UL-DL-ConfigDedicated OPTIONAL, -- Cond TDD

initialDownlinkBWP BWP-DownlinkDedicated OPTIONAL, -- Need M

downlinkBWP-ToReleaseList SEQUENCE (SIZE (1..maxNrofBWPs)) OF BWP-Id OPTIONAL, -- Need N

downlinkBWP-ToAddModList SEQUENCE (SIZE (1..maxNrofBWPs)) OF BWP-Downlink OPTIONAL, -- Need N

firstActiveDownlinkBWP-Id BWP-Id OPTIONAL, -- Cond SyncAndCellAdd

bwp-InactivityTimer ENUMERATED {ms2, ms3, ms4, ms5, ms6, ms8, ms10, ms20, ms30,

ms40,ms50, ms60, ms80,ms100, ms200,ms300, ms500,

ms750, ms1280, ms1920, ms2560, spare10, spare9, spare8,

spare7, spare6, spare5, spare4, spare3, spare2, spare1 } OPTIONAL, --Need R

defaultDownlinkBWP-Id BWP-Id OPTIONAL, -- Need S

uplinkConfig UplinkConfig OPTIONAL, -- Need M

supplementaryUplink UplinkConfig OPTIONAL, -- Need M

pdcch-ServingCellConfig SetupRelease { PDCCH-ServingCellConfig } OPTIONAL, -- Need M

pdsch-ServingCellConfig SetupRelease { PDSCH-ServingCellConfig } OPTIONAL, -- Need M

csi-MeasConfig SetupRelease { CSI-MeasConfig } OPTIONAL, -- Need M

sCellDeactivationTimer ENUMERATED {ms20, ms40, ms80, ms160, ms200, ms240,

ms320, ms400, ms480, ms520, ms640, ms720,

ms840, ms1280, spare2,spare1} OPTIONAL, -- Cond ServingCellWithoutPUCCH

crossCarrierSchedulingConfig CrossCarrierSchedulingConfig OPTIONAL, -- Need M

tag-Id TAG-Id,

dummy1 ENUMERATED {enabled} OPTIONAL, -- Need R

pathlossReferenceLinking ENUMERATED {spCell, sCell} OPTIONAL, -- Cond SCellOnly

servingCellMO MeasObjectId OPTIONAL, -- Cond MeasObject

...,

[[

lte-CRS-ToMatchAround SetupRelease { RateMatchPatternLTE-CRS } OPTIONAL, -- Need M

rateMatchPatternToAddModList SEQUENCE (SIZE (1..maxNrofRateMatchPatterns)) OF RateMatchPattern OPTIONAL, -- Need N

rateMatchPatternToReleaseList SEQUENCE (SIZE (1..maxNrofRateMatchPatterns)) OF RateMatchPatternId OPTIONAL, -- Need N

downlinkChannelBW-PerSCS-List SEQUENCE (SIZE (1..maxSCSs)) OF SCS-SpecificCarrier OPTIONAL -- Need S

]],

[[

supplementaryUplinkRelease-r16 ENUMERATED {true} OPTIONAL, -- Need N

tdd-UL-DL-ConfigurationDedicated-IAB-MT-r16 TDD-UL-DL-ConfigDedicated-IAB-MT-r16 OPTIONAL, -- Cond TDD\_IAB

dormantBWP-Config-r16 SetupRelease { DormantBWP-Config-r16 } OPTIONAL, -- Need M

ca-SlotOffset-r16 CHOICE {

refSCS15kHz INTEGER (-2..2),

refSCS30KHz INTEGER (-5..5),

refSCS60KHz INTEGER (-10..10),

refSCS120KHz INTEGER (-20..20)

} OPTIONAL, -- Cond AsyncCA

dummy2 SetupRelease { DummyJ } OPTIONAL, -- Need M

intraCellGuardBandsDL-List-r16 SEQUENCE (SIZE (1..maxSCSs)) OF IntraCellGuardBandsPerSCS-r16 OPTIONAL, -- Need S

intraCellGuardBandsUL-List-r16 SEQUENCE (SIZE (1..maxSCSs)) OF IntraCellGuardBandsPerSCS-r16 OPTIONAL, -- Need S

csi-RS-ValidationWithDCI-r16 ENUMERATED {enabled} OPTIONAL, -- Need R

lte-CRS-PatternList1-r16 SetupRelease { LTE-CRS-PatternList-r16 } OPTIONAL, -- Need M

lte-CRS-PatternList2-r16 SetupRelease { LTE-CRS-PatternList-r16 } OPTIONAL, -- Need M

crs-RateMatch-PerCORESETPoolIndex-r16 ENUMERATED {enabled} OPTIONAL, -- Need R

enableTwoDefaultTCI-States-r16 ENUMERATED {enabled} OPTIONAL, -- Need R

enableDefaultTCI-StatePerCoresetPoolIndex-r16 ENUMERATED {enabled} OPTIONAL, -- Need R

enableBeamSwitchTiming-r16 ENUMERATED {true} OPTIONAL, -- Need R

cbg-TxDiffTBsProcessingType1-r16 ENUMERATED {enabled} OPTIONAL, -- Need R

cbg-TxDiffTBsProcessingType2-r16 ENUMERATED {enabled} OPTIONAL -- Need R

]],

[[

directionalCollisionHandling-r16 ENUMERATED {enabled} OPTIONAL, -- Need R

channelAccessConfig-r16 SetupRelease { ChannelAccessConfig-r16 } OPTIONAL -- Need M

]],

[[

nr-dl-PRS-PDC-Info-r17 SetupRelease {NR-DL-PRS-PDC-Info-r17} OPTIONAL, -- Need M

semiStaticChannelAccessConfigUE-r17 SetupRelease {SemiStaticChannelAccessConfigUE-r17} OPTIONAL, -- Need M

mimoParam-r17 SetupRelease {MIMOParam-r17} OPTIONAL, -- Need M

channelAccessMode2-r17 ENUMERATED {enabled} OPTIONAL, -- Need R

timeDomainHARQ-BundlingType1-r17 ENUMERATED {enabled} OPTIONAL, -- Need R

nrofHARQ-BundlingGroups-r17 ENUMERATED {n1, n2, n4} OPTIONAL, -- Need R

fdmed-ReceptionMulticast-r17 ENUMERATED {true} OPTIONAL, -- Need R

moreThanOneNackOnlyMode-r17 ENUMERATED {mode2} OPTIONAL, -- Need S

tci-ActivatedConfig-r17 TCI-ActivatedConfig-r17 OPTIONAL, -- Cond TCI\_ActivatedConfig

directionalCollisionHandling-DC-r17 ENUMERATED {enabled} OPTIONAL, -- Need R

lte-NeighCellsCRS-AssistInfoList-r17 SetupRelease { LTE-NeighCellsCRS-AssistInfoList-r17 } OPTIONAL -- Need M

]],

[[

lte-NeighCellsCRS-Assumptions-r17 ENUMERATED {false} OPTIONAL -- Need R

]],

[[

crossCarrierSchedulingConfigRelease-r17 ENUMERATED {true} OPTIONAL -- Need N

]],

[[

multiPDSCH-PerSlotType1-CB-r17 ENUMERATED {enabled, disabled} OPTIONAL -- Need R

]],

[[

lte-CRS-PatternList3-r18 SetupRelease { LTE-CRS-PatternList-r16 } OPTIONAL, -- Need M

lte-CRS-PatternList4-r18 SetupRelease { LTE-CRS-PatternList-r16 } OPTIONAL, -- Need M

pdcch-CandidateReceptionWithCRS-Overlap-r18 ENUMERATED {enabled} OPTIONAL, -- Need R

cjt-Scheme-PDSCH-r18 ENUMERATED {cjtSchemeA, cjtSchemeB} OPTIONAL, -- Need R

tag2-r18 Tag2-r18 OPTIONAL, -- Need R

cellDTX-DRX-Config-r18 SetupRelease { CellDTX-DRX-Config-r18 } OPTIONAL, -- Need M

positionInDCI-cellDTRX-r18 INTEGER (0..maxDCI-2-9-Size-1-r18) OPTIONAL, -- Need R

cellDTX-DRX-L1activation-r18 ENUMERATED {enabled} OPTIONAL, -- Need R

mc-DCI-SetOfCellsToAddModList-r18 SEQUENCE (SIZE (1..maxNrofSetsOfCells-r18)) OF MC-DCI-SetOfCells-r18 OPTIONAL, -- Need N

mc-DCI-SetOfCellsToReleaseList-r18 SEQUENCE (SIZE (1..maxNrofSetsOfCells-r18)) OF SetOfCellsId-r18 OPTIONAL -- Need N

]],

[[

mimoParam-v1850 SetupRelease {MIMOParam-v1850} OPTIONAL -- Need M

]],

[[

mc-DCI-SetOfCellsToAddModListExt-v19xy SEQUENCE (SIZE (1..maxNrofSetsOfCells-r18)) OF MC-DCI-SetOfCellsExt-v19xy OPTIONAL -- Need N

]]

}

Tag2-r18 ::= SEQUENCE {

tag2-Id-r18 TAG-Id,

tag2-flag-r18 BOOLEAN,

n-TimingAdvanceOffset2-r18 ENUMERATED { n0, n25600, n39936, spare1 } OPTIONAL -- Need S

}

UplinkConfig ::= SEQUENCE {

initialUplinkBWP BWP-UplinkDedicated OPTIONAL, -- Need M

uplinkBWP-ToReleaseList SEQUENCE (SIZE (1..maxNrofBWPs)) OF BWP-Id OPTIONAL, -- Need N

uplinkBWP-ToAddModList SEQUENCE (SIZE (1..maxNrofBWPs)) OF BWP-Uplink OPTIONAL, -- Need N

firstActiveUplinkBWP-Id BWP-Id OPTIONAL, -- Cond SyncAndCellAdd

pusch-ServingCellConfig SetupRelease { PUSCH-ServingCellConfig } OPTIONAL, -- Need M

carrierSwitching SetupRelease { SRS-CarrierSwitching } OPTIONAL, -- Need M

...,

[[

powerBoostPi2BPSK BOOLEAN OPTIONAL, -- Need M

uplinkChannelBW-PerSCS-List SEQUENCE (SIZE (1..maxSCSs)) OF SCS-SpecificCarrier OPTIONAL -- Need S

]],

[[

enablePL-RS-UpdateForPUSCH-SRS-r16 ENUMERATED {enabled} OPTIONAL, -- Need R

enableDefaultBeamPL-ForPUSCH0-0-r16 ENUMERATED {enabled} OPTIONAL, -- Need R

enableDefaultBeamPL-ForPUCCH-r16 ENUMERATED {enabled} OPTIONAL, -- Need R

enableDefaultBeamPL-ForSRS-r16 ENUMERATED {enabled} OPTIONAL, -- Need R

uplinkTxSwitching-r16 SetupRelease { UplinkTxSwitching-r16 } OPTIONAL, -- Need M

mpr-PowerBoost-FR2-r16 ENUMERATED {true} OPTIONAL -- Need R

]],

[[

srs-PosTx-Hopping-r18 SetupRelease { SRS-PosTx-Hopping-r18 } OPTIONAL, -- Need M

enablePL-RS-UpdateForType1CG-PUSCH-r18 ENUMERATED {enabled} OPTIONAL, -- Need R

powerBoostPi2BPSK-r18 BOOLEAN OPTIONAL, -- Need R

powerBoostQPSK-r18 BOOLEAN OPTIONAL -- Need R

]]

}

DummyJ ::= SEQUENCE {

maxEnergyDetectionThreshold-r16 INTEGER(-85..-52),

energyDetectionThresholdOffset-r16 INTEGER (-20..-13),

ul-toDL-COT-SharingED-Threshold-r16 INTEGER (-85..-52) OPTIONAL, -- Need R

absenceOfAnyOtherTechnology-r16 ENUMERATED {true} OPTIONAL -- Need R

}

ChannelAccessConfig-r16 ::= SEQUENCE {

energyDetectionConfig-r16 CHOICE {

maxEnergyDetectionThreshold-r16 INTEGER (-85..-52),

energyDetectionThresholdOffset-r16 INTEGER (-13..20)

} OPTIONAL, -- Need R

ul-toDL-COT-SharingED-Threshold-r16 INTEGER (-85..-52) OPTIONAL, -- Need R

absenceOfAnyOtherTechnology-r16 ENUMERATED {true} OPTIONAL -- Need R

}

IntraCellGuardBandsPerSCS-r16 ::= SEQUENCE {

guardBandSCS-r16 SubcarrierSpacing,

intraCellGuardBands-r16 SEQUENCE (SIZE (1..4)) OF GuardBand-r16

}

GuardBand-r16 ::= SEQUENCE {

startCRB-r16 INTEGER (0..274),

nrofCRBs-r16 INTEGER (0..15)

}

DormancyGroupID-r16 ::= INTEGER (0..4)

DormantBWP-Config-r16::= SEQUENCE {

dormantBWP-Id-r16 BWP-Id OPTIONAL, -- Need M

withinActiveTimeConfig-r16 SetupRelease { WithinActiveTimeConfig-r16 } OPTIONAL, -- Need M

outsideActiveTimeConfig-r16 SetupRelease { OutsideActiveTimeConfig-r16 } OPTIONAL -- Need M

}

WithinActiveTimeConfig-r16 ::= SEQUENCE {

firstWithinActiveTimeBWP-Id-r16 BWP-Id OPTIONAL, -- Need M

dormancyGroupWithinActiveTime-r16 DormancyGroupID-r16 OPTIONAL -- Need R

}

OutsideActiveTimeConfig-r16 ::= SEQUENCE {

firstOutsideActiveTimeBWP-Id-r16 BWP-Id OPTIONAL, -- Need M

dormancyGroupOutsideActiveTime-r16 DormancyGroupID-r16 OPTIONAL -- Need R

}

UplinkTxSwitching-r16 ::= SEQUENCE {

uplinkTxSwitchingPeriodLocation-r16 BOOLEAN,

uplinkTxSwitchingCarrier-r16 ENUMERATED {carrier1, carrier2}

}

MIMOParam-r17 ::= SEQUENCE {

additionalPCI-ToAddModList-r17 SEQUENCE (SIZE(1..maxNrofAdditionalPCI-r17)) OF SSB-MTC-AdditionalPCI-r17 OPTIONAL, -- Need N

additionalPCI-ToReleaseList-r17 SEQUENCE (SIZE(1..maxNrofAdditionalPCI-r17)) OF AdditionalPCIIndex-r17 OPTIONAL, -- Need N

unifiedTCI-StateType-r17 ENUMERATED {separate, joint} OPTIONAL, -- Need R

uplink-PowerControlToAddModList-r17 SEQUENCE (SIZE (1..maxUL-TCI-r17)) OF Uplink-powerControl-r17 OPTIONAL, -- Need N

uplink-PowerControlToReleaseList-r17 SEQUENCE (SIZE (1..maxUL-TCI-r17)) OF Uplink-powerControlId-r17 OPTIONAL, -- Need N

sfnSchemePDCCH-r17 ENUMERATED {sfnSchemeA,sfnSchemeB} OPTIONAL, -- Need R

sfnSchemePDSCH-r17 ENUMERATED {sfnSchemeA,sfnSchemeB} OPTIONAL -- Need R

}

MIMOParam-v1850 ::= SEQUENCE {

additionalTDDConfig-perPCI-ToAddModList-r18 SEQUENCE (SIZE (1..maxNrofAdditionalPCI-r17)) OF AdditionalTDDConfig-perPCI-ToAddMod-r18

OPTIONAL, -- Cond 2TA-TDD-Only

additionalTDDConfig-perPCI-ToReleaseList-r18 SEQUENCE (SIZE (1..maxNrofAdditionalPCI-r17)) OF AdditionalPCIIndex-r17

OPTIONAL -- Need N

}

AdditionalTDDConfig-perPCI-ToAddMod-r18 ::= SEQUENCE {

additionalTDDConfig-Index-r18 AdditionalPCIIndex-r17,

tdd-UL-DL-ConfigurationCommon-r18 TDD-UL-DL-ConfigCommon

}

MC-DCI-SetOfCells-r18 ::= SEQUENCE {

setOfCellsId-r18 SetOfCellsId-r18,

nCI-Value-r18 INTEGER (0..7),

scheduledCellListDCI-1-3-r18 SEQUENCE (SIZE (2..maxNrofCellsInSet-r18)) OF ServCellIndex OPTIONAL, -- Need R

scheduledCellListDCI-0-3-r18 SEQUENCE (SIZE (2..maxNrofCellsInSet-r18)) OF ServCellIndex OPTIONAL, -- Need R

scheduledCellComboListDCI-1-3-r18 SEQUENCE (SIZE (1..maxNrofCellCombos-r18)) OF ScheduledCellCombo-r18 OPTIONAL, -- Need R

scheduledCellComboListDCI-0-3-r18 SEQUENCE (SIZE (1..maxNrofCellCombos-r18)) OF ScheduledCellCombo-r18 OPTIONAL, -- Need R

antennaPortsDCI1-3-r18 ENUMERATED {type1a, type2} OPTIONAL, -- Cond TypeDCI1-3

antennaPortsDCI0-3-r18 ENUMERATED {type1a, type2} OPTIONAL, -- Cond TypeDCI0-3

tpmi-DCI0-3-r18 ENUMERATED {type1a, type2} OPTIONAL, -- Cond TypeDCI0-3

sri-DCI0-3-r18 ENUMERATED {type1a, type2} OPTIONAL, -- Cond TypeDCI0-3

priorityIndicatorDCI-1-3-r18 ENUMERATED {enabled} OPTIONAL, -- Need R

priorityIndicatorDCI-0-3-r18 ENUMERATED {enabled} OPTIONAL, -- Need R

dormancyDCI-1-3-r18 ENUMERATED {enabled} OPTIONAL, -- Need R

dormancyDCI-0-3-r18 ENUMERATED {enabled} OPTIONAL, -- Need R

pdcchMonAdaptDCI-1-3-r18 ENUMERATED {enabled} OPTIONAL, -- Need R

pdcchMonAdaptDCI-0-3-r18 ENUMERATED {enabled} OPTIONAL, -- Need R

minimumSchedulingOffsetK0DCI-1-3-r18 ENUMERATED {enabled} OPTIONAL, -- Need R

minimumSchedulingOffsetK0DCI-0-3-r18 ENUMERATED {enabled} OPTIONAL, -- Need R

pdsch-HARQ-ACK-OneShotFeedbackDCI-1-3-r18 ENUMERATED {enabled} OPTIONAL, -- Need R

pdsch-HARQ-ACK-enhType3DCI-1-3-r18 ENUMERATED {enabled} OPTIONAL, -- Need R

pdsch-HARQ-ACK-enhType3DCIfieldDCI-1-3-r18 ENUMERATED {enabled} OPTIONAL, -- Need R

pdsch-HARQ-ACK-retxDCI-1-3-r18 ENUMERATED {enabled} OPTIONAL, -- Need R

pucch-sSCellDynDCI-1-3-r18 ENUMERATED {enabled} OPTIONAL, -- Need R

tdra-FieldIndexListDCI-1-3-r18 SEQUENCE (SIZE (1..32)) OF TDRA-FieldIndexDCI-1-3-r18 OPTIONAL, -- Need R

tdra-FieldIndexListDCI-0-3-r18 SEQUENCE (SIZE (1..64)) OF TDRA-FieldIndexDCI-0-3-r18 OPTIONAL, -- Need R

rateMatchListDCI-1-3-r18 SEQUENCE (SIZE (1..16)) OF RateMatchDCI-1-3-r18 OPTIONAL, -- Need R

zp-CSI-RSListDCI-1-3-r18 SEQUENCE (SIZE (1..8)) OF ZP-CSI-DCI-1-3-r18 OPTIONAL, -- Need R

tci-ListDCI-1-3-r18 SEQUENCE (SIZE (1..16)) OF TCI-DCI-1-3-r18 OPTIONAL, -- Need R

srs-RequestListDCI-1-3-r18 SEQUENCE (SIZE (1..16)) OF SRS-RequestCombo-r18 OPTIONAL, -- Need R

srs-OffsetListDCI-1-3-r18 SEQUENCE (SIZE (1..8)) OF SRS-OffsetCombo-r18 OPTIONAL, -- Need R

srs-RequestListDCI-0-3-r18 SEQUENCE (SIZE (1..16)) OF SRS-RequestCombo-r18 OPTIONAL, -- Need R

srs-OffsetListDCI-0-3-r18 SEQUENCE (SIZE (1..8)) OF SRS-OffsetCombo-r18 OPTIONAL -- Need R

}

MC-DCI-SetOfCellsExt-v19xy ::= SEQUENCE {

tdra-FieldIndexListDCI-1-3-r19 SEQUENCE (SIZE (1..64)) OF TDRA-FieldIndexDCI-1-3-r19 OPTIONAL, -- Need R

tdra-FieldIndexListDCI-0-3-r19 SEQUENCE (SIZE (1..128)) OF TDRA-FieldIndexDCI-0-3-r19 OPTIONAL -- Need R

}

SetOfCellsId-r18 ::= INTEGER (0..maxNrofSetsOfCells-1-r18)

ScheduledCellCombo-r18 ::= SEQUENCE (SIZE (1..maxNrofCellsInSet-r18)) OF INTEGER (0..maxNrofCellsInSet-1-r18)

RateMatchDCI-1-3-r18 ::= SEQUENCE (SIZE (1..maxNrofCellsInSet-r18)) OF BIT STRING (SIZE (1..2))

ZP-CSI-DCI-1-3-r18 ::= SEQUENCE (SIZE (1.. maxNrofCellsInSet-r18)) OF BIT STRING (SIZE (1..2))

TCI-DCI-1-3-r18 ::= SEQUENCE (SIZE (2.. maxNrofCellsInSet-r18)) OF BIT STRING (SIZE (3))

SRS-RequestCombo-r18 ::= SEQUENCE (SIZE (1.. maxNrofCellsInSet-r18)) OF BIT STRING (SIZE (2..3))

SRS-OffsetCombo-r18 ::= SEQUENCE (SIZE (1.. maxNrofCellsInSet-r18)) OF INTEGER (0..3)

TDRA-FieldIndexDCI-1-3-r18 ::= SEQUENCE (SIZE (2.. maxNrofBWPsInSetOfCells-r18)) OF INTEGER (0..maxNrofDL-Allocations-1-r18)

TDRA-FieldIndexDCI-1-3-r19 ::= SEQUENCE (SIZE (2.. maxNrofBWPsInSetOfCells-r18)) OF INTEGER (0.. maxNrofDL-AllocationsExt-1-r19)

TDRA-FieldIndexDCI-0-3-r18 ::= SEQUENCE (SIZE (2.. maxNrofBWPsInSetOfCells-r18)) OF INTEGER (0..maxNrofUL-Allocations-1-r18)

TDRA-FieldIndexDCI-0-3-r19 ::= SEQUENCE (SIZE (2.. maxNrofBWPsInSetOfCells-r18)) OF INTEGER (0..maxNrofUL-Allocations-1-r18)

-- TAG-SERVINGCELLCONFIG-STOP

-- ASN1STOP

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| *ChannelAccessConfig* field descriptions |
| ***absenceOfAnyOtherTechnology***  Presence of this field indicates absence on a long term basis (e.g. by level of regulation) of any other technology sharing the carrier; absence of this field indicates the potential presence of any other technology sharing the carrier, as specified in TS 37.213 [48] clauses 4.2.1 and 4.2.3. |
| ***energyDetectionConfig***  Indicates whether to use the *maxEnergyDetectionThreshold* or the *energyDetectionThresholdOffset* (see TS 37.213 [48], clause 4.2.3)*.* |
| ***energyDetectionThresholdOffset***  Indicates the offset to the default maximum energy detection threshold value. Unit in dB. Value -13 corresponds to -13dB, value -12 corresponds to -12dB, and so on (i.e. in steps of 1dB) as specified in TS 37.213 [48], clause 4.2.3. |
| ***maxEnergyDetectionThreshold***  Indicates the absolute maximum energy detection threshold value. Unit in dBm. Value -85 corresponds to -85 dBm, value -84 corresponds to -84 dBm, and so on (i.e. in steps of 1dBm) as specified in TS 37.213 [48], clause 4.2.3. |
| ***ul-toDL-COT-SharingED-Threshold***  Maximum energy detection threshold that the UE should use to share channel occupancy with gNB for DL transmission as specified in TS 37.213 [48], clause 4.1.3 for downlink channel access and clause 4.2.3 for uplink channel access. This field is not applicable in semi-static channel access mode. |

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| --- |
| *ServingCellConfig* field descriptions |
| ***additionalPCI-ToAddModList***  List of information for the additional SSB with different PCI than the serving cell PCI. The additional SSBs with different PCIs are not used for serving cell quality derivation. |
| ***additionalTDDConfig-perPCI-ToAddModList***  List of TDD-UL-DL configurations for the additional PCIs. When the network releases an additional PCI of a serving cell, the network also explicitly releases the associated TDD-UL-DL configuration for the additional PCI. |
| ***bwp-InactivityTimer***  The duration in ms after which the UE falls back to the default Bandwidth Part (see TS 38.321 [3], clause 5.15). When the network releases the timer configuration, the UE stops the timer without switching to the default BWP. |
| ***ca-SlotOffset***  Slot offset between the primary cell (PCell/PSCell) and the SCell in unaligned frame boundary with slot alignment and partial SFN alignment inter-band CA. Based on this field, the UE determines the time offset of the SCell as specified in clause 4.5 of TS 38.211 [16]. The granularity of this field is determined by the reference SCS for the slot offset (i.e. the maximum of PCell/PSCell lowest SCS among all the configured SCSs in DL/UL *SCS-SpecificCarrierList* in *ServingCellConfigCommon* or *ServingCellConfigCommonSIB* and this serving cell's lowest SCS among all the configured SCSs in DL/UL *SCS-SpecificCarrierList* in *ServingCellConfigCommon* or *ServingCellConfigCommonSIB*).  The Network configures at most single non-zero offset duration in ms (independent on SCS) among CCs in the unaligned CA configuration. If the field is absent, the UE applies the value of 0. The slot offset value can only be changed with SCell release and add. |
| ***cbg-TxDiffTBsProcessingType1, cbg-TxDiffTBsProcessingType2***  Indicates whether processing types 1 and 2 based CBG based operation is enabled according to Rel-16 UE capabilities. |
| ***cellDTX-DRX-Config***  Used to configure cell DTX/DRX for the serving cell, as specified in TS 38.321 [3]. A maximum of two cell DTX/DRX patterns can be configured per MAC entity for different serving cells. The two configured patterns are aligned, that the start and slot offset are common and the periodicity of one pattern is an integer multiple of the other. Cell DTX is configured only when connected mode DRX is configured. |
| ***cellDTX-DRX-L1activation***  Indicates whether this serving cell has enabled L1 signaling based on DCI 2\_9 for dynamic activation/deactivation of cell DTX/DRX configuration. |
| ***cjt-Scheme-PDSCH***  This field is used to configure CJT Tx scheme *cjtSchemeA* or *cjtSchemeB* for PDSCH reception, see TS 38.214 [19] clause 5.1.5. |
| ***channelAccessConfig***  List of parameters used for access procedures of operation with shared spectrum channel access (see TS 37.213 [48). |
| ***channelAccessMode2***  If present, this field indicates that the UE shall apply channel access procedures for operation with shared spectrum channel access in accordance with TS 37.213 [48], clause 4.4 for FR2-2. If absent, the UE does not apply these channel access procedures. The network always configures this field if channel access procedures are required for the serving cell within this region by regulations.  Overwrites the corresponding field in *ServingCellConfigCommon* or *ServingCellConfigCommonSIB* for this serving cell. |
| ***crossCarrierSchedulingConfig***  Indicates whether this serving cell is cross-carrier scheduled by another serving cell or whether it cross-carrier schedules another serving cell. If the field *other* is configured for an SpCell (i.e., the SpCell is cross-carrier scheduled by another serving cell), the SpCell can be additionally scheduled by the PDCCH on the SpCell. |
| ***crossCarrierSchedulingConfigRelease***  If this field is included, the UE shall release the cross carrier scheduling configuration configured by *crossCarrierSchedulingConfig*. The network may only include either *crossCarrierSchedulingConfigRelease* or *crossCarrierSchedulingConfig* at a time. |
| ***crs-RateMatch-PerCORESETPoolIndex***  Indicates how UE performs rate matching when both lte-CRS-PatternList1-r16 and lte-CRS-PatternList2-r16 are configured or when both *lte-CRS-PatternList3-r18* and *lte-CRS-PatternList4-r18* are configured as specified in TS 38.214 [19], clause 5.1.4.2. |
| ***csi-RS-ValidationWithDCI***  Indicates how the UE performs periodic and semi-persistent CSI-RS reception in a slot. The presence of this field indicates that the UE uses DCI detection to validate whether to receive CSI-RS (see TS 38.213 [13], clause 11.1). |
| ***defaultDownlinkBWP-Id***  The initial bandwidth part is referred to by BWP-Id = 0. ID of the downlink bandwidth part to be used upon expiry of the BWP inactivity timer. This field is UE specific. When the field is absent the UE uses the initial BWP as default BWP. (see TS 38.213 [13], clause 12 and TS 38.321 [3], clause 5.15). |
| ***directionalCollisionHandling***  Indicates that this serving cell is using directional collision handling between a reference and other cell(s) for half-duplex operation in TDD CA with same SCS as specified in TS 38.213 [13], clause 11.1. The half-duplex operation only applies within the same frequency range and cell group.  The network only configures this field for TDD serving cells that are using the same SCS. |
| ***directionalCollisionHandling-DC***  For the IAB-MT, it indicates that this serving cell is using directional collision handling between a reference and other cell(s) for half-duplex operation in TDD NR-DC with same SCS within same cell group or cross different cell groups. |
| ***dormantBWP-Config***  The dormant BWP configuration for an SCell. This field can be configured only for a (non-PUCCH) SCell. |
| ***downlinkBWP-ToAddModList***  List of additional downlink bandwidth parts to be added or modified. (see TS 38.213 [13], clause 12). |
| ***downlinkBWP-ToReleaseList***  List of additional downlink bandwidth parts to be released. (see TS 38.213 [13], clause 12). |
| ***downlinkChannelBW-PerSCS-List***  A set of UE specific channel bandwidth and location configurations for different subcarrier spacings (numerologies). Defined in relation to Point A. The UE uses the configuration provided in this field only for the purpose of channel bandwidth and location determination. If absent, UE uses the configuration indicated in *scs-SpecificCarrierList* in *DownlinkConfigCommon* / *DownlinkConfigCommonSIB*. Network only configures channel bandwidth that corresponds to the channel bandwidth values defined in TS 38.101-1 [15], TS 38.101-2 [39], and TS 38.101-5 [75]. If the UE is an (e)RedCap UE and needs to autonomously switch to its initial downlink bandwidth part to perform a random access procedure but its current UE specific channel bandwidth does not cover the initial downlink bandwidth part, the UE autonomously changes its UE specific channel bandwidth to cover the initial downlink bandwidth part. In that case, after completion of the random access procedure, the network ensures that the UE specific channel bandwidth fully covers the UE's active downlink bandwidth part in subsequent bandwidth part switch operations. |
| ***dummy1, dummy 2***  This field is not used in the specification. If received it shall be ignored by the UE. |
| ***enableBeamSwitchTiming***  Indicates the aperiodic CSI-RS triggering with beam switching triggering behaviour as defined in clause 5.2.1.5.1 of TS 38.214 [19]. |
| ***enableDefaultTCI-StatePerCoresetPoolIndex***  Presence of this field indicates the UE shall follow the release 16 behavior of default TCI state per CORESETPoolindex when the UE is configured by higher layer parameter PDCCH-Config that contains two different values of CORESETPoolIndex in ControlResourceSet is enabled. |
| ***enableTwoDefaultTCI-States***  Presence of this field indicates the UE shall follow the release 16 behavior of two default TCI states for PDSCH when at least one TCI codepoint is mapped to two TCI states is enabled |
| ***fdmed-ReceptionMulticast***  Indicates the Type-1 HARQ codebook generation as specified in TS 38.213 [13], clause 9.1.2.1. |
| ***firstActiveDownlinkBWP-Id***  If configured for an SpCell, this field contains the ID of the DL BWP to be activated or to be used for RLM, BFD and measurements if included in an *RRCReconfiguration* message contained in an NR or E-UTRA RRC message indicating that the SCG is deactivated, upon performing the RRC (re-)configuration. If the field is absent, the RRC (re-)configuration does not impose a BWP switch. If the field is absent for the PSCell at SCG deactivation, the UE considers the previously activated DL BWP as the BWP to be used for RLM, BFD and measurements. If the field is absent for the PSCell at SCG activation, the DL BWP to be activated is the DL BWP previously to be used for RLM, BFD and measurements.  If configured for an SCell, this field contains the ID of the downlink bandwidth part to be used upon activation of an SCell. The initial bandwidth part is referred to by BWP-Id = 0.  Upon reconfiguration with *reconfigurationWithSync*, the network sets the *firstActiveDownlinkBWP-Id* and *firstActiveUplinkBWP-Id* to the same value. |
| ***initialDownlinkBWP***  The dedicated (UE-specific) configuration for the initial downlink bandwidth-part (i.e., DL BWP#0). If any of the optional IEs are configured within this IE, the UE considers the BWP#0 to be an RRC configured BWP (from UE capability viewpoint). Otherwise, the UE does not consider the BWP#0 as an RRC configured BWP (from UE capability viewpoint). Network always configures the UE with a value for this field if no other BWPs are configured. NOTE1 |
| ***intraCellGuardBandsDL-List, intraCellGuardBandsUL-List***  List of intra-cell guard bands in a serving cell for operation with shared spectrum channel access in FR1. If not configured, the guard bands are defined according to 38.101-1 [15], see TS 38.214 [19], clause 7. For operation in licensed spectrum, this field is absent, and no UE action is required. |
| ***lte-CRS-PatternList1***  A list of LTE CRS patterns around which the UE shall do rate matching for PDSCH. The LTE CRS patterns in this list shall be non-overlapping in frequency. The network does not configure this field and *lte-CRS-ToMatchAround* simultaneously. |
| ***lte-CRS-PatternList2***  A list of LTE CRS patterns around which the UE shall do rate matching for PDSCH scheduled with a DCI detected on a CORESET with CORESETPoolIndex configured with 1. This list is configured only if CORESETPoolIndex configured with 1. The first LTE CRS pattern in this list shall be fully overlapping in frequency with the first LTE CRS pattern in lte-CRS-PatternList1, The second LTE CRS pattern in this list shall be fully overlapping in frequency with the second LTE CRS pattern in lte-CRS-PatternList1, and so on. Network configures this field only if the field *lte-CRS-ToMatchAround* is not configured and there is at least one ControlResourceSet in one DL BWP of this serving cell with *coresetPoolIndex* set to 1. |
| ***lte-CRS-PatternList3***  A list of LTE CRS patterns around which the UE shall do rate matching for PDSCH. The LTE CRS patterns in this list shall be non-overlapping in frequency. The network does not configure this field and *lte-CRS-ToMatchAround,* or this field and *lte-CRS-PatternList1*, or this field and *lte-CRS-PatternList2* simultaneously. |
| ***lte-CRS-PatternList4***  A list of LTE CRS patterns around which the UE shall do rate matching for PDSCH. The LTE CRS patterns in this list shall be non-overlapping in frequency. The first LTE CRS pattern in this list shall be fully overlapping in frequency with the first LTE CRS pattern in *lte-CRS-PatternList3*. The second LTE CRS pattern in this list shall be fully overlapping in frequency with the second LTE CRS pattern in *lte-CRS-PatternList3*, and so on. Network configures this field only if the field *lte-CRS-ToMatchAround* is not configured and the field *lte-CRS-PatternList3* is configured. |
| ***lte-CRS-ToMatchAround***  Parameters to determine an LTE CRS pattern that the UE shall rate match around. |
| ***lte-NeighCellsCRS-AssistInfoList***  A list of LTE neighbour cells configuration information which is used to assist the UE to perform CRS interference mitigation (CRS-IM) in scenarios with overlapping spectrum for LTE and NR (see TS 38.101-4 [59]). If the field is included, it replaces any previous list, i.e. all the entries of the list are replaced and each of the *LTE-NeighCellsCRS-AssistInfo* entries is considered to be newly created and the conditions and Need codes for setup of the entry apply. |
| ***lte-NeighCellsCRS-Assumptions***  If the field is not configured, the following default network configuration assumptions are valid for all LTE neighbour cells for the purpose of CRS interference mitigation (CRS-IM) in scenarios with overlapping spectrum for LTE and NR (see TS 38.101-4 [59]).  - The CRS port number is the same as the one indicated in *RateMatchPatternLTE-CRS* if configured for the serving cell.  - The CRS port number is 4 if *RateMatchPatternLTE-CRS* is not configured for the serving cell.  - The channel bandwidth and centre frequency are the same as the ones indicated in *RateMatchPatternLTE-CRS* if configured for the serving cell.  - The MBSFN configuration is the same as the one indicated in *RateMatchPatternLTE-CRS* if configured for the serving cell. If *RateMatchPatternLTE-CRS* is not configured for the serving cell, MBSFN subframe is not configured.  - Network-based CRS interference mitigation (i.e., CRS muting), as in *crs-IntfMitigConfig* specified in TS 36.331 [10], is not enabled.  If the field is configured (i.e. false) and *LTE-NeighCellsCRS-AssistInfoList* is configured, the configuration provided in *LTE-NeighCellsCRS-AssistInfoList* overrides the default network configuration assumptions.  If the field is configured (i.e. false) and *LTE-NeighCellsCRS-AssistInfoList* is not configured, it is up to the UE implementation whether to apply CRS-IM operation. |
| ***mc-DCI-SetOfCellsToAddModList, mc-DCI-SetOfCellsToAddModListExt***  List of up to N (N<=4) configurations of set(s) of cells for multi-cell PDSCH/PUSCH scheduling from the serving cell, where N is reported as UE capability and up to 4 sets of cells can be configured per PUCCH group. When this field is configured to a SCell, PCell cannot be included in either *ScheduledCellListDCI-1-3* or *ScheduledCellListDCI-0-3*. If *mc-DCI-SetOfCellsToAddModListExt* is present, it contains the same number of entries, and listed in the same order, as in *mc-DCI-SetOfCellsToAddModList.* |
| ***mc-DCI-SetOfCellsToReleaseList***  List of cell set configurations to release. |
| ***multiPDSCH-PerSlotType1-CB***  Configures the UE behaviour for Type1 codebook HARQ ACK generation regarding the number of PDSCHs per slot on a serving cell as specified in TS 38.213 [13], clause 9.1.2.1.  When this parameter is configured and set to *disabled* for a serving cell, the network does not schedule UE with more than one PDSCH in a slot on the serving cell if HARQ-ACKs of any two PDSCHs in the slot on the serving cell are supposed to be reported on one PUCCH resource in the same PUCCH slot. If two *coresetPoolIndex* values are configured, the number of received PDSCHs is per *coresetPoolIndex* value per slot for a serving cell. If the UE generates two HARQ-ACK codebooks for two priorities, the number of received PDSCHs is per priority per slot for a serving cell. If *fdmed-ReceptionMulticast* is configured, the number of received PDSCHs is per traffic type (unicast / multicast) per slot for a serving cell. |
| ***nr-dl-PRS-PDC-Info***  Configures the DL PRS for propagation delay compensation. When configured, the UE measures the UE Rx-Tx time difference based on the reference signals configured in this field. |
| ***nrofHARQ-BundlingGroups***  Indicates the number of HARQ bundling groups for type2 HARQ-ACK codebook. |
| ***pathlossReferenceLinking***  Indicates whether UE shall apply as pathloss reference either the downlink of SpCell (PCell for MCG or PSCell for SCG) or of SCell that corresponds with this uplink (see TS 38.213 [13], clause 7). |
| ***pdcch-CandidateReceptionWithCRS-Overlap***  Presence of this field indicates the UE shall monitor PDCCH candidates that overlap with LTE CRS RE(s). |
| ***pdsch-ServingCellConfig***  PDSCH related parameters that are not BWP-specific. |
| ***positionInDCI-cellDTRX***  The starting bit position of an information block of DCI format 2\_9 for this serving cell (see TS 38.212 [17], clause 7.3.1.3.10). |
| ***rateMatchPatternToAddModList***  Resources patterns which the UE should rate match PDSCH around. The UE rate matches around the union of all resources indicated in the rate match patterns. Rate match patterns defined here on cell level apply only to PDSCH of the same numerology. See TS 38.214 [19], clause 5.1.4.1. If a *RateMatchPattern* with the same *RateMatchPatternId* is configured in both *ServingCellConfig/ServingCellConfigCommon* and in SIB20/MCCH, the entire *RateMatchPattern* configuration shall be the same, including the set of RBs/REs indicated by the patterns for the rate matching around, and they are counted as a single rate match pattern in the total configured rate match patterns as defined in TS 38.214 [19]. |
| ***sCellDeactivationTimer***  SCell deactivation timer in TS 38.321 [3]. If the field is absent, the UE applies the value infinity. |
| ***sfnSchemePDCCH***  This parameter is used to configure single frequency network scheme for PDCCH: sfnSchemeA or sfnSchemeB as specified (see TS 38.214 [19], clause 5.1). If network includes both *sfnSchemePDCCH* and *sfnSchemePDSCH*, same value shall be configured. |
| ***sfnSchemePDSCH***  This parameter is used to configure single frequency network scheme for PDSCH: sfnSchemeA or sfnSchemeB as specified (see TS 38.214 [19], clause 5.1). If network includes both *sfnSchemePDCCH* and *sfnSchemePDSCH*, same value shall be configured. The network does not configure this parameter and *repetitionSchemeConfig* in *PDSCH-Config* simultaneously in the same serving cell. |
| ***semiStaticChannelAccessConfigUE***  When this field is configured and when *channelAccessMode-r16* (see IE ServingCellConfigCommon and IE ServingCellConfigCommonSIB) is configured to *semiStatic*, the UE operates in semi-static channel access mode and can initiate a channel occupancy periodically (see TS 37.213 [48], Clause 4.3).  The period can be configured independently from period configured in *SemiStaticChannelAccessConfig-r16* if the UE indicates the corresponding capability. Otherwise, the periodicity configured by *periodUE-r17* is an integer multiple of or an integer factor of the periodicity indicated by *period* in *SemiStaticChannelAccessConfig-r16.* |
| ***servingCellMO***  *measObjectId* of the *MeasObjectNR* in *MeasConfig* which is associated to the serving cell. If the serving cell is associated with SSB, the following relationship applies between the corresponding MeasObjectNR and *frequencyInfoDL* in *ServingCellConfigCommon/ServingCellConfigCommonSIB* of the serving cell: if *ssbFrequency* is configured, its value is the same as the *absoluteFrequencySSB* and if *csi-rs-ResourceConfigMobility* is configured, the value of its *subcarrierSpacing* is present in one entry of the *scs-SpecificCarrierList*, *csi-RS-CellListMobility* includes an entry corresponding to the serving cell (with *cellId* equal to *physCellId* in *ServingCellConfigCommon*) and the frequency range indicated by the *csi-rs-MeasurementBW* of the entry in *csi-RS-CellListMobility* is included in the frequency range indicated by in the entry of the *scs-SpecificCarrierList*.  If the serving cell is not associated with SSB (i.e. SSB-less SCell), the carrier frequency indicated by *ssbFrequency* of the corresponding *MeasObjectNR*, if configured, is within the frequency range indicated by any entry of the *scs-SpecificCarrierList*. |
| ***supplementaryUplink***  Network may configure this field only when *supplementaryUplinkConfig* is configured in *ServingCellConfigCommon* or *supplementaryUplink* is configured in *ServingCellConfigCommonSIB*. |
| ***supplementaryUplinkRelease***  If this field is included, the UE shall release the uplink configuration configured by *supplementaryUplink*. The network only includes either *supplementaryUplinkRelease* or *supplementaryUplink* at a time. |
| ***tag-Id***  Timing Advance Group ID, as specified in TS 38.321 [3], which this cell or set of TCI-States of this cell are associated with. |
| ***tag2***  This field is used to indicate the second TAG information for the serving cell, it is optionally configured in a serving cell if and only if the serving cell is configured with more than one value for the *coresetPoolIndex*. |
| ***tci-ActivatedConfig***  If configured for an SCell, or if configured for the PSCell when the SCG is being activated upon the reception of the containing message, the UE shall consider the TCI states provided in this field as the activated TCI states for PDCCH/PDSCH reception on this serving cell.  If configured for the PSCell when the SCG is indicated as deactivated in the containing message:  - the UE shall consider the TCI states provided in this field as the TCI states to be activated for PDCCH/PDSCH reception upon a later SCG activation in which *tci-ActivatedConfig* is absent  - if bfd-and-RLM is configured and no RS is configured in *RadioLinkMonitoringConfig* for RLM, respectively for BFD, the UE shall use the TCI states provided in this field for PDCCH as RS for RLM, respectively for BFD.  When this field is absent for the PSCell and the SCG is being deactivated:  - the UE shall consider the previously activated TCI states as the TCI states to be activated for PDCCH/PDSCH reception upon a later SCG activation in which *tci-ActivatedConfig* is absent  - if *bfd-and-RLM* is configured and no RS is configured in *RadioLinkMonitoringConfig* for RLM, respectively for BFD, the UE shall use the previously activated TCI states for PDCCH as RS for RLM, respectively for BFD. |
| ***tdd-UL-DL-ConfigurationDedicated-IAB-MT***  Resource configuration per IAB-MT D/U/F overrides all symbols (with a limitation that effectively only flexible symbols can be overwritten in Rel-16) per slot over the number of slots as provided by *TDD-UL-DL ConfigurationCommon*. |
| ***unifiedTCI-StateType***  Indicates the unified TCI state type the UE is configured for this serving cell. The value *separate* means this serving cell is configured with *dl-OrJointTCI-StateList* for DL TCI state and *ul-TCI-StateList* for UL TCI state. The value *joint* means this serving cell is configured with *dl-OrJointTCI-StateList* for joint TCI state for UL and DL operation. |
| ***uplinkConfig***  Network may configure this field only when *uplinkConfigCommon* is configured in *ServingCellConfigCommon* or *ServingCellConfigCommonSIB*. Addition or release of this field can only be done upon SCell addition or release (respectively). |
| ***uplink-PowerControlToAddModList***  Configures UL power control parameters for PUSCH, PUCCH and SRS when field unifiedTCI-StateType is configured for this serving cell. |

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| *Tag2 field descriptions* |
| ***n-TimingAdvanceOffset2***  The *N\_TA-Offset2* to be applied for PDCCH order CFRA towards the active *additionalPCI* as specified in TS 38.133 [14] clause 7.1.1 and for all uplink transmissions on this serving cell associated to *tag2* as specified in TS 38.213 [13] clause 4.2. This field is always present if *SSB-MTC-AdditionalPCI* is configured. It is absent otherwise. If absent, the *N\_TA-Offset* is applied for all uplink transmissions on this serving cell associated to *tag2*. |
| ***tag2-flag***  If this field is set to true, the *tag2-Id* is associated to value 0 and *tag-Id* is associated to value 1 of field TI bit in RAR, fallbackRAR and in the absolute TAC MAC CE, see TS 38.321 [3]. Otherwise, the *tag2-Id* is associated to value 1 and *tag-Id* is associated to value 0 of field TI bit in RAR, fallbackRAR and in the absolute TAC MAC CE, see TS 38.321 [3]. |
| ***tag2-Id***  Timing Advance Group ID, as specified in TS 38.321 [3], which this cell or set of TCI-States of this cell are associated with. |

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| *UplinkConfig* field descriptions |
| ***carrierSwitching***  Includes parameters for configuration of carrier based SRS switching (see TS 38.214 [19], clause 6.2.1.3. |
| ***enableDefaultBeamPL-ForPUSCH0-0, enableDefaultBeamPL-ForPUCCH, enableDefaultBeamPL-ForSRS***  When the parameter is present, UE derives the spatial relation and the corresponding pathloss reference Rs as specified in 38.213, clauses 7.1.1, 7.2.1, 7.3.1 and 9.2.2. The network only configures these parameters for FR2. |
| ***enablePL-RS-UpdateForPUSCH-SRS***  When this parameter is present, the Rel-16 feature of MAC CE based pathloss RS updates for PUSCH/SRS is enabled. Network only configures this parameter when the UE is configured with *sri-PUSCH-PowerControl*. If this field is not configured, network configures at most 4 pathloss RS resources for PUSCH/PUCCH/SRS transmissions per BWP, not including pathloss RS resources for SRS transmissions for positioning. (See TS 38.213 [13], clause 7). |
| ***enablePL-RS-UpdateForType1CG-PUSCH***  When this parameter is present, the Rel-18 feature of MAC CE based pathloss RS updates for Type 1 CG-PUSCH is enabled. The network only configures this parameter, when the parameter *enablePL-RS-UpdateForPUSCH-SRS* is configured. (See TS 38.213 [13], clause 7). |
| ***firstActiveUplinkBWP-Id***  If configured for an SpCell, this field contains the ID of the UL BWP to be activated upon performing the RRC (re-)configuration. If the field is absent, the RRC (re-)configuration does not impose a BWP switch.  If configured for an SCell, this field contains the ID of the uplink bandwidth part to be used upon activation of an SCell. The initial bandwidth part is referred to by BandiwdthPartId = 0. |
| ***initialUplinkBWP***  The dedicated (UE-specific) configuration for the initial uplink bandwidth-part (i.e. UL BWP#0). If any of the optional IEs are configured within this IE as part of the IE *uplinkConfig*, the UE considers the BWP#0 to be an RRC configured BWP (from UE capability viewpoint). Otherwise, the UE does not consider the BWP#0 as an RRC configured BWP (from UE capability viewpoint). Network always configures the UE with a value for this field if no other BWPs are configured. NOTE1 |
| ***moreThanOneNackOnlyMode***  Indicates the mode of NACK-only feedback in the PUCCH transmission, as specified in TS 38.213 [13], clause 18. If multicast CFR is not configured, this field is not included. Otherwise, if the field is absent, UE uses mode 1 for multicast CFR. |
| ***mpr-PowerBoost-FR2***  Indicates whether UE is allowed to boost uplink transmission power by suspending in-band emission (IBE) requirements as specified in TS 38.101-2 [39]. Network only configures this field for FR2 serving cells. |
| ***powerBoostPi2BPSK***  If this field is set to *true*, the UE determines the maximum output power for PUCCH/PUSCH transmissions that use pi/2 BPSK modulation according to TS 38.101-1 [15] /TS 38.101-5 [75], clause 6.2.4. The network ensures that *powerBoostPi2BPSK* and *powerBoostPi2BPSK-r18* are not configured at the same time for a UE. |
| ***powerBoostQPSK***  If this field is set to *true*, the UE determines the maximum output power for PUSCH transmissions that use QPSK modulation according to TS 38.101-1 [15], clause 6.2.4. |
| ***pusch-ServingCellConfig***  PUSCH related parameters that are not BWP-specific. |
| ***srs-PosTx-Hopping***  Contains configuration related to the SRS for Positioning with frequency hopping for RRC\_CONNECTED state. |
| ***uplinkBWP-ToAddModList***  The additional bandwidth parts for uplink to be added or modified. In case of TDD uplink- and downlink BWP with the same *bandwidthPartId* are considered as a BWP pair and must have the same center frequency. |
| ***uplinkBWP-ToReleaseList***  The additional bandwidth parts for uplink to be released. |
| ***uplinkChannelBW-PerSCS-List***  A set of UE specific channel bandwidth and location configurations for different subcarrier spacings (numerologies). Defined in relation to Point A. The UE uses the configuration provided in this field only for the purpose of channel bandwidth and location determination. If absent, UE uses the configuration indicated in *scs-SpecificCarrierList* in *UplinkConfigCommon* / *UplinkConfigCommonSIB*. Network only configures channel bandwidth that corresponds to the channel bandwidth values defined in TS 38.101-1 [15], TS 38.101-2 [39], and TS 38.101-5 [75]. If the UE is an (e)RedCap UE and needs to autonomously switch to its initial uplink bandwidth part to perform a random access procedure but its current UE specific channel bandwidth does not cover the initial uplink bandwidth part, the UE autonomously changes its UE specific channel bandwidth to cover the initial uplink bandwidth part. In that case, after completion of the random access procedure, the network ensures that the UE specific channel bandwidth fully covers the UE's active uplink bandwidth part in subsequent bandwidth part switch operations. |
| ***uplinkTxSwitchingPeriodLocation***  Indicates whether the location of UL Tx switching period is configured in this uplink carrier in case of inter-band UL CA, SUL, or (NG)EN-DC, as specified in TS 38.101-1 [15] and TS 38.101-3 [34].  In case of (NG)EN-DC, network always configures this field to TRUE for NR carrier (i.e. with (NG)EN-DC, the UL switching period always occurs on the NR carrier).  In case of inter-band UL CA or SUL, for dynamic uplink Tx switching between 2 bands with 2 uplink carriers or 3 uplink carriers as defined in TS 38.101-1 [15], network configures this field to TRUE for the uplink carrier(s) on one band and configures this field to FALSE for the uplink carrier(s) on the other band. This field is set to the same value for the carriers on the same band. |
| ***uplinkTxSwitchingCarrier***  Indicates that the configured carrier is carrier1 or carrier2 for dynamic uplink Tx switching, as defined in TS 38.101-1 [15] and TS 38.101-3 [34]. In case of (NG)EN-DC, network always configures the NR carrier as carrier 2.  In case of inter-band UL CA or SUL, for dynamic uplink Tx switching between 2 bands with 2 uplink carriers or 3 uplink carriers as defined in TS 38.101-1 [15], network configures the uplink carrier(s) on one band as carrier1 and the uplink carrier(s) on the other band as carrier2. This field is set to the same value for the carriers on the same band. |

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| *DormantBWP-Config* field descriptions |
| ***dormancyGroupWithinActiveTime***  This field contains the ID of an SCell group for Dormancy within active time, to which this SCell belongs. The use of the Dormancy within active time for SCell groups is specified in TS 38.213 [13]. |
| ***dormancyGroupOutsideActiveTime***  This field contains the ID of an SCell group for Dormancy outside active time, to which this SCell belongs. The use of the Dormancy outside active time for SCell groups is specified in TS 38.213 [13]. |
| ***dormantBWP-Id***  This field contains the ID of the downlink bandwidth part to be used as dormant BWP. If this field is configured, its value is different from *defaultDownlinkBWP-Id*, and at least one of the *withinActiveTimeConfig* and *outsideActiveTimeConfig* should be configured. |
| ***firstOutsideActiveTimeBWP-Id***  This field contains the ID of the downlink bandwidth part to be activated when receiving a DCI indication for SCell dormancy outside active time. |
| ***firstWithinActiveTimeBWP-Id***  This field contains the ID of the downlink bandwidth part to be activated when receiving a DCI indication for SCell dormancy within active time. |
| ***outsideActiveTimeConfig***  This field contains the configuration to be used for SCell dormancy outside active time, as specified in TS 38.213 [13]. The field can only be configured when the cell group the SCell belongs to is configured with *dcp-Config*. |
| ***withinActiveTimeConfig***  This field contains the configuration to be used for SCell dormancy within active time, as specified in TS 38.213 [13]. |

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| *GuardBand* field descriptions |
| ***startCRB***  Indicates the starting RB of the guard band. |
| ***nrofCRB***  Indicates the length of the guard band in RBs. When set to 0, zero-size guard band is used. |

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| *MC-DCI-SetOfCells* field descriptions |
| ***antennaPortsDCI1-3, antennaPortsDCI0-3***  Configure the indication type for antenna port(s) field in DCI format 1\_3 and DCI format 0\_3, respectively (see TS 38.212, clauses 7.3.1.2.4 and 7.3.1.1.4). |
| ***dormancyDCI-1-3, dormancyDCI-0-3***  Configure the presence of Scell dormancy indication field in DCI format 1\_3 and DCI format 0\_3, respectively. |
| ***minimumSchedulingOffsetK0DCI-1-3, minimumSchedulingOffsetK0DCI-0-3***  Configure the presence of minimum applicable scheduling offset indicator field in DCI format 1\_3 and DCI format 0\_3, respectively. |
| ***nCI-Value***  Configure n\_CI value used for the set of cells, where unique n\_CI value is configured for each set of cells. |
| ***pdcchMonAdaptDCI-1-3, pdcchMonAdaptDCI-0-3***  Configure the presence of PDCCH monitoring adaptation indication field in DCI format 1\_3 and DCI format 0\_3, respectively. |
| ***pdsch-HARQ-ACK-enhType3DCI-1-3***  Enable the enhanced Type 3 HARQ-ACK codebook triggering using DCI format 1\_3. |
| ***pdsch-HARQ-ACK-enhType3DCIfieldDCI-1-3***  Enables the enhanced Type 3 CB through a new DCI field to indicate the enhanced Type 3 HARQ-ACK codebook in DCI format 1\_3 if the more than one enhanced Type HARQ-ACK codebook is configured for the primary PUCCH cell group. |
| ***pdsch-HARQ-ACK-OneShotFeedbackDCI-1-3***  When configured, the DCI format 1\_3 can request the UE to report A/N for all HARQ processes and all CCs configured in the PUCCH group. |
| ***pdsch-HARQ-ACK-retxDCI-1-3***  When configured, the DCI format 1\_3 can request the UE to perform a HARQ-ACK re-transmission on a PUCCH resource (see TS 38.213 [13], clause 9.1.5). |
| ***priorityIndicatorDCI-1-3, priorityIndicatorDCI-0-3***  Configure the presence of priority indicator field in DCI format 1\_3 and DCI format 0\_3, respectively (see TS 38.212 [17], clauses 7.3.1.2.4 and 7.3.1.1.4 and TS 38.213 [13] clause 9). |
| ***pucch-sSCellDynDCI-1-3***  Configure the UE with PUCCH cell switching based on dynamic indication in DCI format 1\_3 (see TS 38.213 [13], clause 9.A). |
| ***RateMatchDCI-1-3***  Configure each row of the joint rate matching indication table for DL scheduling via DCI format 1\_3, where bitmap for a cell points to a corresponding rate matching indication applicable for DCI format 1\_1 (i.e., MSB and LSB of bitmap refer *rateMatchPatternGroup1* and *rateMatchPatternGroup2* for a cell, respectively), the order of rate matching indication bitmap in each row refers the order of cells in *ScheduledCellListDCI-1-3*, that are configured with *rateMatchPatternGroup1* or *rateMatchPatternGroup2* on at least one DL BWP (i.e., first bitmap is for the first cell in *ScheduledCellListDCI-1-X*, that are configured with *rateMatchPatternGroup1* or *rateMatchPatternGroup2* on at least one DL BWP and so on), the number of entries in a row of *rateMatchDCI-1-3* should be the same as the number of cells, that are configured with *rateMatchPatternGroup1* or *rateMatchPatternGroup2* on at least one DL BWP, included in *ScheduledCellListDCI-1-3*, and entries for co-scheduled cells in a row of *rateMatchDCI-1-3* are interpreted based on the BWPs of co-scheduled cells on which the UE operates based on the BWP indicator field of DCI format 1\_3 (see TS 38.212 [17], clause 7.3.1.2.4 and TS 38.213 [13], clause 12). |
| ***rateMatchListDCI-1-3***  Configure joint rate matching indication table for DL scheduling via DCI format 1\_3. |
| ***ScheduledCellCombo***  Configure each row of the table for combinations of co-scheduled cells for DL scheduling via DCI format 1\_3 and for UL scheduling via DCI format 0\_3, where index with value INTEGER (0...3) of co-scheduled cell refers to *scheduledCellListDCI-1-3* for DL and *scheduledCellListDCI-0-3* for UL. |
| ***scheduledCellComboListDCI-1-3, scheduledCellComboListDCI-0-3***  Configure the table for combinations of co-scheduled cells for DL scheduling via DCI format 1\_3 and UL scheduling via DCI format 0\_3, respectively. |
| ***scheduledCellListDCI-1-3, scheduledCellListDCI-0-3***  Configure the list of possible co-scheduled cells in the set for DL scheduling via DCI format 1\_3 and UL scheduling via DCI format 0\_3 respectively, where the serving cells in the list are in ascending order of serving cell indices and are mapped to index {0, 1, 2, 3} in the set. Total number of cells within the same set of cells i.e., in *scheduledCellListDCI-1-3* and *scheduledCellListDCI-0-3*, is up to 4.  When a cell is included in either or both of *scheduledCellListDCI-1-3* or *scheduledCellListDCI-0-3* for one set of cells *MC-DCI-SetofCells*, the cell cannot be included in any of *scheduledCellListDCI-1-3* or *scheduledCellListDCI-0-3* for any other set of cells. |
| ***setOfCellsId***  Configure index of the set of cells to be indicated in DCI format 0\_3/1\_3. |
| ***sri-DCI0-3***  Configure the indication type for SRS resource indicator field in DCI format 0\_3 (See TS 38.212, clause 7.3.1.1.4). |
| ***SRS-OffsetCombo***  Configure each row of the joint SRS offset indicator table for DL scheduling via DCI format 1\_3 and for UL scheduling via DCI format 0\_3, where index for a cell points to a corresponding SRS offset indicator applicable for DCI formats 1\_1 and 0\_1, and the order of SRS offset indicator index in each row refers the order of cells in *scheduledCell-ListDCI-1-3* (i.e., first index is for the first cell in *scheduledCellListDCI-1-3*, that are configured with more than one entry in *availableSlotOffsetList* for at least one aperiodic SRS resource set on at least one UL BWP and so on) for DL and *scheduledCellListDCI-0-3* for UL, included in *scheduledCellListDCI-1-3* for *srs-OffsetListDCI-1-3* and *scheduledCellListDCI-0-3* for *srs-OffsetListDCI-0-3*, and entries for co-scheduled cells in a row of *SRS-OffsetCombo* are interpreted based on the BWPs of co-scheduled cells on which the UE operates based on the BWP indicator field of DCI format 1\_3 and 0\_3 (see TS 38.212 [17], clause 7.3.1.2.4 and clause 7.3.1.1.4, and TS 38.213 [13], clause 12). |
| ***srs-OffsetListDCI-1-3, srs-OffsetListDCI-0-3***  Configure joint SRS offset indicator table for DL scheduling via DCI format 1\_3 and UL scheduling via DCI format 0\_3, respectively. |
| ***SRS-RequestCombo***  Configure each row of the joint SRS request table for DL scheduling via DCI format 1\_3 and for UL scheduling via DCI format 0\_3, where index for a cell points to a corresponding SRS request applicable for DCI formats 1\_1 and 0\_1, and the order of SRS request index in each row refers the order of cells in *scheduledCellListDCI-1-3* (i.e., first index is for the first cell in *scheduledCellListDCI-1-3* and so on) for DL and *scheduledCellListDCI-0-3* for UL. The number of entries in a row of *SRS-RequestCombo* should be the same as the number of cells included in *scheduledCellListDCI-1-3* for *srs-RequestListDCI-1-3* and *scheduledCellListDCI-0-3* for *srs-RequestListDCI-0-3*, and entries for co-scheduled cells in a row of *SRS-RequestCombo* are interpreted based on the BWPs of co-scheduled cells on which the UE operates based on the BWP indicator field of DCI format 1\_3 and 0\_3 (see TS 38.212 [17], clause 7.3.1.2.4 and clause 7.3.1.1.4, and TS 38.213 [13], clause 12). |
| ***srs-RequestListDCI-1-3, srs-RequestListDCI-0-3***  Configure joint SRS request table for DL scheduling via DCI format 1\_3 and UL scheduling via DCI format 0\_3, respectively. |
| ***TCI-DCI-1-3***  Configure each row of the joint TCI table for DL scheduling via DCI format 1\_3, where index for a cell points to a corresponding TCI applicable for DCI format 1\_1, and the order of TCI index in each row refers the order of cells in *scheduledCellListDCI-1-3* (i.e., first index is for the first cell in *scheduledCellListDCI-1-3* that configured with *tci-StatesToAddModList* and so on), the number of entries in a row of *TCI-DCI-1-3* should be the same as the number of cells that configured with *tci-StatesToAddModList* on at least one DL BWP, included in *scheduledCellListDCI-1-3*, and entries for cells in a row of *TCI-DCI-1-3* are interpreted based on the BWPs of cells in *scheduledCellListDCI-1-3* on which the UE operates based on the BWP indicator field of DCI format 1\_3 (see TS 38.212 [17], clause 7.3.1.2.4, and TS 38.213 [13], clause 12). |
| ***tci-ListDCI-1-3***  Configure joint TCI table for DL scheduling via DCI format 1\_3 |
| ***TDRA-FieldIndexDCI-0-3***  Configure each row of the joint TDRA field table for UL scheduling via DCI format 0\_3 containing the applicable TDRA field indexes for multiple BWPs/cells, where the TDRA index for a BWP of a cell points to a corresponding TDRA in the TDRA table applicable for DCI format 0\_1 when *TDRA-FieldIndexDCI-0-3-r18* is configured or for DCI format 0\_3 when *TDRA-FieldIndexDCI-0-3-r19* is configured, the order of TDRA index in each row refers the *BWP-Id* for a cell and the order of cells in *scheduledCellListDCI-0-3* (i.e., first TDRA index in a row is for the smallest BWP-Id that can be scheduled by the DCI format 0\_3, as specified in TS 38.212 [17], of the first cell in *scheduledCellListDCI-0-3*, second TDRA index in a row is for the second smallest BWP-Id that can be scheduled by the DCI format 0\_3, as specified in TS 38.212 [17], of the first cell and so on), and the number of TDRA indices in a row of *TDRA-FieldIndexDCI-0-3* should be the same as the total number of BWPs that can be scheduled by the DCI format 0\_3, as specified in TS 38.212 [17], across cells included in *scheduledCellListDCI-0-3*. |
| ***TDRA-FieldIndexDCI-1-3***  Configure each row of the joint TDRA field table for DL scheduling via DCI format 1\_3 containing the applicable TDRA field indexes for multiple BWPs/cells, where the TDRA index for a BWP of a cell points to a corresponding TDRA in the TDRA table applicable for DCI format 1\_1 when *TDRA-FieldIndexDCI-1-3-r18* is configured or for DCI format 1\_3 when *TDRA-FieldIndexDCI-1-3-r19* is configured, the order of TDRA index in each row refers the BWP-Id for a cell and the order of cells in *scheduledCellListDCI-1-3* (i.e., first TDRA index in a row is for the smallest BWP-Id that can be scheduled by the DCI format 1\_3, as specified in TS 38.212 [17], of the first cell in *scheduledCellListDCI-1-3*, second TDRA index in a row is for the second smallest BWP-Id that can be scheduled by the DCI format 1\_3, as specified in TS 38.212 [17], of the first cell and so on ), and the number of TDRA indices in a row of *TDRA-FieldIndexDCI-1-3* should be the same as the total number of BWPs that can be scheduled by the DCI format 1\_3, as specified in TS 38.212 [17], across cells included in *scheduledCellListDCI-1-3*. |
| ***tdra-FieldIndexListDCI-1-3, tdra-FieldIndexListDCI-0-3***  Configure joint TDRA table for DL scheduling via DCI format 1\_3 and UL scheduling via DCI format 0\_3, respectively. |
| ***tpmi-DCI0-3***  Configure the indication type for precoding information and number of layers field in DCI format 0\_3 (See TS 38.212 [17], clause 7.3.1.1.4). |
| ***ZP-CSI-DCI-1-3***  Configure each row of the joint ZP-CSI-RS trigger table for DL scheduling via DCI format 1\_3, where index for a cell points to a corresponding ZP-CSI-RS trigger applicable for DCI format 1\_1, and the order of ZP-CSI-RS trigger index in each row refers the order of cells in *scheduledCellListDCI-1-3* (i.e., first index is for the first cell in *scheduledCellListDCI-1-3*, that are configured with aperiodic-*ZP-CSI-RS-ResourceSetsToAddModList* on at least one DL BWP and so on), the number of entries in a row of *ZP-CSI-DCI-1-3* should be the same as the number of cells, that are configured with *aperiodic-ZP-CSI-RS-ResourceSetsToAddModList* on at least one DL BWP, included in *scheduledCellListDCI-1-3*, and entries for co-scheduled cells in a row of *ZP-CSI-DCI-1-3* are interpreted based on the BWPs of co-scheduled cells on which the UE operates based on the BWP indicator field of DCI format 1\_3 (see TS 38.212 [17], clause 7.3.1.2.4 and TS 38.213 [13], clause 12). |
| ***zp-CSI-RSListDCI-1-3***  Configure joint ZP-CSI-RS trigger table for DL scheduling via DCI format 1\_3. |

NOTE 1: If the dedicated part of initial UL/DL BWP configuration is absent, the initial BWP can be used but with some limitations. For example, changing to another BWP requires *RRCReconfiguration* since DCI format 1\_0 doesn't support DCI-based switching.

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| Conditional Presence | Explanation |
| *2TA-TDD-Only* | The field is optionally present, Need N, for a TDD cell, in the *mimoParam-v1850* if *additionalPCI-ToAddModList* is present in *ServingCellConfig* and if *tag2* is present in *ServingCellConfig*. It is absent otherwise. |
| *AsyncCA* | This field is mandatory present for SCells whose slot offset between the SpCell is not 0. Otherwise it is absent, Need S. |
| *MeasObject* | This field is mandatory present for the SpCell if the UE has a *measConfig*, and it is optionally present, Need M, for SCells. For (e)RedCap UEs, this field is optionally present, Need M.  For SSB-less SCell(s), this field is not present if *intraF-NeighMeasForSCellWithoutSSB* is not supported by the UE, otherwise this field is optionally present, Need M. |
| *SCellOnly* | This field is optionally present, Need R, for SCells. It is absent otherwise. |
| *ServingCellWithoutPUCCH* | This field is optionally present, Need S, for SCells except PUCCH SCells. It is absent otherwise. |
| *SyncAndCellAdd* | This field is mandatory present for a SpCell upon reconfiguration with *reconfigurationWithSync* and upon *RRCSetup*/*RRCResume*.  The field is optionally present for an SpCell, Need N, upon reconfiguration without *reconfigurationWithSync*.  The field is mandatory present for an SCell upon addition, and absent for SCell in other cases, Need M. |
| *TCI\_ActivatedConfig* | This field is optional Need N for SCells if *sCellState* is configured, otherwise it is absent.  This field is optional Need S for the PSCell when the SCG is indicated as deactivated or is being activated, otherwise it is absent.  This field is absent for the PCell. |
| *TDD* | This field is optionally present, Need R, for TDD cells. It is absent otherwise. |
| *TDD\_IAB* | For IAB-MT, this field is optionally present, Need R, for TDD cells. It is absent otherwise. |
| *TypeDCI0-3* | This field is mandatory present if *ScheduledCellListDCI-0-3* is configured, otherwise it is absent, Need R. |
| *TypeDCI1-3* | This field is mandatory present if *ScheduledCellListDCI-1-3* is configured, otherwise it is absent, Need R. |

#### – *ServingCellConfigCommon*

The IE *ServingCellConfigCommon* is used to configure cell specific parameters of a UE's serving cell. The IE contains parameters which a UE would typically acquire from SSB, MIB or SIBs when accessing the cell from IDLE. With this IE, the network provides this information in dedicated signalling when configuring a UE with a SCells or with an additional cell group (SCG). It also provides it for SpCells (MCG and SCG) upon reconfiguration with sync.

*ServingCellConfigCommon* information element

-- ASN1START

-- TAG-SERVINGCELLCONFIGCOMMON-START

ServingCellConfigCommon ::= SEQUENCE {

physCellId PhysCellId OPTIONAL, -- Cond HOAndServCellAdd,

downlinkConfigCommon DownlinkConfigCommon OPTIONAL, -- Cond HOAndServCellAdd

uplinkConfigCommon UplinkConfigCommon OPTIONAL, -- Need M

supplementaryUplinkConfig UplinkConfigCommon OPTIONAL, -- Need S

n-TimingAdvanceOffset ENUMERATED { n0, n25600, n39936 } OPTIONAL, -- Need S

ssb-PositionsInBurst CHOICE {

shortBitmap BIT STRING (SIZE (4)),

mediumBitmap BIT STRING (SIZE (8)),

longBitmap BIT STRING (SIZE (64))

} OPTIONAL, -- Cond AbsFreqSSB

ssb-periodicityServingCell ENUMERATED { ms5, ms10, ms20, ms40, ms80, ms160, spare2, spare1 } OPTIONAL, -- Need S

dmrs-TypeA-Position ENUMERATED {pos2, pos3},

lte-CRS-ToMatchAround SetupRelease { RateMatchPatternLTE-CRS } OPTIONAL, -- Need M

rateMatchPatternToAddModList SEQUENCE (SIZE (1..maxNrofRateMatchPatterns)) OF RateMatchPattern OPTIONAL, -- Need N

rateMatchPatternToReleaseList SEQUENCE (SIZE (1..maxNrofRateMatchPatterns)) OF RateMatchPatternId OPTIONAL, -- Need N

ssbSubcarrierSpacing SubcarrierSpacing OPTIONAL, -- Cond HOAndServCellWithSSB

tdd-UL-DL-ConfigurationCommon TDD-UL-DL-ConfigCommon OPTIONAL, -- Cond TDD

ss-PBCH-BlockPower INTEGER (-60..50),

...,

[[

channelAccessMode-r16 CHOICE {

dynamic NULL,

semiStatic SemiStaticChannelAccessConfig-r16

} OPTIONAL, -- Cond SharedSpectrum

discoveryBurstWindowLength-r16 ENUMERATED {ms0dot5, ms1, ms2, ms3, ms4, ms5} OPTIONAL, -- Need R

ssb-PositionQCL-r16 SSB-PositionQCL-Relation-r16 OPTIONAL, -- Cond SharedSpectrum

highSpeedConfig-r16 HighSpeedConfig-r16 OPTIONAL -- Need R

]],

[[

highSpeedConfig-v1700 HighSpeedConfig-v1700 OPTIONAL, -- Need R

channelAccessMode2-r17 ENUMERATED {enabled} OPTIONAL, -- Cond SharedSpectrum2

discoveryBurstWindowLength-r17 ENUMERATED {ms0dot125, ms0dot25, ms0dot5, ms0dot75, ms1, ms1dot25} OPTIONAL, -- Need R

ssb-PositionQCL-r17 SSB-PositionQCL-Relation-r17 OPTIONAL, -- Cond SharedSpectrum2

highSpeedConfigFR2-r17 HighSpeedConfigFR2-r17 OPTIONAL, -- Need R

uplinkConfigCommon-v1700 UplinkConfigCommon-v1700 OPTIONAL, -- Need R

ntn-Config-r17 NTN-Config-r17 OPTIONAL -- Need R

]],

[[

featurePriorities-r17 SEQUENCE {

redCapPriority-r17 FeaturePriority-r17 OPTIONAL, -- Need R

slicingPriority-r17 FeaturePriority-r17 OPTIONAL, -- Need R

msg3-Repetitions-Priority-r17 FeaturePriority-r17 OPTIONAL, -- Need R

sdt-Priority-r17 FeaturePriority-r17 OPTIONAL -- Need R

} OPTIONAL -- Need R

]],

[[

ra-ChannelAccess-r17 ENUMERATED {enabled} OPTIONAL -- Cond SharedSpectrum2

]],

[[

featurePriorities-v1800 SEQUENCE {

msg1-Repetitions-Priority-r18 FeaturePriority-r17 OPTIONAL, -- Need R

eRedCapPriority-r18 FeaturePriority-r17 OPTIONAL -- Need R

} OPTIONAL, -- Need R

atg-Config-r18 ATG-Config-r18 OPTIONAL -- Need R

]]

}

-- TAG-SERVINGCELLCONFIGCOMMON-STOP

-- ASN1STOP

|  |
| --- |
| *ServingCellConfigCommon* field descriptions |
| ***channelAccessMode***  If present, this field indicates which channel access procedures to apply for operation with shared spectrum channel access as defined in TS 37.213 [48]. If the field is configured as "semiStatic", the UE shall apply the channel access procedures for semi-static channel occupancy as described in clause 4.3 in TS 37.213. If the field is configured as "dynamic", the UE shall apply the channel access procedures as defined in TS 37.213, clause 4.1 and 4.2. |
| ***channelAccessMode2***  If present, the UE shall apply channel access procedures for operation with shared spectrum channel access in accordance with TS 37.213 [48], clause 4.4 for FR2-2. If absent, the UE shall not apply any channel access procedure. The network always configures this field if channel access procedures are required for the serving cell within this region by regulations. |
| ***dmrs-TypeA-Position***  Position of (first) DM-RS for downlink (see TS 38.211 [16], clause 7.4.1.1.1) and uplink (TS 38.211 [16], clause 6.4.1.1.3). |
| ***downlinkConfigCommon***  The common downlink configuration of the serving cell, including the frequency information configuration and the initial downlink BWP common configuration. The parameters provided herein should match the parameters configured by MIB and SIB1 (if provided) of the serving cell, with the exception of *controlResourceSetZero* and *searchSpaceZero* which can be configured in *ServingCellConfigCommon* even if MIB indicates that they are absent. |
| ***discoveryBurstWindowLength***  Indicates the window length of the discovery burst in ms (see TS 37.213 [48]). The field *discoveryBurstWindowLength-r17* is applicable to SCS 480 kHz and SCS 960 kHz. |
| ***featurePriorities***  Indicates priorities for features, such as (e)RedCap, Slicing, SDT, MSG1-Repetitions, and MSG3-Repetitions for Coverage Enhancements. These priorities are used to determine which *FeatureCombinationPreambles* the UE shall use when a feature maps to more than one *FeatureCombinationPreambles*, as specified in TS 38.321 [3]. A lower value means a higher priority. The network does not signal the same priority for more than one feature. The network signals a priority for all feature that map to at least one *FeatureCombinationPreambles*. |
| ***longBitmap***  Bitmap when maximum number of SS/PBCH blocks per half frame equals to 64 as defined in TS 38.213 [13], clause 4.1. |
| ***lte-CRS-ToMatchAround***  Parameters to determine an LTE CRS pattern that the UE shall rate match around. |
| ***mediumBitmap***  Bitmap when maximum number of SS/PBCH blocks per half frame equals to 8 as defined in TS 38.213 [13], clause 4.1. |
| ***n-TimingAdvanceOffset***  The N\_TA-Offset to be applied for all uplink transmissions on this serving cell if *n-TimingAdvanceOffset2* is not configured. If *tag2* is configured for this serving cell, this field is to be applied to all uplink transmissions associated to *tag-id* configured for this serving cell. If the field is absent, the UE applies the value defined for the duplex mode and frequency range of this serving cell. See TS 38.133 [14], table 7.1.2-2/table 7.1C.2-4. |
| ***ra-ChannelAccess***  If present, this field indicates that the UE shall apply channel access procedures before msg1/msgA transmission for operation with shared spectrum channel access in accordance with TS 37.213 [48], clause 4.4.5 for FR2-2. |
| ***rateMatchPatternToAddModList***  Resources patterns which the UE should rate match PDSCH around. The UE rate matches around the union of all resources indicated in the rate match patterns. Rate match patterns defined here on cell level apply only to PDSCH of the same numerology (see TS 38.214 [19], clause 5.1.4.1). If a *RateMatchPattern* with the same *RateMatchPatternId* is configured in both *ServingCellConfig/ServingCellConfigCommon* and in SIB20/MCCH, the entire *RateMatchPattern* configuration, including the set of RBs/REs indicated by the patterns for the rate matching around, shall be the same and they are counted as a single rate match pattern in the total configured rate match patterns as defined in TS 38.214 [19]. |
| ***shortBitmap***  Bitmap when maximum number of SS/PBCH blocks per half frame equals to 4 as defined in TS 38.213 [13], clause 4.1. |
| ***ss-PBCH-BlockPower***  Average EPRE of the resources elements that carry secondary synchronization signals in dBm that the NW used for SSB transmission, see TS 38.213 [13], clause 7. |
| ***ssb-periodicityServingCell***  The SSB periodicity in ms for the rate matching purpose. If the field is absent, the UE applies the value ms5. (see TS 38.213 [13], clause 4.1) |
| ***ssb-PositionQCL***  Indicates the QCL relation between SSB positions for this serving cell as specified in TS 38.213 [13], clause 4.1. |
| ***ssb-PositionsInBurst***  For operation in licensed spectrum, indicates the time domain positions of the transmitted SS-blocks in a half frame with SS/PBCH blocks as defined in TS 38.213 [13], clause 4.1. The first/leftmost bit corresponds to SS/PBCH block index 0, the second bit corresponds to SS/PBCH block index 1, and so on. Value 0 in the bitmap indicates that the corresponding SS/PBCH block is not transmitted while value 1 indicates that the corresponding SS/PBCH block is transmitted. The network configures the same pattern in this field as in the corresponding field in ServingCellConfigCommonSIB.  For operation with shared spectrum channel access, the UE assumes that one or more SS/PBCH blocks indicated by *ssb-PositionsInBurst* may be transmitted within the discovery burst transmission window and have candidate SS/PBCH blocks indexes corresponding to SS/PBCH block indexes provided by *ssb-PositionsInBurst* (see TS 38.213 [13], clause 4.1). If the k-th bit of *ssb-PositionsInBurst* is set to 1, the UE assumes that one or more SS/PBCH blocks within the discovery burst transmission window with candidate SS/PBCH block indexes corresponding to SS/PBCH block index equal to k – 1 may be transmitted; if the kt-th bit is set to 0, the UE assumes that the corresponding SS/PBCH block(s) are not transmitted. The k-th bit is set to 0, where k > *ssb-PositionQCL* and the number of actually transmitted SS/PBCH blocks is not larger than the number of 1's in the bitmap. The network configures the same pattern in this field as in the corresponding field in *ServingCellConfigCommonSIB*. For operation with shared spectrum channel access in FR1, only *mediumBitmap* is used, and for FR2-2, *longBitmap* is used. |
| ***ssbSubcarrierSpacing***  Subcarrier spacing of SSB.  Only the following values are applicable depending on the used frequency:  FR1: 15 or 30 kHz  FR2-1/FR2-NTN: 120 or 240 kHz  FR2-2: 120, 480, or 960 kHz |
| ***supplementaryUplinkConfig***  The network configures this field only if *uplinkConfigCommon* is configured. If this field is absent, the UE shall release the *supplementaryUplinkConfig* and the *supplementaryUplink* configured in *ServingCellConfig* of this serving cell, if configured. |
| ***tdd-UL-DL-ConfigurationCommon***  A cell-specific TDD UL/DL configuration, see TS 38.213 [13], clause 11.1. |

|  |  |
| --- | --- |
| Conditional Presence | Explanation |
| *AbsFreqSSB* | The field is absent when *absoluteFrequencySSB* in frequencyInfoDL is absent, otherwise the field is mandatory present. |
| *HOAndServCellAdd* | This field is mandatory present upon SpCell change (including path switch between a serving cell and a L2 U2N Relay UE) and upon serving cell (PSCell/SCell) addition. Otherwise, the field is absent. |
| *HOAndServCellWithSSB* | This field is mandatory present upon SpCell change and upon serving cell (SCell with SSB or PSCell) addition. Otherwise, the field is absent. |
| *SharedSpectrum* | This field is mandatory present if this cell operates with shared spectrum channel access in FR1. Otherwise, it is absent, Need R. |
| *SharedSpectrum2* | This field is optionally present if this cell operates with shared spectrum channel access in FR2-2, Need R. Otherwise, it is absent, Need R. |
| *TDD* | The field is optionally present, Need R, for TDD cells; otherwise it is absent. |

*Next change*

## 6.4 RRC multiplicity and type constraint values

### – Multiplicity and type constraint definitions

-- ASN1START

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

maxAdditionalRACH-r17 INTEGER ::= 256 -- Maximum number of additional RACH configurations.

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

maxBandComb-MUSIM-r18 INTEGER ::= 64 -- Maximum number of MUSIM bands and/or band combinations

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

maxCandidateBandIndex-r18 INTEGER ::= 8 -- Maximum number of band entry index for MUSIM capability

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}

maxTwoPUCCH-Grp-ConfigList-r17 INTEGER ::= 16 -- Maximum number of supported configuration(s) of {primary PUCCH group

-- config, secondary PUCCH group config} for PUCCH cell switching

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

maxCellATG-r18 INTEGER ::= 8 -- Maximum number of ATG neighbour cells for which assistance information is

-- provided

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 across all reported PCells

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

maxCellNTN-r17 INTEGER ::= 4 -- Maximum number of NTN neighbour cells for which assistance information is

-- provided

maxCarrierTypePairList-r16 INTEGER ::= 16 -- Maximum number of supported carrier type pair of (carrier type on which

-- CSI measurement is performed, carrier type on which CSI reporting is

-- performed) for CSI reporting cross PUCCH group

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

maxFeatureCombPreamblesPerRACHResource-r17 INTEGER ::= 256 -- Maximum number of feature combination preambles.

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

maxNrofAperiodicFwdTimeResource-r18 INTEGER ::= 112 -- Max number of aperiodic fowarding time resources for NCR

maxNrofAperiodicFwdTimeResource-1-r18 INTEGER ::= 111 -- Max number of aperiodic fowarding time resources for NCR minus 1

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 minus 1

maxNrofAppLayerReports-r18 INTEGER ::= 16 -- Max number of application layer measurement reports with the same

-- measConfigAppLayerId included in the same

-- MeasurementReportAppLayerMessage

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

maxNrofIABResourceConfig-r17 INTEGER ::= 65536 -- Max number of IAB-ResourceConfigID used in MAC CE

maxNrofIABResourceConfig-1-r17 INTEGER ::= 65535 -- Max number of IAB-ResourceConfigID used in MAC CE minus 1

maxNrofPeriodicFwdResourceSet-r18 INTEGER ::= 32 -- Max number of periodic fowarding resource sets for NCR

maxNrofPeriodicFwdResourceSet-1-r18 INTEGER ::= 31 -- Max number of periodic fowarding resource sets for NCR minus 1

maxNrofPeriodicFwdResource-r18 INTEGER ::= 1024 -- Max number of periodic fowarding resources for NCR

maxNrofPeriodicFwdResource-1-r18 INTEGER ::= 1023 -- Max number of periodic fowarding resources for NCR minus 1

maxNrofSemiPersistentFwdResourceSet-r18 INTEGER ::= 32 -- Max number of semi-persistent fowarding resource sets for NCR

maxNrofSemiPersistentFwdResourceSet-1-r18 INTEGER ::= 31 -- Max number of semi-persistent fowarding resource sets for NCR minus 1

maxNrofSemiPersistentFwdResource-r18 INTEGER ::= 128 -- Max number of semi-persistent fowarding resources for NCR

maxNrofSemiPersistentFwdResource-1-r18 INTEGER ::= 127 -- Max number of semi-persistent fowarding resources for NCR 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

maxNrofCRS-IM-InterfCell-r17 INTEGER ::= 8 -- Maximum number of LTE interference cells for CRS-IM per UE

maxNrofRelayMeas-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 ::= 16 -- Max number of sidelink DRX configurations for NR

-- sidelink groupcast/broadcast communication

maxNrofSL-RxInfoSet-r17 INTEGER ::= 4 -- Max number of sidelink DRX configuration sets in sidelink DRX assistant

-- information

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

maxNrofCondCells-1-r17 INTEGER ::= 7 -- Max number of conditional candidate SpCells minus 1

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

maxNrofDL-AllocationsExt-r17 INTEGER ::= 64 -- Maximum number of PDSCH time domain resource allocations for multi-PDSCH

-- scheduling

maxNrofDL-AllocationsExt-1-r19 INTEGER ::= 63 -- Maximum number of PDSCH time domain resource allocations for for multi-cell

-- multi-PDSCH scheduling minus 1

maxNrofDL-Allocations-1-r18 INTEGER ::= 15 -- Maximum number of PDSCH time domain resource allocations minus 1

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

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

maxNrofLCGs-r18 INTEGER ::= 8 -- Maximum number of LCGs

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

maxNrOfLinkedSRS-CarriersInactive-1-r18 INTEGER ::= 2 -- Maximum number of carriers for positioning SRS CA in RRC\_INACTIVE minus 1

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 ::= 39 -- Max number of Search Space links minus 1

maxNrofBFDResourcePerSet-r17 INTEGER ::= 64 -- Max number of reference signal in one BFD set

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-ResourcesPerSet-1-r18 INTEGER ::= 63 -- Maximum number of NZP CSI-RS resources per resource set minus 1

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

maxNrofFailureDetectionResources-1-r17 INTEGER ::= 63 -- Maximum number of the enhanced failure detection resources minus 1

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

maxNrofFreqSL-1-r18 INTEGER ::= 7 -- Maximum number of carrier frequency for NR sidelink communication minus 1

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

maxNrofSL-CarrierSetConfig-r18 INTEGER ::= 96 -- Maximum number of SCCH carrier set configuration 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)

maxNrofDedicatedSL-PRS-PoolToMeas-r18 INTEGER ::= 8 -- Maximum number of SL-PRS dedicated resource pool for positioning

-- measurement to measure for each measurement object (for SL-PRS 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 and discovery

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

maxNrofSL-PRS-PerDest-r18 INTEGER ::= 8 -- Max number of SL-PRS transmission supported per destination UE

maxNrofSLRB-r16 INTEGER ::= 512 -- Maximum number of radio bearer for NR sidelink communication per UE without duplication

maxSL-LCID-Plus1-r18 INTEGER ::= 513 -- Maximum number of RLC bearer for NR sidelink communication per UE without duplication plus 1

maxSL-LCID-r18 INTEGER ::= 1024 -- Maximum number of RLC bearer for NR sidelink communication per UE with duplication

maxSL-NonAnchorRBsets INTEGER ::= 4 -- Maximum number of non-anchor RB sets

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 and

-- discovery

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

-- discovery

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

-- discovery

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

maxSimultaneousBands-2-r18 INTEGER ::= 30 -- Maximum number of simultaneously aggregated bands minus 2.

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

-- combination.

maxULTxSwitchingBetweenBandPairs-r18 INTEGER ::= 32 -- Maximum number of combinations of a band pair and another band pair/band

-- between which dynamic UL Tx switching requires additional switching

-- period.

maxSchedulingBandCombination-r18 INTEGER ::= 32 -- Maximum number of combinations of scheduling cell and co-scheduled cells

-- have same or different carrier type.

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-PathlossReferenceRSs-1-r17 INTEGER ::= 7 -- Maximum number of RSs used as pathloss reference for PUCCH power control

-- minus 1.

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

maxNrofPathlossReferenceRSs-r17 INTEGER ::= 64 -- Maximum number of RSs used as pathloss reference for PUSCH, PUCCH, SRS

-- power control for unified TCI state operation

maxNrofPathlossReferenceRSs-1-r17 INTEGER ::= 63 -- Maximum number of RSs used as pathloss reference for PUSCH, PUCCH, SRS

-- power control for unified TCI state operation minus 1

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.

maxFreqPlus1 INTEGER ::= 9 -- Max number of frequencies for Slicing.

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.

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

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

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

maxNrofAdditionalPRACHConfigs-r18 INTEGER ::= 7 -- Maximum number of additional PRACH configurations for 2TA

maxNrofdelayD-r18 INTEGER ::= 4 -- Maximum number of delayD values.

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 fetype2R1 and fetype2R2

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

maxSIB-MessagePlus1-r17 INTEGER::= 33 -- Maximum number of SIB 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

maxSNPN-ConfigCellId-r18 INTEGER ::= 32 -- Maximum number of Cell ID subject for SNPNS for MDT scope

maxSNPN-ConfigID-r18 INTEGER ::= 16 -- Maximum number of SNPNs subject for MDT scope

maxSNPN-ConfigTAI-r18 INTEGER ::= 8 -- Maximum number of TA subject for MDT scope

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

maxDCI-2-9-Size-r18 INTEGER ::= 140 -- Maximum DCI format 2-9 size

maxDCI-2-9-Size-1-r18 INTEGER ::= 139 -- Maximum DCI format 2-9 size minus 1

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

maxNrofUL-Allocations-1-r18 INTEGER ::= 63 -- Maximum number of PUSCH time domain resource allocations minus 1

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-RelayRLC-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

maxNrofCC-Group-r17 INTEGER ::= 16 -- Maximum number of CC groups for DC location report

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

maxNrofCSI-ReportSubconfigPerCSI-ReportConfig-r18 INTEGER ::= 8 -- Maximum number of CSI report subconfigurations per CSI report

-- configuration

maxNrofCSI-ReportSubconfigPerCSI-ReportConfig-1-r18 INTEGER ::= 7 -- Maximum number of CSI report subconfigurations per CSI report

-- configuration 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 ::= 4 -- Maximum number of Preconfigured PRS processing windows per DL BWP

maxNrofPPW-ID-1-r17 INTEGER ::= 15 -- Maximum number of Preconfigured PRS processing windows minus 1

maxNrOfTxTEGReport-r17 INTEGER ::= 256 -- Maximum number of UE Tx Timing Error Group Report

maxNrOfTxTEG-ID-1-r17 INTEGER ::= 7 -- Maximum number of UE Tx Timing Error Group ID minus 1

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

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

maxNrofReqComDC-Location-r17 INTEGER ::= 128 -- Maximum number of requested carriers/BWPs combinations for DC location

-- report

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

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

maxNrofRB-Sets-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

maxNrofPreConfigPosGapId-r17 INTEGER ::= 16 -- Maximum number of preconfigured positioning measurement gap

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

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 NSAGs

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

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

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

maxNrofRemoteUE-r17 INTEGER ::= 32 -- Maximum number of connected L2 U2N Remote UEs

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

maxFreqMBS-r17 INTEGER ::= 16 -- Maximum number of MBS frequencies reported in MBSInterestIndication

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 or multicast in

-- a cell

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

maxNrofMTCH-SSB-MappingWindow-1-r17 INTEGER ::= 15 -- 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

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.

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

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

maxG-CS-RNTI-1-r17 INTEGER ::= 7 -- 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

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

maxNrofPdcch-BlindDetectionMixed-1-r16 INTEGER ::= 7 -- Maximum number of combinations of mixed Rel-16 and Rel-15 PDCCH

-- monitoring capabilities minus 1

maxNrofPdcch-BlindDetection-r17 INTEGER ::= 16 -- Maximum number of combinations of PDCCH blind detection monitoring

-- capabilities

maxNrofAltitudeRanges-r18 INTEGER ::= 8 -- Maximum number of altitude ranges for altitude-based measurement configurations

maxWayPoint-r18 INTEGER ::= 20 -- Maximum number of flight path information waypoints

maxAltitude-r18 INTEGER ::= 10000 -- Maximum altitude in meters

minAltitude-r18 INTEGER ::= -420 -- Minimum altitude in meters

maxMeasSequence-r18 INTEGER ::= 64 -- Maximum number of configured sequence for measurement

maxNrofHops-1-r18 INTEGER ::= 5 -- Maximum number of Hops that can be configured for Positioning SRS Transmission

maxNrOfCellsInVA-r18 INTEGER ::= 16 -- Maximum number of cells in validity area for Positioning SRS

maxNrOfCellsInVA-Ext-r18 INTEGER ::= 16 -- Maximum number of additional cells in validity area for Positioning SRS

maxNrOfLinkedSRS-PosResourceSet-r18 INTEGER ::= 3 -- Maximum number of linked SRSPosResourceSets that can be aggregated across

-- CCs

maxNrOfLinkedSRS-PosResSetComb-r18 INTEGER ::= 32 -- Maximum number of combinations of linked SRSPosResourceSets that can be

-- aggregated in RRC\_CONNECTED state

maxNrOfLinkedSRS-PosResSetCombInactive-r18 INTEGER ::= 16 -- Maximum number of combinations of linked SRSPosResourceSets that can be

-- aggregated in RRC\_INACTIVE state

maxCBR-ConfigDedSL-PRS-1-r18 INTEGER ::= 7 -- Maximum number of CBR ranges for dedicated SL PRS resource pool

maxCBR-LevelDedSL-PRS-1-r18 INTEGER ::= 15 -- Maximum number of CBR levels for dedicated SL PRS resource pool

maxNrofSL-PRS-TxPool-r18 INTEGER ::= 8 -- Maximum number of Tx dedicated SL-PRS resource pool for NR sidelink positioning

maxNrofSL-PRS-TxConfig-r18 INTEGER ::= 64 -- Maximum number of SL PRS transmission parameter configurations

maxNrOfVA-r18 INTEGER ::= 16 -- Maximum number of validity area

maxNrofLTM-Configs-r18 INTEGER ::= 8 -- Maximum number of LTM candidate cells

maxNrofLTM-Configs-plus1-r18 INTEGER ::= 9 -- Maximum number of LTM candidate cells plus 1

maxNrofLTM-CSI-ReportConfigurations-r18 INTEGER ::= 48 -- Maximum number of LTM CSI reporting configurations

maxNrofLTM-CSI-ReportConfigurations-1-r18 INTEGER ::= 47 -- Maximum number of LTM CSI reporting configurations minus 1

maxNrofLTM-CSI-SSB-ResourcesPerSet-r18 INTEGER ::= 512 -- Maximum number of LTM CSI SSB resource per set

maxNrofLTM-CSI-ResourceConfigurations-r18 INTEGER ::= 112 -- Maximum number of LTM CSI resource configurations

maxNrofLTM-CSI-ResourceConfigurations-1-r18 INTEGER ::= 111 -- Maximum number of LTM CSI resource configurations minus 1

maxNrofCandidateTCI-State-r18 INTEGER ::= 128 -- Maximum number of LTM TCI states

maxNrofCandidateUL-TCI-r18 INTEGER ::= 64 -- Maximum number of LTM UL TCI states

maxSecurityCellSet-r18 INTEGER ::= 9 -- Maximum number of cell sets for subsequent CPAC.

maxSK-Counter-r18 INTEGER ::= 8 -- Maximum number of SK-counters configured for a cell set for subsequent CPAC.

maxNrofThresholdMBS-r18 INTEGER ::= 8 -- Max number of thresholds of MBS sessions for RRC connection resume for a

-- UE receiving multicast in RRC\_INACTIVE

maxNrofThresholdMBS-1-r18 INTEGER ::= 7 -- Max number of thresholds of MBS sessions for RRC connection resume for a

-- UE receiving multicast in RRC\_INACTIVE minus 1

maxTN-AreaInfo-r18 INTEGER ::= 32 -- Maximum number of TN coverage areas for which assistance info is

-- provided in an NTN cell

maxNrofSetsOfCells-r18 INTEGER ::= 4 -- Maximum number of sets of cells for multi-cell PDSCH/PUSCH scheduling

maxNrofSetsOfCells-1-r18 INTEGER ::= 3 -- Maximum number of sets of cells for multi-cell PDSCH/PUSCH scheduling

-- minus 1

maxNrofCellsInSet-r18 INTEGER ::= 4 -- Maximum number of cells configured in a set of cells for multi-cell

-- PDSCH/PUSCH scheduling

maxNrofCellsInSet-1-r18 INTEGER ::= 3 -- Maximum number of cells configured in a set of cells for multi-cell

-- PDSCH/PUSCH scheduling minus 1

maxNrofCellCombos-r18 INTEGER ::= 16 -- Maximum number of combinations of co-scheduled cells for multi-cell

-- PDSCH/PUSCH scheduling

maxNrofBWPsInSetOfCells-r18 INTEGER ::= 16 -- Maximum number of BWPs configured in a set of cells for multi-cell

-- PDSCH/PUSCH scheduling

maxLowerMSD-r18 INTEGER ::= 256 -- Maximum number of lower MSD capability sets for a victim band

maxLowerMSDInfo-r18 INTEGER ::= 64 -- Maximum number of lower MSD capability sets for a band combination

maxNrofIntraEndc-Components-r17 INTEGER ::= 4 -- Maximum number of intra-band (NG)EN-DC band components in an inter-band

-- (NG)EN-DC band combination

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

-- ASN1STOP

### – End of NR-RRC-Definitions

-- ASN1START

END

-- ASN1STOP

## 6.5 Short Message

Short Messages can be transmitted on PDCCH using P-RNTI with or without associated *Paging* message using Short Message field in DCI format 1\_0 (see TS 38.212 [17], clause 7.3.1.2.1).

Table 6.5-1 defines Short Messages. Bit 1 is the most significant bit.

Table 6.5-1: Short Messages

|  |  |
| --- | --- |
| Bit | Short Message |
| 1 | ***systemInfoModification***  If set to 1: indication of a BCCH modification other than *SIB6*, *SIB7*, *SIB8* and *posSIBs*. |
| 2 | ***etwsAndCmasIndication***  If set to 1: indication of an ETWS primary notification and/or an ETWS secondary notification and/or a CMAS notification. |
| 3 | ***stopPagingMonitoring***  This bit can be used for only operation with shared spectrum channel access and if *nrofPDCCH-MonitoringOccasionPerSSB-InPO* is present.  If set to 1: indication that the UE may stop monitoring PDCCH occasion(s) for paging in this Paging Occasion as specified in TS 38.304 [20], clause 7.1. |
| 4 | ***systemInfoModification-eDRX***  If set to 1: indication of a BCCH modification other than *SIB6*, *SIB7*, *SIB8* and *posSIB*s. This indication applies only to UEs using IDLE eDRX cycle longer than the BCCH modification period. |
| 5 – 8 | Not used in this release of the specification, and shall be ignored by UE if received. |

## 6.6 PC5 RRC messages

### 6.6.1 General message structure

#### – *PC5-RRC-Definitions*

This ASN.1 segment is the start of the PC5 RRC PDU definitions.

-- ASN1START

-- TAG-PC5-RRC-DEFINITIONS-START

PC5-RRC-Definitions DEFINITIONS AUTOMATIC TAGS ::=

BEGIN

IMPORTS

ARFCN-ValueNR,

CellAccessRelatedInfo,

SetupRelease,

RRC-TransactionIdentifier,

SN-FieldLengthAM,

SN-FieldLengthUM,

LogicalChannelIdentity,

maxNrofSLRB-r16,

maxNrofSL-RxInfoSet-r17,

maxNrofSL-QFIs-r16,

maxNrofSL-QFIsPerDest-r16,

PagingCycle,

PagingRecord,

RSRP-Range,

SL-MeasConfig-r16,

SL-MeasId-r16,

FreqBandList,

FreqBandIndicatorNR,

GNSS-ID-r16,

maxNrofRelayMeas-r17,

maxSimultaneousBands,

maxBandComb,

maxBands,

maxSIB,

maxSIB-MessagePlus1-r17,

maxSL-LCID-r16,

maxNrofFreqSL-1-r18,

BandParametersSidelink-r16,

PagingRecord-v1700,

RLC-ParametersSidelink-r16,

SBAS-ID-r16,

SIB1,

SL-DRX-ConfigUC-r17,

SL-DRX-ConfigUC-SemiStatic-r17,

SL-PagingIdentityRemoteUE-r17,

SL-RLC-ChannelID-r17,

SL-SourceIdentity-r17,

SystemInformation,

maxNrofSL-Dest-r16,

SL-DestinationIdentity-r16,

SL-RelayIndicationMP-r18,

SL-RSRP-Range-r16,

SL-QoS-FlowIdentity-r16,

SL-QoS-Info-r16,

maxNrofPhysicalResourceBlocks,

SubcarrierSpacing

FROM NR-RRC-Definitions;

-- TAG-PC5-RRC-DEFINITIONS-STOP

-- ASN1STOP

#### – *SBCCH-SL-BCH-Message*

The *SBCCH-SL-BCH-Message* class is the set of RRC messages that may be sent from the UE to the UE via SL-BCH on the SBCCH logical channel.

-- ASN1START

-- TAG-SBCCH-SL-BCH-MESSAGE-START

SBCCH-SL-BCH-Message ::= SEQUENCE {

message SBCCH-SL-BCH-MessageType

}

SBCCH-SL-BCH-MessageType::= CHOICE {

c1 CHOICE {

masterInformationBlockSidelink MasterInformationBlockSidelink,

spare1 NULL

},

messageClassExtension SEQUENCE {}

}

-- TAG-SBCCH-SL-BCH-MESSAGE-STOP

-- ASN1STOP

#### – *SCCH-Message*

The *SCCH-Message* class is the set of PC5-RRC messages that may be sent from the UE to the UE for unicast of NR sidelink communication on SCCH logical channel.

-- ASN1START

-- TAG-SCCH-MESSAGE-START

SCCH-Message ::= SEQUENCE {

message SCCH-MessageType

}

SCCH-MessageType ::= CHOICE {

c1 CHOICE {

measurementReportSidelink MeasurementReportSidelink,

rrcReconfigurationSidelink RRCReconfigurationSidelink,

rrcReconfigurationCompleteSidelink RRCReconfigurationCompleteSidelink,

rrcReconfigurationFailureSidelink RRCReconfigurationFailureSidelink,

ueCapabilityEnquirySidelink UECapabilityEnquirySidelink,

ueCapabilityInformationSidelink UECapabilityInformationSidelink,

uuMessageTransferSidelink-r17 UuMessageTransferSidelink-r17,

remoteUEInformationSidelink-r17 RemoteUEInformationSidelink-r17

},

messageClassExtension CHOICE {

c2 CHOICE {

notificationMessageSidelink-r17 NotificationMessageSidelink-r17,

ueAssistanceInformationSidelink-r17 UEAssistanceInformationSidelink-r17,

ueInformationRequestSidelink-r18 UEInformationRequestSidelink-r18,

ueInformationResponseSidelink-r18 UEInformationResponseSidelink-r18, spare4 NULL, spare3 NULL, spare2 NULL, spare1 NULL

},

messageClassExtensionFuture-r17 SEQUENCE {}

}

}

-- TAG-SCCH-MESSAGE-STOP

-- ASN1STOP

6.6.2 Message definitions

#### – *MasterInformationBlockSidelink*

The *MasterInformationBlockSidelink* includes the system information transmitted by a UE via SL-BCH.

Signalling radio bearer: N/A

RLC-SAP: TM

Logical channel: SBCCH

Direction: UE to UE

*MasterInformationBlockSidelink*

-- ASN1START

-- TAG-MASTERINFORMATIONBLOCKSIDELINK-START

MasterInformationBlockSidelink ::= SEQUENCE {

sl-TDD-Config-r16 BIT STRING (SIZE (12)),

inCoverage-r16 BOOLEAN,

directFrameNumber-r16 BIT STRING (SIZE (10)),

slotIndex-r16 BIT STRING (SIZE (7)),

reservedBits-r16 BIT STRING (SIZE (2))

}

-- TAG-MASTERINFORMATIONBLOCKSIDELINK-STOP

-- ASN1STOP

|  |
| --- |
| *MasterInformationBlockSidelink* field descriptions |
| ***directFrameNumber***  Indicates the frame number in which S-SSB transmitted. |
| ***inCoverage***  Value true indicates that the UE transmitting the *MasterInformationBlockSidelink* is in network coverage, or UE selects GNSS timing as the synchronization reference source. |
| ***slotIndex***  Indicates the slot index in which S-SSB transmitted. |

#### – *MeasurementReportSidelink*

The *MeasurementReportSidelink* message is used for the indication of measurement results of NR sidelink.

Signalling radio bearer: SL-SRB3

RLC-SAP: AM

Logical channel: SCCH

Direction: UE to UE

*MeasurementReportSidelink* message

-- ASN1START

-- TAG-MEASUREMENTREPORTSIDELINK-START

MeasurementReportSidelink ::= SEQUENCE {

criticalExtensions CHOICE {

measurementReportSidelink-r16 MeasurementReportSidelink-r16-IEs,

criticalExtensionsFuture SEQUENCE {}

}

}

MeasurementReportSidelink-r16-IEs ::= SEQUENCE {

sl-MeasResults-r16 SL-MeasResults-r16,

lateNonCriticalExtension OCTET STRING OPTIONAL,

nonCriticalExtension SEQUENCE{} OPTIONAL

}

SL-MeasResults-r16 ::= SEQUENCE {

sl-MeasId-r16 SL-MeasId-r16,

sl-MeasResult-r16 SL-MeasResult-r16,

...

}

SL-MeasResult-r16 ::= SEQUENCE {

sl-ResultDMRS-r16 SL-MeasQuantityResult-r16 OPTIONAL,

...,

[[

sl-Result-SL-PRS-r18 SL-MeasQuantityResult-r16 OPTIONAL

]]

}

SL-MeasQuantityResult-r16 ::= SEQUENCE {

sl-RSRP-r16 RSRP-Range OPTIONAL,

...,

[[

sl-RSRP-DedicatedSL-PRS-RP-r18 SL-RSRP-Range-r16 OPTIONAL

]]

}

SL-MeasResultListRelay-r17 ::= SEQUENCE (SIZE (1..maxNrofRelayMeas-r17)) OF SL-MeasResultRelay-r17

SL-MeasResultRelay-r17 ::= SEQUENCE {

cellIdentity-r17 CellAccessRelatedInfo,

sl-RelayUE-Identity-r17 SL-SourceIdentity-r17,

sl-MeasResult-r17 SL-MeasResult-r16,

...,

[[

sl-MeasQuantity-r18 ENUMERATED { sl-rsrp, sd-rsrp } OPTIONAL,

sl-RelayIndicationMP-r18 SL-RelayIndicationMP-r18 OPTIONAL

]]

}

-- TAG-MEASUREMENTREPORTSIDELINK-STOP

-- ASN1STOP

|  |
| --- |
| *MeasurementReportSidelink* field descriptions |
| ***sl-MeasId***  Identifies the sidelink measurement identity for which the reporting is being performed. |
| ***sl-MeasResult***  Measured RSRP results of a unicast destination. |
| ***sl-RSRP-DedicatedSL-PRS-RP***  Measured SL PRS-based filtered RSRP. |
| ***sl-RelayIndicationMP***  Indicate the reported L2 U2N Relay UE supports RRC connection establishment/resume for MP operation triggered by receiving *RemoteUEInformationSidelink* containing the *connectionForMP* as specified in 5.3.3.1a and 5.3.13.1a in Rel-18. |

#### – *NotificationMessageSidelink*

The *NotificationMessageSidelink* message is used to send notification message from U2N Relay UE to the connected U2N Remote UE or from U2U Relay UE to the connected U2U Remote UE.

Signalling radio bearer: SL-SRB3

RLC-SAP: AM

Logical channel: SCCH

Direction: U2N Relay UE to U2N Remote UE or U2U Relay UE to U2U Remote UE

*NotificationMessageSidelink* message

-- ASN1START

-- TAG-NOTIFICATIONMESSAGESIDELINK-START

NotificationMessageSidelink-r17 ::= SEQUENCE {

criticalExtensions CHOICE {

notificationMessageSidelink-r17 NotificationMessageSidelink-r17-IEs,

criticalExtensionsFuture SEQUENCE {}

}

}

NotificationMessageSidelink-r17-IEs ::= SEQUENCE {

indicationType-r17 ENUMERATED {

relayUE-Uu-RLF, relayUE-HO, relayUE-CellReselection,

relayUE-Uu-RRC-Failure

} OPTIONAL, -- Need N

lateNonCriticalExtension OCTET STRING OPTIONAL,

nonCriticalExtension NotificationMessageSidelink-v1800-IEs OPTIONAL

}

NotificationMessageSidelink-v1800-IEs ::= SEQUENCE {

sl-IndicationType-r18 ENUMERATED {relayUE-PC5-RLF, spare1} OPTIONAL, -- Need N

sl-DestinationIdentityRemoteUE-r18 SL-DestinationIdentity-r16 OPTIONAL, -- Need N

nonCriticalExtension SEQUENCE {} OPTIONAL

}

-- TAG-NOTIFICATIONMESSAGESIDELINK -STOP

-- ASN1STOP

#### – *RemoteUEInformationSidelink*

The *RemoteUEInformationSidelink* message is used to request SIB(s) or provide paging related information, or provide other remote UE information, as specified in clause 5.8.9.8.1.

Signalling radio bearer: SL-SRB3

RLC-SAP: AM

Logical channel: SCCH

Direction: L2 U2N Remote UE to L2 U2N Relay UE, or L2 U2U Remote UE to L2 U2U Relay UE

*RemoteUEInformationSidelink* message

-- ASN1START

-- TAG-REMOTEUEINFORMATIONSIDELINK-START

RemoteUEInformationSidelink-r17 ::= SEQUENCE {

criticalExtensions CHOICE {

remoteUEInformationSidelink-r17 RemoteUEInformationSidelink-r17-IEs,

criticalExtensionsFuture SEQUENCE {}

}

}

RemoteUEInformationSidelink-r17-IEs ::= SEQUENCE {

sl-RequestedSIB-List-r17 SetupRelease { SL-RequestedSIB-List-r17} OPTIONAL, -- Need M

sl-PagingInfo-RemoteUE-r17 SetupRelease { SL-PagingInfo-RemoteUE-r17} OPTIONAL, -- Need M

lateNonCriticalExtension OCTET STRING OPTIONAL,

nonCriticalExtension RemoteUEInformationSidelink-v1800-IEs OPTIONAL

}

RemoteUEInformationSidelink-v1800-IEs ::= SEQUENCE {

sl-RequestedPosSIB-List-r18 SetupRelease { SL-RequestedPosSIB-List-r18 } OPTIONAL, -- Need M

sl-SFN-DFN-OffsetRequested-r18 ENUMERATED { true } OPTIONAL, -- Need R

connectionForMP-r18 ENUMERATED {true} OPTIONAL, -- Need N

sl-DestinationIdentityRemoteUE-r18 SL-DestinationIdentity-r16 OPTIONAL, -- Need N

nonCriticalExtension SEQUENCE {} OPTIONAL

}

SL-RequestedSIB-List-r17 ::= SEQUENCE (SIZE (maxSIB-MessagePlus1-r17)) OF SL-SIB-ReqInfo-r17

SL-PagingInfo-RemoteUE-r17 ::= SEQUENCE {

sl-PagingIdentityRemoteUE-r17 SL-PagingIdentityRemoteUE-r17,

sl-PagingCycleRemoteUE-r17 PagingCycle OPTIONAL -- Need M

}

SL-SIB-ReqInfo-r17 ::= ENUMERATED { sib1, sib2, sib3, sib4, sib5, sib6, sib7, sib8, sib9, sib10, sib11, sib12, sib13,

sib14, sib15, sib16, sib17, sib18, sib19, sib20, sib21, sibNotReq11, sibNotReq10,

sibNotReq9, sibNotReq8, sibNotReq7, sibNotReq6, sibNotReq5, sibNotReq4,

sibNotReq3, sibNotReq2, sibNotReq1, ..., sib17bis-v1820 }

SL-RequestedPosSIB-List-r18 ::= SEQUENCE (SIZE (1..maxSIB)) OF SL-PosSIB-ReqInfo-r18

SL-PosSIB-ReqInfo-r18 ::= SEQUENCE {

gnss-id-r18 GNSS-ID-r16 OPTIONAL, -- Need R

sbas-id-r18 SBAS-ID-r16 OPTIONAL, -- Cond GNSS-ID-SBAS

posSibType-r18 ENUMERATED { posSibType1-1, posSibType1-2, posSibType1-3, posSibType1-4, posSibType1-5, posSibType1-6,

posSibType1-7, posSibType1-8, posSibType1-9, posSibType1-10, posSibType1-11,

posSibType1-12, posSibType2-1, posSibType2-2, posSibType2-3, posSibType2-4, posSibType2-5,

posSibType2-6, posSibType2-7, posSibType2-8, posSibType2-9, posSibType2-10, posSibType2-11,

posSibType2-12, posSibType2-13, posSibType2-14, posSibType2-15, posSibType2-16,

posSibType2-17, posSibType2-17a, posSibType2-18, posSibType2-18a, posSibType2-19,

posSibType2-20, posSibType2-20a, posSibType2-21, posSibType2-22, posSibType2-23,

posSibType2-24, posSibType2-25, posSibType2-26, posSibType2-27, posSibType3-1,

posSibType4-1, posSibType5-1, posSibType6-1, posSibType6-2, posSibType6-3, posSibType6-4,

posSibType6-5, posSibType6-6, posSibType6-7, posSibType7-1, posSibType7-2, posSibType7-3,

posSibType7-4, spare9, spare8, spare7, spare6, spare5, spare4, spare3, spare2, spare1,

... }

}

-- TAG-REMOTEUEINFORMATIONSIDELINK-STOP

-- ASN1STOP

|  |
| --- |
| *RemoteUEInformationSidelink-IEs* field descriptions |
| ***connectionForMP***  Indicates the connected L2 U2N Relay UE by the L2 U2N Remote UE that the access is for MP. |
| ***sl-DestinationIdentityRemoteUE***  Indicates the peer L2 U2U Remote UE upon end-to-end PC5 connection failure or release. |
| ***sl-PagingCycleRemoteUE***  Indicates the L2 U2N Remote UE's UE specific DRX cycle as the minimum value of the one provided by upper layers (if configured) and the one provided by RRC layer (if configured). Value rf32 corresponds to 32 radio frames, value rf64 corresponds to 64 radio frames and so on. |
| ***sl-PagingIdentityRemoteUE***  Indicates the L2 U2N Remote UE's paging UE ID. |
| ***sl-PagingInfo-RemoteUE***  Indicates the paging information used by L2 U2N Relay UE to perform the connected L2 U2N Remote UE's paging monitoring. |
| ***sl-RequestedPosSIB-List***  Contains a list of requested PosSIBs. |
| ***sl-RequestedSIB-List***  Contains a list of requested SIBs. |
| ***sl-SFN-DFN-OffsetRequested***  If present, this field indicates that the L2 U2N Remote UE requests the L2 U2N Relay UE to provide the SFN-DFN offset in a subsequent *RRCReconfigurationSidelink* message. |
| ***SL-SIB-ReqInfo***  Indicates the requested SIB type. Values sibNotReq11, sibNotReq10, …, sibNotReq1 shall be ignored by L2 U2N relay UE (i.e., no SIB requested). |

| Conditional presence | Explanation |
| --- | --- |
| *GNSS-ID-SBAS* | The field is mandatory present if *gnss-id* is set to *sbas*. It is absent otherwise. |

#### – *RRCReconfigurationSidelink*

The *RRCReconfigurationSidelink* message is the command to AS configuration of the PC5 RRC connection. It is only applied to unicast of NR sidelink communication.

Signalling radio bearer: SL-SRB3

RLC-SAP: AM

Logical channel: SCCH

Direction: UE to UE

*RRCReconfigurationSidelink* message

-- ASN1START

-- TAG-RRCRECONFIGURATIONSIDELINK-START

RRCReconfigurationSidelink ::= SEQUENCE {

rrc-TransactionIdentifier-r16 RRC-TransactionIdentifier,

criticalExtensions CHOICE {

rrcReconfigurationSidelink-r16 RRCReconfigurationSidelink-r16-IEs,

criticalExtensionsFuture SEQUENCE {}

}

}

RRCReconfigurationSidelink-r16-IEs ::= SEQUENCE {

slrb-ConfigToAddModList-r16 SEQUENCE (SIZE (1..maxNrofSLRB-r16)) OF SLRB-Config-r16 OPTIONAL, -- Need N

slrb-ConfigToReleaseList-r16 SEQUENCE (SIZE (1..maxNrofSLRB-r16)) OF SLRB-PC5-ConfigIndex-r16 OPTIONAL, -- Need N

sl-MeasConfig-r16 SetupRelease {SL-MeasConfig-r16} OPTIONAL, -- Need M

sl-CSI-RS-Config-r16 SetupRelease {SL-CSI-RS-Config-r16} OPTIONAL, -- Need M

sl-ResetConfig-r16 ENUMERATED {true} OPTIONAL, -- Need N

sl-LatencyBoundCSI-Report-r16 INTEGER (3..160) OPTIONAL, -- Need M

lateNonCriticalExtension OCTET STRING OPTIONAL,

nonCriticalExtension RRCReconfigurationSidelink-v1700-IEs OPTIONAL

}

RRCReconfigurationSidelink-v1700-IEs ::= SEQUENCE {

sl-DRX-ConfigUC-PC5-r17 SetupRelease { SL-DRX-ConfigUC-r17 } OPTIONAL, -- Need M

sl-LatencyBoundIUC-Report-r17 SetupRelease { SL-LatencyBoundIUC-Report-r17 } OPTIONAL, -- Need M

sl-RLC-ChannelToReleaseListPC5-r17 SEQUENCE (SIZE (1..maxSL-LCID-r16)) OF SL-RLC-ChannelID-r17 OPTIONAL, -- Need N

sl-RLC-ChannelToAddModListPC5-r17 SEQUENCE (SIZE (1..maxSL-LCID-r16)) OF SL-RLC-ChannelConfigPC5-r17 OPTIONAL, -- Need N

nonCriticalExtension RRCReconfigurationSidelink-v1800-IEs OPTIONAL

}

RRCReconfigurationSidelink-v1800-IEs ::= SEQUENCE {

sl-SFN-DFN-Offset-r18 SetupRelease { SL-SFN-DFN-Offset-r18 } OPTIONAL, -- Need M

sl-CarrierToAddModList-r18 SEQUENCE (SIZE (1..maxNrofFreqSL-1-r18)) OF SL-CarrierConfig-r18 OPTIONAL, -- Need N

sl-CarrierToReleaseList-r18 SEQUENCE (SIZE (1..maxNrofFreqSL-1-r18)) OF SL-CarrierId-r18 OPTIONAL, -- Need N

sl-RLC-BearerToAddModList-r18 SEQUENCE (SIZE(1..maxNrofSLRB-r16)) OF SL-RLC-BearerConfig-r18 OPTIONAL, -- Need N

sl-RLC-BearerToReleaseList-r18 SEQUENCE (SIZE(1..maxNrofSLRB-r16)) OF SL-RLC-BearerConfigIndex-r18 OPTIONAL, -- Need N

sl-LocalID-PairList-r18 SEQUENCE (SIZE (1..maxNrofSL-Dest-r16)) OF SL-SRAP-ConfigPC5-r18 OPTIONAL, -- Need N

nonCriticalExtension SEQUENCE {} OPTIONAL

}

SL-CarrierConfig-r18 ::= SEQUENCE {

sl-CarrierId-r18 SL-CarrierId-r18,

sl-OffsetToCarrier-r18 INTEGER (0..2199),

subcarrierSpacing-r18 SubcarrierSpacing,

carrierBandwidth-r18 INTEGER (1..maxNrofPhysicalResourceBlocks),

sl-AbsoluteFrequencyPointA-r18 ARFCN-ValueNR

}

SL-CarrierId-r18 ::= INTEGER (1..maxNrofFreqSL-1-r18)

SL-RLC-BearerConfig-r18 ::= CHOICE {

srb SEQUENCE {

sl-SRB-IdentityWithDuplication INTEGER (1..3),

sL-RLC-BearerConfigIndex-r18 SL-RLC-BearerConfigIndex-r18,

...

},

drb SEQUENCE {

slrb-PC5-ConfigIndex-r18 SLRB-PC5-ConfigIndex-r16,

sL-RLC-BearerConfigIndex-r18 SL-RLC-BearerConfigIndex-r18,

sl-RLC-ConfigPC5-r18 SL-RLC-ConfigPC5-r16 OPTIONAL, -- Need M

sl-MAC-LogicalChannelConfigPC5-r18 SL-LogicalChannelConfigPC5-r16 OPTIONAL, -- Need M

...

}

}

SL-RLC-BearerConfigIndex-r18 ::= INTEGER (1..maxSL-LCID-r16)

SL-LatencyBoundIUC-Report-r17::= INTEGER (3..160)

SLRB-Config-r16::= SEQUENCE {

slrb-PC5-ConfigIndex-r16 SLRB-PC5-ConfigIndex-r16,

sl-SDAP-ConfigPC5-r16 SL-SDAP-ConfigPC5-r16 OPTIONAL, -- Need M

sl-PDCP-ConfigPC5-r16 SL-PDCP-ConfigPC5-r16 OPTIONAL, -- Need M

sl-RLC-ConfigPC5-r16 SL-RLC-ConfigPC5-r16 OPTIONAL, -- Need M

sl-MAC-LogicalChannelConfigPC5-r16 SL-LogicalChannelConfigPC5-r16 OPTIONAL, -- Need M

...

}

SLRB-PC5-ConfigIndex-r16 ::= INTEGER (1..maxNrofSLRB-r16)

SL-SDAP-ConfigPC5-r16 ::= SEQUENCE {

sl-MappedQoS-FlowsToAddList-r16 SEQUENCE (SIZE (1.. maxNrofSL-QFIsPerDest-r16)) OF SL-PQFI-r16 OPTIONAL, -- Need N

sl-MappedQoS-FlowsToReleaseList-r16 SEQUENCE (SIZE (1.. maxNrofSL-QFIsPerDest-r16)) OF SL-PQFI-r16 OPTIONAL, -- Need N

sl-SDAP-Header-r16 ENUMERATED {present, absent},

...

}

SL-PDCP-ConfigPC5-r16 ::= SEQUENCE {

sl-PDCP-SN-Size-r16 ENUMERATED {len12bits, len18bits} OPTIONAL, -- Need M

sl-OutOfOrderDelivery-r16 ENUMERATED { true } OPTIONAL, -- Need R

...

}

SL-RLC-ConfigPC5-r16 ::= CHOICE {

sl-AM-RLC-r16 SEQUENCE {

sl-SN-FieldLengthAM-r16 SN-FieldLengthAM OPTIONAL, -- Need M

...

},

sl-UM-Bi-Directional-RLC-r16 SEQUENCE {

sl-SN-FieldLengthUM-r16 SN-FieldLengthUM OPTIONAL, -- Need M

...

},

sl-UM-Uni-Directional-RLC-r16 SEQUENCE {

sl-SN-FieldLengthUM-r16 SN-FieldLengthUM OPTIONAL, -- Need M

...

}

}

SL-LogicalChannelConfigPC5-r16 ::= SEQUENCE {

sl-LogicalChannelIdentity-r16 LogicalChannelIdentity,

...,

[[

sl-LogicalChannelIdentity-v1800 INTEGER (33..38) OPTIONAL -- Need M

]]

}

SL-PQFI-r16 ::= INTEGER (1..64)

SL-CSI-RS-Config-r16 ::= SEQUENCE {

sl-CSI-RS-FreqAllocation-r16 CHOICE {

sl-OneAntennaPort-r16 BIT STRING (SIZE (12)),

sl-TwoAntennaPort-r16 BIT STRING (SIZE (6))

} OPTIONAL, -- Need M

sl-CSI-RS-FirstSymbol-r16 INTEGER (3..12) OPTIONAL, -- Need M

...

}

SL-RLC-ChannelConfigPC5-r17::= SEQUENCE {

sl-RLC-ChannelID-PC5-r17 SL-RLC-ChannelID-r17,

sl-RLC-ConfigPC5-r17 SL-RLC-ConfigPC5-r16 OPTIONAL, -- Need M

sl-MAC-LogicalChannelConfigPC5-r17 SL-LogicalChannelConfigPC5-r16 OPTIONAL, -- Need M

...

}

SL-SFN-DFN-Offset-r18 ::= SEQUENCE {

sl-FrameOffset-r18 INTEGER (0..1023),

sl-SubframeOffset-r18 INTEGER (0..9),

sl-SlotOffset-r18 INTEGER (0..31)

}

SL-SRAP-ConfigPC5-r18 ::= SEQUENCE {

sl-PeerRemoteUE-L2Identity-r18 SL-DestinationIdentity-r16 OPTIONAL, -- Need M

sl-PeerRemoteUE-LocalIdentity-r18 INTEGER (0..255) OPTIONAL, -- Need M

sl-RemoteUE-L2Identity-r18 SL-SourceIdentity-r17 OPTIONAL, -- Need M

sl-RemoteUE-LocalIdentity-r18 INTEGER (0..255) OPTIONAL, -- Need M

...

}

-- TAG-RRCRECONFIGURATIONSIDELINK-STOP

-- ASN1STOP

|  |
| --- |
| *RRCReconfigurationSidelink* field descriptions |
| ***sl-AbsoluteFrequencyPointA***  Absolute frequency of the reference resource block (Common RB 0). Its lowest subcarrier is also known as Point A. |
| ***sl-CarrierToAddModList***  Indicate the carrier(s) to be added/modified for transmission by UE transmitting *RRCReconfigurationSidelink* message, corresponding to the frequency in *sl-FreqInfoListSizeExt* broadcast in *SIB12* or corresponding to the frequency in *sl-PreconfigFreqInfoListSizeExt* in *SL-PreconfigurationNR*. |
| ***sl-CarrierToReleaseList***  Indicate the carrier(s) to be released for the transmission by UE transmitting *RRCReconfigurationSidelink* message. |
| ***sl-CSI-RS-FreqAllocation***  Indicates the frequency domain position for sidelink CSI-RS. |
| ***sl-CSI-RS-FirstSymbol***  Indicates the position of first symbol of sidelink CSI-RS. |
| ***sl-DRX-ConfigUC-PC5***  Indicates the NR sidelink DRX configuration for unicast communication, as specified in TS 38.321 [3] |
| ***sl-LatencyBoundCSI-Report***  Indicates the latency bound of SL CSI report from the associated SL CSI triggering in terms of number of slots. |
| ***sl-LatencyBoundIUC-Report***  Indicates the latency bound of SL Inter-UE coordination report from the associated SL Inter-UE coordination explicit request triggering in terms of number of slots. |
| ***sl-LocalID-PairList***  Indicate a list of local ID pair which is assigned for one end-to-end PC5 connection by the L2 U2U Relay UE. |
| ***sl-LogicalChannelIdentity***  Indicates the identity of the sidelink logical channel, as specified in TS 38.321 [3], clause 6.2.4. If the *sl-LogicalChannelIdentity-v1800* is present, the UE shall ignore the *sl-LogicalChannelIndentity-r16* field. |
| ***sl-MappedQoS-FlowsToAddList***  Indicate the QoS flows to be mapped to the configured sidelink DRB. Each entry is indicated by the *SL-PQFI*, which is used between UEs, as defined in TS 23.287 [55]. |
| ***sl-MappedQoS-FlowsToReleaseList***  Indicate the QoS flows to be released from the configured sidelink DRB. Each entry is indicated by the *SL-PQFI*, which is used between UEs, as defined in TS 23.287 [55]. |
| ***sl-MeasConfig***  Indicates the sidelink measurement configuration for the unicast destination. |
| ***sl-OffsetToCarrier***  Offset in frequency domain between Point A (lowest subcarrier of common RB 0) and the lowest usable subcarrier on this carrier in number of PRBs (using the subcarrierSpacing defined for this carrier). The maximum value corresponds to 275\*8-1. See TS 38.211 [16], clause 4.4.2. |
| ***sl-OutOfOrderDelivery***  Indicates whether or not outOfOrderDelivery specified in TS 38.323 [5] is configured. This field should be either always present or always absent, after the sidelink radio bearer is established. |
| ***sl-PDCP-SN-Size***  Indicates the PDCP SN size of the configured sidelink DRB. |
| ***sl-Resetconfig***  Indicates that the full configuration should be applicable for the *RRCReconfigurationSidelink* message. |
| ***sl-RLC-BearerToAddModList***  Indicate the additional Sidelink RLC bearer to be added / modified for the configured sidelink SRB/DRB. |
| ***sl-RLC-BearerToReleaseList***  Indicate the additional Sidelink RLC bearer to be released for the configured sidelink SRB/DRB. |
| ***sl-SDAP-Header***  Indicates whether or not a SDAP header is present on this sidelink DRB. |
| ***sl-SFN-DFN-Offset***  Indicates the SFN-DFN offset to be used for determining the SFN timeline based on the DFN timeline. |
| ***sl-SRB-IdentityWithDuplication***  Indicate the sidelink SRB for which duplication is configured. |
| ***slrb-PC5-ConfigIndex***  Indicates the identity of the configuration of a sidelink DRB. In case of L2 U2U relay, only value 4-31 can be signaled for an end-to-end sidelink DRB, and all other values are reserved. |

|  |
| --- |
| *SL-SRAP-ConfigPC5* field descriptions |
| ***sl-RemoteUE-LocalIdentity***  Indicates the local UE ID of the L2 U2U Remote UE used in SRAP as specified in TS 38.351 [66]. |
| ***sl-RemoteUE-L2Identity***  Indicates the Source L2 ID of the L2 U2U Remote UE as specified in TS 23.304 [65]. |
| ***sl-PeerRemoteUE-LocalIdentity***  Indicates the local UE ID of the peer L2 U2U Remote UE used in SRAP as specified in TS 38.351 [66]. |
| ***sl-PeerRemoteUE-L2Identity***  Indicates the destination L2 ID identifying the peer L2 U2U Remote UE as specified in TS 23.304 [65]. |

#### – *RRCReconfigurationCompleteSidelink*

The *RRCReconfigurationCompleteSidelink* message is used to confirm the successful completion of a PC5 RRC AS reconfiguration. It is only applied to unicast of NR sidelink communication.

Signalling radio bearer: SL-SRB3

RLC-SAP: AM

Logical channel: SCCH

Direction: UE to UE

*RRCReconfigurationCompleteSidelink* message

-- ASN1START

-- TAG-RRCRECONFIGURATIONCOMPLETESIDELINK-START

RRCReconfigurationCompleteSidelink ::= SEQUENCE {

rrc-TransactionIdentifier-r16 RRC-TransactionIdentifier,

criticalExtensions CHOICE {

rrcReconfigurationCompleteSidelink-r16 RRCReconfigurationCompleteSidelink-r16-IEs,

criticalExtensionsFuture SEQUENCE {}

}

}

RRCReconfigurationCompleteSidelink-r16-IEs ::= SEQUENCE {

lateNonCriticalExtension OCTET STRING OPTIONAL,

nonCriticalExtension RRCReconfigurationCompleteSidelink-v1710-IEs OPTIONAL

}

RRCReconfigurationCompleteSidelink-v1710-IEs ::= SEQUENCE {

dummy ENUMERATED {true},

nonCriticalExtension RRCReconfigurationCompleteSidelink-v1720-IEs OPTIONAL

}

RRCReconfigurationCompleteSidelink-v1720-IEs ::= SEQUENCE {

sl-DRX-ConfigReject-v1720 ENUMERATED {true} OPTIONAL,

nonCriticalExtension SEQUENCE {} OPTIONAL

}

-- TAG-RRCRECONFIGURATIONCOMPLETESIDELINK-STOP

-- ASN1STOP

|  |
| --- |
| *RRCReconfigurationCompleteSidelink* field descriptions |
| ***dummy***  This field is not used in the specification. The UE shall not include this field. If received it shall be ignored by the peer UE. |
| ***sl-DRX-ConfigReject***  Indicates the rejection of sidelink DRX configuration received from the peer UE for the corresponding NR sidelink unicast communication. |

#### – *RRCReconfigurationFailureSidelink*

The *RRCReconfigurationFailureSidelink* message is used to indicate the failure of a PC5 RRC AS reconfiguration. It is only applied to unicast of NR sidelink communication.

Signalling radio bearer: SL-SRB3

RLC-SAP: AM

Logical channel: SCCH

Direction: UE to UE

*RRCReconfigurationFailureSidelink* message

-- ASN1START

-- TAG-RRCRECONFIGURATIONFAILURESIDELINK-START

RRCReconfigurationFailureSidelink ::= SEQUENCE {

rrc-TransactionIdentifier-r16 RRC-TransactionIdentifier,

criticalExtensions CHOICE {

rrcReconfigurationFailureSidelink-r16 RRCReconfigurationFailureSidelink-r16-IEs,

criticalExtensionsFuture SEQUENCE {}

}

}

RRCReconfigurationFailureSidelink-r16-IEs ::= SEQUENCE {

lateNonCriticalExtension OCTET STRING OPTIONAL,

nonCriticalExtension SEQUENCE {} OPTIONAL

}

-- TAG-RRCRECONFIGURATIONFAILURESIDELINK-STOP

-- ASN1STOP

#### – *UEAssistanceInformationSidelink*

The *UEAssistanceInformationSidelink* message may include sidelink DRX assistance information used to determine the sidelink DRX configuration.

Signalling radio bearer: SL-SRB3

RLC-SAP: AM

Logical channel: SCCH

Direction: UE to UE

*UEAssistanceInformationSidelink* message

-- ASN1START

-- TAG-UEASSISTANCEINFORMATIONSIDELINK-START

UEAssistanceInformationSidelink-r17 ::= SEQUENCE {

criticalExtensions CHOICE {

ueAssistanceInformationSidelink-r17 UEAssistanceInformationSidelink-r17-IEs,

criticalExtensionsFuture SEQUENCE {}

}

}

UEAssistanceInformationSidelink-r17-IEs ::= SEQUENCE {

sl-PreferredDRX-ConfigList-r17 SEQUENCE (SIZE (1..maxNrofSL-RxInfoSet-r17)) OF SL-DRX-ConfigUC-SemiStatic-r17

OPTIONAL, -- Need R

lateNonCriticalExtension OCTET STRING OPTIONAL,

nonCriticalExtension SEQUENCE {} OPTIONAL

}

-- TAG-UEASSISTANCEINFORMATIONSIDELINK-STOP

-- ASN1STOP

|  |
| --- |
| *UEAssistanceInformationSidelink* field descriptions |
| ***sl-PreferredDRX-ConfigList***  Indicates a list of the reference sidelink DRX configurations provided by a UE to a peer UE for determining the sidelink DRX configuration. |

#### – *UECapabilityEnquirySidelink*

The *UECapabilityEnquirySidelink* message is used to request UE sidelink capabilities. It is only applied to unicast of NR sidelink communication.

Signalling radio bearer: SL-SRB3

RLC-SAP: AM

Logical channel: SCCH

Direction: UE to UE

*UECapabilityEnquirySidelink* message

-- ASN1START

-- TAG-UECAPABILITYENQUIRYSIDELINK-START

UECapabilityEnquirySidelink ::= SEQUENCE {

rrc-TransactionIdentifier-r16 RRC-TransactionIdentifier,

criticalExtensions CHOICE {

ueCapabilityEnquirySidelink-r16 UECapabilityEnquirySidelink-r16-IEs,

criticalExtensionsFuture SEQUENCE {}

}

}

UECapabilityEnquirySidelink-r16-IEs ::= SEQUENCE {

frequencyBandListFilterSidelink-r16 FreqBandList OPTIONAL, -- Need N

ue-CapabilityInformationSidelink-r16 OCTET STRING OPTIONAL, -- Need N

lateNonCriticalExtension OCTET STRING OPTIONAL,

nonCriticalExtension SEQUENCE{} OPTIONAL

}

-- TAG-UECAPABILITYENQUIRYSIDELINK-STOP

-- ASN1STOP

|  |
| --- |
| *UECapabilityEnquirySidelink-IEs* field descriptions |
| ***frequencyBandListFilterSidelink***  This field is used to indicate frequency bands for which the peer UE is requested to provide supported bands and band combinations for NR sidelink communications. The UE always provides this field. |
| ***ue-CapabilityInformationSidelink***  This field indicates the *UECapabilityInformationSidelink* message to provide the UE sidelink capability, which can be optionally sent together with *UECapabilityEnquirySidelink*. |

#### – *UECapabilityInformationSidelink*

The *UECapabilityInformationSidelink* message is used to transfer UE radio access capabilities. It is only applied to unicast of NR sidelink communication.

Signalling radio bearer: SL-SRB3

RLC-SAP: AM

Logical channel: SCCH

Direction: UE to UE

*UECapabilityInformationSidelink* message

-- ASN1START

-- TAG-UECAPABILITYINFORMATIONSIDELINK-START

UECapabilityInformationSidelink ::= SEQUENCE {

rrc-TransactionIdentifier-r16 RRC-TransactionIdentifier,

criticalExtensions CHOICE {

ueCapabilityInformationSidelink-r16 UECapabilityInformationSidelink-r16-IEs,

criticalExtensionsFuture SEQUENCE {}

}

}

UECapabilityInformationSidelink-r16-IEs ::= SEQUENCE {

accessStratumReleaseSidelink-r16 AccessStratumReleaseSidelink-r16,

pdcp-ParametersSidelink-r16 PDCP-ParametersSidelink-r16 OPTIONAL,

rlc-ParametersSidelink-r16 RLC-ParametersSidelink-r16 OPTIONAL,

supportedBandCombinationListSidelinkNR-r16 BandCombinationListSidelinkNR-r16 OPTIONAL,

supportedBandListSidelink-r16 SEQUENCE (SIZE (1..maxBands)) OF BandSidelinkPC5-r16 OPTIONAL,

appliedFreqBandListFilter-r16 FreqBandList OPTIONAL,

lateNonCriticalExtension OCTET STRING OPTIONAL,

nonCriticalExtension UECapabilityInformationSidelink-v1700-IEs OPTIONAL

}

UECapabilityInformationSidelink-v1700-IEs ::= SEQUENCE {

mac-ParametersSidelink-r17 MAC-ParametersSidelink-r17 OPTIONAL,

supportedBandCombinationListSidelinkNR-v1710 BandCombinationListSidelinkNR-v1710 OPTIONAL,

nonCriticalExtension UECapabilityInformationSidelink-v1800-IEs OPTIONAL

}

UECapabilityInformationSidelink-v1800-IEs ::= SEQUENCE {

sfn-DFN-OffsetSupported-r18 ENUMERATED { supported } OPTIONAL,

posSIB-ForwardingSupported-r18 ENUMERATED { supported } OPTIONAL,

nonCriticalExtension SEQUENCE {} OPTIONAL

}

MAC-ParametersSidelink-r17 ::= SEQUENCE {

drx-OnSidelink-r17 ENUMERATED {supported} OPTIONAL,

...

}

AccessStratumReleaseSidelink-r16 ::= ENUMERATED { rel16, rel17, rel18, spare5, spare4, spare3, spare2, spare1, ... }

PDCP-ParametersSidelink-r16 ::= SEQUENCE {

outOfOrderDeliverySidelink-r16 ENUMERATED {supported} OPTIONAL,

...,

[[

pdcp-DuplicationSRB-sidelink-r18 ENUMERATED {supported} OPTIONAL,

pdcp-DuplicationDRB-sidelink-r18 ENUMERATED {supported} OPTIONAL

]]

}

BandCombinationListSidelinkNR-r16 ::= SEQUENCE (SIZE (1..maxBandComb)) OF BandCombinationParametersSidelinkNR-r16

BandCombinationListSidelinkNR-v1710 ::= SEQUENCE (SIZE (1..maxBandComb)) OF BandCombinationParametersSidelinkNR-v1710

BandCombinationParametersSidelinkNR-r16 ::= SEQUENCE (SIZE (1..maxSimultaneousBands)) OF BandParametersSidelink-r16

BandCombinationParametersSidelinkNR-v1710 ::= SEQUENCE (SIZE (1..maxSimultaneousBands)) OF BandParametersSidelink-v1710

BandParametersSidelink-v1710 ::= SEQUENCE {

--32-5a-1

tx-IUC-Scheme1-Mode2Sidelink-r17 ENUMERATED {supported} OPTIONAL,

--32-5b-1

tx-IUC-Scheme2-Mode2Sidelink-r17 ENUMERATED {n4, n8, n16} OPTIONAL

}

BandSidelinkPC5-r16 ::= SEQUENCE {

freqBandSidelink-r16 FreqBandIndicatorNR,

--15-1

sl-Reception-r16 SEQUENCE {

harq-RxProcessSidelink-r16 ENUMERATED {n16, n24, n32, n64},

pscch-RxSidelink-r16 ENUMERATED {value1, value2},

scs-CP-PatternRxSidelink-r16 CHOICE {

fr1-r16 SEQUENCE {

scs-15kHz-r16 BIT STRING (SIZE (16)) OPTIONAL,

scs-30kHz-r16 BIT STRING (SIZE (16)) OPTIONAL,

scs-60kHz-r16 BIT STRING (SIZE (16)) OPTIONAL

},

fr2-r16 SEQUENCE {

scs-60kHz-r16 BIT STRING (SIZE (16)) OPTIONAL,

scs-120kHz-r16 BIT STRING (SIZE (16)) OPTIONAL

}

} OPTIONAL,

extendedCP-RxSidelink-r16 ENUMERATED {supported} OPTIONAL

} OPTIONAL,

--15-10

sl-Tx-256QAM-r16 ENUMERATED {supported} OPTIONAL,

--15-12

lowSE-64QAM-MCS-TableSidelink-r16 ENUMERATED {supported} OPTIONAL,

...,

[[

--15-14

csi-ReportSidelink-r16 SEQUENCE {

csi-RS-PortsSidelink-r16 ENUMERATED {p1, p2}

} OPTIONAL,

--15-19

rankTwoReception-r16 ENUMERATED {supported} OPTIONAL,

--15-23

sl-openLoopPC-RSRP-ReportSidelink-r16 ENUMERATED {supported} OPTIONAL,

--13-1

sl-Rx-256QAM-r16 ENUMERATED {supported} OPTIONAL

]],

[[

--32-5a-2

rx-IUC-Scheme1-PreferredMode2Sidelink-r17 ENUMERATED {supported} OPTIONAL,

--32-5a-3

rx-IUC-Scheme1-NonPreferredMode2Sidelink-r17 ENUMERATED {supported} OPTIONAL,

--32-5b-2

rx-IUC-Scheme2-Mode2Sidelink-r17 ENUMERATED {n5, n15, n25, n32, n35, n45, n50, n64} OPTIONAL,

--32-6-1

rx-IUC-Scheme1-SCI-r17 ENUMERATED {supported} OPTIONAL,

--32-6-2

rx-IUC-Scheme1-SCI-ExplicitReq-r17 ENUMERATED {supported} OPTIONAL,

--32-7

scheme2-ConflictDeterminationRSRP-r17 ENUMERATED {supported} OPTIONAL

]],

[[

-- R1 41-1-17: Open loop SL pathloss based power control for SL-PRS and associated PSCCH and SL RSRP report for dedicated resource

-- pool

sl-PathlossBasedOLPC-SL-RSRP-Report-r18 ENUMERATED {supported} OPTIONAL,

-- R1 47-k4: Transmitting UE to UE COT sharing information

sl-UE-COT-Sharing-r18 ENUMERATED {supported} OPTIONAL,

-- R1 47-m11: PSFCH transmissions in multiple contiguous RB sets

sl-PSFCH-MultiContiguousRB-r18 ENUMERATED {supported} OPTIONAL,

-- R1 47-m11a: PSFCH transmissions in multiple non-contiguous RB sets

sl-PSFCH-MultiNonContiguousRB-r18 ENUMERATED {supported} OPTIONAL,

-- R1 47-v1: NR SL communication with SL CA

sl-CA-Communication-r18 SEQUENCE {

numberOfCarriers-r18 INTEGER (2..8),

numberOfPSCCH-DecodeValueZ-r18 INTEGER (1..2),

totalBandwidth-r18 ENUMERATED {mhz20,mhz30,mhz40,mhz50,mhz60,mhz70}

} OPTIONAL,

-- R4 45-2: SL reception in intra-carrier guard band

sl-ReceptionIntraCarrierGuardBand-r18 ENUMERATED {supported} OPTIONAL,

-- R4 45-3: Power class for sidelink unlicensed

sl-PowerClassUnlicensed-r18 ENUMERATED {pc5, spare7, spare6, spare5, spare4, spare3, spare2, spare1} OPTIONAL

]]

}

-- TAG-UECAPABILITYINFORMATIONSIDELINK-STOP

-- ASN1STOP

#### *– UEInformationRequestSidelink*

The *UEInformationRequestSidelink* message is used to transfer UE information in sidelink, e.g. the end-to-end QoS information for L2 U2U Relay operation.

Signalling radio bearer: SL-SRB3

RLC-SAP: AM

Logical channel: SCCH

Direction: L2 U2U Remote UE to L2 U2U Relay UE

*UEInformationRequestSidelink* message

-- ASN1START

-- TAG-UEINFORMATIONREQUESTSIDELINK-START

UEInformationRequestSidelink-r18 ::= SEQUENCE {

rrc-TransactionIdentifier-r18 RRC-TransactionIdentifier,

criticalExtensions CHOICE {

ueInformationRequestSidelink-r18 UEInformationRequestSidelink-r18-IEs,

criticalExtensionsFuture SEQUENCE {}

}

}

UEInformationRequestSidelink-r18-IEs ::= SEQUENCE {

sl-E2E-QoS-InfoListPC5-r18 SEQUENCE (SIZE (1..maxNrofSLRB-r16)) OF SL-E2E-QoS-InfoPC5-r18 OPTIONAL, -- Need N

lateNonCriticalExtension OCTET STRING OPTIONAL,

nonCriticalExtension SEQUENCE {} OPTIONAL

}

SL-E2E-QoS-InfoPC5-r18 ::= SEQUENCE {

sl-DestinationIdentityRemoteUE-r18 SL-DestinationIdentity-r16,

sl-E2E-SLRB-Index-r18 SLRB-PC5-ConfigIndex-r16,

sl-QoS-InfoList-r18 SEQUENCE (SIZE (1..maxNrofSL-QFIsPerDest-r16)) OF SL-QoS-Info-r16

}

-- TAG-UEINFORMATIONREQUESTSIDELINK-STOP

-- ASN1STOP

|  |
| --- |
| *UEInformationRequestSidelink* field descriptions |
| ***sl-E2E-QoS-InfoListPC5***  Indicates the per-QoS flow QoS info for a list of end-to-end PC5 connections with each connection indicated by the destination L2 ID of the peer L2 U2U Remote UE. In addition, the end-to-end SLRB index is included to indicate the mapping from the QoS flow to the SLRB. |

|  |
| --- |
| *SL-E2E-QoS-InfoPC5* field descriptions |
| ***sl-DestinationIdentityRemoteUE***  Indicates the destination L2 ID of the peer L2 U2U Remote UE for an end-to-end PC5 connection. |
| ***sl-E2E-SLRB-Index***  Indicates the index of an end-to-end SLRB. |
| ***sl-QoS-InfoList***  List of QoS profile of the sidelink QoS flow for an end-to-end PC5 connection, with each QoS flow indicated by *sl-QoS-FlowIdentity* which is unique for different end-to-end PC5 connection in the scope of UE, and uniquely identifies one sidelink QoS flow between the L2 U2U Remote UE and the L2 U2U Relay UE. |

#### – *UEInformationResponseSidelink*

The *UEInformationResponseSidelink* message is used to deliver UE information in sidelink, e.g. the split QoS information for L2 U2U Relay operation.

Signalling radio bearer: SL-SRB3

RLC-SAP: AM

Logical channel: SCCH

Direction: L2 U2U Relay UE to L2 U2U Remote UE

*UEInformationResponseSidelink* message

-- ASN1START

-- TAG-UEINFORMATIONRESPONSESIDELINK-START

UEInformationResponseSidelink-r18 ::= SEQUENCE {

rrc-TransactionIdentifier-r18 RRC-TransactionIdentifier,

criticalExtensions CHOICE {

ueInformationResponseSidelink-r18 UEInformationResponseSidelink-r18-IEs,

criticalExtensionsFuture SEQUENCE {}

}

}

UEInformationResponseSidelink-r18-IEs ::= SEQUENCE {

sl-SplitQoS-InfoListPC5-r18 SEQUENCE (SIZE (1.. maxNrofSL-QFIs-r16)) OF SL-SplitQoS-InfoPC5-r18 OPTIONAL, -- Need N

lateNonCriticalExtension OCTET STRING OPTIONAL,

nonCriticalExtension SEQUENCE {} OPTIONAL

}

SL-SplitQoS-InfoPC5-r18 ::= SEQUENCE {

sl-QoS-FlowIdentity-r18 SL-QoS-FlowIdentity-r16,

sl-SplitPacketDelayBudget-r18 INTEGER (0..1023)

}

-- TAG-UEINFORMATIONRESPONSESIDELINK-STOP

-- ASN1STOP

|  |
| --- |
| *UEInformationResponseSidelink* field descriptions |
| ***sl-SplitQoS-InfoListPC5***  Indicates the split PDB on the first PC5 hop between L2 U2U Relay UE and the L2 U2U Remote UE for a list of QoS flow indicated by *sl-QoS-FlowIdentity* for one or more end-to-end PC5 connections. *sl-SplitPacketDelayBudget* indicates upper bound value for the delay that a packet may experience expressed in unit of 0.5ms. |

#### – *UuMessageTransferSidelink*

The *UuMessageTransferSidelink* message is used for the sidelink transfer of Paging message and System Information messages.

Signalling radio bearer: SL-SRB3

RLC-SAP: AM

Logical channel: SCCH

Direction: L2 U2N Relay UE to L2 U2N Remote UE

*UuMessageTransferSidelink* message

-- ASN1START

-- TAG-UUMESSAGETRANSFERSIDELINK-START

UuMessageTransferSidelink-r17 ::= SEQUENCE {

criticalExtensions CHOICE {

uuMessageTransferSidelink-r17 UuMessageTransferSidelink-r17-IEs,

criticalExtensionsFuture SEQUENCE {}

}

}

UuMessageTransferSidelink-r17-IEs ::= SEQUENCE {

sl-PagingDelivery-r17 OCTET STRING (CONTAINING PagingRecord) OPTIONAL, -- Need N

sl-SIB1-Delivery-r17 OCTET STRING (CONTAINING SIB1) OPTIONAL, -- Need N

sl-SystemInformationDelivery-r17 OCTET STRING (CONTAINING SystemInformation) OPTIONAL, -- Need N

lateNonCriticalExtension OCTET STRING OPTIONAL,

nonCriticalExtension UuMessageTransferSidelink-v1800-IEs OPTIONAL

}

UuMessageTransferSidelink-v1800-IEs ::= SEQUENCE {

sl-PagingDelivery-r18 OCTET STRING (CONTAINING PagingRecord-v1700) OPTIONAL, -- Need N

nonCriticalExtension SEQUENCE {} OPTIONAL

}

-- TAG-UUMESSAGETRANSFERSIDELINK-STOP

-- ASN1STOP

|  |
| --- |
| *UuMessageTransferSidelink-IEs* field descriptions |
| ***sl-PagingDelivery***  This field is used to transfer PagingRecord and *PagingRecord-v1700* relevant to the L2 U2N Remote UE in RRC\_IDLE or RRC\_INACTIVE. |
| ***sl-SIB1-Delivery***  This field is used to transfer SIB1 to the L2 U2N Remote UE in RRC\_IDLE or RRC\_INACTIVE. |
| ***sl-SystemInformationDelivery***  This field is used to transfer SIBs and posSIBs to the L2 U2N Remote UE in RRC\_IDLE or RRC\_INACTIVE. |

#### – *End of PC5-RRC-Definitions*

-- ASN1START

END

-- ASN1STOP

# 7 Variables and constants

## 7.1 Timers

### 7.1.1 Timers (Informative)

| Timer | Start | Stop | At expiry |
| --- | --- | --- | --- |
| T300 | Upon transmission of *RRCSetupRequest.* | Upon reception of *RRCSetup* or *RRCReject* message, cell re-selection, relay (re)selection or cell selection by a L2 U2N Remote UE, and upon abortion of connection establishment by upper layers. | Perform the actions as specified in 5.3.3.7. |
| T301 | Upon transmission of *RRCReestabilshmentRequest* | Upon reception of *RRCReestablishment* or *RRCSetup* message as well as when the selected cell becomes unsuitable or the (re)selected L2 U2N Relay UE becomes unsuitable, upon reception of *NotificationMessageSidelink* indicating *relayUE-HO* or *relayUE-CellReselection*. | Go to RRC\_IDLE |
| T302 | Upon reception of *RRCReject* while performing RRC connection establishment or resume, upon reception of *RRCRelease* with *waitTime*. | Upon entering RRC\_CONNECTED or RRC\_IDLE, upon cell re-selection, upon cell change due to relay (re)selection or cell selection by a L2 U2N Remote UE, and upon reception of *RRCReject* message. | Inform upper layers about barring alleviation as specified in 5.3.14.4 |
| T304 | Upon reception of *RRCReconfiguration* message including *reconfigurationWithSync* for the MCG which does not include *sl-PathSwitchConfig*, or upon reception of *RRCReconfiguration* message including *reconfigurationWithSync* for the SCG not indicated as deactivated in the NR or E-UTRA message containing the *RRCReconfiguration* message or upon conditional reconfiguration execution i.e. when applying a stored *RRCReconfiguration* message including *reconfigurationWithSync*.  Also, for the MCG and SCG upon an indication from lower layer that an LTM cell switch procedure is triggered and, for the MCG, upon performing an LTM cell switch procedure following cell selection performed while timer T311 is running. | Upon successful completion of random access on the corresponding SpCell.  Upon receiving an indication from lower layers of successful completion of Rach-less handover, or upon receiving an indication from lower layers of successful completion of an LTM RACH-less cell switch.  For T304 of SCG, upon SCG release. | For T304 of MCG, in case of the handover from NR or intra-NR handover, or path switch from a L2 U2N Relay UE to a NR cell, or an LTM cell switch procedure, initiate the RRC re-establishment procedure; In case of handover to NR, perform the actions defined in the specifications applicable for the source RAT. If any DAPS bearer is configured and if there is no RLF in source PCell, initiate the failure information procedure.  For T304 of SCG, inform network about the reconfiguration with sync failure by initiating the SCG failure information procedure as specified in 5.7.3. |
| T310 | Upon detecting physical layer problems for the SpCell i.e. upon receiving N310 consecutive out-of-sync indications from lower layers. | Upon receiving N311 consecutive in-sync indications from lower layers for the SpCell, upon receiving RRCReconfiguration with *reconfigurationWithSync* for that cell group, upon reception of *MobilityFromNRCommand*, upon the reconfiguration of *rlf-TimersAndConstant,* upon initiating the connection re-establishment procedure, upon conditional reconfiguration execution i.e. when applying a stored RRCReconfiguration message including *reconfigurationWithSync* for that cell group, upon an indication from lower layers that an LTM cell switch procedure is triggered, and upon initiating the MCG failure information procedure.  Upon SCG release, if the T310 is kept in SCG. | If the T310 is kept in MCG: If AS security is not activated: go to RRC\_IDLE else: initiate the MCG failure information procedure as specified in 5.7.3b or the connection re-establishment procedure as specified in 5.3.7 or the procedure as specified in 5.3.10.3 if any DAPS bearer is configured.  If the T310 is kept in SCG, Inform E-UTRAN/NR about the SCG radio link failure by initiating the SCG failure information procedure as specified in 5.7.3. |
| T311 | Upon initiating the RRC connection re-establishment procedure | Upon selection of a suitable NR cell, or upon selection of a suitable L2 U2N Relay UE, or a cell using another RAT. | Enter RRC\_IDLE |
| T312 | If T312 is configured in MCG: Upon triggering a measurement report for a measurement identity for which T312 has been configured and *useT312* has been set to true, while T310 in PCell is running.  If T312 is configured in SCG and *useT312* has been set to true: Upon triggering a measurement report for a measurement identity for which T312 has been configured, while T310 in PSCell is running. | Upon receiving N311 consecutive in-sync indications from lower layers for the SpCell, receiving *RRCReconfiguration* with *reconfigurationWithSync* for that cell group, upon reception of *MobilityFromNRCommand*, upon initiating the connection re-establishment procedure, upon the reconfiguration of *rlf-TimersAndConstant*, upon initiating the MCG failure information procedure, upon conditional reconfiguration execution i.e. when applying a stored RRCReconfiguration message including *reconfigurationWithSync* for that cell group, upon an indication from lower layers that an LTM cell switch procedure is triggered, and upon the expiry of T310 in corresponding SpCell.  Upon SCG release, if the T312 is kept in SCG | If the T312 is kept in MCG, initiate the MCG failure information procedure as specified in 5.7.3b or the connection re-establishment procedure.  If the T312 is kept in SCG, Inform E-UTRAN/NR about the SCG radio link failure by initiating the SCG failure information procedure.as specified in 5.7.3. |
| T316 | Upon transmission of the *MCGFailureInformation* message | Upon receiving *RRCRelease*, *RRCReconfiguration* with *reconfigurationwithSync* for the PCell, *MobilityFromNRCommand,* or upon initiating the re-establishment procedure | Perform the actions as specified in 5.7.3b.5. |
| T319 | Upon transmission of *RRCResumeRequest* or *RRCResumeRequest1 when the resume procedure is not initiated for SDT.* | Upon reception of *RRCResume,* *RRCSetup, RRCRelease, RRCRelease* with *suspendConfig* or *RRCReject* message, upon cell re-selection or upon relay (re)selection. | Perform the actions as specified in 5.3.13.5. |
| T319a | Upon transmission of *RRCResumeRequest* or *RRCResumeRequest1* when the resume procedure is initiated for SDT. | Upon reception of *RRCResume,* *RRCSetup, RRCRelease,* *RRCReject* message or upon failure to resume RRC connection for SDT as specified in 5.3.13.5 or upon cell reselection. | Perform the actions as specified in 5.3.13.5. |
| T320 | Upon reception of *t320* or upon cell (re)selection to NR from another RAT with validity time configured for dedicated priorities (in which case the remaining validity time is applied). | Upon entering RRC\_CONNECTED, upon reception of *RRCRelease*, when PLMN selection or SNPN selection is performed on request by NAS, when the UE enters RRC\_IDLE from RRC\_INACTIVE, or upon cell (re)selection to another RAT (in which case the timer is carried on to the other RAT). | Discard the cell reselection priority information provided by dedicated signalling. |
| T321 | Upon receiving *measConfig* including a *reportConfig* with the *reportType* set to *reportCGI* | Upon acquiring the information needed to set all fields of *cgi-info*, upon receiving *measConfig* that includes removal of the *reportConfig* with the *reportType* set to *reportCGI* and upon detecting that a cell is not broadcasting SIB1. | Initiate the measurement reporting procedure, stop performing the related measurements. |
| T322 | Upon receiving *measConfig* including *reportConfigNR* with the *reportType* set to *reportSFTD* and *drx-SFTD-NeighMeas* is set to *true*. | Upon acquiring the SFTD measurement results, upon receiving *measConfig* that includes removal of the *reportConfig* with the *reportType* set to *reportSFTD*. | Initiate the measurement reporting procedure, stop performing the related measurements*.* |
| T325 | Upon reception of *RRCRelease* message with *deprioritisationTimer*. | When PLMN selection or SNPN selection is performed on request by NAS according to TS 38.304 [20]. | Stop deprioritisation of all frequencies or NR signalled by *RRCRelease* and discard the stored deprioritisation request(s)*.* |
| T330 | Upon receiving *LoggedMeasurementConfiguration* message | Upon log volume exceeding the suitable UE memory, upon initiating the release of *LoggedMeasurementConfiguration* procedure | Perform the actions specified in 5.5a.1.4 |
| T331 | Upon receiving *RRCRelease* message with *measIdleDuration* | Upon receiving *RRCSetup, RRCResume*, *RRCRelease* with idle/inactive measurement configuration, upon cell selection/reselection to a cell that does not belong to the *validityArea* (if configured)*,* or upon cell re-selection to another RAT*.* | Perform the actions as specified in 5.7.8.3. |
| T342 | Upon transmitting *UEAssistanceInformation* message with *DelayBudgetReport*. | Upon releasing *delayBudgetReportingConfig* during the connection re-establishment/resume procedures, and upon receiving *delayBudgetReportingConfig* set to *release.* | No action. |
| T345 | Upon transmitting *UEAssistanceInformation* message with *overheatingAssistance* | Upon releasing *overheatingAssistanceConfig* during the connection re-establishment procedure, upon initiating the connection resumption procedure, and upon receiving *overheatingAssistanceConfig* set to *release.* | No action. |
| T346a (The UE maintains one instance of this timer per cell group) | Upon transmitting *UEAssistanceInformation* message with *drx-Preference*. | Upon releasing *drx-PreferenceConfig* during the connection re-establishment/resume procedures, upon receiving *drx-PreferenceConfig* set to *release*, or upon performing MR-DC release*.* | No action. |
| T346b (The UE maintains one instance of this timer per cell group) | Upon transmitting *UEAssistanceInformation* message with *maxBW-Preference*. | Upon releasing *maxBW-PreferenceConfig* during the connection re-establishment/resume procedures, upon receiving *maxBW-PreferenceConfig* set to *release*, or upon performing MR-DC release*.* | No action. |
| T346c (The UE maintains one instance of this timer per cell group) | Upon transmitting *UEAssistanceInformation* message with *maxCC-Preference*. | Upon releasing *maxCC-PreferenceConfig* during the connection re-establishment/resume procedures, upon receiving *maxCC-PreferenceConfig* set to *release*, or upon performing MR-DC release*.* | No action. |
| T346d (The UE maintains one instance of this timer per cell group) | Upon transmitting *UEAssistanceInformation* message with *maxMIMO-LayerPreference*. | Upon releasing *maxMIMO-LayerPreferenceConfig* during the connection re-establishment/resume procedures, upon receiving *maxMIMO-LayerPreferenceConfig* set to *release*, or upon performing MR-DC release*.* | No action. |
| T346e (The UE maintains one instance of this timer per cell group) | Upon transmitting *UEAssistanceInformation* message with *minSchedulingOffsetPreference*. | Upon releasing *minSchedulingOffsetPreferenceConfig* during the connection re-establishment/resume procedures, upon receiving *minSchedulingOffsetPreferenceConfig* set to *release*, or upon performing MR-DC release*.* | No action. |
| T346f | Upon transmitting *UEAssistanceInformation* message with *releasePreference*. | Upon releasing *releasePreferenceConfig* during the connection re-establishment/resume procedures, or upon receiving *releasePreferenceConfig* set to *release.* | No action. |
| T346g | Upon transmitting *UEAssistanceInformation* message with *musim-PreferredRRC-State*. | Upon receiving *RRCRelease*, or upon receiving *musim-LeaveAssistanceConfig* set to *release*. | Perform the actions as specified in 5.3.8.6. |
| T346h | Upon transmitting *UEAssistanceInformation* message with *musim-GapPreferenceList* and/or *musim-GapPriorityPreferenceList* and/or *musim-GapKeepPreference* Information. | Upon releasing *musim-GapAssistanceConfig* during the connection re-establishment/resume procedures, or upon receiving *musim-GapAssistanceConfig* set to *release*. | No action. |
| T346i | Upon transmitting *UEAssistanceInformation* message with *scg-DeactivationPreference* | Upon releasing *scg-DeactivationPreferenceConfig* during RRC connection re-establishment/resume or upon receiving *scg-DeactivationPreferenceConfig* set to *release*. | No action. |
| T346j (The UE maintains one instance of this timer per cell group) | Upon transmitting *UEAssistanceInformation* message with *rlm-RelaxationReportingConfig*. | Upon releasing *rlm-RelaxationReportingConfig* during the connection re-establishment/resume procedures, upon receiving *rlm-RelaxationReportingConfig* set to *release*, or upon performing MR-DC release*.* | No action. |
| T346k (The UE maintains one instance of this timer per cell group) | Upon transmitting *UEAssistanceInformation* message with *bfd-RelaxationReportingConfig*. | Upon releasing *bfd-RelaxationReportingConfig* during the connection re-establishment/resume procedures, upon receiving *bfd-RelaxationReportingConfig* set to *release*, or upon performing MR-DC release*.* | No action. |
| T346l  (The UE maintains one instance of this timer per QoS flow) | Upon transmitting *UEAssistanceInformation* message with *ul-TrafficInfo* for the concerned QoS flow. | Upon releasing *ul-TrafficInfoReportingConfig* during the connection re-establishment/resume procedures, or upon receiving *ul-TrafficInfoReportingConfig* set to *release.* | No action. |
| T346m | Upon transmitting *UEAssistanceInformation* message with *multiRx-PreferenceFR2*. | Upon releasing *multiRx-PreferenceReportingConfigFR2* during the connection re-establishment/resume procedures, upon receiving *multiRx-PreferenceReportingConfigFR2* set to release. | No action. |
| T346n | Upon transmission of MUSIM temporary restriction of *musim-CapRestriction* for affected bands or combination of bands and/or avoided band(s) or combination of bands. | Upon releasing *musim-CapabilityRestrictionConfig* during the connection re-establishment/resume procedures, or upon receiving *musim-CapabilityRestrictionConfig* set to *release.* | No action. |
| T348 | Upon transmission of MUSIM temporary restriction of *musim-CapRestriction* for serving cell(s) with capabilities restricted, release of SCell or PSCell or release of SCG. | Upon reception of *RRCReconfiguration* message that does not exceed UE temporary capability restriction indicated via *musim-CapRestriction*. | UE may apply the temporary UE capability restriction in accordance with the one indicated in the last transmission of the *UEAssistanceInformation* message including *musim-CapRestriction*. UE may apply the temporary capability restriction that SCG is not supported if *ServCellIndex* of PSCell was included in indicated *MUSIM-CellToRelease-r18*. |
| T350 | Upon transmitting *DedicatedSIBRequest* message with *requestedSIB-List* and/or *requestedPosSIB-List*. | Upon acquiring the requested SIB(s) or posSIB(s), upon releasing *onDemandSIB-Request* during the connection re-establishment procedures, upon receiving *onDemandSIB-Request* set to release, upon reception of *RRCRelease* or upon successful change of PCell while in RRC\_CONNECTED. | No action |
| T380 | Upon reception of t380 in *RRCRelease.* | Upon reception of *RRCResume*, *RRCSetup* or *RRCRelease*. | Perform the actions as specified in 5.3.13. |
| T390 | When access attempt is barred at access barring check for an Access Category. The UE maintains one instance of this timer per Access Category. | Upon cell (re)selection, upon relay (re)selection, upon entering RRC\_CONNECTED, upon reception of *RRCReconfiguration* including *reconfigurationWithSync*, upon change of PCell while in RRC\_CONNECTED, upon reception of *MobilityFromNRCommand*, or upon reception of *RRCRelease*. | Perform the actions as specified in 5.3.14.4. |
| T400 | Upon transmission of RRCReconfigurationSidelink | Upon reception of RRCReconfigurationFailureSidelink or RRCReconfigurationCompleteSidelink | Perform the Sidelink radio link failure related actions as specified in 5.8.9.3. |
| T420 | Upon reception of the *RRCReconfiguration* message including *sl-PathSwitchConfig* where *sl-IndirectPathMaintain* is not included in *reconfigurationWithSync* | Upon successfully sending *RRCReconfigurationComplete* message (i.e., PC5 RLC acknowledgement is received from target L2 U2N Relay UE) | Perform the RRC re-establishment procedure as specified in 5.3.7. |
| T421 | Upon reception of the *RRCReconfiguration* message including *sl-IndirectPathAddChange* where *sl-IndirectPathMaintain* is not included in *reconfigurationWithSync* | Upon successfully sending *RRCReconfigurationComplete* message (i.e., PC5 RLC acknowledgement is received from target L2 U2N Relay UE) if split SRB1 with duplication is configured, or upon reception of *RRCReconfigurationCompleteSidelink* if split SRB1 with duplication is not configured, or upon initiation of indirect path failure information procedure. | Perform the Failure Information Reporting as specified in 5.7.3c. |
| T430 | Start or restart from the subframe indicated by *epochTime* upon reception of *SIB19*, or upon reception of *RRCReconfiguration* message for the target cell including *reconfigurationWithSync*, or upon conditional reconfiguration execution i.e. when applying a stored *RRCReconfiguration* message for the target cell including *reconfigurationWithSync,* or upon satellite switch with resynchronization*.* | Stop T430, if it is running, for the source cell upon reception of *RRCReconfiguration* message including *reconfigurationWithSync*, or upon conditional reconfiguration execution i.e. when applying a stored *RRCReconfiguration* message including *reconfigurationWithSync,* or upon satellite switch with resynchronization*.* | Perform the actions as specified in 5.2.2.6. |

### 7.1.2 Timer handling

When the UE applies zero value for a timer, the timer shall be started and immediately expire unless explicitly stated otherwise.

*The end of change*