**3GPP TSG-RAN WG2 #127 *2***

**Maastricht, Netherlands, Aug 19th – 23rd 2024**

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| *CR-Form-v12.3* |
| **CHANGE REQUEST** |
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|  |  | **CR** |  **4917** | **rev** | **1** | **Current version:** |  |  |
|  |
| *For* [***HELP***](http://www.3gpp.org/3G_Specs/CRs.htm#_blank)*on using this form: comprehensive instructions can be found at* [*http://www.3gpp.org/Change-Requests*](http://www.3gpp.org/Change-Requests)*.* |
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| ***Proposed change affects:*** | UICC apps |  | ME | **X** | Radio Access Network | **X** | Core Network |  |

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|  |
| ***Title:***  | Miscellaneous non-controversial corrections Set XXII |
|  |  |
| ***Source to WG:*** |  |
| ***Source to TSG:*** |  |
|  |  |
| ***Work item code:*** | NR\_newRAT-Core, TEI18 |  | ***Date:*** |  |
|  |  |  |  |  |
| ***Category:*** | **F** |  | ***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 canbe 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:*** | Correction of miscellaneous non-controversial errors (typos etc). |
|  |  |
| ***Summary of change:*** | 1. *PUCCH-Config* field descriptionsIn field description for *dl-DataToUL-ACK*/*dl-DataToUL-ACK-DCI-1-2*, changed “…and *dl-DataToUL-ACK-r17* is applicable for up to 71 GHz” to “…and *dl-DataToUL-ACK-r17* is applicable for FR2-2”.
2. In 7.1.1 Timers, added a comma for T312, to improve the text.
3. In IE *DownlinkConfigCommonSIB*, moved nrofPDCCH-MonitoringOccasionPerSSB-InPO from DownlinkConfigCommonSIB field descriptions to PCCH-Config field descriptions, to match the structure of the ASN.1.
4. In IE ServingCellConfig information, changed *elementpdcch-CandidateReceptionWith-CRS-Overlap-r18* to *elementpdcch-CandidateReceptionWithCRS-Overlap-r18* (removed “-“) to align with RRC naming rules (and name used in RAN1 parameter list).
5. Changed UE variable name *VarLTM-ServingCellUeMeasuredTA-ID-r18-IEs* to *VarLTM-ServingCellUE-MeasuredTA-ID-r18-IEs*, to align with RRC naming rules (and align with other occurrences in the spec).
6. Deleted ”-IEs" from the following UE variable definitions, to allign with RRC the style:

*VarAppLayerIdleConfig-r18-IEs, VarAppLayerPLMN-ListConfig-r18-IEs, VarLogMeasConfig-r16-IEs, VarLTM-ServingCellNoResetID-r18-IEs, VarSuccessHO-Report-r17-IEs, VarSuccessPSCell-Report-r18-IEs, VarLTM-ServingCellUE-MeasuredTA-ID-r18-IEs***CRs agreed to be merged at RAN2#127**1. R2-2406597 Miscellaneous Corrections in 38.331Clarified reference to TS 36.101 in IE description of *EUTRA-NS-PmaxLis*t.
2. R2-2407170 Misc RRC corrections for mobile IABIn field description of *mobileIAB-Freq* in *SIB4*, added “be” (in “may be”) to make the sentence complete.
3. R2-2407086 Generic procedure text for SetupReleaseClarified guidelines on how to capture SetupRelease in A.3.8.
4. R2-2407371 Clarification on the case the SIB17 is absentIn SIB17bis description, changed existing text to “SIB17bis is optionally scheduled if SIB17 is not scheduled”.
5. R2-2406992 Miscellaneous corrections to epochTimeIn *SIB19* field descriptions, for field *ntn-Config*, changed from “epoch” to “epoch time”

**Impact analysis**Impacted 5G architecture options: NR SA, (NG)EN-DC, NE-DC, NR-DCImpacted functionality: MiscellaneousInter-operability:There are no interoperability issues. |
|  |  |
| ***Consequences if not approved:*** | Miscellaneous typos and editorials will remain in the specification. |
|  |  |
| ***Clauses affected:*** | 6.3.1, 6.3.2, 6.3.4, 7.1.1, 7.4, A.3.8 |
|  |  |
|  | **Y** | **N** |  |  |
| ***Other specs*** |  | **N** |  Other core specifications  | TS/TR ... CR ...  |
| ***affected:*** |  | **N** |  Test specifications | TS/TR ... CR ...  |
| ***(show related CRs)*** |  | **N** |  O&M Specifications | TS/TR ... CR ...  |
|  |  |
| ***Other comments:*** |  |
|  |  |
| ***This CR's revision history:*** |  |

### 6.3.1 System information blocks

<cut>

#### – *SIB4*

*SIB4* contains information relevant for inter-frequency cell re-selection (i.e. information about other NR frequencies and inter-frequency neighbouring cells relevant for cell re-selection), which can also be used for NR idle/inactive measurements. The IE includes cell re-selection parameters common for a frequency as well as cell specific re-selection parameters.

*SIB4* information element

-- ASN1START

-- TAG-SIB4-START

SIB4 ::= SEQUENCE {

 interFreqCarrierFreqList InterFreqCarrierFreqList,

 lateNonCriticalExtension OCTET STRING OPTIONAL,

 ...,

 [[

 interFreqCarrierFreqList-v1610 InterFreqCarrierFreqList-v1610 OPTIONAL -- Need R

 ]],

 [[

 interFreqCarrierFreqList-v1700 InterFreqCarrierFreqList-v1700 OPTIONAL -- Need R

 ]],

 [[

 interFreqCarrierFreqList-v1720 InterFreqCarrierFreqList-v1720 OPTIONAL -- Need R

 ]],

 [[

 interFreqCarrierFreqList-v1730 InterFreqCarrierFreqList-v1730 OPTIONAL -- Need R

 ]],

 [[

 interFreqCarrierFreqList-v1760 InterFreqCarrierFreqList-v1760 OPTIONAL -- Need R

 ]],

 [[

 interFreqCarrierFreqList-v1800 InterFreqCarrierFreqList-v1800 OPTIONAL -- Need R

 ]]

}

InterFreqCarrierFreqList ::= SEQUENCE (SIZE (1..maxFreq)) OF InterFreqCarrierFreqInfo

InterFreqCarrierFreqList-v1610 ::= SEQUENCE (SIZE (1..maxFreq)) OF InterFreqCarrierFreqInfo-v1610

InterFreqCarrierFreqList-v1700 ::= SEQUENCE (SIZE (1..maxFreq)) OF InterFreqCarrierFreqInfo-v1700

InterFreqCarrierFreqList-v1720 ::= SEQUENCE (SIZE (1..maxFreq)) OF InterFreqCarrierFreqInfo-v1720

InterFreqCarrierFreqList-v1730 ::= SEQUENCE (SIZE (1..maxFreq)) OF InterFreqCarrierFreqInfo-v1730

InterFreqCarrierFreqList-v1760 ::= SEQUENCE (SIZE (1..maxFreq)) OF InterFreqCarrierFreqInfo-v1760

InterFreqCarrierFreqList-v1800 ::= SEQUENCE (SIZE (1..maxFreq)) OF InterFreqCarrierFreqInfo-v1800

InterFreqCarrierFreqInfo ::= SEQUENCE {

 dl-CarrierFreq ARFCN-ValueNR,

 frequencyBandList MultiFrequencyBandListNR-SIB OPTIONAL, -- Cond Mandatory

 frequencyBandListSUL MultiFrequencyBandListNR-SIB OPTIONAL, -- Need R

 nrofSS-BlocksToAverage INTEGER (2..maxNrofSS-BlocksToAverage) OPTIONAL, -- Need S

 absThreshSS-BlocksConsolidation ThresholdNR OPTIONAL, -- Need S

 smtc SSB-MTC OPTIONAL, -- Need S

 ssbSubcarrierSpacing SubcarrierSpacing,

 ssb-ToMeasure SSB-ToMeasure OPTIONAL, -- Need S

 deriveSSB-IndexFromCell BOOLEAN,

 ss-RSSI-Measurement SS-RSSI-Measurement OPTIONAL, -- Need R

 q-RxLevMin Q-RxLevMin,

 q-RxLevMinSUL Q-RxLevMin OPTIONAL, -- Need R

 q-QualMin Q-QualMin OPTIONAL, -- Need S

 p-Max P-Max OPTIONAL, -- Need S

 t-ReselectionNR T-Reselection,

 t-ReselectionNR-SF SpeedStateScaleFactors OPTIONAL, -- Need S

 threshX-HighP ReselectionThreshold,

 threshX-LowP ReselectionThreshold,

 threshX-Q SEQUENCE {

 threshX-HighQ ReselectionThresholdQ,

 threshX-LowQ ReselectionThresholdQ

 } OPTIONAL, -- Cond RSRQ

 cellReselectionPriority CellReselectionPriority OPTIONAL, -- Need R

 cellReselectionSubPriority CellReselectionSubPriority OPTIONAL, -- Need R

 q-OffsetFreq Q-OffsetRange DEFAULT dB0,

 interFreqNeighCellList InterFreqNeighCellList OPTIONAL, -- Need R

 interFreqExcludedCellList InterFreqExcludedCellList OPTIONAL, -- Need R

 ...

}

InterFreqCarrierFreqInfo-v1610 ::= SEQUENCE {

 interFreqNeighCellList-v1610 InterFreqNeighCellList-v1610 OPTIONAL, -- Need R

 smtc2-LP-r16 SSB-MTC2-LP-r16 OPTIONAL, -- Need R

 interFreqAllowedCellList-r16 InterFreqAllowedCellList-r16 OPTIONAL, -- Cond SharedSpectrum2

 ssb-PositionQCL-Common-r16 SSB-PositionQCL-Relation-r16 OPTIONAL, -- Cond SharedSpectrum

 interFreqCAG-CellList-r16 SEQUENCE (SIZE (1..maxPLMN)) OF InterFreqCAG-CellListPerPLMN-r16 OPTIONAL -- Need R

}

InterFreqCarrierFreqInfo-v1700 ::= SEQUENCE {

 interFreqNeighHSDN-CellList-r17 InterFreqNeighHSDN-CellList-r17 OPTIONAL, -- Need R

 highSpeedMeasInterFreq-r17 ENUMERATED {true} OPTIONAL, -- Need R

 redCapAccessAllowed-r17 ENUMERATED {true} OPTIONAL, -- Need R

 ssb-PositionQCL-Common-r17 SSB-PositionQCL-Relation-r17 OPTIONAL, -- Cond SharedSpectrum

 interFreqNeighCellList-v1710 InterFreqNeighCellList-v1710 OPTIONAL -- Cond SharedSpectrum2

}

InterFreqCarrierFreqInfo-v1720 ::= SEQUENCE {

 smtc4list-r17 SSB-MTC4List-r17 OPTIONAL -- Need R

}

InterFreqCarrierFreqInfo-v1730 ::= SEQUENCE {

 channelAccessMode2-r17 ENUMERATED {enabled} OPTIONAL -- Need R

}

InterFreqCarrierFreqInfo-v1760 ::= SEQUENCE {

 frequencyBandList-v1760 MultiFrequencyBandListNR-SIB-v1760 OPTIONAL, -- Need R

 frequencyBandListSUL-v1760 MultiFrequencyBandListNR-SIB-v1760 OPTIONAL -- Need R

}

InterFreqCarrierFreqInfo-v1800 ::= SEQUENCE {

 dl-CarrierFreq-r18 ARFCN-ValueNR OPTIONAL, -- Cond LessThan5MHz

 frequencyBandList-r18 MultiFrequencyBandListNR-SIB OPTIONAL, -- Cond LessThan5MHz

 frequencyBandListAerial-r18 MultiFrequencyBandListNR-Aerial-SIB-r18 OPTIONAL, -- Need S

 mobileIAB-CellList-r18 PCI-Range OPTIONAL, -- Need R

 mobileIAB-Freq-r18 ENUMERATED {true} OPTIONAL, -- Need R

 eRedCapAccessAllowed-r18 ENUMERATED {true} OPTIONAL, -- Need R

 tn-AreaIdList-r18 SEQUENCE (SIZE (1..maxTN-AreaInfo-r18)) OF TN-AreaId-r18 OPTIONAL, -- Need R

 accessAllowed2RxXR-r18 ENUMERATED {true} OPTIONAL -- Need R

}

InterFreqNeighHSDN-CellList-r17 ::= SEQUENCE (SIZE (1..maxCellInter)) OF PCI-Range

InterFreqNeighCellList ::= SEQUENCE (SIZE (1..maxCellInter)) OF InterFreqNeighCellInfo

InterFreqNeighCellList-v1610 ::= SEQUENCE (SIZE (1..maxCellInter)) OF InterFreqNeighCellInfo-v1610

InterFreqNeighCellList-v1710 ::= SEQUENCE (SIZE (1..maxCellInter)) OF InterFreqNeighCellInfo-v1710

InterFreqNeighCellInfo ::= SEQUENCE {

 physCellId PhysCellId,

 q-OffsetCell Q-OffsetRange,

 q-RxLevMinOffsetCell INTEGER (1..8) OPTIONAL, -- Need R

 q-RxLevMinOffsetCellSUL INTEGER (1..8) OPTIONAL, -- Need R

 q-QualMinOffsetCell INTEGER (1..8) OPTIONAL, -- Need R

 ...

}

InterFreqNeighCellInfo-v1610 ::= SEQUENCE {

 ssb-PositionQCL-r16 SSB-PositionQCL-Relation-r16 OPTIONAL -- Cond SharedSpectrum2

}

InterFreqNeighCellInfo-v1710 ::= SEQUENCE {

 ssb-PositionQCL-r17 SSB-PositionQCL-Relation-r17 OPTIONAL -- Cond SharedSpectrum2

}

InterFreqExcludedCellList ::= SEQUENCE (SIZE (1..maxCellExcluded)) OF PCI-Range

InterFreqAllowedCellList-r16 ::= SEQUENCE (SIZE (1..maxCellAllowed)) OF PCI-Range

InterFreqCAG-CellListPerPLMN-r16 ::= SEQUENCE {

 plmn-IdentityIndex-r16 INTEGER (1..maxPLMN),

 cag-CellList-r16 SEQUENCE (SIZE (1..maxCAG-Cell-r16)) OF PCI-Range

}

-- TAG-SIB4-STOP

-- ASN1STOP

| *SIB4* field descriptions |
| --- |
| ***absThreshSS-BlocksConsolidation***Threshold for consolidation of L1 measurements per RS index. If the field is absent, the UE uses the measurement quantity as specified in TS 38.304 [20]. |
| ***accessAllowed2RxXR***Indicates if the cells on the frequency support 2Rx XR UEs. If present, 2Rx XR UEs shall consider only these NR frequencies in cell reselection evaluation. |
| ***channelAccessMode2***If present, this field indicates that the neighbor cells on the inter-frequency apply channel access mode procedures for operation with shared spectrum channel access in accordance with TS 37.213 [48], clause 4.4 for FR2-2. If absent, the neighbor cells on the inter-frequency do not apply any channel access procedure. |
| ***deriveSSB-IndexFromCell***This field indicates whether the UE may use the timing of any detected cell on that frequency to derive the SSB index of all neighbour cells on that frequency. If this field is set to *true*, the UE assumes SFN and frame boundary alignment across cells on the neighbor frequency as specified in TS 38.133 [14]. |
| ***dl-CarrierFreq***This field indicates center frequency of the SS block of the neighbour cells, where the frequency corresponds to a GSCN value as specified in TS 38.101-1 [15] or TS 38.101-5 [75].For a neighbouring carrier frequency when *dl-CarrierFreq-r18* is included, the network sets the corresponding value of *dl-CarrierFreq* (without suffix) to 250, and the UE applies *dl-CarrierFreq-r18* instead of *dl-CarrierFreq* (without suffix). In such case, if the UE does not support the GSCN value corresponding to the *dl-CarrierFreq-r18*, it ignores the corresponding neighbour cell. |
| ***eRedCapAccessAllowed***Indicates whether eRedCap UEs are allowed to access cells on the frequency. |
| ***frequencyBandList***Indicates the list of frequency bands for which the NR cell reselection parameters apply. For a neighbouring carrier frequency when *frequencyBandList-r18* is included, the network sets the corresponding value of *freqBandIndicatorNR* in *frequencyBandList* (without suffix) to 200, and the UE applies *frequencyBandList-r18* instead of *frequencyBandList* (without suffix). |
| ***frequencyBandListAerial***Indicates the list of frequency bands for aerial operation for which the NR cell reselection parameters apply. The UE behaviour in case the field is absent is described in clause 5.2.2.4.5. |
| ***highSpeedMeasInterFreq***If the field is set to *true* and UE supports high speed inter-frequency IDLE/INACTIVE measurements, the UE shall apply the enhanced inter-frequency RRM requirements on the inter-frequency carrier to support high speed up to 500 km/h in RRC\_IDLE/RRC\_INACTIVE as specified in TS 38.133 [14]. |
| ***interFreqAllowedCellList***List of allow-listed inter-frequency neighbouring cells, see TS 38.304 [20], clause 5.2.4. |
| ***interFreqCAG-CellList***List of inter-frequency neighbouring CAG cells (as defined in TS 38.304 [20] per PLMN. |
| ***interFreqCarrierFreqList***List of neighbouring carrier frequencies and frequency specific cell re-selection information. If *interFreqCarrierFreqList-v1610, interFreqCarrierFreqList-v1700, interFreqCarrierFreqList-v1720*, *interFreqCarrierFreqList-v1730,* *interFreqCarrierFreqList-v1760* or *interFreqCarrierFreqInfo-v1800* are present, they shall contain the same number of entries, listed in the same order as in *interFreqCarrierFreqList* (without suffix). |
| ***interFreqExcludedCellList***List of exclude-listed inter-frequency neighbouring cells. |
| ***interFreqNeighCellList***List of inter-frequency neighbouring cells with specific cell re-selection parameters. If *interFreqNeighCellList-v1610* is present, it shall contain the same number of entries, listed in the same order as in *interFreqNeighCellList* (without suffix). |
| ***interFreqNeighHSDN-CellList***List of inter-frequency neighbouring HSDN cells as specified in TS 38.304 [20]. |
| ***mobileIAB-CellList***Contains a PCI range on which mobile IAB cells may be deployed. |
| ***mobileIAB-Freq***If present, it indicates that a mobile IAB node may be deployed on the inter-frequency carrier. |
| ***nrofSS-BlocksToAverage***Number of SS blocks to average for cell measurement derivation. If the field is absent, the UE uses the measurement quantity as specified in TS 38.304 [20]. |
| ***plmn-IdentityIndex***Index of the PLMN across the *plmn-IdentityInfoList* and *npn-IdentityInfoList* fields included in SIB1. |
| ***p-Max***Value in dBm applicable for the neighbouring NR cells on this carrier frequency. If absent the UE applies the maximum power according to TS 38.101-1 [15] in case of an FR1 cell, TS 38.101-2 [39] in case of an FR2 cell or TS 38.101-5 [75] in case of an NTN cell. In this release of the specification, if *p-Max* is present on a carrier frequency in FR2, the UE shall ignore the field and applies the maximum power according to TS 38.101-2 [39]. This field is ignored by IAB-MT and NCR-MT. The IAB-MT applies output power and emissions requirements, as specified in TS 38.174 [63]. The NCR-MT applies output power and emissions requirements as specified in TS 38.106 [79]. |
| ***q-OffsetCell***Parameter "Qoffsets,n" in TS 38.304 [20]. |
| ***q-OffsetFreq***Parameter "Qoffsetfrequency" in TS 38.304 [20]. |
| ***q-QualMin***Parameter "Qqualmin" in TS 38.304 [20]. If the field is absent, the UE applies the (default) value of negative infinity for Qqualmin. |
| ***q-QualMinOffsetCell***Parameter "Qqualminoffsetcell" in TS 38.304 [20]. Actual value Qqualminoffsetcell = field value [dB]. |
| ***q-RxLevMin***Parameter "Qrxlevmin" in TS 38.304 [20]. |
| ***q-RxLevMinOffsetCell***Parameter "Qrxlevminoffsetcell" in TS 38.304 [20]. Actual value Qrxlevminoffsetcell = field value \* 2 [dB]. |
| ***q-RxLevMinOffsetCellSUL***Parameter "QrxlevminoffsetcellSUL" in TS 38.304 [20]. Actual value QrxlevminoffsetcellSUL = field value \* 2 [dB]. |
| ***q-RxLevMinSUL***Parameter "Qrxlevmin" in TS 38.304 [20]. |
| ***redCapAccessAllowed***Indicates whether RedCap UEs are allowed to access cells on the frequency. |
| ***smtc***Measurement timing configuration for inter-frequency measurement. If this field is absent, the UE assumes that SSB periodicity is 5 ms in this frequency. If the field is broadcast by an NTN cell, the o*ffset* (derived from parameter *periodicityAndOffset*) is based on the assumption that the gNB-UE propagation delay difference between the serving cell and neighbour cells equals to 0 ms, and UE can adjust the actual o*ffset* based on the actual propagation delay difference. |
| ***smtc2-LP***Measurement timing configuration for inter-frequency neighbour cells with a Long Periodicity (LP) indicated by periodicity in *smtc2-LP*. The timing offset and duration are equal to the offset and duration indicated in *smtc* in *InterFreqCarrierFreqInfo*. The periodicity in *smtc2-LP* can only be set to a value strictly larger than the periodicity in *smtc* in *InterFreqCarrierFreqInfo* (e.g. if *smtc* indicates sf20 the Long Periodicity can only be set to sf40, sf80 or sf160, if *smtc* indicates sf160, *smtc2-LP* cannot be configured). The *pci-List*, if present, includes the physical cell identities of the inter-frequency neighbour cells with Long Periodicity. If *smtc2-LP* is absent, the UE assumes that there are no inter-frequency neighbour cells with a Long Periodicity. |
| ***smtc4list***Measurement timing configuration list for NTN deployments, see clause 5.5.2.10. The offset of each SSB-MTC4 in *smtc4list* is based on the assumption that the gNB-UE propagation delay difference between the serving cell and neighbour cells equals to 0 ms, and UE can adjust the actual *offset* based on the actual propagation delay difference. For a UE that supports less SMTCs than what is included in this list, it is up to the UE to select which SMTCs to consider. |
| ***ssb-PositionQCL***Indicates the QCL relation between SS/PBCH blocks for a specific neighbor cell as specified in TS 38.213 [13], clause 4.1. If provided, the cell specific value overwrites the common value signalled by *ssb-PositionQCL-Common* in *SIB4* for the indicated cell. |
| ***ssb-PositionQCL-Common***Indicates the QCL relation between SS/PBCH blocks for inter-frequency neighbor cells as specified in TS 38.213 [13], clause 4.1. |
| ***ssb-ToMeasure***The set of SS blocks to be measured within the SMTC measurement duration (see TS 38.215 [9]). When the field is absent the UE measures on all SS-blocks. |
| ***ssbSubcarrierSpacing***Subcarrier spacing of SSB.Only the following values are applicable depending on the used frequency:FR1: 15 or 30 kHzFR2-1: 120 or 240 kHzFR2-2: 120, 480, or 960 kHz |
| ***threshX-HighP***Parameter "ThreshX, HighP" in TS 38.304 [20]. |
| ***threshX-HighQ***Parameter "ThreshX, HighQ" in TS 38.304 [20]. |
| ***threshX-LowP***Parameter "ThreshX, LowP" in TS 38.304 [20]. |
| ***threshX-LowQ***Parameter "ThreshX, LowQ" in TS 38.304 [20]. |
| ***tn-AreaIdList***List of TN area identifiers. The associated coverage information is provided in *SIB25*. |
| ***t-ReselectionNR***Parameter "TreselectionNR" in TS 38.304 [20]. |
| ***t-ReselectionNR-SF***Parameter "Speed dependent ScalingFactor for TreselectionNR" in TS 38.304 [20]. If the field is absent, the UE behaviour is specified in TS 38.304 [20]. |

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| Conditional Presence | Explanation |
| *LessThan5MHz* | The field is mandatory present if the *carrierBandwidth* in SIB1 indicates UL or DL transmission bandwidth other than 15 PRB and the corresponding neighbour cell(s) support(s) 12 PRB, 15 PRB or 20 PRB transmission bandwidth configuration as defined in TS 38.101-1 [15], TS 38.211 [16] and TS 38.213 [13]. Otherwise, the field is optional, Need S. |
| *Mandatory* | The field is mandatory present in SIB4. |
| *RSRQ* | The field is mandatory present if *threshServingLowQ* is present in *SIB2*; otherwise it is absent. |
| *SharedSpectrum* | This field is mandatory present if this inter-frequency operates with shared spectrum channel access. Otherwise, it is absent, Need R. |
| *SharedSpectrum2* | The field is optional present, Need R, if this inter-frequency or neighbor cell operates with shared spectrum channel access. Otherwise, it is absent, Need R. |

#### – *SIB17bis*

*SIB17bis* contains configurations of TRS resources for idle/inactive UEs. *SIB17bis* is optionally scheduled if *SIB17* is not scheduled.

*SIB17bis* information element

-- ASN1START

-- TAG-SIB17bis-START

SIB17bis-r18 ::= SEQUENCE {

 segmentNumber-r18 INTEGER (0..63),

 segmentType-r18 ENUMERATED {notLastSegment, lastSegment},

 segmentContainer-r18 OCTET STRING

}

SIB17bis-IEs-r18 ::= SEQUENCE {

 trs-ResourceSetConfig-r18 SEQUENCE (SIZE (1..maxNrofTRS-ResourceSets-r17)) OF TRS-ResourceSet-r18 OPTIONAL, -- Need R

 validityDuration-r18 ENUMERATED {t1, t2, t4, t8, t16, t32, t64, t128, t256, t512, infinity, spare5, spare4, spare3, spare2,

 spare1} OPTIONAL, -- Need S

 lateNonCriticalExtension OCTET STRING OPTIONAL,

 ...

}

TRS-ResourceSet-r18 ::= SEQUENCE {

 powerControlOffsetSS-r18 ENUMERATED {db-3, db0, db3, db6},

 scramblingID-Info-r18 CHOICE {

 scramblingIDforCommon-r18 ScramblingId,

 scramblingIDperResourceListWith2-r18 SEQUENCE (SIZE (2)) OF ScramblingId,

 scramblingIDperResourceListWith4-r18 SEQUENCE (SIZE (4)) OF ScramblingId,

 ...

 },

 firstOFDMSymbolInTimeDomain-r18 INTEGER (0..9),

 startingRB-r18 INTEGER (0..maxNrofPhysicalResourceBlocks-1),

 nrofRBs-r18 INTEGER (24..maxNrofPhysicalResourceBlocksPlus1),

 ssb-Index-r18 SSB-Index,

 periodicityAndOffset-r18 CHOICE {

 slots10 INTEGER (0..9),

 slots20 INTEGER (0..19),

 slots40 INTEGER (0..39),

 slots80 INTEGER (0..79),

 slots160 INTEGER (0..159),

 slots320 INTEGER (0..319),

 slots640 INTEGER (0..639)

 },

 frequencyDomainAllocation-r18 BIT STRING (SIZE (4)),

 indBitID-r18 INTEGER (0..5),

 nrofResources-r18 ENUMERATED {n2, n4}

}

-- TAG-SIB17bis-STOP

-- ASN1STOP

| *SIB17bis* field descriptions |
| --- |
| ***segmentContainer***This field includes a segment of the encoded *SIB17bis-IEs*. The size of the included segment in this container should be small enough that the SIB message size is less than or equal to the maximum size of a NR SI, i.e. 2976 bits when *SIB17bis* is broadcast. |
| ***segmentNumber***This field identifies the sequence number of a segment of *SIB17bis-IEs*. A segment number of zero corresponds to the first segment, a segment number of one corresponds to the second segment, and so on. |
| ***segmentType***This field indicates whether the included segment is the last segment or not. |
| ***trs-ResourceSetConfig***RS configuration of TRS occasion(s) for idle/inactive UE(s), in terms of a list of N>=1 NZP TRS resource set(s). The maximum number of TRS resource sets configured by higher layer is 64. If a TRS resource is configured, the L1 based availability indication is always enabled based on that configuration. A UE which acquired *SIB17bis* with a TRS configuration but did not yet receive an associated L1-based availability indication considers the configured TRS as unavailable. If SIB scheduling indicates that *SIB17bis* has changed, the UE considers its configured TRS(s) from *SIB17bis* as unavailable until it receives the associated L1-based availability indication(s). |
| ***validityDuration***The valid time duration for L1 availability indication, time unit is one default paging cycle. When the field is absent, UE assumes a default time duration to be 2 default paging cycles. The field is only valid while the UE has a valid *SIB17bis*. |

| *TRS-ResourceSet* field descriptions |
| --- |
| ***firstOFDMSymbolInTimeDomain***The index of the first OFDM symbol in the PRB used for TRS in a slot. The field indicates the first symbol in a slot for the first TRS resource within the slot, and the symbol for the second TRS resource in the same slot can be derived implicitly with symbol index as *firstOFDMSymbolInTimeDomain*+4. |
| ***frequencyDomainAllocation***Indicates the offset of the first RE to RE#0 in a RB in row1 in table 7.4.1.5.3-1 for frequency domain allocation within a physical resource block (TS 38.211 [16], clause 7.4.1.5.3). |
| ***indBitID***The index of the associated bit in TRS availability indication field in DCI. Each TRS resource set is configured with an ID i for the association with (i+1)-th indication bit in TRS availability indication field in DCI. |
| ***nrofRBs***Number of PRBs across which corresponding TRS resource spans. |
| ***nrofResources***The number of TRS resources for a TRS resource set. |
| ***periodicityAndOffset***The periodicity and slot offset (slot) for periodic TRS. It is used to determine the location of the first slot of TRS resource set. The periodicity value *slots10* corresponds to 10 slots, value *slots20* corresponds to 20 slots, and so on. Only the following values of the periodicity are used: 10 slots (SCS 15 kHz), 20 slots (SCS 15 and 30 kHz), 40 slots (SCS 15, 30 and 60 kHz), 80 slots (SCS 15, 30, 60 and 120 kHz), 160 slots (SCS 30, 60 and 120 kHz), 320 slots (SCS 60 and 120 kHz), and 640 slots (SCS 120 kHz). |
| ***powerControlOffsetSS***Power offset (dB) of NZP CSI-RS RE to SSS RE. |
| ***scramblingID-Info***One or more scrambling IDs are configured for a TRS resource set. If a common scrambling ID is configured, it applies to all the TRS resources within the TRS resource set. Otherwise, each TRS resource within the TRS resource set is provided with a scrambling ID. If the number of TRS resources for the TRS resource set is 2, *scramblingIDperResourceListWith2-r18* is configured, while *scramblingIDperResourceListWith4-r18* is configured for the case that the number of TRS resources for the TRS resource set is 4. |
| ***ssb-Index***The index of reference SSB with which quasi-collocation information is provided as specified in TS 38.214 [19] clause 5.1.5. |
| ***startingRB***The PRB index where corresponding TRS resource starts in relation to common resource block #0 (CRB#0) on the common resource block grid. |

#### *– SIB19*

*SIB19* contains satellite assistance information for NTN access.

***SIB19* information element**

-- ASN1START

-- TAG-SIB19-START

SIB19-r17 ::= SEQUENCE {

 ntn-Config-r17 NTN-Config-r17 OPTIONAL, -- Need R

 t-Service-r17 INTEGER (0..549755813887) OPTIONAL, -- Need R

 referenceLocation-r17 ReferenceLocation-r17 OPTIONAL, -- Need R

 distanceThresh-r17 INTEGER(0..65525) OPTIONAL, -- Need R

 ntn-NeighCellConfigList-r17 NTN-NeighCellConfigList-r17 OPTIONAL, -- Need R

 lateNonCriticalExtension OCTET STRING OPTIONAL,

 ...,

 [[

 ntn-NeighCellConfigListExt-v1720 NTN-NeighCellConfigList-r17 OPTIONAL -- Need R

 ]],

 [[

 movingReferenceLocation-r18 ReferenceLocation-r17 OPTIONAL, -- Need R

 ntnCovEnh-r18 NTN-CovEnh-r18 OPTIONAL, -- Need R

 satSwitchWithReSync-r18 SatSwitchWithReSync-r18 OPTIONAL -- Need R

 ]]

}

NTN-NeighCellConfigList-r17 ::= SEQUENCE (SIZE(1..maxCellNTN-r17)) OF NTN-NeighCellConfig-r17

NTN-NeighCellConfig-r17 ::= SEQUENCE {

 ntn-Config-r17 NTN-Config-r17 OPTIONAL, -- Need R

 carrierFreq-r17 ARFCN-ValueNR OPTIONAL, -- Need R

 physCellId-r17 PhysCellId OPTIONAL -- Need R

}

NTN-CovEnh-r18 ::= SEQUENCE {

 numberOfMsg4HARQ-ACK-Repetitions-r18 BIT STRING (SIZE(4)),

 rsrp-ThresholdMsg4HARQ-ACK-r18 RSRP-Range OPTIONAL -- Need R

}

SatSwitchWithReSync-r18 ::= SEQUENCE {

 ntn-Config-r18 NTN-Config-r17,

 t-ServiceStart-r18 INTEGER (0..549755813887) OPTIONAL, -- Need R

 ssb-TimeOffset-r18 INTEGER (0..159) OPTIONAL -- Need R

}

-- TAG-SIB19-STOP

-- ASN1STOP

| ***SIB19* field descriptions** |
| --- |
| ***distanceThresh***Distance from the serving cell reference location and is used in location-based measurement initiation in RRC\_IDLE and RRC\_INACTIVE, as defined in TS 38.304 [20]. Each step represents 50m. This field is only present in an NTN cell. |
| ***movingReferenceLocation***Reference location of the serving cell of an NTN Earth-moving cell at a time reference. It is used in the evaluation of *eventD2* and *condEventD2* criteria for the serving cell in RRC\_CONNECTED, and location-based measurement initiation in RRC\_IDLE and RRC\_INACTIVE when *distanceThresh* is also configured, as defined in TS 38.304 [20]. The time reference of this field is indicated by *epochTime* in *ntn-Config* of the serving cell. This field is excluded when determining changes in system information, i.e., changes to *movingReferenceLocation* should neither result in system information change notifications nor in a modification of *valueTag* in *SIB1*. This field is only present in an NTN cell. |
| ***ntn-Config***Provides parameters needed for the UE to access NR via NTN access such as Ephemeris data, common TA parameters, k\_offset, validity duration for UL sync information and epoch time. In a TN cell, this field is only present in *ntn-NeighCellConfigList* and *ntn-NeighCellConfigListExt*. |
| ***ntn-NeighCellConfigList, ntn-NeighCellConfigListExt***Provides a list of NTN neighbour cells including their *ntn-Config*, carrier frequency and *PhysCellId*. This set includes all elements of *ntn-NeighCellConfigList* and all elements of *ntn-NeighCellConfigListExt*. If *ntn-Config* is absent for an entry in *ntn-NeighCellConfigListExt*, the *ntn-Config* provided in the entry at the same position in *ntn-NeighCellConfigList* applies. Network provides *ntn-Config* for the first entry of *ntn-NeighCellConfigList.* If the *ntn-Config* is absent for any other entry in *ntn-NeighCellConfigList*, the *ntn-Config* provided in the previous entry in *ntn-NeighCellConfigList* applies. |
| ***referenceLocation***Reference location of the serving cell provided via NTN (quasi)-Earth fixed cell and is used in location-based measurement initiation in RRC\_IDLE and RRC\_INACTIVE, as defined in TS 38.304 [20]. This field is only present in an NTN cell. |
| ***satSwitchWithReSync***Provides parameters for the target satellite required to perform satellite switch with resynchronization. This field is only present in an NTN cell and its presence indicates that satellite switch without PCI change is supported in the cell. |
| ***t-Service***Indicates the time information on when a cell provided via NTN is going to stop serving the area it is currently covering. This field applies for both service link switches in NTN quasi-Earth fixed cell and feeder link switches for both NTN quasi-Earth fixed and Earth-moving cell. The field indicates a time in multiples of 10 ms after 00:00:00 on Gregorian calendar date 1 January, 1900 (midnight between Sunday, December 31, 1899 and Monday, January 1, 1900). The exact stop time is between the time indicated by the value of this field minus 1 and the time indicated by the value of this field. The reference point for *t-Service* is the uplink time synchronization reference point of the cell. This field is only present in an NTN cell. |

|  |
| --- |
| *NTN-CovEnh* field descriptions |
| ***numberOfMsg4HARQ-ACK-Repetitions***The number of repetition slots for PUCCH transmission with HARQ-ACK information for Msg4, see clause 9.2.6 in TS 38.213 [13]. The first/leftmost bit corresponds to the repetition factor 1, the second bit corresponds to repetition factor 2, the third bit corresponds to the repetition factor 4, and the last/rightmost bit corresponds to the repetition factor 8. The repetition factor 1 shall be indicated together with at least one other repetition factor. |
| ***rsrp-ThresholdMsg4HARQ-ACK***This threshold is used by the UE for determining the configuration of the MAC entity for PUCCH repetition for Msg4 HARQ-ACK, as specified in clause 6.2.1 in TS 38.321 [3]. |

| *SatSwitchWithReSync* field descriptions |
| --- |
| ***ssb-TimeOffset***Indicates the time offset between the SSB from source and target satellite at the uplink time synchronization reference point. It is given in number of subframes. |
| ***t-ServiceStart***Indicates the time information on when the target satellite is going to start serving the area currently covered by the serving satellite. The field indicates a time in multiples of 10 ms after 00:00:00 on Gregorian calendar date 1st January 1900 (midnight between Sunday, December 31, 1899, and Monday, January 1, 1900). The exact start time is between the time indicated by the value of this field minus 1 and the time indicated by the value of this field. The reference point for *t-ServiceStart* is the uplink time synchronization reference point of the serving satellite. |

### 6.3.2 Radio resource control information elements

<cut>‘

#### – *DownlinkConfigCommonSIB*

The IE *DownlinkConfigCommonSIB* provides common downlink parameters of a cell.

*DownlinkConfigCommonSIB* information element

-- ASN1START

-- TAG-DOWNLINKCONFIGCOMMONSIB-START

DownlinkConfigCommonSIB ::= SEQUENCE {

 frequencyInfoDL FrequencyInfoDL-SIB,

 initialDownlinkBWP BWP-DownlinkCommon,

 bcch-Config BCCH-Config,

 pcch-Config PCCH-Config,

 ...,

 [[

 pei-Config-r17 PEI-Config-r17 OPTIONAL, -- Need R

 initialDownlinkBWP-RedCap-r17 BWP-DownlinkCommon OPTIONAL -- Need R

 ]],

 [[

 frequencyInfoDL-v1800 FrequencyInfoDL-SIB-v1800 OPTIONAL -- Need R

 ]]

}

DownlinkConfigCommonSIB-v1760 ::= SEQUENCE {

 frequencyInfoDL-v1760 FrequencyInfoDL-SIB-v1760

}

BCCH-Config ::= SEQUENCE {

 modificationPeriodCoeff ENUMERATED {n2, n4, n8, n16},

 ...

}

PCCH-Config ::= SEQUENCE {

 defaultPagingCycle PagingCycle,

 nAndPagingFrameOffset CHOICE {

 oneT NULL,

 halfT INTEGER (0..1),

 quarterT INTEGER (0..3),

 oneEighthT INTEGER (0..7),

 oneSixteenthT INTEGER (0..15)

 },

 ns ENUMERATED {four, two, one},

 firstPDCCH-MonitoringOccasionOfPO CHOICE {

 sCS15KHZoneT SEQUENCE (SIZE (1..maxPO-perPF)) OF INTEGER (0..139),

 sCS30KHZoneT-SCS15KHZhalfT SEQUENCE (SIZE (1..maxPO-perPF)) OF INTEGER (0..279),

 sCS60KHZoneT-SCS30KHZhalfT-SCS15KHZquarterT SEQUENCE (SIZE (1..maxPO-perPF)) OF INTEGER (0..559),

 sCS120KHZoneT-SCS60KHZhalfT-SCS30KHZquarterT-SCS15KHZoneEighthT SEQUENCE (SIZE (1..maxPO-perPF)) OF INTEGER (0..1119),

 sCS120KHZhalfT-SCS60KHZquarterT-SCS30KHZoneEighthT-SCS15KHZoneSixteenthT SEQUENCE (SIZE (1..maxPO-perPF)) OF INTEGER (0..2239),

 sCS480KHZoneT-SCS120KHZquarterT-SCS60KHZoneEighthT-SCS30KHZoneSixteenthT SEQUENCE (SIZE (1..maxPO-perPF)) OF INTEGER (0..4479),

 sCS480KHZhalfT-SCS120KHZoneEighthT-SCS60KHZoneSixteenthT SEQUENCE (SIZE (1..maxPO-perPF)) OF INTEGER (0..8959),

 sCS480KHZquarterT-SCS120KHZoneSixteenthT SEQUENCE (SIZE (1..maxPO-perPF)) OF INTEGER (0..17919)

 } OPTIONAL, -- Need R

 ...,

 [[

 nrofPDCCH-MonitoringOccasionPerSSB-InPO-r16 INTEGER (2..4) OPTIONAL -- Cond SharedSpectrum2

 ]],

 [[

 ranPagingInIdlePO-r17 ENUMERATED {true} OPTIONAL, -- Need R

 firstPDCCH-MonitoringOccasionOfPO-v1710 CHOICE {

 sCS480KHZoneEighthT SEQUENCE (SIZE (1..maxPO-perPF)) OF INTEGER (0..35839),

 sCS480KHZoneSixteenthT SEQUENCE (SIZE (1..maxPO-perPF)) OF INTEGER (0..71679)

} OPTIONAL -- Need R

 ]]

}

PEI-Config-r17 ::= SEQUENCE {

 po-NumPerPEI-r17 ENUMERATED {po1, po2, po4, po8},

 payloadSizeDCI-2-7-r17 INTEGER (1..maxDCI-2-7-Size-r17),

 pei-FrameOffset-r17 INTEGER (0..16),

 subgroupConfig-r17 SubgroupConfig-r17,

 lastUsedCellOnly-r17 ENUMERATED {true} OPTIONAL, -- Need R

 ...

}

SubgroupConfig-r17 ::= SEQUENCE {

 subgroupsNumPerPO-r17 INTEGER (1.. maxNrofPagingSubgroups-r17),

 subgroupsNumForUEID-r17 INTEGER (1.. maxNrofPagingSubgroups-r17) OPTIONAL, -- Need S

 ...

}

-- TAG-DOWNLINKCONFIGCOMMONSIB-STOP

-- ASN1STOP

|  |
| --- |
| *DownlinkConfigCommonSIB* field descriptions |
| ***bcch-Config***The modification period related configuration. |
| ***frequencyInfoDL-SIB***Basic parameters of a downlink carrier and transmission thereon. |
| ***initialDownlinkBWP***The initial downlink BWP configuration for a PCell. The network configures the *locationAndBandwidth* so that the initial downlink BWP contains the entire CORESET#0 of this serving cell in the frequency domain. The UE applies the *locationAndBandwidth* upon reception of this field (e.g. to determine the frequency position of signals described in relation to this *locationAndBandwidth*) but it keeps CORESET#0 until after reception of *RRCSetup*/*RRCResume/RRCReestablishment*. |
| ***initialDownlinkBWP-RedCap***If present, (e)RedCap UEs use this DL BWP instead of *initialDownlinkBWP*. If the *locationAndBandwidth* of this BWP contains the entire CORESET#0, the UE applies the *locationAndBandwidth* upon reception of this field (e.g. to determine the frequency position of signals described in relation to this *locationAndBandwidth*) but it keeps CORESET#0 until after reception of *RRCSetup*/*RRCResume/RRCReestablishment*. Otherwise, i.e., if the *locationAndBandwidth* of this BWP does not contain the entire CORESET#0, the UE uses this BWP for receiving DL messages during initial access (Msg2, MsgB, Msg4) and after initial access.If absent, (e)RedCap UEs use *initialDownlinkBWP* provided that it does not exceed the (e)RedCap UE maximum bandwidth (see also clause 5.2.2.4.2). |
| ***lastUsedCellOnly***When present, the field indicates that the UE monitors PEI only if the latest received *RRCRelease* without *noLastCellUpdate* is from this cell. A PEI-capable UE stores its last used cell information. |
|  |
| ***pcch-Config***The paging related configuration. |
| ***pei-Config***The PEI related configuration. |
| ***subgroupConfig***The paging subgroup related configuration. |

|  |
| --- |
| *BCCH-Config* field descriptions |
| ***modificationPeriodCoeff***Actual modification period, expressed in number of radio frames m = *modificationPeriodCoeff* \* *defaultPagingCycle*, see clause 5.2.2.2.2. *n2* corresponds to value 2, *n4* corresponds to value 4, and so on. |

|  |
| --- |
| *PCCH-Config* field descriptions |
| ***defaultPagingCycle***Default paging cycle, used to derive 'T' in TS 38.304 [20]. Value *rf32* corresponds to 32 radio frames, value *rf64* corresponds to 64 radio frames and so on. |
| ***firstPDCCH-MonitoringOccasionOfPO***Points out the first PDCCH monitoring occasion for paging of each PO of the PF, see TS 38.304 [20]. |
| ***nAndPagingFrameOffset***Used to derive the number of total paging frames in T (corresponding to parameter N in TS 38.304 [20]) and paging frame offset (corresponding to parameter PF\_offset in TS 38.304 [20]). A value of *oneSixteenthT* corresponds to T / 16, a value of oneEighthT corresponds to T / 8, and so on.If *pagingSearchSpace* is set to zero and if SS/PBCH block and CORESET multiplexing pattern is 2 or 3 (as specified in TS 38.213 [13]):- for *ssb-periodicityServingCell* of 5 or 10 ms, N can be set to one of {*oneT, halfT, quarterT, oneEighthT, oneSixteenthT*}- for *ssb-periodicityServingCell* of 20 ms, N can be set to one of {*halfT, quarterT, oneEighthT, oneSixteenthT*}- for *ssb-periodicityServingCell* of 40 ms, N can be set to one of {*quarterT, oneEighthT, oneSixteenthT*}- for *ssb-periodicityServingCell* of 80 ms, N can be set to one of {*oneEighthT, oneSixteenthT*}- for *ssb-periodicityServingCell* of 160 ms, N can be set to *oneSixteenthT*If *pagingSearchSpace* is set to zero and if SS/PBCH block and CORESET multiplexing pattern is 1 (as specified in TS 38.213 [13]), N can be set to one of {*halfT, quarterT, oneEighthT, oneSixteenthT*}If *pagingSearchSpace* is not set to zero, N can be configured to one of {*oneT, halfT, quarterT, oneEighthT, oneSixteenthT*} |
|  |
| ***ns***Number of paging occasions per paging frame. |
| ***ranPagingInIdlePO***Indicates that the network supports to send RAN paging in PO that corresponds to the i\_s as determined by UE in RRC\_IDLE state, see TS38.304 [20]. |

|  |
| --- |
| *PEI-Config* field descriptions |
| ***payloadSizeDCI-2-7***Payload size of PEI DCI, i.e., DCI format 2\_7. The size is no larger than the payload size of paging DCI which has maximum of 41 bits and 43 bits for licensed and unlicensed spectrums, respectively. |
| ***pei-FrameOffset***Offset, in number of frames from the start of a reference frame for PEI-O to the start of a first paging frame of the paging frames associated with the PEI-O, see TS 38.213 [13], clause 10.4A. |
| ***po-NumPerPEI***The number of PO(s) associated with one PEI monitoring occasion. It is a factor of the total PO number in a paging cycle, i.e N x Ns, as specified in TS 38.304 [20]. The maximum number of PF associated with one PEI monitoring occasion is 2. The number of PO mapping to one PEI should be multiple of Ns when *po-NumPerPEI* is larger than Ns. |

|  |
| --- |
| *SubgroupConfig* field descriptions |
| ***subgroupsNumPerPO***Total number of subgroups per Paging Occasion (PO) for UE to read subgroups indication from physical-layer signaling. The field represents the sum of CN-assigned and UEID-based subgroups supported by the network. When *PEI-Config* is configured, there is always at least one subgroup (UEID-based subgroup or CN-assigned subgroup) configured. |
| ***subgroupsNumForUEID***Number of subgroups per Paging Occasion (PO) for UE to read subgroups indication from physical-layer signaling, for UEID-based subgrouping method. When present, the fieldis set to an integer smaller than or equal to *subgroupsNumPerPO. subgroupsNumPerPO* equals to *subgroupsNumForUEID* when the network does not configure CN-assigned subgrouping. When *pei-Config* is configured, the field is absent when the network only configures CN-assigned subgrouping. Both this field and *subgroupsNumPerPO* are equal to 1 when the network does not configure subgrouping. When *pei-Config* is configured, if the field is absent, the UE uses subgrouping according to TS 38.304 [20], clause 7.3.0. |

|  |  |
| --- | --- |
| Conditional Presence | Explanation |
| *SharedSpectrum2* | The field is optional present, Need R, if this cell operates with shared spectrum channel access. Otherwise, it is absent, Need R. |

#### – *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. This field is not configured if *unifiedTCI-StateType* is configured for the serving cell. |
| ***resourceGroupToAddModList, resourceGroupToReleaseList***Lists for adding and releasing groups of PUCCH resources that can be updated simultaneously for spatial relations with a MAC CE. |
| ***resourceSetToAddModList, resourceSetToReleaseList***Lists for adding and releasing PUCCH resource sets (see TS 38.213 [13], clause 9.2). |
| ***resourceToAddModList, resourceToAddModListExt, resourceToReleaseList***Lists for adding and releasing PUCCH resources applicable for the UL BWP and serving cell in which the *PUCCH-Config* is defined. The resources defined herein are referred to from other parts of the configuration to determine which resource the UE shall use for which report. If the network includes of *resourceToAddModListExt*, it includes the same number of entries, and listed in the same order, as in *resourceToAddModList*. |
| ***secondTPCFieldDCI-1-1, secondTPCFieldDCI-1-2***A second TPC field can be configured via RRC for DCI-1-1 and DCI-1-2. Each TPC field is for each closed-loop index value respectively (i.e., 1st /2nd TPC fields correspond to "closedLoopIndex" value = 0 and 1. |
| ***spatialRelationInfoToAddModList, spatialRelationInfoToAddModListSizeExt , spatialRelationInfoToAddModListExt***Configuration of the spatial relation between a reference RS and PUCCH. Reference RS can be SSB/CSI-RS/SRS. If the list has more than one element, MAC-CE selects a single element (see TS 38.321 [3], clause 5.18.8 and TS 38.213 [13], clause 9.2.2). The UE shall consider entries in *spatialRelationInfoToAddModList* and in *spatialRelationInfoToAddModListSizeExt* as a single list, i.e. an entry created using *spatialRelationInfoToAddModList* can be modified using *spatialRelationInfoToAddModListSizeExt* (or deleted using *spatialRelationInfoToReleaseListSizeExt*) and vice-versa. If the network includes *spatialRelationInfoToAddModListExt*, it includes the same number of entries, and listed in the same order, as in the concatenation of *spatialRelationInfoToAddModList* and of *spatialRelationInfoToAddModListSizeExt*. 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. |

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| *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). |

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

|  |  |
| --- | --- |
| 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. |

#### – *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

 ]]

}

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

}

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

}

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-0-3-r18 ::= SEQUENCE (SIZE (2.. maxNrofBWPsInSetOfCells-r18)) OF INTEGER (0..maxNrofUL-Allocations-1-r18)

-- TAG-SERVINGCELLCONFIG-STOP

-- ASN1STOP

|  |
| --- |
| *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. |

|  |
| --- |
| *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. |
| ***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***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. |
| ***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. For this *MeasObjectNR*, the following relationship applies between this 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*. |
| ***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 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-ToAddModList* 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 all uplink transmissions on this serving cell associated to *tag2*. 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], 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\_CONNETCED 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 that is determined by the BWP indicator field of DCI format 1\_3. |
| ***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 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 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 format 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 that is determined by the BWP indicator field of DCI format 1\_3/0\_3. |
| ***srs-OffsetListDCI-1-3, srs-OffsetListDCI-0-3***Configure joint SRS offset indicator table for DL scheduling via DCI format 1\_3 and 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 format 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 that is determined by the BWP indicator field of DCI format 1\_3/0\_3. |
| ***srs-RequestListDCI-1-3, srs-RequestListDCI-0-3***Configure joint SRS request table for DL scheduling via DCI format 1\_3 and 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 co-scheduled cells in a row of *TCI-DCI-1-3* are interpreted based on the BWPs of co-scheduled cells that is determined by the BWP indicator field of DCI format 1\_3. |
| ***tci-ListDCI-1-3***Configure joint TCI table for DL scheduling via DCI format 1\_3 |
| ***TDRA-FieldIndexDC-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, 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 38.212, of the first cell in *scheduledCellListDCI-0-3*, second TDRA index in a row is for the second smallest BWP-Id 1 that can be scheduled by the DCI format 0-3, as specified in 38.212, 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 38.212, 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, 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 38.212, 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 38.212, 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 38.212, across cells included in *scheduledCellListDCI-1-3*. |
| ***tdra-FieldIndexListDCI-1-3, tdra-FieldIndexListDCI-0-3***Configure joint TDRA table for UL scheduling via DCI format 1\_3 and 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, 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 that is determined by the BWP indicator field of DCI format 1\_3. |
| ***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 |
| *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. |
| *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. |

### 6.3.4 Other information elements

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#### – *EUTRA-NS-PmaxList*

The IE *EUTRA-NS-PmaxList* concerns a list of *additionalPmax* and *additionalSpectrumEmission*, as defined in TS 36.101 [22], clause 6, for a given frequency band.

*EUTRA-NS-PmaxList* information element

-- ASN1START

-- TAG-EUTRA-NS-PMAXLIST-START

EUTRA-NS-PmaxList ::= SEQUENCE (SIZE (1..maxEUTRA-NS-Pmax)) OF EUTRA-NS-PmaxValue

EUTRA-NS-PmaxValue ::= SEQUENCE {

 additionalPmax INTEGER (-30..33) OPTIONAL, -- Need R

 additionalSpectrumEmission INTEGER (1..288) OPTIONAL -- Need R

}

-- TAG-EUTRA-NS-PMAXLIST-STOP

-- ASN1STOP

### 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 reselection, 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, 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*. |  | Stop deprioritisation of all frequencies or NR signalled by *RRCRelease.* |
| 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. |

## 7.4 UE variables

<cut>

#### – *VarAppLayerIdleConfig*

The UE variable *VarAppLayerIdleConfig* includes the parameters of the application layer measurements stored in the UE while in RRC\_IDLE.

*VarAppLayerIdleConfig* UE variable

-- ASN1START

-- TAG-VARAPPLAYERIDLECONFIG-START

VarAppLayerIdleConfig-r18 ::= SEQUENCE {

 appLayerIdleConfigList-r18 SEQUENCE (SIZE (1..maxNrofAppLayerMeas-r17)) OF VarAppLayerIdle-r18

}

VarAppLayerIdle-r18 ::= SEQUENCE {

 measConfigAppLayerId-r18 MeasConfigAppLayerId-r17,

 serviceType-r18 ENUMERATED {streaming, mtsi, vr, spare5, spare4, spare3, spare2, spare1},

 appLayerIdleInactiveConfig-r18 AppLayerIdleInactiveConfig-r18,

 appLayerMeasPriority-r18 INTEGER (1..16) OPTIONAL

}

-- TAG-VARAPPLAYERIDLECONFIG-STOP

-- ASN1STOP

#### – *VarAppLayerPLMN-ListConfig*

The UE variable *VarAppLayerPLMN-ListConfig* includes the PLMNs to which application layer measurement reports and application layer measurement configurations are allowed to be sent.

*VarAppLayerPLMN-ListConfig* UE variable

-- ASN1START

-- TAG-VARAPPLAYERPLMN-LISTCONFIG-START

VarAppLayerPLMN-ListConfig-r18 ::= SEQUENCE {

 plmnConfigList-r18 SEQUENCE (SIZE (1..maxNrofAppLayerMeas-r17)) OF VarAppLayerPLMN-List-r18

}

VarAppLayerPLMN-List-r18 ::= SEQUENCE {

 measConfigAppLayerId-r18 MeasConfigAppLayerId-r17,

 plmn-IdentityList-r18 PLMN-IdentityList2-r16

}

-- TAG-VARAPPLAYERPLMN-LISTCONFIG-STOP

-- ASN1STOP

**<cut>**

#### – *VarLogMeasConfig*

The UE variable *VarLogMeasConfig* includes the configuration of the logging of measurements to be performed by the UE while in RRC\_IDLE, RRC\_INACTIVE, covering intra-frequency, inter-frequency and inter-RAT mobility related measurements. The UE performs logging of measurements only while in RRC\_IDLE and RRC\_INACTIVE.

*VarLogMeasConfig* UE variable

-- ASN1START

-- TAG-VARLOGMEASCONFIG-START

VarLogMeasConfig-r16 ::= SEQUENCE {

 areaConfiguration-r16 AreaConfiguration-r16 OPTIONAL,

 bt-NameList-r16 BT-NameList-r16 OPTIONAL,

 wlan-NameList-r16 WLAN-NameList-r16 OPTIONAL,

 sensor-NameList-r16 Sensor-NameList-r16 OPTIONAL,

 loggingDuration-r16 LoggingDuration-r16,

 reportType CHOICE {

 periodical LoggedPeriodicalReportConfig-r16,

 eventTriggered LoggedEventTriggerConfig-r16

 },

 earlyMeasIndication-r17 ENUMERATED {true} OPTIONAL,

 areaConfiguration-r17 AreaConfiguration-r17 OPTIONAL,

 areaConfiguration-v1800 AreaConfiguration-v1800 OPTIONAL

}

-- TAG-VARLOGMEASCONFIG-STOP

-- ASN1STOP

<cut>

#### – *VarLTM-ServingCellNoResetID*

The IE *VarLTM-ServingCellNoResetID* is used to store the serving cell ID based on which the UE determines whether a L2 reset is needed or not upon an LTM cell switch procedure.

*VarLTM-ServingCellNoResetID* UE variable

-- ASN1START

-- TAG-VARLTM-SERVINGCELLNORESETID-START

VarLTM-ServingCellNoResetID-r18 ::= SEQUENCE {

 ltm-ServingCellNoResetID-r18 INTEGER (1..maxNrofLTM-Configs-plus1-r18) OPTIONAL

}

-- TAG-VARLTM-SERVINGCELLNORESETID-STOP

-- ASN1STOP

#### – *VarLTM-ServingCellUE-MeasuredTA-ID*

The IE *VarLTM-ServingCellUE-MeasuredTA-ID* is used to store the serving cell ID based on which the UE determines whether UE-based TA measurements are needed or not.

*VarLTM-ServingCellUE-MeasuredTA-ID* UE variable

-- ASN1START

-- TAG-VARLTM-SERVINGCELLUE-MEASUREDTA-ID-START

VarLTM-ServingCellUE-MeasuredTA-ID-r18 ::= SEQUENCE {

 ltm-ServingCellUE-MeasuredTA-ID-r18 INTEGER (1..maxNrofLTM-Configs-plus1-r18) OPTIONAL

}

-- TAG-VARLTM-SERVINGCELLUE-MEASUREDTA-ID-STOP

-- ASN1STOP

<cut>

#### – *VarSuccessHO-Report*

The UE variable *VarSuccessHO-Report* includes the successful handover information.

*VarSuccessHO-Report* UE variable

-- ASN1START

-- TAG-VARSUCCESSHO-Report-START

VarSuccessHO-Report-r17 ::= SEQUENCE {

 successHO-Report-r17 SuccessHO-Report-r17,

 identityList-r18 CHOICE {

 plmn-IdentityList-r18 PLMN-IdentityList2-r16,

 snpn-IdentityList-r18 SEQUENCE (SIZE (1..maxNPN-r16)) OF SNPN-Identity-r18

 }

}

-- TAG-VARSUCCESSHO-Report-STOP

-- ASN1STOP

#### – *VarSuccessPSCell-Report*

The UE variable *VarSuccessPSCell-Report* includes the successful PSCell change or addition information.

*VarSuccessPSCell-Report* UE variable

-- ASN1START

-- TAG-VARSUCCESSPSCELL-Report-START

VarSuccessPSCell-Report-r18 ::= SEQUENCE {

 successPSCell-Report-r18 SuccessPSCell-Report-r18,

 identityList-r18 CHOICE {

 plmn-IdentityList-r18 PLMN-IdentityList2-r16,

 snpn-IdentityList-r18 SEQUENCE (SIZE (1..maxNPN-r16)) OF SNPN-Identity-r18

 }

}

-- TAG-VARSUCCESSPSCELL-Report-STOP

-- ASN1STOP

<cut>

## A.3.8 Guidelines on use of parameterised SetupRelease type

The usage of the parameterised *SetupRelease* type is like a function call in programming languages where the element type parameter is passed as a parameter. The parameterised type only implies a textual change in abstract syntax where all references to the parameterised type are replaced by the compiler with the release/setup choice. Two examples of the usage are shown below:

-- /example/ ASN1START

RRCMessage-rX-IEs ::= SEQUENCE {

 field-rX SetupRelease { IE-rX } OPTIONAL, -- Need M

 ...

}

RRCMessage-rX-IEs ::= SEQUENCE {

 field-rX SetupRelease { Element-rX }

} OPTIONAL, -- Need M

Element-rX ::= SEQUENCE {

 field1-rX IE1-rX,

 field2-rX IE2-rX OPTIONAL -- Need N

} OPTIONAL, -- Need M

-- /example/ ASN1STOP

The *SetupRelease* is always be used with only named IEs, i.e. the example below is not allowed:

-- /example/ ASN1START

RRCMessage-rX-IEs ::= SEQUENCE {

 field-rX SetupRelease { SEQUENCE { -- Unnamed SEQUENCEs are not allowed!

 field1-rX IE1-rX,

 field2-rX IE2-rX OPTIONAL -- Need N

 }

 } OPTIONAL, -- Need M

}

-- /example/ ASN1STOP

Typically, a field defined using the parameterized *SetupRelease* type does not require procedural or field description text that refers to the *setup* or *release* values. If such a field anyway requires procedural text for specific actions, the field is referred to using the values defined for the type itself, namely, "setup" and "release". For example, procedural text for field-rX above could be as follows:

1> if *field-rX* is set to "setup":

2> do something;

1> else (*field-rX* is set to "release"):

2> release *field-rX* (if appropriate).