**3GPP TSG-RAN WG2 Meeting #127 *R2-240xxxx***

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

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| *CR-Form-v12.3* |
| **CHANGE REQUEST** |
|  |
|  | **38.331** | **CR** | **4903** | **rev** | **1** | **Current version:** | **18.2.0** |  |
|  |
| *For* [***HE******LP***](http://www.3gpp.org/3G_Specs/CRs.htm#_blank)*on using this form: comprehensive instructions can be found at* [*http://www.3gpp.org/Change-Requests*](http://www.3gpp.org/Change-Requests)*.* |
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| ***Proposed change affects:*** | UICC apps |  | ME | **X** | Radio Access Network | **X** | Core Network |  |

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| ***Title:***  | Miscellaneous corrections for Multi-Carrier enhancements |
|  |  |
| ***Source to WG:*** | Huawei, HiSilicon, Lenovo, NTT DOCOMO INC. |
| ***Source to TSG:*** | R2 |
|  |  |
| ***Work item code:*** | NR\_MC\_enh-Core |  | ***Date:*** | 2024.08.19 |
|  |  |  |  |  |
| ***Category:*** | F |  | ***Release:*** | Rel-18 |
|  | *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:*** | According to RAN1 specification TS 38.212 clause 7.3.1.2.4, *tci-presentInDCI* is also applied to DCI format 1\_3, which is missing in the field description;To capture the editorial changes to some field descriptions for multi-cell PDSCH/PUSCH scheduling.  |
|  |  |
| ***Summary of change:*** |  In clause 6.3.2,* Editiorial changes are added to *tci-presentInDCI*, and for some field descriptions under *PUSCH-Config*, *SearchSpace*, *ServingCellConfig*.

**Impact analysis**Impacted functionality: multi-cell PDSCH/PUSCH scheduling in carrier aggregationImpacted architecture options: NR SA, MR-DCInter-operability: * There are no inter-operability issues, considering this CR is for editorial changes.
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|  |  |
| ***Consequences if not approved:*** | Without the change, some errors remain in the specification. |
|  |  |
| ***Clauses affected:*** | 6.3.2  |
|  |  |
|  | **Y** | **N** |  |  |
| ***Other specs*** |  | **X** |  Other core specifications  | TS/TR ... CR ... |
| ***affected:*** |  | **X** |  Test specifications | TS/TR ... CR ...  |
| ***(show related CRs)*** |  | **X** |  O&M Specifications | TS/TR ... CR ...  |
|  |  |
| ***Other comments:*** |  |
|  |  |
| ***This CR's revision history:*** |  |

Start of Change

### 6.3.2 Radio resource control information elements

<Unrelated part is omitted>

#### – *ControlResourceSet*

The IE *ControlResourceSet* is used to configure a time/frequency control resource set (CORESET) in which to search for downlink control information (see TS 38.213 [13], clause 10.1). For the UE not supporting *multipleCORESET* in FR1, in order to receive MBS multicast in CFR within the UE's active BWP, if a CORESET is not configured within the *PDCCH-ConfigMulticast*, the CORESET other than CORESET#0 configured within the UE's active BWP for scheduling unicast can be used for scheduling MBS multicast, and the CORESET is expected to be included completely within the CFR and the parameters configured in the CORESET are expected to be supported by the UE for MBS multicast.

*ControlResourceSet* information element

-- ASN1START

-- TAG-CONTROLRESOURCESET-START

ControlResourceSet ::= SEQUENCE {

 controlResourceSetId ControlResourceSetId,

 frequencyDomainResources BIT STRING (SIZE (45)),

 duration INTEGER (1..maxCoReSetDuration),

 cce-REG-MappingType CHOICE {

 interleaved SEQUENCE {

 reg-BundleSize ENUMERATED {n2, n3, n6},

 interleaverSize ENUMERATED {n2, n3, n6},

 shiftIndex INTEGER(0..maxNrofPhysicalResourceBlocks-1) OPTIONAL -- Need S

 },

 nonInterleaved NULL

 },

 precoderGranularity ENUMERATED {sameAsREG-bundle, allContiguousRBs},

 tci-StatesPDCCH-ToAddList SEQUENCE(SIZE (1..maxNrofTCI-StatesPDCCH)) OF TCI-StateId OPTIONAL, -- Cond NotSIB-initialBWP

 tci-StatesPDCCH-ToReleaseList SEQUENCE(SIZE (1..maxNrofTCI-StatesPDCCH)) OF TCI-StateId OPTIONAL, -- Cond NotSIB-initialBWP

 tci-PresentInDCI ENUMERATED {enabled} OPTIONAL, -- Need S

 pdcch-DMRS-ScramblingID INTEGER (0..65535) OPTIONAL, -- Need S

 ...,

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 rb-Offset-r16 INTEGER (0..5) OPTIONAL, -- Need S

 tci-PresentDCI-1-2-r16 INTEGER (1..3) OPTIONAL, -- Need S

 coresetPoolIndex-r16 INTEGER (0..1) OPTIONAL, -- Need S

 controlResourceSetId-v1610 ControlResourceSetId-v1610 OPTIONAL -- Need S

 ]],

 [[

 followUnifiedTCI-State-r17 ENUMERATED {enabled} OPTIONAL -- Need R

 ]],

 [[

 applyIndicatedTCI-State-r18 ENUMERATED {first, second, both, none} OPTIONAL -- Cond FollowUTCI

 ]]

}

-- TAG-CONTROLRESOURCESET-STOP

-- ASN1STOP

|  |
| --- |
| *ControlResourceSet* field descriptions |
| ***applyIndicatedTCI-State***This field indicates, for PDCCH reception on this CORESET, if UE applies the first, the second, both or none "indicated" DL only TCI or joint TCI as specified in TS 38.213 [13], clause 10.1. |
| ***cce-REG-MappingType***Mapping of Control Channel Elements (CCE) to Resource Element Groups (REG) (see TS 38.211 [16], clauses 7.3.2.2 and 7.4.1.3.2). |
| ***controlResourceSetId***Identifies the instance of the *ControlResourceSet* IE. Value 0 identifies the common CORESET configured in *MIB* and in *ServingCellConfigCommon* (*controlResourceSetZero*) and is hence not used here in the *ControlResourceSet* IE. Other values identify CORESETs configured by dedicated signalling or in *SIB1* or *SIB20*. The *controlResourceSetId* is unique among the BWPs of a serving cell.If the field *controlResourceSetId-v1610* is present, the UE shall ignore the *controlResourceSetId* field (without suffix). |
| ***coresetPoolIndex***The index of the CORESET pool for this CORESET as specified in TS 38.213 [13] (clauses 9 and 10) and TS 38.214 [19] (clauses 5.1 and 6.1). If the field is absent, the UE applies the value 0. |
| ***duration***Contiguous time duration of the CORESET in number of symbols (see TS 38.211 [16], clause 7.3.2.2). |
| ***followUnifiedTCI-State***When set to enabled, for PDCCH reception on this CORESET, the UE applies the "indicated" DL only TCI or joint TCI as specified in TS 38.214 [19], clause 5.1.5. |
| ***frequencyDomainResources***Frequency domain resources for the CORESET. Each bit corresponds a group of 6 RBs, with grouping starting from the first RB group in the BWP or MBS CFR where the CORESET is configured. When at least one search space is configured with *freqMonitorLocation-r16*, only the first $N\_{RBG,set0}^{size}$ bits are valid (see TS 38.213 [13], clause 10.1). The first (left-most / most significant) bit corresponds to the first RB group in the BWP or MBS CFR where the CORESET is configured, and so on. A bit that is set to 1 indicates that this RB group belongs to the frequency domain resource of this CORESET. Bits corresponding to a group of RBs not fully contained in the bandwidth part within which the CORESET is configured are set to zero (see TS 38.211 [16], clause 7.3.2.2). |
| ***interleaverSize***Interleaver-size (see TS 38.211 [16], clause 7.3.2.2). |
| ***pdcch-DMRS-ScramblingID***PDCCH DMRS scrambling initialization (see TS 38.211 [16], clause 7.4.1.3.1). When the field is absent the UE applies the value of the *physCellId* configured for this serving cell. |
| ***precoderGranularity***Precoder granularity in frequency domain (see TS 38.211 [16], clauses 7.3.2.2 and 7.4.1.3.2). |
| ***rb-Offset***Indicates the RB level offset in units of RB from the first RB of the first 6RB group to the first RB of BWP (see 38.213 [13], clause 10.1). |
| ***reg-BundleSize***Resource Element Groups (REGs) can be bundled to create REG bundles. This parameter defines the size of such bundles (see TS 38.211 [16], clause 7.3.2.2). |
| ***shiftIndex***When the field is absent the UE applies the value of the *physCellId*configured for this serving cell (see TS 38.211 [16], clause 7.3.2.2). |
| ***tci-PresentInDCI***This field indicates if TCI field is present or absent in DCI format 1\_1, DCI format 1\_3 and DCI format 4\_2. When the field is absent the UE considers the TCI to be absent/disabled. In case of cross carrier scheduling, the network sets this field to enabled for the *ControlResourceSet* used for cross carrier scheduling in DCI format 1\_1 in the scheduling cell if *enableDefaultBeamForCCS* is not configured (see TS 38.214 [19], clause 5.1.5). |
| ***tci-PresentDCI-1-2***Configures the number of bits for "Transmission configuration indicator" in DCI format 1\_2. When the field is absent the UE applies the value of 0 bit for the "Transmission configuration indicator" in DCI format 1\_2 (see TS 38.212 [17], clause 7.3.1 and TS 38.214 [19], clause 5.1.5). In case of cross carrier scheduling, the network configures this field for the *ControlResourceSet* used for cross carrier scheduling in DCI format 1\_2 in the scheduling cell if *enableDefaultBeamForCCS* is not configured (see TS 38.214 [19], clause 5.1.5). |
| ***tci-StatesPDCCH-ToAddList***A subset of the TCI states defined in *pdsch-Config,* either with *tci-StatesToAddModList* or *dl-OrJointTCI-StateList,* included in the *BWP-DownlinkDedicated* corresponding to the serving cell and to the DL BWP to which the *ControlResourceSet* belong to. They are used for providing QCL relationships between the DL RS(s) in one RS Set (TCI-State) and the PDCCH DMRS ports (see TS 38.213 [13], clause 6.). The network configures at most *maxNrofTCI-StatesPDCCH* entries. The QCL relationships defined herein do not apply to MBS broadcast. |

Next Change

#### – *PUSCH-Config*

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

*PUSCH-Config* information element

-- ASN1START

-- TAG-PUSCH-CONFIG-START

PUSCH-Config ::= SEQUENCE {

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

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

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

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

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

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

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

 OPTIONAL, -- Need M

 resourceAllocation ENUMERATED { resourceAllocationType0, resourceAllocationType1, dynamicSwitch},

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

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

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

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

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

 codebookSubset ENUMERATED {fullyAndPartialAndNonCoherent, partialAndNonCoherent,nonCoherent}

 OPTIONAL, -- Cond codebookBased

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

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

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

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

 ...,

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

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

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

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

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

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

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

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

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

 frequencyHoppingDCI-0-2-r16 CHOICE {

 pusch-RepTypeA ENUMERATED {intraSlot, interSlot},

 pusch-RepTypeB ENUMERATED {interRepetition, interSlot}

 } OPTIONAL, -- Need S

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

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

 OPTIONAL, -- Cond codebookBased

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

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

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

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

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

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

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

 OPTIONAL, -- Need M

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

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

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

 OPTIONAL, -- Need M

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

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

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

 OPTIONAL, -- Need M

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

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

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

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

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

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

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

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

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

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

 OPTIONAL, -- Need M

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

 ]]

}

UCI-OnPUSCH ::= SEQUENCE {

 betaOffsets CHOICE {

 dynamic SEQUENCE (SIZE (4)) OF BetaOffsets,

 semiStatic BetaOffsets

 } OPTIONAL, -- Need M

 scaling ENUMERATED { f0p5, f0p65, f0p8, f1 }

}

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

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

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

 betaOffsetsDCI-0-2-r16 CHOICE {

 dynamicDCI-0-2-r16 CHOICE {

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

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

 },

 semiStaticDCI-0-2-r16 BetaOffsets

 } OPTIONAL, -- Need M

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

}

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

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

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

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

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

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

BetaOffsetsCrossPriSel-r17 ::= CHOICE {

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

 semiStatic-r17 BetaOffsetsCrossPri-r17

}

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

 dynamicDCI-0-2-r17 CHOICE {

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

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

 },

 semiStaticDCI-0-2-r17 BetaOffsetsCrossPri-r17

}

MPE-Resource-r17 ::= SEQUENCE {

 mpe-ResourceId-r17 MPE-ResourceId-r17,

 cell-r17 ServCellIndex OPTIONAL, -- Need R

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

 mpe-ReferenceSignal-r17 CHOICE {

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

 ssb-Resource-r17 SSB-Index

 }

}

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

SDM-Scheme-r18 ::= SEQUENCE {

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

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

}

SFN-Scheme-r18 ::= SEQUENCE {

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

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

}

CodebookTypeUL-r18 ::= CHOICE {

 codebook1-r18 ENUMERATED {ng1n4n1, ng1n2n2},

 codebook2-r18 ENUMERATED {ng2},

 codebook3-r18 ENUMERATED {ng4},

 codebook4-r18 ENUMERATED {ng8}

}

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

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

 OPTIONAL, -- Need M

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

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

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

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

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

}

-- TAG-PUSCH-CONFIG-STOP

-- ASN1STOP

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

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

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

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

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

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

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| Conditional Presence | Explanation |
| *codebookBased* | The field is mandatory present if *txConfig* is set to codebook and absent otherwise. |
| *RepTypeB* | The field is optionally present, Need S, if *pusch-RepTypeIndicatorDCI-0-1* is set to pusch-RepTypeB. It is absent otherwise. |
| *RepTypeB2* | The field is optionally present, Need S, if *pusch-RepTypeIndicatorDCI-0-1* or *pusch-RepTypeIndicatorDCI-0-2* is set to pusch-RepTypeB. It is absent otherwise. |
| *SRSsets* | This field is mandatory present when UE is configured with two SRS sets in either *srs-ResourceSetToAddModList* or *srs-ResourceSetToAddModListDCI-0-2* with usage codebook or non-codebook. |

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Next Change

#### – *SearchSpace*

The IE *SearchSpace* defines how/where to search for PDCCH candidates. Each search space is associated with one *ControlResourceSet*. For a scheduled SCell in the case of cross carrier scheduling, except for *nrofCandidates*, all the optional fields are absent (regardless of their presence conditions). For a scheduled SpCell in the case of the cross carrier scheduling, if the search space is linked to another search space in the scheduling SCell, all the optional fields of this search space in the scheduled SpCell are absent (regardless of their presence conditions) except for *nrofCandidates*.

*SearchSpace* information element

-- ASN1START

-- TAG-SEARCHSPACE-START

SearchSpace ::= SEQUENCE {

 searchSpaceId SearchSpaceId,

 controlResourceSetId ControlResourceSetId OPTIONAL, -- Cond SetupOnly

 monitoringSlotPeriodicityAndOffset CHOICE {

 sl1 NULL,

 sl2 INTEGER (0..1),

 sl4 INTEGER (0..3),

 sl5 INTEGER (0..4),

 sl8 INTEGER (0..7),

 sl10 INTEGER (0..9),

 sl16 INTEGER (0..15),

 sl20 INTEGER (0..19),

 sl40 INTEGER (0..39),

 sl80 INTEGER (0..79),

 sl160 INTEGER (0..159),

 sl320 INTEGER (0..319),

 sl640 INTEGER (0..639),

 sl1280 INTEGER (0..1279),

 sl2560 INTEGER (0..2559)

 } OPTIONAL, -- Cond Setup4

 duration INTEGER (2..2559) OPTIONAL, -- Need S

 monitoringSymbolsWithinSlot BIT STRING (SIZE (14)) OPTIONAL, -- Cond Setup

 nrofCandidates SEQUENCE {

 aggregationLevel1 ENUMERATED {n0, n1, n2, n3, n4, n5, n6, n8},

 aggregationLevel2 ENUMERATED {n0, n1, n2, n3, n4, n5, n6, n8},

 aggregationLevel4 ENUMERATED {n0, n1, n2, n3, n4, n5, n6, n8},

 aggregationLevel8 ENUMERATED {n0, n1, n2, n3, n4, n5, n6, n8},

 aggregationLevel16 ENUMERATED {n0, n1, n2, n3, n4, n5, n6, n8}

 } OPTIONAL, -- Cond Setup

 searchSpaceType CHOICE {

 common SEQUENCE {

 dci-Format0-0-AndFormat1-0 SEQUENCE {

 ...

 } OPTIONAL, -- Need R

 dci-Format2-0 SEQUENCE {

 nrofCandidates-SFI SEQUENCE {

 aggregationLevel1 ENUMERATED {n1, n2} OPTIONAL, -- Need R

 aggregationLevel2 ENUMERATED {n1, n2} OPTIONAL, -- Need R

 aggregationLevel4 ENUMERATED {n1, n2} OPTIONAL, -- Need R

 aggregationLevel8 ENUMERATED {n1, n2} OPTIONAL, -- Need R

 aggregationLevel16 ENUMERATED {n1, n2} OPTIONAL -- Need R

 },

 ...

 } OPTIONAL, -- Need R

 dci-Format2-1 SEQUENCE {

 ...

 } OPTIONAL, -- Need R

 dci-Format2-2 SEQUENCE {

 ...

 } OPTIONAL, -- Need R

 dci-Format2-3 SEQUENCE {

 dummy1 ENUMERATED {sl1, sl2, sl4, sl5, sl8, sl10, sl16, sl20} OPTIONAL, -- Cond Setup

 dummy2 ENUMERATED {n1, n2},

 ...

 } OPTIONAL -- Need R

 },

 ue-Specific SEQUENCE {

 dci-Formats ENUMERATED {formats0-0-And-1-0, formats0-1-And-1-1},

 ...,

 [[

 dci-Formats-MT-r16 ENUMERATED {formats2-5} OPTIONAL, -- Need R

 dci-FormatsSL-r16 ENUMERATED {formats0-0-And-1-0, formats0-1-And-1-1, formats3-0, formats3-1,

 formats3-0-And-3-1} OPTIONAL, -- Need R

 dci-FormatsExt-r16 ENUMERATED {formats0-2-And-1-2, formats0-1-And-1-1And-0-2-And-1-2}

 OPTIONAL -- Need R

 ]],

 [[

 dci-FormatsNCR-r18 ENUMERATED {formats2-8} OPTIONAL, -- Need R

 dci-FormatsSL-PRS-r18 ENUMERATED {formats3-2, formats3-0-And-3-2, formats3-0-And-3-1-And-3-2,

 formats3-1-And-3-2} OPTIONAL -- Need R

 ]]

 }

 } OPTIONAL -- Cond Setup2

}

SearchSpaceExt-r16 ::= SEQUENCE {

 controlResourceSetId-r16 ControlResourceSetId-r16 OPTIONAL, -- Cond SetupOnly2

 searchSpaceType-r16 SEQUENCE {

 common-r16 SEQUENCE {

 dci-Format2-4-r16 SEQUENCE {

 nrofCandidates-CI-r16 SEQUENCE {

 aggregationLevel1-r16 ENUMERATED {n1, n2} OPTIONAL, -- Need R

 aggregationLevel2-r16 ENUMERATED {n1, n2} OPTIONAL, -- Need R

 aggregationLevel4-r16 ENUMERATED {n1, n2} OPTIONAL, -- Need R

 aggregationLevel8-r16 ENUMERATED {n1, n2} OPTIONAL, -- Need R

 aggregationLevel16-r16 ENUMERATED {n1, n2} OPTIONAL -- Need R

 },

 ...

 } OPTIONAL, -- Need R

 dci-Format2-5-r16 SEQUENCE {

 nrofCandidates-IAB-r16 SEQUENCE {

 aggregationLevel1-r16 ENUMERATED {n1, n2} OPTIONAL, -- Need R

 aggregationLevel2-r16 ENUMERATED {n1, n2} OPTIONAL, -- Need R

 aggregationLevel4-r16 ENUMERATED {n1, n2} OPTIONAL, -- Need R

 aggregationLevel8-r16 ENUMERATED {n1, n2} OPTIONAL, -- Need R

 aggregationLevel16-r16 ENUMERATED {n1, n2} OPTIONAL -- Need R

 },

 ...

 } OPTIONAL, -- Need R

 dci-Format2-6-r16 SEQUENCE {

 ...

 } OPTIONAL, -- Need R

 ...

 }

 } OPTIONAL, -- Cond Setup3

 searchSpaceGroupIdList-r16 SEQUENCE (SIZE (1.. 2)) OF INTEGER (0..1) OPTIONAL, -- Need R

 freqMonitorLocations-r16 BIT STRING (SIZE (5)) OPTIONAL -- Need R

}

SearchSpaceExt-v1700 ::= SEQUENCE {

 monitoringSlotPeriodicityAndOffset-v1710 CHOICE {

 sl32 INTEGER (0..31),

 sl64 INTEGER (0..63),

 sl128 INTEGER (0..127),

 sl5120 INTEGER (0..5119),

 sl10240 INTEGER (0..10239),

 sl20480 INTEGER (0..20479)

 } OPTIONAL, -- Cond Setup5

 monitoringSlotsWithinSlotGroup-r17 CHOICE {

 slotGroupLength4-r17 BIT STRING (SIZE (4)),

 slotGroupLength8-r17 BIT STRING (SIZE (8))

 } OPTIONAL, -- Need R

 duration-r17 INTEGER (4..20476) OPTIONAL, -- Need R

 searchSpaceType-r17 SEQUENCE{

 common-r17 SEQUENCE {

 dci-Format4-0-r17 SEQUENCE {

 ...

 } OPTIONAL, -- Need R

 dci-Format4-1-r17 SEQUENCE {

 ...

 } OPTIONAL, -- Need R

 dci-Format4-2-r17 SEQUENCE {

 ...

 } OPTIONAL, -- Need R

 dci-Format4-1-AndFormat4-2-r17 SEQUENCE {

 ...

 } OPTIONAL, -- Need R

 dci-Format2-7-r17 SEQUENCE {

 nrofCandidates-PEI-r17 SEQUENCE {

 aggregationLevel4-r17 ENUMERATED {n0, n1, n2, n3, n4} OPTIONAL, -- Need R

 aggregationLevel8-r17 ENUMERATED {n0, n1, n2} OPTIONAL, -- Need R

 aggregationLevel16-r17 ENUMERATED {n0, n1} OPTIONAL -- Need R

 },

 ...

 } OPTIONAL -- Need R

 }

 } OPTIONAL, -- Need R

 searchSpaceGroupIdList-r17 SEQUENCE (SIZE (1.. 3)) OF INTEGER (0.. maxNrofSearchSpaceGroups-1-r17) OPTIONAL, -- Cond DedicatedOnly

 searchSpaceLinkingId-r17 INTEGER (0..maxNrofSearchSpacesLinks-1-r17) OPTIONAL -- Cond DedicatedOnly

}

SearchSpaceExt-v1800 ::= SEQUENCE {

 searchSpaceType-r18 CHOICE {

 common-r18 SEQUENCE {

 dci-Format2-9-r18 SEQUENCE {

 ...

 } OPTIONAL, -- Need R

 ...

 },

 ue-Specific-r18 SEQUENCE {

 dci-FormatsMC-r18 ENUMERATED {formats0-3, formats1-3, formats0-3-And-1-3} OPTIONAL, -- Need R

 ...

 }

 } OPTIONAL -- Need R

}

-- TAG-SEARCHSPACE-STOP

-- ASN1STOP

|  |
| --- |
| *SearchSpace* field descriptions |
| ***common***Configures this search space as common search space (CSS) and DCI formats to monitor. |
| ***controlResourceSetId***The CORESET applicable for this SearchSpace. Value 0 identifies the common CORESET#0 configured in MIB and in *ServingCellConfigCommon*. Values 1..*maxNrofControlResourceSets-1* identify CORESETs configured in System Information or by dedicated signalling. The CORESETs with *non-zero controlResourceSetId* are configured in the same BWP as this *SearchSpace* except *commonControlResourceSetExt* which is configured by SIB20. If the field *controlResourceSetId-r16* is present, UE shall ignore the *controlResourceSetId* (without suffix). |
| ***dummy1, dummy2***This field is not used in the specification. If received it shall be ignored by the UE. |
| ***dci-Format0-0-AndFormat1-0***If configured, the UE monitors the DCI formats 0\_0 and 1\_0 according to TS 38.213 [13], clause 10.1. |
| ***dci-Format2-0***If configured, UE monitors the DCI format 2\_0 according to TS 38.213 [13], clause 10.1, 11.1.1. |
| ***dci-Format2-1***If configured, UE monitors the DCI format 2\_1 according to TS 38.213 [13], clause 10.1, 11.2. |
| ***dci-Format2-2***If configured, UE monitors the DCI format 2\_2 according to TS 38.213 [13], clause 10.1, 11.3. |
| ***dci-Format2-3***If configured, UE monitors the DCI format 2\_3 according to TS 38.213 [13], clause 10.1, 11.4 |
| ***dci-Format2-4***If configured, UE monitors the DCI format 2\_4 according to TS 38.213 [13], clause 11.2A. |
| ***dci-Format2-5***If configured, IAB-MT monitors the DCI format 2\_5 according to TS 38.213 [13], clause 14. |
| ***dci-Format2-6***If configured, UE monitors the DCI format 2\_6 according to TS 38.213 [13], clause 10.1, 10.3. DCI format 2\_6 can only be configured on the SpCell. |
| ***dci-Format2-7***If configured, UE monitors the DCI format 2\_7 according to TS 38.213 [13], clause 10.1, 10.4A. |
| ***dci-Format2-9***If configured, UE monitors the DCI format 2\_9 according to TS 38.213 [13], clause 10.1, 11.5. DCI format 2\_9 can be configured on only one cell in the cell group. |
| ***dci-Format4-0***If configured, the UE monitors the DCI format 4\_0 with CRC scrambled by MCCH-RNTI/G-RNTI according to TS 38.213 [13], clause [10.1]. |
| ***dci-Format4-1-AndFormat4-2***If configured, the UE monitors the DCI format 4\_1 and 4\_2 with CRC scrambled by G-RNTI/G-CS-RNTI according to TS 38.213 [13], clause [11.1]. |
| ***dci-Format4-1***If configured, the UE monitors the DCI format 4\_1 with CRC scrambled by G-RNTI/G-CS-RNTI according to TS 38.213 [13], clause [10.1]. |
| ***dci-Format4-2***If configured, the UE monitors the DCI format 4\_2 with CRC scrambled by G-RNTI/G-CS-RNTI according to TS 38.213 [13], clause [10.1]. |
| ***dci-Formats***Indicates whether the UE monitors in this USS for DCI formats 0-0 and 1-0 or for formats 0-1 and 1-1. |
| ***dci-FormatsExt***If this field is present, the field *dci-Formats* is ignored and *dci-FormatsExt* is used instead to indicate whether the UE monitors in this USS for DCI format 0\_2 and 1\_2 or formats 0\_1 and 1\_1 and 0\_2 and 1\_2 (see TS 38.212 [17], clause 7.3.1 and TS 38.213 [13], clause 10.1). This field is not configured for operation with shared spectrum channel access in this release*.* |
| ***dci-FormatsMC***Indicates whether the UE monitors in this USS for DCI format 0\_3 or for format 1\_3 or for formats 0\_3 and 1\_3. Separate search space sets for DCI formats in this field and the DCI formats in *ue-Specific* (without suffix) are independently configured.NOTE: This parameter is used only for *SearchSpace* configured to the scheduling cell, while another *SearchSpace* configured to the reference scheduled cell (if any) configures only *nrofCandidates* (i.e., all other optional fields are absent) with same *searchSpaceId* with that for scheduling cell. |
| ***dci-Formats-MT***Indicates whether the IAB-MT monitors the DCI formats 2-5 according to TS 38.213 [13], clause 14. |
| ***dci-FormatsNCR***Indicates whether the NCR-MT monitors the DCI formats 2-8 according to TS 38.213 [13], clause 20. |
| ***dci-FormatsSL***Indicates whether the UE monitors in this USS for DCI formats 0-0 and 1-0 or for formats 0-1 and 1-1 or for format 3-0 or for format 3-1 or for formats 3-0 and 3-1. If this field is present, the field *dci-Formats* is ignored and *dci-FormatsSL* is used. |
| ***dci-FormatsSL-PRS***Indicates whether the UE monitors in this USS for DCI formats 3-2 or for formats 3-0 and 3-2 or for formats 3-0 and 3-1 and 3-2 or for formats3-1 and 3-2. If this field is present, the field *dci-Formats* is ignored and *dci-FormatsSL-PRS* is used. |
| ***duration***Number of consecutive slots that a SearchSpace lasts in every occasion, i.e., upon every period as given in the *periodicityAndOffset*. If the field is absent, the UE applies the value 1 slot, except for DCI format 2\_0. The UE ignores this field for DCI format 2\_0. The maximum valid duration is periodicity-1 (periodicity as given in the *monitoringSlotPeriodicityAndOffset*).For SCS 480 kHz and SCS 960 kHz, duration-r17 is used, and the configured duration is restricted to be an integer multiple of L slots and smaller than periodicity, where L is the configured length of the bitmap *monitoringSlotsWithinSlotGroup-r17*. If *duration-r17* is absent, the UE assumes the duration in slots is equal to L. The maximum valid duration is periodicity-L.For IAB-MT, duration indicates number of consecutive slots that a SearchSpace lasts in every occasion, i.e., upon every period as given in the *periodicityAndOffset*. If the field is absent, the IAB-MT applies the value 1 slot, except for DCI format 2\_0 and DCI format 2\_5. The IAB-MT ignores this field for DCI format 2\_0 and DCI format 2\_5. The maximum valid duration is periodicity-1 (periodicity as given in the *monitoringSlotPeriodicityAndOffset*). |
| ***freqMonitorLocations***Defines an association of the search space to multiple monitoring locations in the frequency domain and indicates whether the pattern configured in the associated CORESET is replicated to a specific RB set, see TS 38.213, clause 10.1. Each bit in the bitmap corresponds to one RB set, and the leftmost (most significant) bit corresponds to RB set 0 in the BWP. A bit set to 1 indicates that a frequency domain resource allocation replicated from the pattern configured in the associated CORESET is mapped to the RB set. |
| ***monitoringSlotPeriodicityAndOffset***Slots for PDCCH Monitoring configured as periodicity and offset.For SCS 15, 30, 60, and 120 kHz and if the UE is configured to monitor:- DCI format 2\_1, only the values 'sl1', 'sl2' or 'sl4' are applicable.- DCI format 2\_0, only the values ′sl1′, ′sl2′, ′sl4′, ′sl5′, ′sl8′, ′sl10′, ′sl16′, and ′sl20′ are applicable (see TS 38.213 [13], clause 10).- DCI format 2\_4, only the values 'sl1', 'sl2', 'sl4', 'sl5', 'sl8' and 'sl10' are applicable.For SCS 480 kHz and if the UE is configured to monitor:- DCI format 2\_0, only the values 'sl4', 'sl8', 'sl16', 'sl20', 'sl32', 'sl40', 'sl64', and 'sl80' are applicable.- DCI format 2\_1, only the values ′sl4′, ′sl8′, and ′sl16′ are applicable.- DCI format 2\_4, only the values 'sl4', 'sl8', 'sl16', 'sl20', 'sl32', 'sl40' are applicable.For SCS 960 kHz and if the UE is configured to monitor:- DCI format 2\_0, only the values 'sl8', 'sl16', 'sl32', 'sl40', 'sl64', 'sl80', 'sl128', and 'sl160' are applicable.- DCI format 2\_1, only the values ′sl8′, ′sl16′, and 'sl32' are applicable.- DCI format 2\_4, only the values 'sl8', 'sl16', 'sl32', 'sl40', 'sl64', 'sl80' are applicable.For SCS 480 kHz and SCS 960 kHz, and the configured periodicity and offset are restricted to be an integer multiple of L slots, where L is the configured length of the bitmap provided by *monitoringSlotsWithinSlotGroup-r17*, i.e. for a given periodicity, the offset has a range of {0, L, 2\*L, …, L\*FLOOR(1/L\*(periodicity-1))}.For IAB-MT, If the IAB-MT is configured to monitor DCI format 2\_1, only the values 'sl1', 'sl2' or 'sl4' are applicable. If the IAB-MT is configured to monitor DCI format 2\_0 or DCI format 2\_5, only the values ′sl1′, ′sl2′, ′sl4′, ′sl5′, ′sl8′, ′sl10′, ′sl16′, and ′sl20′ are applicable (see TS 38.213, clause 10).If *monitoringSlotPeriodicityAndOffset-v1710* is present, any previously configured *monitoringSlotPeriodicityAndOffset* is released, and if *monitoringSlotPeriodicityAndOffset* is present, any previously configured *monitoringSlotPeriodicityAndOffset-v1710* is released. |
| ***monitoringSlotsWithinSlotGroup***Indicates which slot(s) within a slot group are configured for multi-slot PDCCH monitoring. The first (leftmost, most significant) bit represents the first slot in the slot group, the second bit represents the second slot in the slot group, and so on. A bit set to '1' indicates that the corresponding slot is configured for multi-slot PDCCH monitoring (see TS 38.213 [13], clause 10). The number of slots for multi-slot PDCCH monitoring is configured according to clause 10 in TS 38.213 [13]. |
| ***monitoringSymbolsWithinSlot***The first symbol(s) for PDCCH monitoring in the slots configured for (multi-slot) PDCCH monitoring (see *monitoringSlotPeriodicityAndOffset* and *duration*). The most significant (left) bit represents the first OFDM in a slot, and the second most significant (left) bit represents the second OFDM symbol in a slot and so on. The bit(s) set to one identify the first OFDM symbol(s) of the control resource set within a slot. If the cyclic prefix of the BWP is set to extended CP, the last two bits within the bit string shall be ignored by the UE or IAB-MT.For DCI format 2\_0, the first one symbol applies if the *duration* of CORESET (in the IE *ControlResourceSet*) identified by *controlResourceSetId* indicates 3 symbols, the first two symbols apply if the *duration* of CORESET identified by *controlResourceSetId* indicates 2 symbols, and the first three symbols apply if the *duration* of CORESET identified by *controlResourceSetId* indicates 1 symbol.See TS 38.213 [13], clause 10.For IAB-MT: For DCI format 2\_0 or DCI format 2\_5, the first one symbol applies if the duration of CORESET (in the IE *ControlResourceSet*) identified by *controlResourceSetId* indicates 3 symbols, the first two symbols apply if the *duration* of CORESET identified by *controlResourceSetId* indicates 2 symbols, and the first three symbols apply if the *duration* of CORESET identified by *controlResourceSetId* indicates 1 symbol.See TS 38.213 [13], clause 10. |
| ***nrofCandidates-CI***The number of PDCCH candidates specifically for format 2-4 for the configured aggregation level. If an aggregation level is absent, the UE does not search for any candidates with that aggregation level. The network configures only one aggregationLevel and the corresponding number of candidates (see TS 38.213 [13], clause 10.1). |
| ***nrofCandidates-PEI***The number of PDCCH candidates specifically for format 2-7 for the configured aggregation level. |
| ***nrofCandidates-SFI***The number of PDCCH candidates specifically for format 2-0 for the configured aggregation level. If an aggregation level is absent, the UE does not search for any candidates with that aggregation level. The network configures only one aggregationLevel and the corresponding number of candidates (see TS 38.213 [13], clause 11.1.1). For a search space configured with *freqMonitorLocations-r16*, only value ′n1′ is valid. |
| ***nrofCandidates***Number of PDCCH candidates per aggregation level. The number of candidates and aggregation levels configured here applies to all formats unless a particular value is specified or a format-specific value is provided (see inside *searchSpaceType*). If configured in the *SearchSpace* of a cross carrier scheduled cell, this field determines the number of candidates and aggregation levels to be used on the linked scheduling cell (see TS 38.213 [13], clause 10). |
| ***searchSpaceGroupIdList-r16, searchSpaceGroupIdList-r17***List of search space group IDs which the search space is associated with. The network configures at most 2 search space groups per BWP where the group ID is either 0 or 1 if *searchSpaceGroupIdList-r16* is included. The network configures at most 3 search space groups per BWP where the group ID is either 0, 1 or 2 if *searchSpaceGroupIdList-r17* is included. And if *searchSpaceGroupIdList-r17* is included, *searchSpaceGroupIdList-r16* is ignored. |
| ***searchSpaceId***Identity of the search space. SearchSpaceId = 0 identifies the *searchSpaceZero* configured via PBCH (MIB) or *ServingCellConfigCommon* and may hence not be used in the *SearchSpace* IE. The *searchSpaceId* is unique among the BWPs of a Serving Cell. In case of cross carrier scheduling, search spaces with the same *searchSpaceId* in scheduled cell and scheduling cell are linked to each other. The UE applies the search space for the scheduled cell only if the DL BWPs in which the linked search spaces are configured in scheduling cell and scheduled cell are both active.For an IAB-MT, the search space defines how/where to search for PDCCH candidates for an IAB-MT where each search space is associated with one ControlResearchSet and for a scheduled cell in the case of cross carrier scheduling, except for nrofCandidates, all the optional fields are absent. |
| ***SearchSpaceLinkingId***This parameter is used to link two search spaces of same type in the same BWP. If two search spaces have the same SearchSpaceLinkingId UE assumes these search spaces are linked to PDCCH repetition REF. When PDCCH repetition is monitored in two linked search space (SS) sets, the UE does not expect a third monitored SS set to be linked with any of the two linked SS sets. The two linked SS sets have the same SS set type (USS/CSS). The two linked SS sets have the same DCI formats to monitor. For intra-slot PDCCH repetition: The two SS sets should have the same periodicity and offset (monitoringSlotPeriodicityAndOffset), and the same duration. For linking monitoring occasions across the two SS sets that exist in the same slot: The two SS sets have the same number of monitoring occasions within a slot and n-th monitoring occasion of one SS set is linked to n-th monitoring occasion of the other SS set. The following SS sets cannot be linked with another SS set for PDCCH repetition: SS set 0, *searchSpaceSIB1*, *searchSpaceOtherSystemInformation*, *pagingSearchSpace*, *ra-SearchSpace*, *searchSpaceMCCH*, *searchSpaceMTCH*, *peiSearchSpace*, and *sdt-SearchSpace*. SS set configured by *recoverySearchSpaceId* cannot be linked to another SS set for PDCCH repetition. When a scheduled serving cell is configured to be cross-carrier scheduled by a scheduling serving cell, two PDCCH candidates (with the same AL and candidate index associated with the scheduled serving cell) are linked only if the corresponding two SS sets in the scheduling serving cell are linked and two SS sets in the scheduled serving cell with the same SS set IDs are also linked.This parameter is not applicable to search space configured with *dci-FormatsSL* for monitoring format 3-0 or format 3-1 or for monitoring formats 3-0 and format 3-1. |
| ***searchSpaceType***Indicates whether this is a common search space (present) or a UE specific search space as well as DCI formats to monitor for. |
| ***ue-Specific***Configures this search space as UE specific search space (USS). The UE monitors the DCI format with CRC scrambled by C-RNTI, CS-RNTI (if configured), and SP-CSI-RNTI (if configured) |

|  |  |
| --- | --- |
| Conditional Presence | Explanation |
| *DedicatedOnly* | In PDCCH-Config, the field is optionally present, Need R. Otherwise it is absent, Need R. |
| *Setup* | This field is mandatory present upon creation of a new *SearchSpace*. It is optionally present, Need M, otherwise. |
| *Setup2* | This field is mandatory present when a new *SearchSpace* is set up, if the same *SearchSpace* ID is not included in *searchSpacesToAddModListExt-r16*/*searchSpacesToAddModListExt-v1700*/*searchSpacesToAddModListExt-v1800* of the parent IE with the field *searchSpaceType-r16* or *searchSpaceType-r17* or *searchSpaceType-r18* included. This field is absent if the same *SearchSpace* ID is included in *searchSpacesToAddModListExt-v1800* of the parent IE with the field *searchSpaceType-r18* included and set to *dci-FormatsMC-r18*. Otherwise it is optionally present, Need M. |
| *Setup3* | This field is mandatory present when a new *SearchSpace* is set up, if the same *SearchSpace* ID is not included in *searchSpacesToAddModListExt* (without suffix) of the parent IE with the field *searchSpaceType* (without suffix) included. Otherwise it is optionally present, Need M. |
| *Setup4* | This field is mandatory present upon creation of a new *SearchSpace* if *monitoringSlotPeriodicityAndOffset-v1710* is not included. It is optionally present, Need M, otherwise. |
| *Setup5* | This field is mandatory present upon creation of a new *SearchSpace* if *monitoringSlotPeriodicityAndOffset* (without suffix) is not included. It is optionally present, Need M, otherwise. |
| *SetupOnly* | This field is mandatory present upon creation of a new *SearchSpace*. It is absent, Need M, otherwise. |
| *SetupOnly2* | In PDCCH-Config, the field is optionally present upon creation of a new SearchSpace and absent, Need M upon reconfiguration of an existing SearchSpace.In PDCCH-ConfigCommon, the field is absent. |

Next Change

#### – *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-CandidateReceptionWith-CRS-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

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| --- |
| *ChannelAccessConfig* field descriptions |
| ***absenceOfAnyOtherTechnology***Presence of this field indicates absence on a long term basis (e.g. by level of regulation) of any other technology sharing the carrier; absence of this field indicates the potential presence of any other technology sharing the carrier, as specified in TS 37.213 [48] clauses 4.2.1 and 4.2.3. |
| ***energyDetectionConfig***Indicates whether to use the *maxEnergyDetectionThreshold* or the *energyDetectionThresholdOffset* (see TS 37.213 [48], clause 4.2.3)*.* |
| ***energyDetectionThresholdOffset***Indicates the offset to the default maximum energy detection threshold value. Unit in dB. Value -13 corresponds to -13dB, value -12 corresponds to -12dB, and so on (i.e. in steps of 1dB) as specified in TS 37.213 [48], clause 4.2.3. |
| ***maxEnergyDetectionThreshold***Indicates the absolute maximum energy detection threshold value. Unit in dBm. Value -85 corresponds to -85 dBm, value -84 corresponds to -84 dBm, and so on (i.e. in steps of 1dBm) as specified in TS 37.213 [48], clause 4.2.3. |
| ***ul-toDL-COT-SharingED-Threshold***Maximum energy detection threshold that the UE should use to share channel occupancy with gNB for DL transmission as specified in TS 37.213 [48], clause 4.1.3 for downlink channel access and clause 4.2.3 for uplink channel access. This field is not applicable in semi-static channel access mode. |

|  |
| --- |
| *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*. |
| ***mc-DCI-SetOfCellsToReleaseList***List of cell set configurations to release. |
| ***multiPDSCH-PerSlotType1-CB***Configures the UE behaviour for Type1 codebook HARQ ACK generation regarding the number of PDSCHs per slot on a serving cell as specified in TS 38.213 [13], clause 9.1.2.1.When this parameter is configured and set to *disabled* for a serving cell, the network does not schedule UE with more than one PDSCH in a slot on the serving cell if HARQ-ACKs of any two PDSCHs in the slot on the serving cell are supposed to be reported on one PUCCH resource in the same PUCCH slot. If two *coresetPoolIndex* values are configured, the number of received PDSCHs is per *coresetPoolIndex* value per slot for a serving cell. If the UE generates two HARQ-ACK codebooks for two priorities, the number of received PDSCHs is per priority per slot for a serving cell. If *fdmed-ReceptionMulticast* is configured, the number of received PDSCHs is per traffic type (unicast / multicast) per slot for a serving cell. |
| ***nr-dl-PRS-PDC-Info***Configures the DL PRS for propagation delay compensation. When configured, the UE measures the UE Rx-Tx time difference based on the reference signals configured in this field. |
| ***nrofHARQ-BundlingGroups***Indicates the number of HARQ bundling groups for type2 HARQ-ACK codebook. |
| ***pathlossReferenceLinking***Indicates whether UE shall apply as pathloss reference either the downlink of SpCell (PCell for MCG or PSCell for SCG) or of SCell that corresponds with this uplink (see TS 38.213 [13], clause 7). |
| ***pdcch-CandidateReceptionWith-CRS-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 formats 1\_1 and 0\_1, and the order of SRS offset indicator index in each row refers the order of cells in *scheduledCell-ListDCI-1-3* (i.e., first index is for the first cell in *scheduledCellListDCI-1-3*, that are configured with more than one entry in *availableSlotOffsetList* for at least one aperiodic SRS resource set on at least one UL BWP and so on) for DL and *scheduledCellListDCI-0-3* for UL, included in *scheduledCellListDCI-1-3* for *srs-OffsetListDCI-1-3* and *scheduledCellListDCI-0-3* for *srs-OffsetListDCI-0-3*, and entries for co-scheduled cells in a row of *SRS-OffsetCombo* are interpreted based on the BWPs of co-scheduled cells 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 formats 1\_1 and 0\_1, and the order of SRS request index in each row refers the order of cells in *scheduledCellListDCI-1-3* (i.e., first index is for the first cell in *scheduledCellListDCI-1-3* and so on) for DL and *scheduledCellListDCI-0-3* for UL. The number of entries in a row of *SRS-RequestCombo* should be the same as the number of cells included in *scheduledCellListDCI-1-3* for *srs-RequestListDCI-1-3* and *scheduledCellListDCI-0-3* for *srs-RequestListDCI-0-3*, and entries for co-scheduled cells in a row of *SRS-RequestCombo* are interpreted based on the BWPs of co-scheduled cells 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-FieldIndexDCI-0-3***Configure each row of the joint TDRA field table for UL scheduling via DCI format 0\_3 containing the applicable TDRA field indexes for multiple BWPs/cells, where the TDRA index for a BWP of a cell points to a corresponding TDRA in the TDRA table applicable for DCI format 0\_1, 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. |