**3GPP T****SG-RAN WG2 Meeting #121 R2-2301316**

**Athens, Greece, Feburary 14th – 18th, 2022**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| *CR-Form-v12.2* | | | | | | | | |
| **CHANGE REQUEST** | | | | | | | | |
|  | | | | | | | | |
|  | **38.331** | **CR** | **3880** | **rev** | 1 | **Current version:** | **17.3.0** |  |
|  | | | | | | | | |
| *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)*.* | | | | | | | | |
|  | | | | | | | | |

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| ***Proposed change affects:*** | UICC apps |  | ME | **x** | Radio Access Network | **x** | Core Network |  |

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | | | | | | | | | | |
| ***Title:*** | Correction on RRC configuration for RedCap | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Source to WG:*** | ZTE Corporation, Sanechips | | | | | | | | | |
| ***Source to TSG:*** | R2 | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Work item code:*** | NR\_redcap-Core | | | | |  | ***Date:*** | | | 2023-02-16 |
|  |  | | | |  | |  | | |  |
| ***Category:*** | **F** |  | | | | | ***Release:*** | | | Rel-17 |
|  | *Use one of the following categories:* ***F*** *(correction)* ***A*** *(mirror corresponding to a change in an earlier release)* ***B*** *(addition of feature),* ***C*** *(functional modification of feature)* ***D*** *(editorial modification)*  Detailed explanations of the above categories can be found in 3GPP [TR 21.900](http://www.3gpp.org/ftp/Specs/html-info/21900.htm). | | | | | | | | *Use one of the following releases: Rel-8 (Release 8) Rel-9 (Release 9) Rel-10 (Release 10) Rel-11 (Release 11) … Rel-16 (Release 16) Rel-17 (Release 17) Rel-18 (Release 18) Rel-19 (Release 19)* | |
|  |  | | | | | | | | | |
| ***Reason for change:*** | | 1. For RedCap UEs, RAN2 clarified in field description that rach-ConfigCommon can be configured in RedCap-specific initial UL BWP or in the UL BWPs if linked DL BWPs are associated with NCD-SSB. However, the same principle should also apply for msgA-ConfigCommon field. Otherwise, msgA-ConfigCommon can only be configured in legacy initial BWP and the UL BWPs with linked DL BWPs associated with CD-SSB. 2. In the field description of msgA-PUSCH-ResourceGroupA, it says “if the field is not configured for the selected UL BWP, the UE shall use the MsgA PUSCH configuration for group A of initial UL BWP”. However, in case RedCap-specfiic initial UL BWP is configured, the RedCap UE has the common configuration from both legacy initial UL BWP and RedCap-specific initial UL BWP, it is unclear which initial UL BWP’s msgA PUSCH configuration should be applied here, clarification is needed to avoid inter-operability issue. 3. Similarly, in the explanation of condition CellLevel, it says “if RachMatchPattern is defined for MBS broadcast CFR, the UE applies the SCS of the initial BWP”, it is also unclear which initial BWP’s configuration should be applied here. 4. In case RedCap-specific initial BWP does not contain CD-SSB and CORESET#0, how does RRC\_IDLE and RRC\_INACTIVE RedCap UE receive SIB1 is unclear. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Summary of change:*** | | 1. Add “or for RedCap UEs DL BWPs associated with *nonCellDefiningSSB* or the RedCap-specific initial downlink BWP.” in the field description of msgA-ConfigCommon. 2. Clarifies in the field description of ***msgA-PUSCH-ResourceGroupA*** that if the field is absent and the RedCap-specific initial BWP is configured, then the UE should apply corresponding configuration from RedCap-specific initial BWP. 3. Clarifies in condition explanation of ***CellLevel*** that if *RateMatchPattern* is defined for MBS broadcast CFR and the RedCap-specific initial BWP is configured, then the UE should apply the SCS of RedCap-specific initial BWP. 4. Add “In that case, a RedCap UE in RRC\_IDLE or RRC\_INACTIVE shall monitor PDCCH to receive SIB1 using *searchSpaceSIB1* in the initial DL BWP that includes CD-SSB and the entire CORESET#0.” in the field description of searchSpaceSIB1. 5. Fix the typo (BL->DL) in field description of MsgA-ConfigCommon.   **Impact analysis**  Impacted 5G architecture options:  NR SA  Impacted functionality:  RedCap  Inter-operability:  For Change#1   * If the network implements the CR and the UE does not, when the network configures msgA-ConfigCommon in RedCap UL which linked DL does not contain CD-SSB, the UE will consider the configuration is incorrect and trigger reconfiguration failure. * If the UE implements the CR and the network does not, there is no inter-operability issue.   For Change#2, Change#3   * If the network implements the CR and the UE does not, or if the UE implements the CR and the network does not, the network and UE may have different understandings on which initiail BWP’s configuration will be applied as default configuration and results in problem.   For Change#4   * This changes only impacts UE, if the UE behaviour is not aligned with the change, then SIB1 reception fails if the UE is configured with RedCap-specific initial UL BWP which does not contain CD-SSB and CORESET#0. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Consequences if not approved:*** | | * msgA-ConfigCommon configuration in RedCap-specific intial UL BWP or UL BWP with linked DL BWP associated with NCD-SSB is not supported. * It is unclear which initial BWP’s configuration should be applied when msgA-PUSCH-ResourceGroupA is not configured in the active BWP, * It is unclear which SCS should be applied if RachMatchPattern is defined for MBS broadcast CFR. * UE’s behaviour is unclear when RedCap-specific initial BWP does not contain CD-SSB and searchSpaceSIB1 is not configured. | | | | | | | | |
|  | |  | | | | | | | | |
| ***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 changes

### 6.3.2 Radio resource control information elements

– *BWP-UplinkCommon*

The IE *BWP-UplinkCommon* is used to configure the common parameters of an uplink BWP. They are "cell specific" and the network ensures the necessary alignment with corresponding parameters of other UEs. The common parameters of the initial bandwidth part of the PCell are also provided via system information. For all other serving cells, the network provides the common parameters via dedicated signalling.

***BWP-UplinkCommon* information element**

-- ASN1START

-- TAG-BWP-UPLINKCOMMON-START

BWP-UplinkCommon ::= SEQUENCE {

genericParameters BWP,

rach-ConfigCommon SetupRelease { RACH-ConfigCommon } OPTIONAL, -- Need M

pusch-ConfigCommon SetupRelease { PUSCH-ConfigCommon } OPTIONAL, -- Need M

pucch-ConfigCommon SetupRelease { PUCCH-ConfigCommon } OPTIONAL, -- Need M

...,

[[

rach-ConfigCommonIAB-r16 SetupRelease { RACH-ConfigCommon } OPTIONAL, -- Need M

useInterlacePUCCH-PUSCH-r16 ENUMERATED {enabled} OPTIONAL, -- Need R

msgA-ConfigCommon-r16 SetupRelease { MsgA-ConfigCommon-r16 } OPTIONAL -- Cond SpCellOnly2

]],

[[

enableRA-PrioritizationForSlicing-r17 BOOLEAN OPTIONAL, -- Cond RA-PrioSliceAI

additionalRACH-ConfigList-r17 SetupRelease { AdditionalRACH-ConfigList-r17 } OPTIONAL, -- Cond SpCellOnly2

rsrp-ThresholdMsg3-r17 RSRP-Range OPTIONAL, -- Need R

numberOfMsg3-RepetitionsList-r17 SEQUENCE (SIZE (4)) OF NumberOfMsg3-Repetitions-r17 OPTIONAL, -- Cond Msg3Rep

mcs-Msg3-Repetitions-r17 SEQUENCE (SIZE (8)) OF INTEGER (0..31) OPTIONAL -- Cond Msg3Rep

]]

}

AdditionalRACH-ConfigList-r17 ::= SEQUENCE (SIZE(1..maxAdditionalRACH-r17)) OF AdditionalRACH-Config-r17

AdditionalRACH-Config-r17 ::= SEQUENCE {

rach-ConfigCommon-r17 RACH-ConfigCommon OPTIONAL, -- Need R

msgA-ConfigCommon-r17 MsgA-ConfigCommon-r16 OPTIONAL, -- Need R

...

}

NumberOfMsg3-Repetitions-r17::= ENUMERATED {n1, n2, n3, n4, n7, n8, n12, n16}

-- TAG-BWP-UPLINKCOMMON-STOP

-- ASN1STOP

|  |
| --- |
| ***BWP-UplinkCommon* field descriptions** |
| ***additionalRACH-ConfigList***  List of feature or feature combination-specific RACH configurations, i.e. the RACH configurations configured in addition to the one configured by *rach-ConfigCommon* and by *msgA-ConfigCommon*. The network associates all possible preambles of an additional RACH configuration to one or more feature(s) or feature combination(s). The network does not configure this list to have more than 16 entries. If both *rach-ConfigCommon* and *msgA-ConfigCommon* are configured for a specific *FeatureCombination*, the network always provides them in the same *additionalRACH-Config*. |
| ***enableRA-PrioritizationForSlicing***  Indicates whether or not the *ra-PrioritizationForSlicing/ra-PrioritizationForSlicingTwoStep* should override the *ra-PrioritizationForAccessIdentity*. The field is applicable only when the UE is configured by upper layers with both NSAG and Access Identity 1 or 2. If value *TRUE* is configured, the UE should only apply the *ra-PrioritizationForSlicing/ra-PrioritizationForSlicingTwoStep*. If value *FALSE* is configured, the UE should only apply *ra-PrioritizationForAccessIdentity*. If the field is absent, whether to use *ra-PrioritizationForSlicing/ra-PrioritizationForSlicingTwoStep* or *ra-PrioritizationForAccessIdentity* is up to UE implementation. |
| ***mcs-Msg3-Repetitions***  Configuration of eight candidate MCS indexes for PUSCH transmission scheduled by RAR UL grant and DCI format 0\_0 with CRC scrambled by TC-RNTI. Only the first 4 configured or default MCS indexes are used for PUSCH transmission scheduled by RAR UL grant. This field is only applicable when the UE selects Random Access resources indicating Msg3 repetition in this BWP. If this field is absent when the set(s) of Random Access resources with MSG3 repetition indication are configured in the *BWP-UplinkCommon*, the UE shall apply the values {0, 1, 2, 3, 4, 5, 6, 7} (see TS 38.214 [19], clause 6.1.4). |
| ***msgA-ConfigCommon***  Configuration of the cell specific PRACH and PUSCH resource parameters for transmission of MsgA in 2-step random access type procedure. The NW can configure *msgA-ConfigCommon* only for UL BWPs if the linked DL BWPs (same bwp-Id as UL-BWP) are the initial DL BWPs or DL BWPs containing the SSB associated to the initial DL BWP or for RedCap UEs DL BWPs associated with *nonCellDefiningSSB* or the RedCap-specific initial downlink BWP. |
| ***numberOfMsg3-RepetitionsList***  The number of repetitions for PUSCH transmission scheduled by RAR UL grant and DCI format 0\_0 with CRC scrambled by TC-RNTI. This field is only applicable when the UE selects Random Access resources indicating Msg3 repetition in this BWP. If this field is absent when the set(s) of Random Access resources with MSG3 repetition indication are configured in the *BWP-UplinkCommon*, the UE shall apply the values {n1, n2, n3, n4} (see TS 38.214 [19], clause 6.1.2.1). |
| ***pucch-ConfigCommon***  Cell specific parameters for the PUCCH of this BWP. |
| ***pusch-ConfigCommon***  Cell specific parameters for the PUSCH of this BWP. |
| ***rach-ConfigCommon***  Configuration of cell specific random access parameters which the UE uses for contention based and contention free random access as well as for contention based beam failure recovery in this BWP. The NW configures SSB-based RA (and hence *RACH-ConfigCommon*) only for UL BWPs if the linked DL BWPs (same *bwp-Id* as UL-BWP) are the initial DL BWPs or DL BWPs containing the SSB associated to the initial DL BWP or for RedCap UEs DL BWPs associated with *nonCellDefiningSSB* or the RedCap-specific initial downlink BWP. The network configures *rach-ConfigCommon*, whenever it configures contention free random access (for reconfiguration with sync or for beam failure recovery). |
| ***rach-ConfigCommonIAB***  Configuration of cell specific random access parameters for the IAB-MT. The IAB specific IAB RACH configuration is used by IAB-MT, if configured. |
| ***rsrp-ThresholdMsg3***  Threshold used by the UE for determining whether to select resources indicating Msg3 repetition in this BWP, as specified in TS 38.321 [3]. The field is mandatory if both set(s) of Random Access resources with MSG3 repetition indication and set(s) of Random Access resources without MSG3 repetition indication are configured in the BWP. It is absent otherwise. |
| ***useInterlacePUCCH-PUSCH***  If the field is present, the UE uses uplink frequency domain resource allocation Type 2 for cell-specific PUSCH, e.g., PUSCH scheduled by RAR UL grant (see TS 38.213 [13] clause 8.3 and TS 38.214 [19], clause 6.1.2.2) and uses interlaced PUCCH Format 0 and 1 for cell-specific PUCCH (see TS 38.213 [13], clause 9.2.1). |

|  |  |
| --- | --- |
| **Conditional Presence** | **Explanation** |
| *Msg3Rep* | This field is optionally present, Need S, if the set(s) of Random Access resources with MSG3 repetition indication are configured in the *BWP-UplinkCommon*. It is absent otherwise. |
| *RA-PrioSliceAI* | The field is optionally present in *SIB1*, Need R, if both parameters *ra-PrioritizationForAccessIdentity* and the *ra-PrioritizationForSlicing/ra-PrioritizationForSlicingTwoStep* are present in *SIB1*. It is absent otherwise. |
| *SpCellOnly2* | The field is optionally present, Need M, in the *BWP-UplinkCommon* of an SpCell. It is absent otherwise. |

Next change

– *MsgA-PUSCH-Config*

The IE *MsgA-PUSCH-Config* is used to specify the PUSCH allocation for MsgA in 2-step random access type procedure.

***MsgA-PUSCH-Config* information element**

-- ASN1START

-- TAG-MSGA-PUSCH-CONFIG-START

MsgA-PUSCH-Config-r16 ::= SEQUENCE {

msgA-PUSCH-ResourceGroupA-r16 MsgA-PUSCH-Resource-r16 OPTIONAL, -- Cond InitialBWPConfig

msgA-PUSCH-ResourceGroupB-r16 MsgA-PUSCH-Resource-r16 OPTIONAL, -- Cond GroupBConfigured

msgA-TransformPrecoder-r16 ENUMERATED {enabled, disabled} OPTIONAL, -- Need R

msgA-DataScramblingIndex-r16 INTEGER (0..1023) OPTIONAL, -- Need S

msgA-DeltaPreamble-r16 INTEGER (-1..6) OPTIONAL -- Need R

}

MsgA-PUSCH-Resource-r16 ::= SEQUENCE {

msgA-MCS-r16 INTEGER (0..15),

nrofSlotsMsgA-PUSCH-r16 INTEGER (1..4),

nrofMsgA-PO-PerSlot-r16 ENUMERATED {one, two, three, six},

msgA-PUSCH-TimeDomainOffset-r16 INTEGER (1..32),

msgA-PUSCH-TimeDomainAllocation-r16 INTEGER (1..maxNrofUL-Allocations) OPTIONAL, -- Need S

startSymbolAndLengthMsgA-PO-r16 INTEGER (0..127) OPTIONAL, -- Need S

mappingTypeMsgA-PUSCH-r16 ENUMERATED {typeA, typeB} OPTIONAL, -- Need S

guardPeriodMsgA-PUSCH-r16 INTEGER (0..3) OPTIONAL, -- Need R

guardBandMsgA-PUSCH-r16 INTEGER (0..1),

frequencyStartMsgA-PUSCH-r16 INTEGER (0..maxNrofPhysicalResourceBlocks-1),

nrofPRBs-PerMsgA-PO-r16 INTEGER (1..32),

nrofMsgA-PO-FDM-r16 ENUMERATED {one, two, four, eight},

msgA-IntraSlotFrequencyHopping-r16 ENUMERATED {enabled} OPTIONAL, -- Need R

msgA-HoppingBits-r16 BIT STRING (SIZE(2)) OPTIONAL, -- Cond FreqHopConfigured

msgA-DMRS-Config-r16 MsgA-DMRS-Config-r16,

nrofDMRS-Sequences-r16 INTEGER (1..2),

msgA-Alpha-r16 ENUMERATED {alpha0, alpha04, alpha05, alpha06,

alpha07, alpha08, alpha09, alpha1} OPTIONAL, -- Need S

interlaceIndexFirstPO-MsgA-PUSCH-r16 INTEGER (1..10) OPTIONAL, -- Need R

nrofInterlacesPerMsgA-PO-r16 INTEGER (1..10) OPTIONAL, -- Need R

...

}

MsgA-DMRS-Config-r16 ::= SEQUENCE {

msgA-DMRS-AdditionalPosition-r16 ENUMERATED {pos0, pos1, pos3} OPTIONAL, -- Need S

msgA-MaxLength-r16 ENUMERATED {len2} OPTIONAL, -- Need S

msgA-PUSCH-DMRS-CDM-Group-r16 INTEGER (0..1) OPTIONAL, -- Need S

msgA-PUSCH-NrofPorts-r16 INTEGER (0..1) OPTIONAL, -- Need S

msgA-ScramblingID0-r16 INTEGER (0..65535) OPTIONAL, -- Need S

msgA-ScramblingID1-r16 INTEGER (0..65535) OPTIONAL -- Need S

}

-- TAG-MSGA-PUSCH-CONFIG-STOP

-- ASN1STOP

|  |
| --- |
| ***MsgA-PUSCH-Config* field descriptions** |
| ***msgA-DataScramblingIndex***  Identifier used to initiate data scrambling (c\_init) for msgA PUSCH. If the field is absent the UE applies the value Physical cell ID (*physCellID*). |
| ***msgA-DeltaPreamble***  Power offset of msgA PUSCH relative to the preamble received target power. Actual value = field value \* 2 [dB] (see TS 38.213 [13], clause 7.1). |
| ***msgA-PUSCH-ResourceGroupA***  MsgA PUSCH resources that the UE shall use when performing MsgA transmission using preambles group A. If field is not configured for the selected UL BWP, the UE shall use the MsgA PUSCH configuration for group A of initial UL BWP or RedCap-specific initial UL BWP (if configured) for RedCap UEs. |
| ***msgA-PUSCH-ResourceGroupB***  MsgA PUSCH resources that the UE shall use when performing MsgA transmission using preambles group B. |
| ***msgA-TransformPrecoder***  Enables or disables the transform precoder for MsgA transmission (see clause 6.1.3 of TS 38.214 [19]). |

|  |
| --- |
| ***MsgA-PUSCH-Resource* field descriptions** |
| ***guardBandMsgA-PUSCH***  PRB-level guard band between FDMed PUSCH occasions (see TS 38.213 [13], clause 8.1A). If interlaced PUSCH is configured, value 0 is applied. |
| ***guardPeriodMsgA-PUSCH***  Guard period between PUSCH occasions in the unit of symbols (see TS 38.213 [13], clause 8.1A). |
| ***frequencyStartMsgA-PUSCH***  Offset of lowest PUSCH occasion in frequency domain with respect to PRB 0 (see TS 38.213 [13], clause 8.1A). |
| ***interlaceIndexFirstPO-MsgA-PUSCH***  Interlace index of the first PUSCH occasion in frequency domain if interlaced PUSCH is configured. For 30kHz SCS only the integers 1, 2, 3, 4, 5 are applicable (see TS 38.213 [13], clause 8.1A). |
| ***mappingTypeMsgA-PUSCH***  PUSCH mapping type A or B. If the field is absent, the UE shall use the parameter *msgA-PUSCH-TimeDomainAllocation* (see TS 38.213 [13], clause 8.1A). |
| ***msgA-Alpha***  Dedicated alpha value for MsgA PUSCH. If the field is absent, the UE shall use the value of *msg3-Alpha* if configured, else UE applies value 1 (see TS 38.213 [13], clause 7.1.1). |
| ***msgA-DMRS-Config***  DMRS configuration for msgA PUSCH (see TS 38.213 [13], clause 8.1A and TS 38.214 [19] clause 6.2.2). |
| ***msgA-HoppingBits***  Value of hopping bits to indicate which frequency offset to be used for second hop. See Table 8.3-1 in TS 38.213 [13]. |
| ***msgA-IntraSlotFrequencyHopping***  Intra-slot frequency hopping per PUSCH occasion (see TS 38.213 [13], clause 8.1A). |
| ***msgA-MCS***  Indicates the MCS index for msgA PUSCH from the Table 6.1.4.1-1 for DFT-s-OFDM and Table 5.1.3.1-1 for CP-OFDM in TS 38.214 [19]. |
| ***msgA-PUSCH-TimeDomainAllocation***  Indicates a combination of start symbol and length and PUSCH mapping type from the TDRA table (*PUSCH-TimeDomainResourceAllocationList* if provided in *PUSCH-ConfigCommon*, or else the default Table 6.1.2.1.1-2 in 38.214 [19] is used if *pusch-TimeDomainAllocationList* is not provided in PUSCH-ConfigCommon). The parameter K2 in the table is not used for msgA PUSCH. The network configures one of *msgA-PUSCH-TimeDomainAllocation* and *startSymbolAndLengthMsgA-PO,* but not both. If the field is absent, the UE shall use the value of startSymbolAndLenghtMsgA-PO. |
| ***msgA-PUSCH-TimeDomainOffset***  A single time offset with respect to the start of each PRACH slot (with at least one valid RO), counted as the number of slots (based on the numerology of active UL BWP). See TS 38.213 [13], clause 8.1A. |
| ***nrofDMRS-Sequences***  Number of DMRS sequences for MsgA PUSCH for CP-OFDM. In case of single PUSCH configuration or if the DMRS symbols of multiple configurations are not overlapped, if the DMRS resources configured in one PUSCH occasion is no larger than 8 (for *len2*) or 4 (for *len1*), then only DMRS port is configured. |
| ***nrofInterlacesPerMsgA-PO***  Number of consecutive interlaces per PUSCH occasion if interlaced PUSCH is configured. For 30kHz SCS only the integers 1, 2, 3, 4, 5 are applicable (see TS 38.213 [13], clause 8.1A). |
| ***nrofMsgA-PO-FDM***  The number of msgA PUSCH occasions FDMed in one time instance (see TS 38.213 [13], clause 8.1A). |
| ***nrofMsgA-PO-PerSlot***  Number of time domain PUSCH occasions in each slot. PUSCH occasions including guard period are contiguous in time domain within a slot (see TS 38.213 [13], clause 8.1A). |
| ***nrofPRBs-PerMsgA-PO***  Number of PRBs per PUSCH occasion (see TS 38.213 [13], clause 8.1A). |
| ***nrofSlotsMsgA-PUSCH***  Number of slots (in active UL BWP numerology) containing one or multiple PUSCH occasions, each slot has the same time domain resource allocation (see TS 38.213 [13], clause 8.1A). |
| ***startSymbolAndLengthMsgA-PO***  An index giving valid combinations of start symbol, length and mapping type as start and length indicator (SLIV) for the first msgA PUSCH occasion, for RRC\_CONNECTED UEs in non-initial BWP as described in TS 38.214 [19] clause 6.1.2. The network configures the field so that the allocation does not cross the slot boundary. The number of occupied symbols excludes the guard period. If the field is absent, the UE shall use the value in *msgA-PUSCH-TimeDomainAllocation* (see TS 38.213 [13], clause 8.1A). The network configures one of *msgA-PUSCH-TimeDomainAllocation* and *startSymbolAndLengthMsgA-PO,* but not both. If the field is absent, the UE shall use the value of *msgA-PUSCH-TimeDomainAllocation****.*** |

|  |
| --- |
| ***MsgA-DMRS-Config* field descriptions** |
| ***msgA-DMRS-AdditionalPosition***  Indicates the position for additional DM-RS. If the field is absent, the UE applies value *pos2*. |
| ***msgA-MaxLength***  indicates single-symbol or double-symbol DMRS. If the field is absent, the UE applies value *len1*. |
| ***msgA-PUSCH-DMRS-CDM-Group***  1-bit indication of indices of CDM group(s). If the field is absent, then both CDM groups are used. |
| ***msgA-PUSCH-NrofPorts***  0 indicates 1 port per CDM group, 1 indicates 2 ports per CDM group. If the field is absent then 4 ports per CDM group are used (see TS 38.213 [13], clause 8.1A). |
| ***msgA-ScramblingID0***  UL DMRS scrambling initialization for CP-OFDM. If the field is absent the UE applies the value Physical cell ID (*physCellID*). |
| ***msgA-ScramblingID1***  UL DMRS scrambling initialization for CP-OFDM. If the field is absent the UE applies the value Physical cell ID (*physCellID*). |

|  |  |
| --- | --- |
| **Conditional Presence** | **Explanation** |
| *FreqHopConfigured* | This field is mandatory present when the field *msgA-IntraSlotFrequencyHopping* is configured. Otherwise, the field is absent. |
| *GroupBConfigured* | The field is mandatory present if *groupB-ConfiguredTwoStepRA* is configured in *RACH-ConfigCommonTwoStepRA*, otherwise the field is absent. |
| *InitialBWPConfig* | The field is mandatory present when *MsgA-ConfigCommon* is configured for the initial uplink BWP, or when *MsgA-ConfigCommon* is configured for a non-initial uplink BWP and *MsgA-ConfigCommon* is not configured for the initial uplink BWP, otherwise the field is optionally present, Need S. |

Next change

– *PDCCH-ConfigCommon*

The IE *PDCCH-ConfigCommon* is used to configure cell specific PDCCH parameters provided in SIB as well as in dedicated signalling.

***PDCCH-ConfigCommon* information element**

-- ASN1START

-- TAG-PDCCH-CONFIGCOMMON-START

PDCCH-ConfigCommon ::= SEQUENCE {

controlResourceSetZero ControlResourceSetZero OPTIONAL, -- Cond InitialBWP-Only

commonControlResourceSet ControlResourceSet OPTIONAL, -- Need R

searchSpaceZero SearchSpaceZero OPTIONAL, -- Cond InitialBWP-Only

commonSearchSpaceList SEQUENCE (SIZE(1..4)) OF SearchSpace OPTIONAL, -- Need R

searchSpaceSIB1 SearchSpaceId OPTIONAL, -- Need S

searchSpaceOtherSystemInformation SearchSpaceId OPTIONAL, -- Need S

pagingSearchSpace SearchSpaceId OPTIONAL, -- Need S

ra-SearchSpace SearchSpaceId OPTIONAL, -- Need S

...,

[[

firstPDCCH-MonitoringOccasionOfPO CHOICE {

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

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

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

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

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

sCS120KHZquarterT-SCS60KHZoneEighthT-SCS30KHZoneSixteenthT SEQUENCE (SIZE (1..maxPO-perPF)) OF INTEGER (0..4479),

sCS120KHZoneEighthT-SCS60KHZoneSixteenthT SEQUENCE (SIZE (1..maxPO-perPF)) OF INTEGER (0..8959),

sCS120KHZoneSixteenthT SEQUENCE (SIZE (1..maxPO-perPF)) OF INTEGER (0..17919)

} OPTIONAL -- Cond OtherBWP

]],

[[

commonSearchSpaceListExt-r16 SEQUENCE (SIZE(1..4)) OF SearchSpaceExt-r16 OPTIONAL -- Need R

]],

[[

sdt-SearchSpace-r17 CHOICE {

newSearchSpace SearchSpace,

existingSearchSpace SearchSpaceId

} OPTIONAL, -- Need R

searchSpaceMCCH-r17 SearchSpaceId OPTIONAL, -- Need R

searchSpaceMTCH-r17 SearchSpaceId OPTIONAL, -- Need S

commonSearchSpaceListExt2-r17 SEQUENCE (SIZE(1..4)) OF SearchSpaceExt-v1700 OPTIONAL, -- Need R

firstPDCCH-MonitoringOccasionOfPO-v1710 CHOICE {

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

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

} OPTIONAL, -- Need R

pei-ConfigBWP-r17 SEQUENCE {

pei-SearchSpace-r17 SearchSpaceId,

firstPDCCH-MonitoringOccasionOfPEI-O-r17 CHOICE {

sCS15KHZoneT SEQUENCE (SIZE (1..maxPEI-perPF-r17)) OF INTEGER (0..139),

sCS30KHZoneT-SCS15KHZhalfT SEQUENCE (SIZE (1..maxPEI-perPF-r17)) OF INTEGER (0..279),

sCS60KHZoneT-SCS30KHZhalfT-SCS15KHZquarterT SEQUENCE (SIZE (1..maxPEI-perPF-r17)) OF INTEGER (0..559),

sCS120KHZoneT-SCS60KHZhalfT-SCS30KHZquarterT-SCS15KHZoneEighthT SEQUENCE (SIZE (1..maxPEI-perPF-r17)) OF INTEGER (0..1119),

sCS120KHZhalfT-SCS60KHZquarterT-SCS30KHZoneEighthT-SCS15KHZoneSixteenthT SEQUENCE (SIZE (1..maxPEI-perPF-r17)) OF INTEGER (0..2239),

sCS480KHZoneT-SCS120KHZquarterT-SCS60KHZoneEighthT-SCS30KHZoneSixteenthT SEQUENCE (SIZE (1..maxPEI-perPF-r17)) OF INTEGER (0..4479),

sCS480KHZhalfT-SCS120KHZoneEighthT-SCS60KHZoneSixteenthT SEQUENCE (SIZE (1..maxPEI-perPF-r17)) OF INTEGER (0..8959),

sCS480KHZquarterT-SCS120KHZoneSixteenthT SEQUENCE (SIZE (1..maxPEI-perPF-r17)) OF INTEGER (0..17919),

sCS480KHZoneEighthT SEQUENCE (SIZE (1..maxPEI-perPF-r17)) OF INTEGER (0..35839),

sCS480KHZoneSixteenthT SEQUENCE (SIZE (1..maxPEI-perPF-r17)) OF INTEGER (0..71679)

}

} OPTIONAL -- Cond InitialBWP-Paging

]],

[[

followUnifiedTCI-State-v1720 ENUMERATED {enabled} OPTIONAL -- Need R

]]

}

-- TAG-PDCCH-CONFIGCOMMON-STOP

-- ASN1STOP

|  |
| --- |
| ***PDCCH-ConfigCommon* field descriptions** |
| ***commonControlResourceSet***  An additional common control resource set which may be configured and used for any common or UE-specific search space. If the network configures this field, it uses a *ControlResourceSetId* other than 0 for this *ControlResourceSet*. The network configures the *commonControlResourceSet* in *SIB1* so that it is contained in the bandwidth of CORESET#0. If the RedCap-specific initial downlink BWP does not contain the entire CORESET#0, the network configures the *commonControlResourceSet* in *SIB1* for RedCap so that it is not contained in the bandwidth of CORESET#0. |
| ***commonSearchSpaceList, commonSearchSpaceListExt,*** ***commonSearchSpaceListExt2***  A list of additional common search spaces. If the network configures this field, it uses the *SearchSpaceId*s other than 0. If the field is included, it replaces any previous list, i.e. all the entries of the list are replaced and each of the *SearchSpace* entries is considered to be newly created and the conditions and Need codes for setup of the entry apply. If the network includes *commonSearchSpaceListExt/commonSearchSpaceListExt2*, it includes the same number of entries, and listed in the same order, as in *commonSearchSpaceList*. |
| ***controlResourceSetZero***  Parameters of the common CORESET#0 which can be used in any common or UE-specific search spaces. The values are interpreted like the corresponding bits in *MIB* *pdcch-ConfigSIB1*. Even though this field is only configured in the initial BWP (BWP#0) *controlResourceSetZero* can be used in search spaces configured in other DL BWP(s) than the initial DL BWP if the conditions defined in TS 38.213 [13], clause 10 are satisfied. |
| ***firstPDCCH-MonitoringOccasionOfPEI-O***  Offset, in number of symbols, from the start of the reference frame for PEI-O to the start of the first PDCCH monitoring occasion of PEI-O on this BWP, see TS 38.213 [13], clause 10.4A. For the case *po-NumPerPEI* is smaller than Ns, UE applies the (floor(i\_s/po-NumPerPEI)+1)-th value out of (N\_s/po-NumPerPEI) configured values in *firstPDCCH-MonitoringOccasionOfPEI-O* for the symbol-level offset. When *po-NumPerPEI* is one or multiple of Ns, UE applies the first configured value in *firstPDCCH-MonitoringOccasionOfPEI-O* for the symbol-level offset. |
| ***firstPDCCH-MonitoringOccasionOfPO***  Indicates the first PDCCH monitoring occasion of each PO of the PF on this BWP, see TS 38.304 [20]. The field *sCS120KHZquarterT-SCS60KHZoneEighthT-SCS30KHZoneSixteenthT*, *sCS120KHZoneEighthT-SCS60KHZoneSixteenthT* and *sCS120KHZoneSixteenthT* can be applied for SCS 480kHz, corresponding to *sCS480KHZoneT-SCS120KHZquarterT-SCS60KHZoneEighthT-SCS30KHZoneSixteenthT*, *sCS480KHZhalfT-SCS120KHZoneEighthT-SCS60KHZoneSixteenthT* and *sCS480KHZquarterT-SCS120KHZoneSixteenthT* in IE *DownlinkConfigCommonSIB* respectively. |
| ***followUnifiedTCI-State***  When set to enabled, for PDCCH reception in CORESET #0, the UE applies the "indicated" DL only TCI or joint TCI as specified in TS 38.214 [19], clause 5.1.5. |
| ***pagingSearchSpace***  ID of the search space for paging (see TS 38.213 [13], clause 10.1). If the field is absent, the UE does not receive paging in this BWP (see TS 38.213 [13], clause 10). This field is absent for the RedCap-specific initial downlink BWP, if it does not include CD-SSB and the entire CORESET#0. In that case, a RedCap UE in RRC\_IDLE or RRC\_INACTIVE shall monitor paging in the initial DL BWP that includes CORESET#0. |
| ***pei-ConfigBWP***  Provides the configuration for PEI reception in this BWP. If the field is absent, the UE does not receive PEI in this BWP. |
| ***pei-SearchSpace***  ID of dedicated search space for PEI. It can be configured to one of up to 4 common SS sets configured by *commonSearchSpaceList* with *SearchSpaceId* > 0. The CCE aggregation levels and maximum number of PDCCH candidates per CCE aggregation level follows Table 10.1-1 of TS38.213 [13]. *SearchSpaceId* = 0 can be configured for the case of SS/PBCH block and CORESET multiplexing pattern 2 or 3. |
| ***ra-SearchSpace***  ID of the Search space for random access procedure (see TS 38.213 [13], clause 10.1). If the field is absent, the UE does not receive RAR in this BWP. This field is mandatory present in the DL BWP(s) if the conditions described in TS 38.321 [3], clause 5.15 are met. |
| ***sdt-SearchSpace***  Common search space for CG-SDT and RA-SDT (see TS 38.213 [13]). If an *existingSearchSpace* is used, the network only signals the search space ID of the *ra-SearchSpace*. |
| ***searchSpaceMCCH***  ID of the search space for MCCH. If the field is absent, the UE does not receive MCCH in this BWP (see TS 38.213 [13], clause 10). This field is absent for the RedCap-specific initial downlink BWP, if it does not include CD-SSB and the entire CORESET#0. |
| ***searchSpaceMTCH***  ID of the search space for MTCH of MBS broadcast. If the field is absent, the UE applies *searchSpaceMCCH* also for MTCH, (see TS 38.213 [13], clause 10). This field is absent for the RedCap-specific initial downlink BWP, if it does not include CD-SSB and the entire CORESET#0. |
| ***searchSpaceOtherSystemInformation***  ID of the Search space for other system information, i.e., *SIB2* and beyond (see TS 38.213 [13], clause 10.1). If the field is absent, the UE does not receive other system information in this BWP. This field is absent for the RedCap-specific initial DL BWP, if it does not include CD-SSB and the entire CORESET#0. In that case, a RedCap UE in RRC\_IDLE or RRC\_INACTIVE shall monitor PDCCH to receive other system information using *searchSpaceOtherSystemInformation* in the initial DL BWP that includes CD-SSB and the entire CORESET#0. |
| ***searchSpaceSIB1***  ID of the search space for *SIB1* message. In the initial DL BWP of the UE′s PCell, the network sets this field to 0. If the field is absent, the UE does not receive *SIB1* in this BWP. (see TS 38.213 [13], clause 10). This field is absent for the RedCap-specific initial DL BWP, if it does not include CD-SSB and the entire CORESET#0. In that case, a RedCap UE in RRC\_IDLE or RRC\_INACTIVE shall monitor PDCCH to receive SIB1 using *searchSpaceSIB1* in the initial DL BWP that includes CD-SSB and the entire CORESET#0. |
| ***searchSpaceZero***  Parameters of the common SearchSpace#0. The values are interpreted like the corresponding bits in *MIB* *pdcch-ConfigSIB1*. Even though this field is only configured in the initial BWP (BWP#0), *searchSpaceZero* can be used in search spaces configured in other DL BWP(s) than the initial DL BWP if the conditions described in TS 38.213 [13], clause 10, are satisfied. |

|  |  |
| --- | --- |
| **Conditional Presence** | **Explanation** |
| *InitialBWP-Only* | If *SIB1* is broadcast the field is mandatory present in the *PDCCH-ConfigCommon* of the initial BWP (BWP#0) in *ServingCellConfigCommon* except it is the RedCap-specific initial BWP not including CD-SSB and the entire CORESET#0; it is absent in other BWPs and when sent in system information. If SIB1 is not broadcast and there is an SSB associated to the cell, the field is optionally present, Need M, in the *PDCCH-ConfigCommon* of the initial BWP (BWP#0) in *ServingCellConfigCommon* (still with the same setting for all UEs). In other cases, the field is absent. |
| *OtherBWP* | This field is optionally present, Need R, if this BWP is not the *initialDownlinkBWP* and *pagingSearchSpace* is configured in this BWP. Otherwise this field is absent. |
| *InitialBWP-Paging* | This field is optionally present, Need R, if this BWP is the *initialDownlinkBWP* or *initialDownlinkBWP-RedCap* including CD-SSB and the entire CORESET#0, and *pei-Config* is configured in *DownlinkConfigCommonSIB*. Otherwise, this field is absent. |

Next change

– *RateMatchPattern*

The IE *RateMatchPattern* is used to configure one rate matching pattern for PDSCH, see TS 38.214 [19], clause 5.1.4.1.

***RateMatchPattern* information element**

-- ASN1START

-- TAG-RATEMATCHPATTERN-START

RateMatchPattern ::= SEQUENCE {

rateMatchPatternId RateMatchPatternId,

patternType CHOICE {

bitmaps SEQUENCE {

resourceBlocks BIT STRING (SIZE (275)),

symbolsInResourceBlock CHOICE {

oneSlot BIT STRING (SIZE (14)),

twoSlots BIT STRING (SIZE (28))

},

periodicityAndPattern CHOICE {

n2 BIT STRING (SIZE (2)),

n4 BIT STRING (SIZE (4)),

n5 BIT STRING (SIZE (5)),

n8 BIT STRING (SIZE (8)),

n10 BIT STRING (SIZE (10)),

n20 BIT STRING (SIZE (20)),

n40 BIT STRING (SIZE (40))

} OPTIONAL, -- Need S

...

},

controlResourceSet ControlResourceSetId

},

subcarrierSpacing SubcarrierSpacing OPTIONAL, -- Cond CellLevel

dummy ENUMERATED { dynamic, semiStatic },

...,

[[

controlResourceSet-r16 ControlResourceSetId-r16 OPTIONAL -- Need R

]]

}

-- TAG-RATEMATCHPATTERN-STOP

-- ASN1STOP

|  |
| --- |
| ***RateMatchPattern* field descriptions** |
| ***bitmaps***  Indicates rate matching pattern by a pair of bitmaps *resourceBlocks* and *symbolsInResourceBlock* to define the rate match pattern within one or two slots, and a third bitmap *periodicityAndPattern* to define the repetition pattern with which the pattern defined by the above bitmap pair occurs. |
| ***controlResourceSet***  This ControlResourceSet is used as a PDSCH rate matching pattern, i.e., PDSCH reception rate matches around it. In frequency domain, the resource is determined by the frequency domain resource of the CORESET with the corresponding CORESET ID. Time domain resource is determined by the parameters of the associated search space of the CORESET.  If the field *controlResourceSetId-r16* is present, UE shall ignore the *controlResourceSetId* (without suffix). |
| ***periodicityAndPattern***  A time domain repetition pattern at which the pattern defined by *symbolsInResourceBlock* and *resourceBlocks* recurs. This slot pattern repeats itself continuously. Absence of this field indicates the value *n1* (see TS 38.214 [19], clause 5.1.4.1). |
| ***resourceBlocks***  A resource block level bitmap in the frequency domain. A bit in the bitmap set to 1 indicates that the UE shall apply rate matching in the corresponding resource block in accordance with the *symbolsInResourceBlock* bitmap. If used as cell-level rate matching pattern, the bitmap identifies "common resource blocks (CRB)". If used for MBS broadcast CFR, the bitmap identifies "physical resource blocks" inside the MBS broadcast CFR. If used as BWP-level rate matching pattern, the bitmap identifies "physical resource blocks" inside the BWP or MBS multicast CFR. The first/ leftmost bit corresponds to resource block 0, and so on (see TS 38.214 [19], clause 5.1.4.1). |
| ***subcarrierSpacing***  The SubcarrierSpacing for this resource pattern. If the field is absent, the UE applies the SCS of the associated BWP. The value *kHz15* corresponds to µ=0, the value *kHz30* corresponds to µ=1, and so on.  Only the following values are applicable depending on the used frequency (see TS 38.214 [19], clause 5.1.4.1):  FR1: 15, 30 or 60 kHz  FR2-1: 60 or 120 kHz  FR2-2: 120, 480, or 960 kHz |
| ***symbolsInResourceBlock***  A symbol level bitmap in time domain. It indicates with a bit set to true that the UE shall rate match around the corresponding symbol. This pattern recurs (in time domain) with the configured periodicityAndPattern (see TS 38.214 [19], clause 5.1.4.1).  For *oneSlot*, if ECP is configured, the first 12 bits represent the symbols within the slot and the last two bits within the bitstring are ignored by the UE; Otherwise, the 14 bits represent the symbols within the slot.  For *twoSlots*, if ECP is configured, the first 12 bits represent the symbols within the first slot and the next 12 bits represent the symbols in the second slot and the last four bits within the bit string are ignored by the UE; Otherwise, the first 14 bits represent the symbols within the first slot and the next 14 bits represent the symbols in the second slot.  For the bits representing symbols in a slot, the most significant bit of the bit string represents the first symbol in the slot and the second most significant bit represents the second symbol in the slot and so on. |

|  |  |
| --- | --- |
| **Conditional Presence** | **Explanation** |
| *CellLevel* | The field is mandatory present if the *RateMatchPattern* is defined on cell level. The field is absent when the *RateMatchPattern* is defined on BWP level or defined for MBS broadcast CFR. If the *RateMatchPattern* is defined on BWP level, the UE applies the SCS of the BWP and if *RateMatchPattern* is defined for MBS broadcast CFR, the UE applies the SCS of the initial BWP or RedCap-specific initial BWP (if configured) for RedCap UEs. |

End of change