**3GPP TSG-RAN WG2 Meeting #124 *R2-231xxxx***

**Chicago, USA, Nov. 13th – 17th, 2023**

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| *CR-Form-v12.2* | | | | | | | | |
| **CHANGE REQUEST** | | | | | | | | |
|  | | | | | | | | |
|  | **38.331** | **CR** |  | **rev** | **2** | **Current version:** | **17.6.0** |  |
|  | | | | | | | | |
| *For* [***HE******LP***](http://www.3gpp.org/3G_Specs/CRs.htm#_blank)*on using this form: comprehensive instructions can be found at* [*http://www.3gpp.org/Change-Requests*](http://www.3gpp.org/Change-Requests)*.* | | | | | | | | |
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| ***Proposed change affects:*** | UICC apps |  | ME | **X** | Radio Access Network | **X** | Core Network |  |

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| ***Title:*** | RRC Running CR for R18 NR coverage enhancements | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Source to WG:*** | Huawei, HiSilicon | | | | | | | | | |
| ***Source to TSG:*** | RAN2 | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Work item code:*** | NR\_cov\_enh2-Core | | | | |  | ***Date:*** | | | 2023-11-13 |
|  |  | | | |  | |  | | |  |
| ***Category:*** | **B** |  | | | | | ***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 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:*** | | In Rel-18, new functionalities were agreed for NR to further enhance coverage, which require RRC protocol modifications.   * Capture RAN2 agreements * Capture RAN1 parameters based on RAN1 LS in R1-2308674 | | | | | | | | |
|  | |  | | | | | | | | |
| ***Summary of change:*** | | 1. Introdoce New RAN2 RRC parameters for coverage enhancement 2. Add SI request procedure with MSG1 repetition. 3. Introdoce New RAN1 RRC parameters for coverage enhancment | | | | | | | | |
|  | |  | | | | | | | | |
| ***Consequences if not approved:*** | | NR enhancements related to R18 coverage enhancement cannot be supported in Rel-18. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Clauses affected:*** | | 5.2.2.3.3, 5.2.2.3.3a, 6.2.2, 6.3.1a, 6.3.2 | | | | | | | | |
|  | |  | | | | | | | | |
|  | | **Y** | **N** |  | | | |  | | |
| ***Other specs*** | |  | **X** | Other core specifications | | | | TS38.321/38.213 | | |
| ***affected:*** | |  | **X** | Test specifications | | | | TS/TR ... CR ... | | |
| ***(show related CRs)*** | |  | **X** | O&M Specifications | | | | TS/TR ... CR ... | | |
|  | |  | | | | | | | | |
| ***Other comments:*** | |  | | | | | | | | |
|  | |  | | | | | | | | |
| ***This CR's revision history:*** | | 1. R2-2308664 RRC Running CR for R18 NR coverage enhancements v0 2. R2-2310197 RRC Running CR for R18 NR coverage enhancements v1 | | | | | | | | |

============================= start of change ================================

##### 5.2.2.3.3 Request for on demand system information

The UE shall, while SDT procedure is not ongoing:

1> if *SIB1* includes *si-SchedulingInfo* containing *si-RequestConfigSUL-MSG1-Repetition* and criteria to select supplementary uplink as defined in TS 38.321[3], clause 5.1.1 is met and if criteria to select MSG1 repetition number 2, 4 or 8 as defined in TS 38.321[3], clause 5.1.1 is met:

2> trigger the lower layer to initiate the Random Access procedure on supplementary uplink in accordance with TS 38.321 [3] using the PRACH preamble(s) and PRACH resource(s) associated with the selected MSG1 repetition number in *si-RequestConfigSUL-MSG1-Repetition* corresponding to the SI message(s) that the UE requires to operate within the cell, and for which *si-BroadcastStatus* is set to *notBroadcasting*;

2> if acknowledgement for SI request is received from lower layers:

3> acquire the requested SI message(s) as defined in clause 5.2.2.3.2, immediately;

1> else if the UE is a RedCap UE and if *initialUplinkBWP-RedCap* is configured in *UplinkConfigCommonSIB* and if *SIB1* includes *si-SchedulingInfo* containing *si-RequestConfigRedCap-MSG1-Repetition* and criteria to select normal uplink as defined in TS 38.321[3], clause 5.1.1 is met and if criteria to select MSG1 repetition number 2, 4 or 8 as defined in TS 38.321[3], clause 5.1.1 is met:

3> trigger the lower layer to initiate the Random Access procedure on supplementary uplink in accordance with TS 38.321 [3] using the PRACH preamble(s) and PRACH resource(s) associated with the selected MSG1 repetition number in *si-RequestConfigRedCap-MSG1-Repetition* corresponding to the SI message(s) that the UE requires to operate within the cell, and for which *si-BroadcastStatus* is set to *notBroadcasting*;

2> if acknowledgement for SI request is received from lower layers:

3> acquire the requested SI message(s) as defined in clause 5.2.2.3.2, immediately;

1> else if *SIB1* includes *si-SchedulingInfo* containing *si-RequestConfigSUL* and criteria to select supplementary uplink as defined in TS 38.321[3], clause 5.1.1 is met:

2> trigger the lower layer to initiate the Random Access procedure on supplementary uplink in accordance with TS 38.321 [3] using the PRACH preamble(s) and PRACH resource(s) in *si-RequestConfigSUL* corresponding to the SI message(s) that the UE requires to operate within the cell, and for which *si-BroadcastStatus* is set to *notBroadcasting*;

2> if acknowledgement for SI request is received from lower layers:

3> acquire the requested SI message(s) as defined in clause 5.2.2.3.2, immediately;

1> else if the UE is a RedCap UE and if *initialUplinkBWP-RedCap* is configured in *UplinkConfigCommonSIB* and if *SIB1* includes *si-SchedulingInfo* containing *si-RequestConfigRedCap* and criteria to select normal uplink as defined in TS 38.321[3], clause 5.1.1 is met:

2> trigger the lower layer to initiate the Random Access procedure on normal uplink in accordance with TS 38.321 [3] using the PRACH preamble(s) and PRACH resource(s) in *si-RequestConfigRedcap* corresponding to the SI message(s) that the UE requires to operate within the cell, and for which *si-BroadcastStatus* is set to *notBroadcasting*;

2> if acknowledgement for SI request is received from lower layers:

3> acquire the requested SI message(s) as defined in clause 5.2.2.3.2, immediately;

1> else:

2> if the UE is not a RedCap UE and if *SIB1* includes *si-SchedulingInfo* containing *si-RequestConfig-MSG1-Repetition* and criteria to select normal uplink and to select MSG1 repetition number 2, 4 or 8 as defined in TS 38.321[3], clause 5.1.1 are met; or

2> if the UE is a RedCap UE and if *initialUplinkBWP-RedCap* is not configured in *UplinkConfigCommonSIB* and if *SIB1* includes *si-SchedulingInfo* containing *si-RequestConfig**-MSG1-Repetition* and criteria to select normal uplink and to select MSG1 repetition number 2, 4 or 8 as defined in TS 38.321[3], clause 5.1.1 are met:

3> trigger the lower layer to initiate the Random Access procedure on normal uplink in accordance with TS 38.321 [3] using the PRACH preamble(s) and PRACH resource(s) associated with the selected MSG1 repetition number in *si-RequestConfig-MSG1-Repetition* corresponding to the SI message(s) that the UE requires to operate within the cell, and for which *si-BroadcastStatus* is set to *notBroadcasting*;

3> if acknowledgement for SI request is received from lower layers:

4> acquire the requested SI message(s) as defined in clause 5.2.2.3.2, immediately;

2> else if the UE is not a RedCap UE and if *SIB1* includes *si-SchedulingInfo* containing *si-RequestConfig* and criteria to select normal uplink as defined in TS 38.321[3], clause 5.1.1 is met; or

2> if the UE is a RedCap UE and if *initialUplinkBWP-RedCap* is not configured in *UplinkConfigCommonSIB* and if *SIB1* includes *si-SchedulingInfo* containing *si-RequestConfig* and criteria to select normal uplink as defined in TS 38.321[3], clause 5.1.1 is met:

3> trigger the lower layer to initiate the Random Access procedure on normal uplink in accordance with TS 38.321 [3] using the PRACH preamble(s) and PRACH resource(s) in *si-RequestConfig* corresponding to the SI message(s) that the UE requires to operate within the cell, and for which *si-BroadcastStatus* is set to *notBroadcasting*;

3> if acknowledgement for SI request is received from lower layers:

4> acquire the requested SI message(s) as defined in clause 5.2.2.3.2, immediately;

2> else:

3> apply the default L1 parameter values as specified in corresponding physical layer specifications except for the parameters for which values are provided in *SIB1*;

3> apply the default MAC Cell Group configuration as specified in 9.2.2;

3> apply the *timeAlignmentTimerCommon* included in *SIB1*;

3> apply the CCCH configuration as specified in 9.1.1.2;

3> initiate transmission of the *RRCSystemInfoRequest* message with *rrcSystemInfoRequest* in accordance with 5.2.2.3.4;

3> if acknowledgement for *RRCSystemInfoRequest* message with *rrcSystemInfoRequest* is received from lower layers:

4> acquire the requested SI message(s) as defined in clause 5.2.2.3.2, immediately;

1> if cell reselection occurs while waiting for the acknowledgment for SI request from lower layers:

2> reset MAC;

2> if SI request is based on *RRCSystemInfoRequest* message with *rrcSystemInfoRequest*:

3> release RLC entity for SRB0.

NOTE: After RACH failure for SI request it is up to UE implementation when to retry the SI request.

##### 5.2.2.3.3a Request for on demand positioning system information

The UE shall, while SDT procedure is not ongoing:

1> if *SIB1* includes *si-SchedulingInfo* containing *posSI-RequestConfigSUL-MSG1-Repetition* and criteria to select supplementary uplink as defined in TS 38.321[3], clause 5.1.1 is met and if criteria to select MSG1 repetition number 2, 4 or 8 as defined in TS 38.321[3], clause 5.1.1 is met:

2> trigger the lower layer to initiate the Random Access procedure on supplementary uplink in accordance with TS 38.321 [3] using the PRACH preamble(s) and PRACH resource(s) associated with the selected MSG1 repetition number in *posSI-RequestConfigSUL-MSG1-Repetition* corresponding to the SI message(s) that the UE requires to operate within the cell, and for which *si-BroadcastStatus* is set to *notBroadcasting*;

2> if acknowledgement for SI request is received from lower layers:

3> acquire the requested SI message(s) as defined in clause 5.2.2.3.2, immediately;

1> else if the UE is a RedCap UE and if *initialUplinkBWP-RedCap* is configured in *UplinkConfigCommonSIB* and if *SIB1* includes *si-SchedulingInfo* containing *posSI-RequestConfigRedCap-MSG1-Repetition* and criteria to select normal uplink as defined in TS 38.321[3], clause 5.1.1 is met and if criteria to select MSG1 repetition number 2, 4 or 8 as defined in TS 38.321[3], clause 5.1.1 is met:

3> trigger the lower layer to initiate the Random Access procedure on supplementary uplink in accordance with TS 38.321 [3] using the PRACH preamble(s) and PRACH resource(s) associated with the selected MSG1 repetition number in *posSI-RequestConfigRedCap-MSG1-Repetition* corresponding to the SI message(s) that the UE requires to operate within the cell, and for which *si-BroadcastStatus* is set to *notBroadcasting*;

2> if acknowledgement for SI request is received from lower layers:

3> acquire the requested SI message(s) as defined in clause 5.2.2.3.2, immediately;

1> else if *SIB1* includes *posSI-SchedulingInfo* containing *posSI-RequestConfigSUL* and criteria to select supplementary uplink as defined in TS 38.321[3], clause 5.1.1 is met:

2> trigger the lower layer to initiate the Random Access procedure on supplementary uplink in accordance with TS 38.321 [3] using the PRACH preamble(s) and PRACH resource(s) in *posSI-RequestConfigSUL* corresponding to the SI message(s) that the UE upper layers require for positioning operations, and for which *posSI-BroadcastStatus* is set to *notBroadcasting*;

2> if acknowledgement for SI request is received from lower layers:

3> acquire the requested SI message(s) as defined in clause 5.2.2.3.2, immediately;

1> else if the UE is a RedCap UE and if *initialUplinkBWP-RedCap* is configured in *UplinkConfigCommonSIB* and if *SIB1* includes *posSI-SchedulingInfo* containing *posSI-RequestConfigRedCap* and criteria to select normal uplink as defined in TS 38.321[3], clause 5.1.1 is met:

2> trigger the lower layer to initiate the Random Access procedure on normal uplink in accordance with TS 38.321 [3] using the PRACH preamble(s) and PRACH resource(s) in *posSI-RequestConfigRedCap* corresponding to the SI message(s) that the UE upper layers require for positioning operations, and for which *posSI-BroadcastStatus* is set to *notBroadcasting*;

2> if acknowledgement for SI request is received from lower layers:

3> acquire the requested SI message(s) as defined in clause 5.2.2.3.2, immediately;

1> else:

2> if the UE is not a RedCap UE and if *SIB1* includes *si-SchedulingInfo* containing *posSI-RequestConfig-MSG1-Repetition* and criteria to select normal uplink and to select MSG1 repetition number 2, 4 or 8 as defined in TS 38.321[3], clause 5.1.1 are met; or

2> if the UE is a RedCap UE and if *initialUplinkBWP-RedCap* is not configured in *UplinkConfigCommonSIB* and if *SIB1* includes *si-SchedulingInfo* containing *posSI-RequestConfig-MSG1-Repetition* and criteria to select normal uplink and to select MSG1 repetition number 2, 4 or 8 as defined in TS 38.321[3], clause 5.1.1 are met:

3> trigger the lower layer to initiate the Random Access procedure on normal uplink in accordance with TS 38.321 [3] using the PRACH preamble(s) and PRACH resource(s) associated with the selected MSG1 repetition number in *posSI-RequestConfig-MSG1-Repetition* corresponding to the SI message(s) that the UE requires to operate within the cell, and for which *si-BroadcastStatus* is set to *notBroadcasting*;

3> if acknowledgement for SI request is received from lower layers:

4> acquire the requested SI message(s) as defined in clause 5.2.2.3.2, immediately;

2> else if the UE is not a RedCap UE and if *SIB1* includes *posSI-SchedulingInfo* containing *posSI-RequestConfig* and criteria to select normal uplink as defined in TS 38.321[3], clause 5.1.1 is met; or

2> if the UE is a RedCap UE and if *initialUplinkBWP-RedCap* is not configured in *UplinkConfigCommonSIB* and if *SIB1* includes *posSI-SchedulingInfo* containing *posSI-RequestConfig* and criteria to select normal uplink as defined in TS 38.321[3], clause 5.1.1 is met:

3> trigger the lower layer to initiate the Random Access procedure on normal uplink in accordance with TS 38.321 [3] using the PRACH preamble(s) and PRACH resource(s) in *posSI-RequestConfig* corresponding to the SI message(s) that the UE upper layers require for positioning operations , and for which *posSI-BroadcastStatus* is set to *notBroadcasting*;

3> if acknowledgement for SI request is received from lower layers:

4> acquire the requested SI message(s) as defined in clause 5.2.2.3.2, immediately;

2> else:

3> apply the default L1 parameter values as specified in corresponding physical layer specifications except for the parameters for which values are provided in *SIB1*;

3> apply the default MAC Cell Group configuration as specified in 9.2.2;

3> apply the *timeAlignmentTimerCommon* included in *SIB1*;

3> apply the CCCH configuration as specified in 9.1.1.2;

3> initiate transmission of the *RRCSystemInfoRequest* message with *rrcPosSystemInfoRequest* in accordance with 5.2.2.3.4;

3> if acknowledgement for *RRCSystemInfoRequest* message with *rrcPosSystemInfoRequest* is received from lower layers:

4> acquire the requested SI message(s) as defined in clause 5.2.2.3.2, immediately;

1> if cell reselection occurs while waiting for the acknowledgment for SI request from lower layers:

2> reset MAC;

2> if SI request is based on *RRCSystemInfoRequest* message with *rrcPosSystemInfoRequest*:

3> release RLC entity for SRB0.

NOTE: After RACH failure for SI request it is up to UE implementation when to retry the SI request.

============================= next change ================================

6.2.2 Message definitions

<Omitted text>

– *SIB1*

*SIB1* contains information relevant when evaluating if a UE is allowed to access a cell and defines the scheduling of other system information.It also contains radio resource configuration information that is common for all UEs and barring information applied to the unified access control.

Signalling radio bearer: N/A

RLC-SAP: TM

Logical channels: BCCH

Direction: Network to UE

***SIB1* message**

-- ASN1START

-- TAG-SIB1-START

SIB1 ::= SEQUENCE {

cellSelectionInfo SEQUENCE {

q-RxLevMin Q-RxLevMin,

q-RxLevMinOffset INTEGER (1..8) OPTIONAL, -- Need S

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

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

q-QualMinOffset INTEGER (1..8) OPTIONAL -- Need S

} OPTIONAL, -- Cond Standalone

cellAccessRelatedInfo CellAccessRelatedInfo,

connEstFailureControl ConnEstFailureControl OPTIONAL, -- Need R

si-SchedulingInfo SI-SchedulingInfo OPTIONAL, -- Need R

servingCellConfigCommon ServingCellConfigCommonSIB OPTIONAL, -- Need R

ims-EmergencySupport ENUMERATED {true} OPTIONAL, -- Need R

eCallOverIMS-Support ENUMERATED {true} OPTIONAL, -- Need R

ue-TimersAndConstants UE-TimersAndConstants OPTIONAL, -- Need R

uac-BarringInfo SEQUENCE {

uac-BarringForCommon UAC-BarringPerCatList OPTIONAL, -- Need S

uac-BarringPerPLMN-List UAC-BarringPerPLMN-List OPTIONAL, -- Need S

uac-BarringInfoSetList UAC-BarringInfoSetList,

uac-AccessCategory1-SelectionAssistanceInfo CHOICE {

plmnCommon UAC-AccessCategory1-SelectionAssistanceInfo,

individualPLMNList SEQUENCE (SIZE (2..maxPLMN)) OF UAC-AccessCategory1-SelectionAssistanceInfo

} OPTIONAL -- Need S

} OPTIONAL, -- Need R

useFullResumeID ENUMERATED {true} OPTIONAL, -- Need R

lateNonCriticalExtension OCTET STRING OPTIONAL,

nonCriticalExtension SIB1-v1610-IEs OPTIONAL

}

SIB1-v1610-IEs ::= SEQUENCE {

idleModeMeasurementsEUTRA-r16 ENUMERATED{true} OPTIONAL, -- Need R

idleModeMeasurementsNR-r16 ENUMERATED{true} OPTIONAL, -- Need R

posSI-SchedulingInfo-r16 PosSI-SchedulingInfo-r16 OPTIONAL, -- Need R

nonCriticalExtension SIB1-v1630-IEs OPTIONAL

}

SIB1-v1630-IEs ::= SEQUENCE {

uac-BarringInfo-v1630 SEQUENCE {

uac-AC1-SelectAssistInfo-r16 SEQUENCE (SIZE (2..maxPLMN)) OF UAC-AC1-SelectAssistInfo-r16

} OPTIONAL, -- Need R

nonCriticalExtension SIB1-v1700-IEs OPTIONAL

}

SIB1-v1700-IEs ::= SEQUENCE {

hsdn-Cell-r17 ENUMERATED {true} OPTIONAL, -- Need R

uac-BarringInfo-v1700 SEQUENCE {

uac-BarringInfoSetList-v1700 UAC-BarringInfoSetList-v1700

} OPTIONAL, -- Cond MINT

sdt-ConfigCommon-r17 SDT-ConfigCommonSIB-r17 OPTIONAL, -- Need R

redCap-ConfigCommon-r17 RedCap-ConfigCommonSIB-r17 OPTIONAL, -- Need R

featurePriorities-r17 SEQUENCE {

redCapPriority-r17 FeaturePriority-r17 OPTIONAL, -- Need R

slicingPriority-r17 FeaturePriority-r17 OPTIONAL, -- Need R

msg3-Repetitions-Priority-r17 FeaturePriority-r17 OPTIONAL, -- Need R

sdt-Priority-r17 FeaturePriority-r17 OPTIONAL -- Need R

} OPTIONAL, -- Need R

si-SchedulingInfo-v1700 SI-SchedulingInfo-v1700 OPTIONAL, -- Need R

hyperSFN-r17 BIT STRING (SIZE (10)) OPTIONAL, -- Need R

eDRX-AllowedIdle-r17 ENUMERATED {true} OPTIONAL, -- Need R

eDRX-AllowedInactive-r17 ENUMERATED {true} OPTIONAL, -- Cond EDRX-RC

intraFreqReselectionRedCap-r17 ENUMERATED {allowed, notAllowed} OPTIONAL, -- Need S

cellBarredNTN-r17 ENUMERATED {barred, notBarred} OPTIONAL, -- Need S

nonCriticalExtension SIB1-v1740-IEs OPTIONAL

}

SIB1-v1740-IEs ::= SEQUENCE {

si-SchedulingInfo-v1740 SI-SchedulingInfo-v1740 OPTIONAL, -- Need R

nonCriticalExtension SIB1-v18xy-IEs OPTIONAL

}

SIB1-v18xy-IEs ::= SEQUENCE {

featurePriorities-v18xy SEQUENCE {

msg1-Repetitions-Priority-r18 FeaturePriority-r17

} OPTIONAL, -- Need R

si-SchedulingInfo-v18xy SI-SchedulingInfo-v18xy OPTIONAL, -- Need R

nonCriticalExtension SEQUENCE {} OPTIONAL

}

UAC-AccessCategory1-SelectionAssistanceInfo ::= ENUMERATED {a, b, c}

UAC-AC1-SelectAssistInfo-r16 ::= ENUMERATED {a, b, c, notConfigured}

SDT-ConfigCommonSIB-r17 ::= SEQUENCE {

sdt-RSRP-Threshold-r17 RSRP-Range OPTIONAL, -- Need R

sdt-LogicalChannelSR-DelayTimer-r17 ENUMERATED { sf20, sf40, sf64, sf128, sf512, sf1024, sf2560, spare1} OPTIONAL, -- Need R

sdt-DataVolumeThreshold-r17 ENUMERATED {byte32, byte100, byte200, byte400, byte600, byte800, byte1000, byte2000, byte4000,

byte8000, byte9000, byte10000, byte12000, byte24000, byte48000, byte96000},

t319a-r17 ENUMERATED { ms100, ms200, ms300, ms400, ms600, ms1000, ms2000,

ms3000, ms4000, spare7, spare6, spare5, spare4, spare3, spare2, spare1}

}

RedCap-ConfigCommonSIB-r17 ::= SEQUENCE {

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

cellBarredRedCap-r17 SEQUENCE {

cellBarredRedCap1Rx-r17 ENUMERATED {barred, notBarred},

cellBarredRedCap2Rx-r17 ENUMERATED {barred, notBarred}

} OPTIONAL, -- Need R

...

}

FeaturePriority-r17 ::= INTEGER (0..7)

-- TAG-SIB1-STOP

-- ASN1STOP

|  |
| --- |
| ***SIB1* field descriptions** |
| ***cellBarredNTN***  Value *barred* means that the cell is barred for connectivity to NTN, as defined in TS 38.304 [20]. Value *notBarred* means that the cell is allowed for connectivity to NTN. If not present, the UE considers the cell is not allowed for connectivity to NTN, as defined in TS 38.304 [20]. This field is only applicable to NTN-capable UEs. |
| ***cellBarredRedCap1Rx***  Value *barred* means that the cell is barred for a RedCap UE with 1 Rx branch, as defined in TS 38.304 [20]. This field is ignored by non-RedCap UEs. |
| ***cellBarredRedCap2Rx***  Value *barred* means that the cell is barred for a RedCap UE with 2 Rx branches, as defined in TS 38.304 [20]. This field is ignored by non-RedCap UEs. |
| ***cellSelectionInfo***  Parameters for cell selection related to the serving cell. |
| ***eCallOverIMS-Support***  Indicates whether the cell supports eCall over IMS services as defined in TS 23.501 [32]. If absent, eCall over IMS is not supported by the network in the cell. |
| ***eDRX-AllowedIdle***  The presence of this field indicates that extended DRX for CN paging is allowed in the cell for UEs in RRC\_IDLE or RRC\_INACTIVE. The UE shall stop using extended DRX for CN paging in RRC\_IDLE or RRC\_INACTIVE if *eDRX-AllowedIdle* is not present. |
| ***eDRX-AllowedInactive***  The presence of this field indicates that extended DRX for RAN paging is allowed in the cell for UEs in RRC\_INACTIVE. The UE shall stop using extended DRX for RAN paging in RRC\_INACTIVE if *eDRX-AllowedInactive* is not present. |
| ***featurePriorities***  Indicates priorities for features, such as RedCap, Slicing, SDT, MSG1-Repetitions for repetition number 2, 4 and 8, and MSG3-Repetitions for Coverage Enhancements. These priorities are used to determine which *FeatureCombinationPreambles* the UE shall use when a feature maps to more than one *FeatureCombinationPreambles*, as specified in TS 38.321 [3]. A lower value means a higher priority. The network does not signal the same priority for more than one feature. The network signals a priority for all feature that map to at least one *FeatureCombinationPreambles*. |
| ***halfDuplexRedCap-Allowed***  The presence of this field indicates that the cell supports half-duplex FDD RedCap UEs. |
| ***hsdn-Cell***  This field indicates this is a HSDN cell as specified in TS 38.304 [20]. |
| ***hyperSFN***  Indicates hyper SFN which increments by one when the SFN wraps around. This field is excluded when determining changes in system information, i.e. changes of hyper SFN should not result in system information change notifications. |
| ***idleModeMeasurementsEUTRA***  This field indicates that a UE that is configured for EUTRA idle/inactive measurements shall perform the measurements while camping in this cell and report availability of these measurements when establishing or resuming a connection in this cell. If absent, a UE is not required to perform EUTRA idle/inactive measurements. |
| ***idleModeMeasurementsNR***  This field indicates that a UE that is configured for NR idle/inactive measurements shall perform the measurements while camping in this cell and report availability of these measurements when establishing or resuming a connection in this cell. If absent, a UE is not required to perform NR idle/inactive measurements. |
| ***ims-EmergencySupport***  Indicates whether the cell supports IMS emergency bearer services for UEs in limited service mode. If absent, IMS emergency call is not supported by the network in the cell for UEs in limited service mode. |
| ***intraFreqReselectionRedCap***  Controls cell selection/reselection to intra-frequency cells for RedCap UEs when this cell is barred, or treated as barred by the RedCap UE, as specified in TS 38.304 [20]. If not present, a RedCap UE treats the cell as barred, i.e.,the UE considers that the cell does not support RedCap. |
| ***q-QualMin***  Parameter "Qqualmin" in TS 38.304 [20], applicable for serving cell. If the field is absent, the UE applies the (default) value of negative infinity for Qqualmin. |
| ***q-QualMinOffset***  Parameter "Qqualminoffset" in TS 38.304 [20]. Actual value Qqualminoffset = field value [dB]. If the field is absent, the UE applies the (default) value of 0 dB for Qqualminoffset.Affects the minimum required quality level in the cell. |
| ***q-RxLevMin***  Parameter "Qrxlevmin" in TS 38.304 [20], applicable for serving cell. |
| ***q-RxLevMinOffset***  Parameter "Qrxlevminoffset" in TS 38.304 [20]. Actual value Qrxlevminoffset = field value \* 2 [dB]. If absent, the UE applies the (default) value of 0 dB for Qrxlevminoffset*.* Affects the minimum required Rx level in the cell. |
| ***q-RxLevMinSUL***  Parameter "Qrxlevmin" in TS 38.304 [20], applicable for serving cell. |
| ***sdt-RSRP-Threshold***  RSRP threshold used to determine whether SDT procedure can be initiated, as specified in TS 38.321 [3]. |
| ***sdt-DataVolumeThreshold***  Data volume threshold used to determine whether SDT can be initiated, as specified in TS 38.321 [3]. Value *byte32* corresponds to 32 bytes, value *byte100* corresponds to 100 bytes, and so on. |
| ***sdt-LogicalChannelSR-DelayTimer***  The value of *logicalChannelSR-DelayTimer* applied during SDT for logical channels configured with SDT, as specified in TS 38.321 [3]. Value in number of subframes. Value *sf20* corresponds to 20 subframes, *sf40* corresponds to 40 subframes, and so on. If this field is not configured, then logicalChannelSR-DelayTimer is not applied for SDT logical channels. |
| ***servingCellConfigCommon***  Configuration of the serving cell. |
| ***t319a***  Initial value of the timer T319a used for detection of SDT failure. Value *ms100* corresponds to 100 milliseconds, value *ms200* corresponds to 200 milliseconds and so on. |
| ***uac-AccessCategory1-SelectionAssistanceInfo***  Information used to determine whether Access Category 1 applies to the UE, as defined in TS 22.261 [25]. If *plmnCommon* is chosen, the *UAC-AccessCategory1-SelectionAssistanceInfo* is applicable to all the PLMNs and SNPNs in *plmn-IdentityInfoList* and *npn-IdentityInfoList*. If *individualPLMNList* is chosen, the 1st entry in the list corresponds to the first network within all of the PLMNs and SNPNs across the *plmn-IdentityList* and the *npn-IdentityInfoList*, the 2nd entry in the list corresponds to the second network within all of the PLMNs and SNPNs across the *plmn-IdentityList* and the *npn-IdentityInfoList* and so on. If *uac-AC1-SelectAssistInfo-r16* is present, the UE shall ignore the *uac-AccessCategory1-SelectionAssistanceInfo*. |
| ***uac-AC1-SelectAssistInfo***  Information used to determine whether Access Category 1 applies to the UE, as defined in TS 22.261 [25]. The 1st entry in the list corresponds to the first network within all of the PLMNs and SNPNs across the *plmn-IdentityList* and *npn-IdentityInfoList*, the 2nd entry in the list corresponds to the second network within all of the PLMNs and SNPNs across the *plmn-IdentityList* and the *npn-IdentityInfoList* and so on. Value *notConfigured* indicates that Access Category1 is not configured for the corresponding PLMN/SNPN. |
| ***uac-BarringForCommon***  Common access control parameters for each access category. Common values are used for all PLMNs/SNPNs, unless overwritten by the PLMN/SNPN specific configuration provided in *uac-BarringPerPLMN-List*. The parameters are specified by providing an index to the set of configurations (*uac-BarringInfoSetList*). UE behaviour upon absence of this field is specified in clause 5.3.14.2. |
| ***ue-TimersAndConstants***  Timer and constant values to be used by the UE. The cell operating as PCell always provides this field. |
| ***useFullResumeID***  Indicates which resume identifier and Resume request message should be used. UE uses *fullI-RNTI* and *RRCResumeRequest1* if the field is present, or *shortI-RNTI* and *RRCResumeRequest* if the field is absent. |

|  |  |
| --- | --- |
| **Conditional Presence** | **Explanation** |
| *EDRX-RC* | The field is optionally present, Need R, in a cell that enables *eDRX-AllowedIdle*, otherwise it is absent. |
| *MINT* | The field is optionally present, Need R, in a cell that provides a configuration for disaster roaming, otherwise it is absent, Need R. |
| *Standalone* | The field is mandatory present in a cell that supports standalone operation, otherwise it is absent. |

====================================================== next change ==============================================================

6.3.1a Positioning System information blocks

<Omitted text>

– *PosSI-SchedulingInfo*

-- ASN1START

-- TAG-POSSI-SCHEDULINGINFO-START

PosSI-SchedulingInfo-r16 ::= SEQUENCE {

posSchedulingInfoList-r16 SEQUENCE (SIZE (1..maxSI-Message)) OF PosSchedulingInfo-r16,

posSI-RequestConfig-r16 SI-RequestConfig OPTIONAL, -- Cond MSG-1

posSI-RequestConfigSUL-r16 SI-RequestConfig OPTIONAL, -- Cond SUL-MSG-1

...,

[[

posSI-RequestConfigRedCap-r17 SI-RequestConfig OPTIONAL -- Cond REDCAP-MSG-1

]],

[[

posSI-RequestConfigSUL-MSG1-Repetition-r18 SI-RequestConfig-r18 OPTIONAL, -- Cond SUL-MSG-1

posSI-RequestConfigRedCap-MSG1-Repetition-r18 SI-RequestConfig-r18 OPTIONAL, -- Cond REDCAP-MSG-1

posSI-RequestConfig-MSG1-Repetition-r18 SI-RequestConfig-r18 OPTIONAL -- Cond MSG-1

]]

}

PosSchedulingInfo-r16 ::= SEQUENCE {

offsetToSI-Used-r16 ENUMERATED {true} OPTIONAL, -- Need R

posSI-Periodicity-r16 ENUMERATED {rf8, rf16, rf32, rf64, rf128, rf256, rf512},

posSI-BroadcastStatus-r16 ENUMERATED {broadcasting, notBroadcasting},

posSIB-MappingInfo-r16 PosSIB-MappingInfo-r16,

...

}

PosSIB-MappingInfo-r16 ::= SEQUENCE (SIZE (1..maxSIB)) OF PosSIB-Type-r16

PosSIB-Type-r16 ::= SEQUENCE {

encrypted-r16 ENUMERATED { true } OPTIONAL, -- Need R

gnss-id-r16 GNSS-ID-r16 OPTIONAL, -- Need R

sbas-id-r16 SBAS-ID-r16 OPTIONAL, -- Cond GNSS-ID-SBAS

posSibType-r16 ENUMERATED { posSibType1-1, posSibType1-2, posSibType1-3, posSibType1-4, posSibType1-5, posSibType1-6,

posSibType1-7, posSibType1-8, posSibType2-1, posSibType2-2, posSibType2-3, posSibType2-4,

posSibType2-5, posSibType2-6, posSibType2-7, posSibType2-8, posSibType2-9, posSibType2-10,

posSibType2-11, posSibType2-12, posSibType2-13, posSibType2-14, posSibType2-15,

posSibType2-16, posSibType2-17, posSibType2-18, posSibType2-19, posSibType2-20,

posSibType2-21, posSibType2-22, posSibType2-23, posSibType3-1, posSibType4-1,

posSibType5-1,posSibType6-1, posSibType6-2, posSibType6-3,... },

areaScope-r16 ENUMERATED {true} OPTIONAL -- Need S

}

GNSS-ID-r16 ::= SEQUENCE {

gnss-id-r16 ENUMERATED{gps, sbas, qzss, galileo, glonass, bds, ..., navic-v1760},

...

}

SBAS-ID-r16 ::= SEQUENCE {

sbas-id-r16 ENUMERATED { waas, egnos, msas, gagan, ...},

...

}

SI-RequestConfig-r18 ::= SEQUENCE {

si-RequestConfigForMSG1-Repetition-r18 SI-RequestConfig,

si-RequestConfig-v18xy SI-RequestConfig-v18xy

}

-- TAG-POSSI-SCHEDULINGINFO-STOP

-- ASN1STOP

|  |
| --- |
| ***PosSI-SchedulingInfo* field descriptions** |
| ***areaScope***  Indicates that a posSIB is area specific. If the field is absent, the posSIB is cell specific. |
| ***encrypted***  The presence of this field indicates that the *pos-sib-type* is encrypted as specified in TS 37.355 [49]. |
| ***gnss-id***  The presence of this field indicates that the positioning SIB type is for a specific GNSS. Indicates a specific GNSS (see also TS 37.355 [49]) |
| ***posSI-BroadcastStatus***  Indicates if the SI message is being broadcasted or not. Change of *posSI-BroadcastStat*us should not result in system information change notifications in Short Message transmitted with P-RNTI over DCI (see clause 6.5). The value of the indication is valid until the end of the BCCH modification period when set to *broadcasting*.  If *si-SchedulingInfo-v1700* is present, the network ensures that the total number of SI messages with *posSI-BroadcastStatus*and *si-BroadcastStatus*set to *notBroadcasting* in the concatenated list of SI messages configured by *posSchedulingInfoList* in *posSI-SchedulingInfo* and SI messages containing type2 SIB configured by *schedulingInfoList2* in *si-SchedulingInfo-v1700* does not exceed the limit of *maxSI-Message* when *posSI-RequestConfig* or *posSI-RequestConfigRedCap* or *posSI-RequestConfigSUL* is configured. |
| ***posSI-RequestConfig***  Configuration of Msg1 resources that the UE uses for requesting SI-messages for which *posSI-BroadcastStatus* is set to notBroadcasting. |
| ***posSI-RequestConfig-MSG1-Repetition***  Configuration of Msg1 repetition resources on NUL that the UE uses for requesting SI-messages for which posSI-BroadcastStatus is set to *notBroadcasting*. This field is only applicable when Msg1 repetition resources can be used for requesting SI-messages. |
| ***posSI-RequestConfigRedCap***  Configuration of Msg1 resources for *initialUplinkBWP-RedCap*that the RedCap UE uses for requesting SI-messages for which *posSI-BroadcastStatus* is set to *notBroadcasting*. |
| ***posSI-RequestConfigRedCap-MSG1-Repetition***  Configuration of Msg1 repetition resources for *initialUplinkBWP-RedCap*that the RedCap UE uses for requesting SI-messages for which *posSI-BroadcastStatus* is set to *notBroadcasting*. This field is only applicable when Msg1 repetition resources can be used for requesting SI-messages. |
| ***posSI-RequestConfigSUL***  Configuration of Msg1 resources that the UE uses for requesting SI-messages for which *posSI-BroadcastStatus* is set to notBroadcasting. |
| ***posSI-RequestConfigSUL-MSG1-Repetition***  Configuration of Msg1 repetition resources on SUL that the UE uses for requesting SI-messages for which *posSI-BroadcastStatus* is set to *notBroadcasting*. This field is only applicable when Msg1 repetition resources can be used for requesting SI-messages. |
| ***posSIB-MappingInfo***  List of the posSIBs mapped to this *SystemInformation* message. |
| ***posSibType***  The positioning SIB type is defined in TS 37.355 [49]. |
| ***posSI-Periodicity***  Periodicity of the SI-message in radio frames, such that rf8 denotes 8 radio frames, rf16 denotes 16 radio frames, and so on. If the *offsetToSI-Used* is configured, the *posSI-Periodicity* of rf8 cannot be used. |
| ***offsetToSI-Used***  This field, if present indicates that all the SI messages in *posSchedulingInfoList* are scheduled with an offset of 8 radio frames compared to SI messages in *schedulingInfoList*. *offsetToSI-Used* may be present only if the shortest configured SI message periodicity for SI messages in *schedulingInfoList* is 80ms. If SI offset is used, this field is present in each of the SI messages in the *posSchedulingInfoList*. |
| ***sbas-id***  The presence of this field indicates that the positioning SIB type is for a specific SBAS. Indicates a specific SBAS (see also TS 37.355 [49]). |

| **Conditional presence** | **Explanation** |
| --- | --- |
| *GNSS-ID-SBAS* | The field is mandatory present if *gnss-id* is set to *sbas*. It is absent otherwise. |
| *MSG-1* | The field is optionally present, Need R, if *posSI-BroadcastStatus* is set to *notBroadcasting* for any SI-message included in *posSchedulingInfoList* or if *si-BroadcastStatus* is set to *notBroadcasting* for any SI-message containing type2 SIB included in *schedulingInfoList2*. It is absent otherwise. |
| *SUL-MSG-1* | The field is optionally present, Need R, if *supplementaryUplink* is configured in *ServingCellConfigCommonSIB,* and if *posSI-BroadcastStatus* is set to *notBroadcasting* for any SI-message included in *posSchedulingInfoList* or if *si-BroadcastStatus* is set to *notBroadcasting* for anySI-message containing type2 SIB included in *schedulingInfoList2*. It is absent otherwise. |
| *REDCAP-MSG-1* | The field is optionally present, Need R, if *initialUplinkBWP-RedCap* is configured in *UplinkConfigCommonSIB,* and if *posSI-BroadcastStatus* is set to *notBroadcasting* for any SI-message included in *posSchedulingInfoList* or if *si-BroadcastStatus* is set to *notBroadcasting* for anySI-message containing type2 SIB included in *schedulingInfoList2*. It is absent otherwise. |

====================================================== next change ==============================================================

6.3.2 Radio resource control information elements

<Omitted text>

– *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

]],

rsrp-ThresholdMsg1-RepetitionNum2-r18 RSRP-Range OPTIONAL, -- Cond Msg1Rep1

rsrp-ThresholdMsg1-RepetitionNum4-r18 RSRP-Range OPTIONAL, -- Cond Msg1Rep1

rsrp-ThresholdMsg1-RepetitionNum8-r18 RSRP-Range OPTIONAL, -- Cond Msg1Rep1

msg1-RepetitionTransMax-r18 ENUMERATED {n1, n2, n4, n6, n8, n10, n20, n50, n100, n200} OPTIONAL -- Cond Msg1Rep1

]]

}

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). |
| ***msg1-RepetitionTransMax***  Max number of transmissions of MSG1 repetitions number (2, 4 and 8) performed before switching to higher repetition number (see TS 38.321 [3], clauses 5.1.1). This field is only applicable when more than 2 repetition numbers are configured in shared RO. If the field is absent, switching from lower repetition number to higher repetition number is not allowed. |
| ***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). For RedCap-specific initial uplink BWP, *rach-ConfigCommon* is always configured when *msgA-ConfigCommon* is configured in this BWP. |
| ***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-ThresholdMsg1-RepetitionNum2, rsrp-ThresholdMsg1-RepetitionNum4, rsrp-ThresholdMsg1-RepetitionNum8***  Threshold used by the UE for determining whether to select resources indicating Msg1 repetition number 2, 4 or 8 in this BWP, as specified in TS 38.321 [3]. The value applies to all the BWPs and all RACH configurations. This field is absent when only one set of Random Access resources with MSG1 repetition indication is configured in the *BWP-UplinkCommon*. |
| ***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** |
| *Msg1Rep1* | This field is optionally present, Need R, if the set(s) of Random Access resources with MSG1 repetition indication are configured in the *BWP-UplinkCommon*. It is absent otherwise. |
| *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. |

Editor’s Note3: FFS on separate *numberOfMsg3-RepetitionsList*, *mcs-Msg3-Repetitions* when MSG1 repetition is applicable.

Editor’s Note4: FFS on values of *msg1-RepetitionTransMax*.

Editor’s Note5: FFS on limitation of the max number of entries of *additionalRACH-ConfigList*.

====================================================== next change ==============================================================

– *FeatureCombination*

The IE *FeatureCombination* indicates a feature or a combination of features to be associated with a set of Random Access resources (i.e. an instance of *FeatureCombinationPreambles*).

***FeatureCombination* information element**

-- ASN1START

-- TAG-FEATURECOMBINATION-START

FeatureCombination-r17 ::= SEQUENCE {

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

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

nsag-r17 NSAG-List-r17 OPTIONAL, -- Need R

msg3-Repetitions-r17 ENUMERATED {true} OPTIONAL, -- Need R

msg1-Repetitions-r18 ENUMERATED {true} OPTIONAL, -- Need R

spare3 ENUMERATED {true} OPTIONAL, -- Need R

spare2 ENUMERATED {true} OPTIONAL, -- Need R

spare1 ENUMERATED {true} OPTIONAL -- Need R

}

NSAG-List-r17 ::= SEQUENCE (SIZE (1.. maxSliceInfo-r17)) OF NSAG-ID-r17

-- TAG-FEATURECOMBINATION-STOP

-- ASN1STOP

|  |
| --- |
| ***FeatureCombination* field descriptions** |
| ***redCap***  If present, this field indicates that RedCap is part of this feature combination. |
| ***smallData***  If present, this field indicates that Small Data is part of this feature combination. |
| ***nsag***  If present, this field indicates NSAG(s) that are part of this feature combination. |
| ***msg1-Repetitions***  If present, this field indicates that signalling of msg1 repetition is part of this feature combination. This field is not configured in a set of preambles that is configured with 2-step random-access type. |
| ***msg3-Repetitions***  If present, this field indicates that signalling of msg3 repetition is part of this feature combination. This field is not configured in a set of preambles that is configured with 2-step random-access type. |

====================================================== next change ==============================================================

– *FeatureCombinationPreambles*

The IE *FeatureCombinationPreambles* associatesa set of preambles with a feature combination. For parameters which can be provided in this IE, the UE applies this field value when performing Random Access using a preamble in this featureCombinationPreambles, otherwise the UE applies the corresponding value as determined by applicable Need Code, e.g. Need S. On a specific BWP, there can be at most one set of preambles associated with a given feature combination per RA Type (i.e. 4-step RACH or 2-step RACH) per MSG1 repetition number.

***FeatureCombinationPreambles* information element**

-- ASN1START

-- TAG-FEATURECOMBINATIONPREAMBLES-START

FeatureCombinationPreambles-r17 ::= SEQUENCE {

featureCombination-r17 FeatureCombination-r17,

startPreambleForThisPartition-r17 INTEGER (0..63),

numberOfPreamblesPerSSB-ForThisPartition-r17 INTEGER (1..64),

ssb-SharedRO-MaskIndex-r17 INTEGER (1..15) OPTIONAL, -- Need S

groupBconfigured-r17 SEQUENCE {

ra-SizeGroupA-r17 ENUMERATED {b56, b144, b208, b256, b282, b480, b640,

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

messagePowerOffsetGroupB-r17 ENUMERATED { minusinfinity, dB0, dB5, dB8, dB10, dB12, dB15, dB18},

numberOfRA-PreamblesGroupA-r17 INTEGER (1..64)

} OPTIONAL, -- Need R

separateMsgA-PUSCH-Config-r17 MsgA-PUSCH-Config-r16 OPTIONAL, -- Cond MsgAConfigCommon

msgA-RSRP-Threshold-r17 RSRP-Range OPTIONAL, -- Need R

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

deltaPreamble-r17 INTEGER (-1..6) OPTIONAL, -- Need R

...,

[[

msg1-RepetitionNum-r18 ENUMERATED {2, 4, 8} OPTIONAL, -- Cond Msg1Rep2

msg1-RepetitionTimeOffsetROGroup-r18 ENUMERATED {n4, n8, n16, n32} OPTIONAL, –- Cond Msg1Rep3

]]

}

-- TAG-FEATURECOMBINATIONPREAMBLES-STOP

-- ASN1STOP

|  |
| --- |
| ***FeatureCombinationPreambles* field descriptions** |
| ***deltaPreamble***  Power offset between msg3 or msgA-PUSCH and RACH preamble transmission. If configured, this parameter overrides *msg3-DeltaPreamble* or *msgA-DeltaPreamble*, Actual value = field value \* 2 [dB] (see TS 38.213 [13], clause 7.1). If *msgA-DeltaPreamble* is configured in *separateMsgA-PUSCH-Config-r17*, this field is absent. The value applies to all *FeatureCombinationPreambles* for MSG1 repetitions. |
| ***featureCombination***  Indicates which combination of features that the preambles indicated by this IE are associated with. The UE ignores a RACH resource defined by this *FeatureCombinationPreambles* if any feature within the *featureCombination* is not supported by the UE or if any of the spare fields within the *featureCombination* is set to *true*. |
| ***messagePowerOffsetGroupB***  Threshold for preamble selection. Value is in dB. Value *minusinfinity* corresponds to –infinity. Value *dB0* corresponds to 0 dB, *dB5* corresponds to 5 dB and so on (see TS 38.321 [3], clause 5.1.2). |
| ***msg1-RepetitionNum***  Indicates which MSG1-repetition number that this *FeatureCombinationPreambles* is associated with. |
| ***msg1-RepetitionTimeOffsetROGroup***  Indicates a time offset of the starting ROs between two successive RO groups for a given repetition number (2, 4 or 8) associated with this *FeatureCombinationPreambles* for each frequency resource index within a time period (see TS 38.213 [13]). If this field is absent, the time offset is implicitly determined (see TS 38.213 [13]).  For each MSG1 repetition number, the following values are applicable.  • {n16, [n32]}, for MSG1 repetition number 8  • {n8, n16, [n32]}, for MSG1 repetition number 4  • {n4, n8, [n16, n32]}, MSG1 repetition number 2 |
| ***msgA-RSRP-Threshold***  The UE selects 2-step random access type to perform random access based on this threshold (see TS 38.321 [3], clause 5.1.1). This field is only present if both 2-step and 4-step RA type are configured for the concerned feature combination in the BWP. If configured, this parameter overrides *msgA-RSRP-Threshold-r16*. If absent, the UE applies *msgA-RSRP-Threshold-r16*, if configured |
| ***numberOfPreamblesPerSSB-ForThisPartition***  It determines how many consecutive preambles are associated to the Feature Combination starting from the starting preamble(s) per SSB. |
| ***numberOfRA-PreamblesGroupA***  It determines how many consecutive preambles per SSB are associated to Group A starting from the starting preamble(s). The remaining preambles associated to the Feature Combination are associated to Group B |
| ***ra-SizeGroupA***  Transport Blocks size threshold in bits below which the UE shall use a contention-based RA preamble of group A. (see TS 38.321 [3], clause 5.1.2). If this feature combination preambles are associated to a *RACH-ConfigCommon-twostepRA*, this field correspond to *ra-MsgA-SizeGroupA*, otherwise it corresponds to *ra-Msg3SizeGroupA*. |
| ***rsrp-ThresholdSSB***  L1-RSRP threshold used for determining whether a candidate beam may be used by the UE. If this parameter is included in *FeatureCombinationPreambles* which is included in *RACH-ConfigCommonTwoStepRA*, it corresponds to *msgA-RSRP-ThresholdSSB*, as defined in TS 38.321 [3]. If this parameter is included in *FeatureCombinationPreambles* which is included in *RACH-ConfigCommon*, it it corresponds to *rsrp-ThresholdSSB*, as defined in TS 38.321 [3]. |
| ***separateMsgA-PUSCH-Config***  If present it specifies how the 2-step RACH preambles identified by this *FeatureCombinationPreambles* are mapped to a PUSCH slot separate from the one defined in MsgA-ConfigCommon-r16. If the field is absent, the UE should apply the corresponding parameter in the *RACH-ConfigCommonTwoStepRA* of the BWP which includes the *FeatureCombinationPreambles IE*. |
| ***ssb-SharedRO-MaskIndex***  Mask index (see TS 38.321 [3]).  Indicates a subset of ROs where preambles are allocated for this feature combination.  If this field is configured within *FeatureCombinationPreambles* which is included in *RACH-ConfigCommonTwoStepRA*:  - in case of separate ROs are configured for 4-step and 2-step random access, this field indicates a subset of ROs configured within this *RACH-ConfigCommonTwoStepRA*;  - in case shared ROs are used for 4-step and 2-step random access, it indicates the subset of ROs configured within *RACH-ConfigCommon*, which are the subset of ROs configured for 2-step random access.  This field is configured when there is more than one RO per SSB. If the field is absent, all ROs configured in *RACH-ConfigCommon* or *RACH-ConfigCommonTwoStepRA* containing this *FeatureCombinationPreambles* are shared. |
| ***startPreambleForThisPartition***  It defines the first preamble associated with the Feature Combination. If the UE is provided with a number N of SSB block indexes associated with one PRACH occasion, and N<1, the first preamble in each PRACH occasion is the one having the same index as indicated by this field. If N>=1, N blocks of preambles associated with the Feature Combination are defined, each having start index + *startPreambleForThisPartition*, where n refers to SSB block index (see TS 38.213 [13], clause 8.1). |

|  |  |
| --- | --- |
| **Conditional Presence** | **Explanation** |
| *MsgAConfigCommon* | The field is optionally present, Need S, if *FeatureCombinationPreambles* is included in *RACH-ConfigCommonTwoStepRA*. Otherwise, it is absent. If the field is absent in *FeatureCombinationPreambles* included in *RACH-ConfigCommonTwoStepRA*, the UE applies *MsgA-PUSCH-Config* included in the corresponding *MsgA-ConfigCommon*. |
| *Msg1Rep2* | The field is mandatory present, Need R, if *msg1-Repetitions* is included in *FeatureCombination* for this concerned *FeatureCombinationPreambles*. Otherwise, it is absent. |
| *Msg1Rep3* | The field is optionally present, Need S, if *msg1-Repetitions* is included in *FeatureCombination* for this concerned *FeatureCombinationPreambles*. Otherwise, it is absent. |

Editor’s Note1: FFS on separate *groupBconfigure*, *rsrp-ThresholdSSB* for different repetition number.

Editor’s Note2: FFS on values of *msg1-RepetitionTimeOffsetROGroup*, which is up to RAN1.

====================================================== next change ==============================================================

– *PHR-Config*

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

***PHR-Config* information element**

-- ASN1START

-- TAG-PHR-CONFIG-START

PHR-Config ::= SEQUENCE {

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

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

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

multiplePHR BOOLEAN,

dummy BOOLEAN,

phr-Type2OtherCell BOOLEAN,

phr-ModeOtherCG ENUMERATED {real, virtual},

...,

[[

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

]],

[[

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

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

]],

[[

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

]]

}

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

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

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

}

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

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

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

numberOfN-r17 INTEGER(1..4),

...

}

-- TAG-PHR-CONFIG-STOP

-- ASN1STOP

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

====================================================== 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

...,

[[

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

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

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

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

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

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

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

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

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

frequencyHoppingDCI-0-2-r16 CHOICE {

pusch-RepTypeA ENUMERATED {intraSlot, interSlot},

pusch-RepTypeB ENUMERATED {interRepetition, interSlot}

} OPTIONAL, -- Need S

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

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

OPTIONAL, -- Cond codebookBased

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

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

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

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

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

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

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

OPTIONAL, -- Need M

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

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

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

OPTIONAL, -- Need M

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

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

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

OPTIONAL, -- Need M

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

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

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

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

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

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

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

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

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

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

OPTIONAL, -- Need M

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

]],

[[

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

]],

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

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

]]

}

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)

-- TAG-PUSCH-CONFIG-STOP

-- ASN1STOP

|  |
| --- |
| ***PUSCH-Config* field descriptions** |
| ***antennaPortsFieldPresenceDCI-0-2***  Configure the presence of "Antenna ports" field in DCI format 0\_2. When the field is configured, then the "Antenna ports" field is present in DCI format 0\_2. Otherwise, the field size is set to 0 for DCI format 0\_2 (See TS 38.212 [17], clause 7.3.1.1.3). If neither *dmrs-UplinkForPUSCH-MappingTypeA-DCI-0-2* nor *dmrs-UplinkForPUSCH-MappingTypeB-DCI-0-2* is configured, this field is absent. |
| ***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 format 0\_1 and the field *codebookSubsetDCI-0-2* applies to DCI format 0\_2 (see TS 38.214 [19], clause 6.1.1.1). |
| ***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 format 0\_1 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 format 0\_1 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]). |
| ***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]). |
| ***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 format 0\_0 and 0\_1 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 format 0\_0 and DCI format 0\_1 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 format 0\_1 and the field *maxRankDCI-0-2* applies to DCI format 0\_2 (see TS 38.214 [19], clause 6.1.1.1). |
| ***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 format 0\_0 and DCI format 0\_1 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 format 0\_0 and DCI format 0\_1 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. |
| ***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 formats 0\_0 or DCI format 0\_1 when the field *pusch-TimeDomainAllocationListDCI-0-1* is not configured (see TS 38.214 [19], table 6.1.2.1.1-1 and table 6.1.2.1.1-1A). 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 format 0\_1 (see TS 38.214 [19], clause 6.1, table 6.1.2.1.1-1A). |
| ***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. 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'. |
| ***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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| ***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. |

====================================================== next change ==============================================================

– *RACH-ConfigCommon*

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

***RACH-ConfigCommon* information element**

-- ASN1START

-- TAG-RACH-CONFIGCOMMON-START

RACH-ConfigCommon ::= SEQUENCE {

rach-ConfigGeneric RACH-ConfigGeneric,

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

ssb-perRACH-OccasionAndCB-PreamblesPerSSB CHOICE {

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

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

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

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

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

four INTEGER (1..16),

eight INTEGER (1..8),

sixteen INTEGER (1..4)

} OPTIONAL, -- Need M

groupBconfigured SEQUENCE {

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

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

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

numberOfRA-PreamblesGroupA INTEGER (1..64)

} OPTIONAL, -- Need R

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

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

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

prach-RootSequenceIndex CHOICE {

l839 INTEGER (0..837),

l139 INTEGER (0..137)

},

msg1-SubcarrierSpacing SubcarrierSpacing OPTIONAL, -- Cond L139

restrictedSetConfig ENUMERATED {unrestrictedSet, restrictedSetTypeA, restrictedSetTypeB},

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

...,

[[

ra-PrioritizationForAccessIdentity-r16 SEQUENCE {

ra-Prioritization-r16 RA-Prioritization,

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

} OPTIONAL, -- Cond InitialBWP-Only

prach-RootSequenceIndex-r16 CHOICE {

l571 INTEGER (0..569),

l1151 INTEGER (0..1149)

} OPTIONAL -- Need R

]],

[[

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

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

]]

}

-- TAG-RACH-CONFIGCOMMON-STOP

-- ASN1STOP

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

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

Editor’s Note6: FFS on limitation of the max number of entries of *featureCombinationPreamblesList*.

====================================================== next change ==============================================================

– *RACH-ConfigDedicated*

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

***RACH-ConfigDedicated* information element**

-- ASN1START

-- TAG-RACH-CONFIGDEDICATED-START

RACH-ConfigDedicated ::= SEQUENCE {

cfra CFRA OPTIONAL, -- Need S

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

...,

[[

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

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

]]

}

CFRA ::= SEQUENCE {

occasions SEQUENCE {

rach-ConfigGeneric RACH-ConfigGeneric,

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

OPTIONAL -- Cond Mandatory

} OPTIONAL, -- Need S

resources CHOICE {

ssb SEQUENCE {

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

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

},

csirs SEQUENCE {

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

rsrp-ThresholdCSI-RS RSRP-Range

}

},

...,

[[

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

]],

msg1-RepetitionNumForCFRA-r18 ENUMERATED {2, 4, 8} OPTIONAL –- Cond 4StepCFRArep

]]

}

CFRA-TwoStep-r16 ::= SEQUENCE {

occasionsTwoStepRA-r16 SEQUENCE {

rach-ConfigGenericTwoStepRA-r16 RACH-ConfigGenericTwoStepRA-r16,

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

two, four, eight, sixteen}

} OPTIONAL, -- Need S

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

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

resourcesTwoStep-r16 SEQUENCE {

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

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

},

...

}

CFRA-SSB-Resource ::= SEQUENCE {

ssb SSB-Index,

ra-PreambleIndex INTEGER (0..63),

...,

[[

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

]]

}

CFRA-CSIRS-Resource ::= SEQUENCE {

csi-RS CSI-RS-Index,

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

ra-PreambleIndex INTEGER (0..63),

...

}

-- TAG-RACH-CONFIGDEDICATED-STOP

-- ASN1STOP

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

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

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

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

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

|  |  |
| --- | --- |
| **Conditional Presence** | **Explanation** |
| *Mandatory* | The field is mandatory present. |
| *Occasions* | The field is optionally present, Need S, if the field *occasions* is present, otherwise it is absent. |
| *2StepCFRA* | The field is optionally present for the case of 2-step RA type contention free random access, Need S, otherwise it is absent. |
| *4StepCFRArep* | The field is optionally present for the case of only SSB resource is configured for the 4-step RA type contention free random access, Need S, otherwise it is absent. |

Editor’s Note7: FFS on support of CFRA with MSG1-repetition for CHO.

====================================================== next change ==============================================================

– *ServingCellConfigCommon*

The IE *ServingCellConfigCommon* is used to configure cell specific parameters of a UE's serving cell. The IE contains parameters which a UE would typically acquire from SSB, MIB or SIBs when accessing the cell from IDLE. With this IE, the network provides this information in dedicated signalling when configuring a UE with a SCells or with an additional cell group (SCG). It also provides it for SpCells (MCG and SCG) upon reconfiguration with sync.

***ServingCellConfigCommon* information element**

-- ASN1START

-- TAG-SERVINGCELLCONFIGCOMMON-START

ServingCellConfigCommon ::= SEQUENCE {

physCellId PhysCellId OPTIONAL, -- Cond HOAndServCellAdd,

downlinkConfigCommon DownlinkConfigCommon OPTIONAL, -- Cond HOAndServCellAdd

uplinkConfigCommon UplinkConfigCommon OPTIONAL, -- Need M

supplementaryUplinkConfig UplinkConfigCommon OPTIONAL, -- Need S

n-TimingAdvanceOffset ENUMERATED { n0, n25600, n39936 } OPTIONAL, -- Need S

ssb-PositionsInBurst CHOICE {

shortBitmap BIT STRING (SIZE (4)),

mediumBitmap BIT STRING (SIZE (8)),

longBitmap BIT STRING (SIZE (64))

} OPTIONAL, -- Cond AbsFreqSSB

ssb-periodicityServingCell ENUMERATED { ms5, ms10, ms20, ms40, ms80, ms160, spare2, spare1 } OPTIONAL, -- Need S

dmrs-TypeA-Position ENUMERATED {pos2, pos3},

lte-CRS-ToMatchAround SetupRelease { RateMatchPatternLTE-CRS } OPTIONAL, -- Need M

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

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

ssbSubcarrierSpacing SubcarrierSpacing OPTIONAL, -- Cond HOAndServCellWithSSB

tdd-UL-DL-ConfigurationCommon TDD-UL-DL-ConfigCommon OPTIONAL, -- Cond TDD

ss-PBCH-BlockPower INTEGER (-60..50),

...,

[[

channelAccessMode-r16 CHOICE {

dynamic NULL,

semiStatic SemiStaticChannelAccessConfig-r16

} OPTIONAL, -- Cond SharedSpectrum

discoveryBurstWindowLength-r16 ENUMERATED {ms0dot5, ms1, ms2, ms3, ms4, ms5} OPTIONAL, -- Need R

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

highSpeedConfig-r16 HighSpeedConfig-r16 OPTIONAL -- Need R

]],

[[

highSpeedConfig-v1700 HighSpeedConfig-v1700 OPTIONAL, -- Need R

channelAccessMode2-r17 ENUMERATED {enabled} OPTIONAL, -- Cond SharedSpectrum2

discoveryBurstWindowLength-r17 ENUMERATED {ms0dot125, ms0dot25, ms0dot5, ms0dot75, ms1, ms1dot25} OPTIONAL, -- Need R

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

highSpeedConfigFR2-r17 HighSpeedConfigFR2-r17 OPTIONAL, -- Need R

uplinkConfigCommon-v1700 UplinkConfigCommon-v1700 OPTIONAL, -- Need R

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

]],

[[

featurePriorities-r17 SEQUENCE {

redCapPriority-r17 FeaturePriority-r17 OPTIONAL, -- Need R

slicingPriority-r17 FeaturePriority-r17 OPTIONAL, -- Need R

msg3-Repetitions-Priority-r17 FeaturePriority-r17 OPTIONAL, -- Need R

sdt-Priority-r17 FeaturePriority-r17 OPTIONAL -- Need R

} OPTIONAL -- Need R

]],

[[

ra-ChannelAccess-r17 ENUMERATED {enabled} OPTIONAL -- Cond SharedSpectrum2

]],

[[

featurePriorities-v18xy ::= SEQUENCE {

msg1-Repetitions-Priority-r18 FeaturePriority-r17

} OPTIONAL -- Need R

]]

}

-- TAG-SERVINGCELLCONFIGCOMMON-STOP

-- ASN1STOP

|  |
| --- |
| ***ServingCellConfigCommon* field descriptions** |
| ***channelAccessMode***  If present, this field indicates which channel access procedures to apply for operation with shared spectrum channel access as defined in TS 37.213 [48]. If the field is configured as "semiStatic", the UE shall apply the channel access procedures for semi-static channel occupancy as described in clause 4.3 in TS 37.213. If the field is configured as "dynamic", the UE shall apply the channel access procedures as defined in TS 37.213, clause 4.1 and 4.2. |
| ***channelAccessMode2***  If present, the UE shall apply channel access procedures for operation with shared spectrum channel access in accordance with TS 37.213 [48], clause 4.4 for FR2-2. If absent, the UE shall not apply any channel access procedure. The network always configures this field if channel access procedures are required for the serving cell within this region by regulations. |
| ***dmrs-TypeA-Position***  Position of (first) DM-RS for downlink (see TS 38.211 [16], clause 7.4.1.1.1) and uplink (TS 38.211 [16], clause 6.4.1.1.3). |
| ***downlinkConfigCommon***  The common downlink configuration of the serving cell, including the frequency information configuration and the initial downlink BWP common configuration. The parameters provided herein should match the parameters configured by MIB and SIB1 (if provided) of the serving cell, with the exception of *controlResourceSetZero* and *searchSpaceZero* which can be configured in *ServingCellConfigCommon* even if MIB indicates that they are absent. |
| ***discoveryBurstWindowLength***  Indicates the window length of the discovery burst in ms (see TS 37.213 [48]). The field *discoveryBurstWindowLength-r17* is applicable to SCS 480 kHz and SCS 960 kHz. |
| ***featurePriorities***  Indicates priorities for features, such as RedCap, Slicing, SDT, MSG1-Repetitions for repetition number 2, 4 and 8, and MSG3-Repetitions for Coverage Enhancements. These priorities are used to determine which *FeatureCombinationPreambles* the UE shall use when a feature maps to more than one *FeatureCombinationPreambles*, as specified in TS 38.321 [3]. A lower value means a higher priority. The network does not signal the same priority for more than one feature. The network signals a priority for all feature that map to at least one *FeatureCombinationPreambles*. |
| ***longBitmap***  Bitmap when maximum number of SS/PBCH blocks per half frame equals to 64 as defined in TS 38.213 [13], clause 4.1. |
| ***lte-CRS-ToMatchAround***  Parameters to determine an LTE CRS pattern that the UE shall rate match around. |
| ***mediumBitmap***  Bitmap when maximum number of SS/PBCH blocks per half frame equals to 8 as defined in TS 38.213 [13], clause 4.1. |
| ***n-TimingAdvanceOffset***  The N\_TA-Offset to be applied for all uplink transmissions on this serving cell. If the field is absent, the UE applies the value defined for the duplex mode and frequency range of this serving cell. See TS 38.133 [14], table 7.1.2-2. |
| ***ra-ChannelAccess***  If present, this field indicates that the UE shall apply channel access procedures before msg1/msgA transmission for operation with shared spectrum channel access in accordance with TS 37.213 [48], clause 4.4.5 for FR2-2. |
| ***rateMatchPatternToAddModList***  Resources patterns which the UE should rate match PDSCH around. The UE rate matches around the union of all resources indicated in the rate match patterns. Rate match patterns defined here on cell level apply only to PDSCH of the same numerology (see TS 38.214 [19], clause 5.1.4.1). If a *RateMatchPattern* with the same *RateMatchPatternId* is configured in both *ServingCellConfig/ServingCellConfigCommon* and in SIB20/MCCH, the entire *RateMatchPattern* configuration, including the set of RBs/REs indicated by the patterns for the rate matching around, shall be the same and they are counted as a single rate match pattern in the total configured rate match patterns as defined in TS 38.214 [19]. |
| ***shortBitmap***  Bitmap when maximum number of SS/PBCH blocks per half frame equals to 4 as defined in TS 38.213 [13], clause 4.1. |
| ***ss-PBCH-BlockPower***  Average EPRE of the resources elements that carry secondary synchronization signals in dBm that the NW used for SSB transmission, see TS 38.213 [13], clause 7. |
| ***ssb-periodicityServingCell***  The SSB periodicity in ms for the rate matching purpose. If the field is absent, the UE applies the value ms5. (see TS 38.213 [13], clause 4.1) |
| ***ssb-PositionQCL***  Indicates the QCL relation between SSB positions for this serving cell as specified in TS 38.213 [13], clause 4.1. |
| ***ssb-PositionsInBurst***  For operation in licensed spectrum, indicates the time domain positions of the transmitted SS-blocks in a half frame with SS/PBCH blocks as defined in TS 38.213 [13], clause 4.1. The first/leftmost bit corresponds to SS/PBCH block index 0, the second bit corresponds to SS/PBCH block index 1, and so on. Value 0 in the bitmap indicates that the corresponding SS/PBCH block is not transmitted while value 1 indicates that the corresponding SS/PBCH block is transmitted. The network configures the same pattern in this field as in the corresponding field in ServingCellConfigCommonSIB.  For operation with shared spectrum channel access, the UE assumes that one or more SS/PBCH blocks indicated by *ssb-PositionsInBurst* may be transmitted within the discovery burst transmission window and have candidate SS/PBCH blocks indexes corresponding to SS/PBCH block indexes provided by *ssb-PositionsInBurst* (see TS 38.213 [13], clause 4.1). If the k-th bit of *ssb-PositionsInBurst* is set to 1, the UE assumes that one or more SS/PBCH blocks within the discovery burst transmission window with candidate SS/PBCH block indexes corresponding to SS/PBCH block index equal to k – 1 may be transmitted; if the kt-th bit is set to 0, the UE assumes that the corresponding SS/PBCH block(s) are not transmitted. The k-th bit is set to 0, where k > *ssb-PositionQCL* and the number of actually transmitted SS/PBCH blocks is not larger than the number of 1's in the bitmap. The network configures the same pattern in this field as in the corresponding field in *ServingCellConfigCommonSIB*. For operation with shared spectrum channel access in FR1, only *mediumBitmap* is used, and for FR2-2, *longBitmap* is used. |
| ***ssbSubcarrierSpacing***  Subcarrier spacing of SSB.  Only the following values are applicable depending on the used frequency:  FR1: 15 or 30 kHz  FR2-1: 120 or 240 kHz  FR2-2: 120, 480, or 960 kHz |
| ***supplementaryUplinkConfig***  The network configures this field only if *uplinkConfigCommon* is configured. If this field is absent, the UE shall release the *supplementaryUplinkConfig* and the *supplementaryUplink* configured in *ServingCellConfig* of this serving cell, if configured. |
| ***tdd-UL-DL-ConfigurationCommon***  A cell-specific TDD UL/DL configuration, see TS 38.213 [13], clause 11.1. |

|  |  |
| --- | --- |
| **Conditional Presence** | **Explanation** |
| *AbsFreqSSB* | The field is absent when *absoluteFrequencySSB* in frequencyInfoDL is absent, otherwise the field is mandatory present. |
| *HOAndServCellAdd* | This field is mandatory present upon SpCell change (including path switch between a serving cell and a L2 U2N Relay UE) and upon serving cell (PSCell/SCell) addition. Otherwise, the field is absent. |
| *HOAndServCellWithSSB* | This field is mandatory present upon SpCell change and upon serving cell (SCell with SSB or PSCell) addition. Otherwise, the field is absent. |
| *SharedSpectrum* | This field is mandatory present if this cell operates with shared spectrum channel access in FR1. Otherwise, it is absent, Need R. |
| *SharedSpectrum2* | This field is optionally present if this cell operates with shared spectrum channel access in FR2-2, Need R. Otherwise, it is absent, Need R. |
| *TDD* | The field is optionally present, Need R, for TDD cells; otherwise it is absent. |

====================================================== next change ==============================================================

– *SI-RequestConfig*

The IE *SI-RequestConfig* contains configuration for Msg1 based SI request.

***SI-RequestConfig* information element**

-- ASN1START

-- TAG-SI-REQUESTCONFIG-START

SI-RequestConfig ::= SEQUENCE {

rach-OccasionsSI SEQUENCE {

rach-ConfigSI RACH-ConfigGeneric,

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

} OPTIONAL, -- Need R

si-RequestPeriod ENUMERATED {one, two, four, six, eight, ten, twelve, sixteen} OPTIONAL, -- Need R

si-RequestResources SEQUENCE (SIZE (1..maxSI-Message)) OF SI-RequestResources

}

SI-RequestResources ::= SEQUENCE {

ra-PreambleStartIndex INTEGER (0..63),

ra-AssociationPeriodIndex INTEGER (0..15) OPTIONAL, -- Need R

ra-ssb-OccasionMaskIndex INTEGER (0..15) OPTIONAL -- Need R

}

SI-RequestConfig-v18xy ::= SEQUENCE {

si-RequestResources-r18 SEQUENCE (SIZE (1..maxSI-Message)) OF SI-RequestResourcesForMSG1-Repetition-r18

}

SI-RequestResourcesForMSG1-Repetition-r18 ::= SEQUENCE {

si-RequestResourcesList-MSG1-Repetition-r18 SEQUENCE (SIZE (1.. maxNrofMSG1-Repetitions-r18)) OF SI-RequestResourcesForMSG1-RepetitionNum-r18

}

SI-RequestResourcesForMSG1-RepetitionNum-r18 ::= SEQUENCE {

si-RequestResources-r18 SI-RequestResources,

msg1-RepetitionNum-r18 ENUMERATED {2, 4, 8}

}

-- TAG-SI-REQUESTCONFIG-STOP

-- ASN1STOP

|  |
| --- |
| ***SI-RequestConfig* field descriptions** |
| ***rach-OccasionsSI***  Configuration of dedicated RACH Occasions for SI. If the field is absent, the UE uses the corresponding parameters configured in *rach-ConfigCommon* of the initial uplink BWP. |
| ***si-RequestPeriod***  Periodicity of the *SI-Request* configuration in number of association periods. |
| ***si-RequestResources***  If there is only one entry in the list, the configuration is used for all SI messages for which *si-BroadcastStatus* or *posSI-BroadcastStatus* is set to *notBroadcasting*. Otherwise:  - If *si-SchedulingInfo-v1700* is not present and the *SI-RequestConfig* is used for on-demand SI request in *SI-SchedulingInfo* or *PosSI-SchedulingInfo*, the 1st entry in the list corresponds to the first SI message in *schedulingInfoList* or *posSchedulingInfoList* for which *si-BroadcastStatus* or *posSI-BroadcastStatus* is set to *notBroadcasting*, 2nd entry in the list corresponds to the second SI message in *schedulingInfoList* or *posSchedulingInfoList* for which *si-BroadcastStatus* or *posSI-BroadcastStatus* is set to *notBroadcasting* and so on.  - If *si-SchedulingInfo-v1700* is present and *SI-RequestConfig* is configured in *SI-SchedulingInfo* for on-demand SI request, the UE generates a list of concatenated SI messages by appending the SI messages containing type1 SIB configured by *schedulingInfoList2* in *si-SchedulingInfo-v1700* to the SI messagesconfigured by *schedulingInfoList* in *si-SchedulingInfo.* The 1st entry in the list corresponds to the first SI message for which *si-BroadcastStatus* is set to *notBroadcasting*, 2nd entry in the list corresponds to the second SI messagefor which *si-BroadcastStatus* is set to *notBroadcasting* and so on.  - If *si-SchedulingInfo-v1700* is present and *SI-RequestConfig* is configured in *PosSI-SchedulingInfo* for on-demand SI request, the UE generates a list of concatenated SI messages by appending the SI messages containing type2 SIB configured by *schedulingInfoList2* in *si-SchedulingInfo-v1700* to the SI messagesconfigured by *posSchedulingInfoList* in *posSI-SchedulingInfo.* The 1st entry in the list corresponds to the first SI message for which *posSI-BroadcastStatus* or *si-BroadcastStatus* is set to *notBroadcasting*, 2nd entry in the list corresponds to the second SI messagefor which *posSI-BroadcastStatus* or *si-BroadcastStatus* is set to *notBroadcasting* and so on.  Change of *si-RequestResources* should not result in system information change notification.  If *si-RequestResources-r18* is present, UE shall ignore the *si-RequestResources* (without suffix). The field *si-RequestResources-r18* is only applicable for SI request with MSG1-Repetition. |
| ***si-RequestResourcesList-MSG1-Repetition***  A list of SI request resource for MSG1 repetition number for the concerned SI message. |
| ***si-RequestResourcesForMSG1-RepetitionNum***  Configuration of *SI-RequestResources* associated with different repetition number for MSG1-repetition. |

|  |
| --- |
| ***SI-RequestResources* field descriptions** |
| ***ra-AssociationPeriodIndex***  Index of the association period in the *si-RequestPeriod* in which the UE can send the SI request for SI message(s) corresponding to this *SI-RequestResources*, using the preambles indicated by *ra-PreambleStartIndex* and rach occasions indicated by *ra-ssb-OccasionMaskIndex*. |
| ***ra-PreambleStartIndex***  If N SSBs are associated with a RACH occasion, where N > = 1, for the i-th SSB (i=0, …, N-1) the preamble with preamble index = *ra-PreambleStartIndex* + i is used for SI request; For N < 1, the preamble with preamble index = *ra-PreambleStartIndex* is used for SI request. |
| ***msg1-RepetitionNum***  Indicates the MSG1-repetition number used for SI request in TS 38.321 [3]. |

====================================================== next change ==============================================================

– *SI-SchedulingInfo*

The IE *SI-SchedulingInfo* contains information needed for acquisition of SI messages.

***SI-SchedulingInfo* information element**

-- ASN1START

-- TAG-SI-SCHEDULINGINFO-START

SI-SchedulingInfo ::= SEQUENCE {

schedulingInfoList SEQUENCE (SIZE (1..maxSI-Message)) OF SchedulingInfo,

si-WindowLength ENUMERATED {s5, s10, s20, s40, s80, s160, s320, s640, s1280, s2560-v1710, s5120-v1710 },

si-RequestConfig SI-RequestConfig OPTIONAL, -- Cond MSG-1

si-RequestConfigSUL SI-RequestConfig OPTIONAL, -- Cond SUL-MSG-1

systemInformationAreaID BIT STRING (SIZE (24)) OPTIONAL, -- Need R

...

}

SchedulingInfo ::= SEQUENCE {

si-BroadcastStatus ENUMERATED {broadcasting, notBroadcasting},

si-Periodicity ENUMERATED {rf8, rf16, rf32, rf64, rf128, rf256, rf512},

sib-MappingInfo SIB-Mapping

}

SI-SchedulingInfo-v1700 ::= SEQUENCE {

schedulingInfoList2-r17 SEQUENCE (SIZE (1..maxSI-Message)) OF SchedulingInfo2-r17,

dummy SI-RequestConfig OPTIONAL

}

SI-SchedulingInfo-v1740 ::= SEQUENCE {

si-RequestConfigRedCap-r17 SI-RequestConfig OPTIONAL -- Cond REDCAP-MSG-1

}

SI-SchedulingInfo-v18xy ::= SEQUENCE {

si-RequestConfig-MSG1-Repetition-r18 SI-RequestConfig-r18 OPTIONAL, -- Cond MSG-1

si-RequestConfigRedCap-MSG1-Repetition-r18 SI-RequestConfig-r18 OPTIONAL, -- Cond SUL-MSG-1

si-RequestConfigSUL-MSG1-Repetition-r18 SI-RequestConfig-r18 OPTIONAL -- Cond REDCAP-MSG-1

}

SI-RequestConfig-r18 ::= SEQUENCE {

si-RequestConfigForMSG1-Repetition-r18 SI-RequestConfig,

si-RequestConfig-v18xy SI-RequestConfig-v18xy

}

SchedulingInfo2-r17 ::= SEQUENCE {

si-BroadcastStatus-r17 ENUMERATED {broadcasting, notBroadcasting},

si-WindowPosition-r17 INTEGER (1..256),

si-Periodicity-r17 ENUMERATED {rf8, rf16, rf32, rf64, rf128, rf256, rf512},

sib-MappingInfo-r17 SIB-Mapping-v1700

}

SIB-Mapping ::= SEQUENCE (SIZE (1..maxSIB)) OF SIB-TypeInfo

SIB-Mapping-v1700 ::= SEQUENCE (SIZE (1..maxSIB)) OF SIB-TypeInfo-v1700

SIB-TypeInfo ::= SEQUENCE {

type ENUMERATED {sibType2, sibType3, sibType4, sibType5, sibType6, sibType7, sibType8, sibType9,

sibType10-v1610, sibType11-v1610, sibType12-v1610, sibType13-v1610,

sibType14-v1610, spare3, spare2, spare1,... },

valueTag INTEGER (0..31) OPTIONAL, -- Cond SIB-TYPE

areaScope ENUMERATED {true} OPTIONAL -- Need S

}

SIB-TypeInfo-v1700 ::= SEQUENCE {

sibType-r17 CHOICE {

type1-r17 ENUMERATED {sibType15, sibType16, sibType17, sibType18, sibType19, sibType20, sibType21,

spare9, spare8, spare7, spare6, spare5, spare4, spare3, spare2, spare1,...},

type2-r17 SEQUENCE {

posSibType-r17 ENUMERATED {posSibType1-9, posSibType1-10, posSibType2-24, posSibType2-25,

posSibType6-4, posSibType6-5, posSibType6-6, spare9, spare8, spare7, spare6,

spare5, spare4, spare3, spare2, spare1,...},

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

gnss-id-r17 GNSS-ID-r16 OPTIONAL, -- Need R

sbas-id-r17 SBAS-ID-r16 OPTIONAL -- Need R

}

},

valueTag-r17 INTEGER (0..31) OPTIONAL, -- Cond NonPosSIB

areaScope-r17 ENUMERATED {true} OPTIONAL -- Need S

}

-- TAG-SI-SCHEDULINGINFO-STOP

-- ASN1STOP

|  |
| --- |
| ***SchedulingInfo* field descriptions** |
| ***areaScope***  Indicates that a SIB is area specific. If the field is absent, the SIB is cell specific. |
| ***si-BroadcastStatus***  Indicates if the SI message is being broadcasted or not. Change of *si-BroadcastStat*us should not result in system information change notifications in Short Message transmitted with P-RNTI over DCI (see clause 6.5). The value of the indication is valid until the end of the BCCH modification period when set to *broadcasting.* When *SIB19* is scheduled, the *si-BroadcastStatus* for the mapped *SIB19* is set to *broadcasting*.  If *si-SchedulingInfo-v1700* is present, the network ensures that the total number of SI messages with *si-BroadcastStatus* set to *notBroadcasting* in the list of concatenated SI messages configured by *schedulingInfoList* in *si-SchedulingInfo* and SI messages containing type1 SIB configured by *schedulingInfoList2* in *si-SchedulingInfo-v1700* does not exceed the limit of *maxSI-Message* when *si-RequestConfig*, *si-RequestConfigRedCap* or *si-RequestConfigSUL* is configured. |
| ***si-Periodicity***  Periodicity of the SI-message in radio frames. Value *rf8* corresponds to 8 radio frames, value *rf16* corresponds to 16 radio frames, and so on. |

|  |
| --- |
| ***SI-SchedulingInfo* field descriptions** |
| ***dummy***  This field is not used in this specification. If received, it is ignored by the UE. |
| ***si-RequestConfig***  Configuration of Msg1 resources that the UE uses for requesting SI-messages for which *si-BroadcastStatus* is set to *notBroadcasting*. |
| ***si-RequestConfig-MSG1-Repetition***  Configuration of Msg1 repetition resources on NUL that the UE uses for requesting SI-messages for which *si-BroadcastStatus* is set to *notBroadcasting*. This field is only applicable when Msg1 repetition resources can be used for requesting SI-messages. |
| ***si-RequestConfigRedCap***  Configuration of Msg1 resources for *initialUplinkBWP-RedCap*that the RedCap UE uses for requesting SI-messages for which *si-BroadcastStatus* is set to *notBroadcasting*. |
| ***si-RequestConfigRedCap-MSG1-Repetition***  Configuration of Msg1 repetition resources for *initialUplinkBWP-RedCap*that the RedCap UE uses for requesting SI-messages for which *si-BroadcastStatus* is set to *notBroadcasting*. This field is only applicable when Msg1 repetition resources can be used for requesting SI-messages. |
| ***si-RequestConfigSUL***  Configuration of Msg1 resources that the UE uses for requesting SI-messages for which *si-BroadcastStatus* is set to *notBroadcasting*. |
| ***si-RequestConfigSUL-MSG1-Repetition***  Configuration of Msg1 repetition resources on SUL that the UE uses for requesting SI-messages for which *si-BroadcastStatus* is set to *notBroadcasting*. This field is only applicable when Msg1 repetition resources can be used for requesting SI-messages. |
| ***si-WindowLength***  The length of the SI scheduling window. Value *s5* corresponds to 5 slots, value *s10* corresponds to 10 slots and so on. The network always configures *si-WindowLength* to be shorter than or equal to the *si-Periodicity*. The values *s2560-v1710* and *s5120-v1710* are only applicable for SCS 480 kHz. |
| ***systemInformationAreaID***  Indicates the system information area that the cell belongs to, if any. Any SIB with *areaScope* within the SI is considered to belong to this *systemInformationAreaID*. The systemInformationAreaID is unique within a PLMN/SNPN. |

|  |
| --- |
| ***SchedulingInfo2* field descriptions** |
| ***encrypted***  The presence of this field indicates that the pos-sib-type is encrypted as specified in TS 37.355 [49]. |
| ***gnss-id***  The presence of this field indicates that the positioning SIB type is for a specific GNSS. Indicates a specific GNSS (see also TS 37.355 [49]) |
| ***posSibType***  The posSIBs as defined in TS 37.355 [49] mapped to SI for scheduling using*schedulingInfoList2*. |
| ***sbas-id***  The presence of this field indicates that the positioning SIB type is for a specific SBAS. Indicates a specific SBAS (see also TS 37.355 [49]). |
| ***si-WindowPosition***  This field indicates the SI window position of the associated SI-message. The network provides *si-WindowPosition* in an ascending order, i.e. *si-WindowPosition* in the subsequent entry in *schedulingInfoList2* has always value higher than in the previous entry of *schedulingInfoList2*. The network configures this field in a way that ensures that SI messages scheduled by *schedulingInfoList* and/or *posSchedulingInfoList* do not overlap with SI messages scheduled by *schedulingInfoList2*. |
| ***sib-MappingInfo***  Indicates which SIBs or posSIBs are contained in the SI message. |
| ***sibType***  The type of SIB(s) mapped to SI for scheduling using*schedulingInfoList2*. Value *type1* indicates SIBs and value *type2* indicates posSIBs. |

| **Conditional presence** | **Explanation** |
| --- | --- |
| *MSG-1* | The field is optionally present, Need R, if *si-BroadcastStatus* is set to *notBroadcasting* for any SI-message included in *schedulingInfoList* oranySI-message containing type1 SIB included in *schedulingInfoList2*. It is absent otherwise. |
| *SIB-TYPE* | The field is mandatory present if the SIB type is different from *SIB6*, *SIB7* or *SIB8*. For *SIB6*, *SIB7* and *SIB8* it is absent. |
| *NonPosSIB* | The field is mandatory present if the SIB type is *type1*. For *type2* it is absent. |
| *SUL-MSG-1* | The field is optionally present, Need R, if *supplementaryUplink* is configured in *ServingCellConfigCommonSIB* and if *si-BroadcastStatus* is set to *notBroadcasting* for any SI-message included in *schedulingInfoList* oranySI-message containing type1 SIB included in *schedulingInfoList2*. It is absent otherwise. |
| *REDCAP-MSG-1* | The field is optionally present, Need R, if *initialUplinkBWP-RedCap* is configured in *UplinkConfigCommonSIB* and if *si-BroadcastStatus* is set to *notBroadcasting* for any SI-message included in *schedulingInfoList* oranySI-message containing type1 SIB included in *schedulingInfoList2*. It is absent otherwise. |

====================================================== next change ==============================================================

6.4 RRC multiplicity and type constraint values

– Multiplicity and type constraint definitions

-- ASN1START

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

maxAdditionalRACH-r17 INTEGER ::= 256 -- Maximum number of additional RACH configurations.

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

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

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

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

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

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

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

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

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

-- config, secondary PUCCH group config}

maxTwoPUCCH-Grp-ConfigList-r17 INTEGER ::= 16 -- Maximum number of supported configuration(s) of {primary PUCCH group

-- config, secondary PUCCH group config} for PUCCH cell switching

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

-- congestion control

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

-- congestion control minus 1

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

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

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

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

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

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

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

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

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

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

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

maxCellNTN-r17 INTEGER ::= 4 -- Maximum number of NTN neighbour cells for which assistance information is

-- provided

maxCarrierTypePairList-r16 INTEGER ::= 16 -- Maximum number of supported carrier type pair of (carrier type on which

-- CSI measurement is performed, carrier type on which CSI reporting is

-- performed) for CSI reporting cross PUCCH group

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

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

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

-- in SIB5

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

maxFeatureCombPreamblesPerRACHResource-r17 INTEGER ::= 256 -- Maximum number of feature combination preambles.

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

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

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

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

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

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

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

maxNrofAggregatedCellsPerCellGroup INTEGER ::= 16

maxNrofAggregatedCellsPerCellGroupMinus4-r16 INTEGER ::= 12

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

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

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

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

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

maxNrofIABResourceConfig-r17 INTEGER ::= 65536 -- Max number of IAB-ResourceConfigID used in MAC CE

maxNrofIABResourceConfig-1-r17 INTEGER ::= 65535 -- Max number of IAB-ResourceConfigID used in MAC CE minus 1

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

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

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

maxNrofCRS-IM-InterfCell-r17 INTEGER ::= 8 -- Maximum number of LTE interference cells for CRS-IM per UE

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

-- on sidelink frequency

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

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

maxSL-GC-BC-DRX-QoS-r17 INTEGER ::= 16 -- Max number of sidelink DRX configurations for NR

-- sidelink groupcast/broadcast communication

maxNrofSL-RxInfoSet-r17 INTEGER ::= 4 -- Max number of sidelink DRX configuration sets in sidelink DRX assistant

-- information

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

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

maxNrofCondCells-1-r17 INTEGER ::= 7 -- Max number of conditional candidate SpCells minus 1

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

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

maxNrofDL-AllocationsExt-r17 INTEGER ::= 64 -- Maximum number of PDSCH time domain resource allocations for multi-PDSCH

-- scheduling

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

maxNrofSearchSpacesLinks-1-r17 INTEGER ::= 39 -- Max number of Search Space links minus 1

maxNrofBFDResourcePerSet-r17 INTEGER ::= 64 -- Max number of reference signal in one BFD set

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

-- extended

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

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

maxNrofFailureDetectionResources-1-r17 INTEGER ::= 63 -- Maximum number of the enhanced failure detection resources minus 1

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

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

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

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

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

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

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

-- each measurement object (for CBR)

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

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

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

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

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

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

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

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

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

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

-- minus 1.

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

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

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

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

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

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

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

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

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

-- discovery

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

-- discovery

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

-- discovery

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

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

-- minus 1.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

-- combination.

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

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

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

maxNrofPUCCH-Resources INTEGER ::= 128

maxNrofPUCCH-Resources-1 INTEGER ::= 127

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

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

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

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

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

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

-- minus 1.

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

-- extended.

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

-- minus 1 extended.

maxNrofPUCCH-PathlossReferenceRSs-1-r17 INTEGER ::= 7 -- Maximum number of RSs used as pathloss reference for PUCCH power control

-- minus 1.

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

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

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

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

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

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

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

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

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

-- minus 1.

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

-- extended

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

-- extended minus 1

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

-- maxNrofPUSCH-PathlossReferenceRSs

maxNrofPathlossReferenceRSs-r17 INTEGER ::= 64 -- Maximum number of RSs used as pathloss reference for PUSCH, PUCCH, SRS

-- power control for unified TCI state operation

maxNrofPathlossReferenceRSs-1-r17 INTEGER ::= 63 -- Maximum number of RSs used as pathloss reference for PUSCH, PUCCH, SRS

-- power control for unified TCI state operation minus 1

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

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

maxBandsMRDC INTEGER ::= 1280

maxBandsEUTRA INTEGER ::= 256

maxCellReport INTEGER ::= 8

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

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

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

maxFreqPlus1 INTEGER ::= 9 -- Max number of frequencies for Slicing.

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

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

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

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

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

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

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

maxNrofQFIs INTEGER ::= 64

maxNrofResourceAvailabilityPerCombination-r16 INTEGER ::= 256

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

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

maxNrofSlotFormatsPerCombination INTEGER ::= 256

maxNrofSpatialRelationInfos INTEGER ::= 8

maxNrofSpatialRelationInfos-plus-1 INTEGER ::= 9

maxNrofSpatialRelationInfos-r16 INTEGER ::= 64

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

maxNrofIndexesToReport INTEGER ::= 32

maxNrofIndexesToReport2 INTEGER ::= 64

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

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

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

maxNrofTCI-StatesPDCCH INTEGER ::= 64

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

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

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

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

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

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

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

maxQFI INTEGER ::= 63

maxRA-CSIRS-Resources INTEGER ::= 96

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

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

maxRA-SSB-Resources INTEGER ::= 64

maxSCSs INTEGER ::= 5

maxSecondaryCellGroups INTEGER ::= 3

maxNrofServingCellsEUTRA INTEGER ::= 32

maxMBSFN-Allocations INTEGER ::= 8

maxNrofMultiBands INTEGER ::= 8

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

maxReportConfigId INTEGER ::= 64

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

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

maxNrofCSI-RS-ResourcesExt-r17 INTEGER ::= 8 -- Maximum number of codebook resources for fetype2R1 and fetype2R2

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

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

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

maxNrofSRI-PUSCH-Mappings INTEGER ::= 16

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

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

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

maxSIB-MessagePlus1-r17 INTEGER::= 33 -- Maximum number of SIB messages plus 1

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

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

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

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

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

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

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

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

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

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

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

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

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

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

maxInterRAT-RSTD-Freq INTEGER ::= 3

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

maxCLI-Report-r16 INTEGER ::= 8

maxNrofCC-Group-r17 INTEGER ::= 16 -- Maximum number of CC groups for DC location report

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

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

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

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

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

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

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

maxNrofPPW-Config-r17 INTEGER ::= 4 -- Maximum number of Preconfigured PRS processing windows per DL BWP

maxNrofPPW-ID-1-r17 INTEGER ::= 15 -- Maximum number of Preconfigured PRS processing windows minus 1

maxNrOfTxTEGReport-r17 INTEGER ::= 256 -- Maximum number of UE Tx Timing Error Group Report

maxNrOfTxTEG-ID-1-r17 INTEGER ::= 7 -- Maximum number of UE Tx Timing Error Group ID minus 1

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

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

maxNrofReqComDC-Location-r17 INTEGER ::= 128 -- Maximum number of requested carriers/BWPs combinations for DC location

-- report

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

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

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

maxNrofRB-Sets-r17 INTEGER ::= 8 -- Maximum number of RB sets

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

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

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

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

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

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

maxNrofPreConfigPosGapId-r17 INTEGER ::= 16 -- Maximum number of preconfigured positioning measurement gap

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

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

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

maxSliceInfo-r17 INTEGER ::= 8 -- Maximum number of NSAGs

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

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

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

maxNrofRemoteUE-r17 INTEGER ::= 32 -- Maximum number of connected L2 U2N Remote UEs

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

maxFreqMBS-r17 INTEGER ::= 16 -- Maximum number of MBS frequencies reported in MBSInterestIndication

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

-- cell

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

-- cell minus 1

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

-- indication

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

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

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

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

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

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

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

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

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

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

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

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

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

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

maxNrofPdcch-BlindDetectionMixed-1-r16 INTEGER ::= 7 -- Maximum number of combinations of mixed Rel-16 and Rel-15 PDCCH

-- monitoring capabilities minus 1

maxNrofPdcch-BlindDetection-r17 INTEGER ::= 16 -- Maximum number of combinations of PDCCH blind detection monitoring

-- capabilities

maxNrofMSG1-Repetitions-r18 INTEGER ::= 3 -- Maximum number of MSG1 repetition

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

-- ASN1STOP

– End of NR-RRC-Definitions

-- ASN1START

END

===================================================== end of change =============================================================

### **List of agreement**

|  |
| --- |
| RAN2#121 bis   * RAN2 assumes that MSG1 repetition can be applicable to all 4-step CBRA procedures (FFS for SI request) * RAN2 assumes that MSG1 repetition can be applicable to NUL， RAN2 assumes that MSG1 repetition can be applicable to SUL * Msg1 repetition with different repetition number {2, 4, 8} are treated a separate feature, and a RACH partition is associated with a specific repetition number (Stage 3 details are FFS, e.g. we should not use all the spare values in the current IE) * General assumption is that various feature combinations can be configured (which is up to network implementation), unless explicitly specified otherwise * RAN2 will not support the fallback from legacy RA to Msg1 repetition and vice versa; Other fall back scenarios are FFS * BWP selection mechanism is not impacted by PRACH coverage enhancements. Legacy BWP selection mechanism is re-used * RA type selection mechanism is not impacted by PRACH coverage enhancements. Legacy RA type selection mechanism is re-used |

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| RAN2#122   * MSG1 repetition can be applicable to the 4-step CBRA procedure initiated by Msg3-based SI request * RAN2 intends to support CFRA for msg1 repetition for ReconfigurationWithSync case, FFS for other cases. * RAN2 to agree to configure multiple RSRP thresholds for different repetition numbers * The RSRP threshold(s) for triggering Msg1 repetition are configured per-BWP * RAN2 to further discusss fallback from lower number of MSG1 repetition to higher number which is also FFS for now. We need to understand how to signal this and how this impacts MAC procedure. |

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| RAN2#123   * **Some RAN2 work is essential to enable this. RAN2 thinks the plenary agreement allows further RAN2 work on this. So, we can discuss this at next meeting. (But this doesn’t necessarily mean that we will be able to finish this work without further RAN1 input as there are still FFSs in RAN1)** * **Regarding the framework for Msg1 repetition and whether to support fallback from lower number to higher number, Fallback is supported. All repetitions are treated as a single feature, but within the feature, different repetition numbers are treated as different RACH type.** * **UE selects higher repetition number upon Msg1 retransmission when the number of Msg1 retransmission reaches a configured value. FFS whether we need to also check DL RSRP at the time of switching (can ask RAN1) discuss as part of offline 801.** * **support fallback from CFRA with Msg1 repetition to 4-step CBRA with Msg1 repetition. Details are FFS.** * support fallback from CFRA with Msg1 repetition to 4-step CBRA with Msg1 repetition. Details are FFS. * **MSG1 repetition can be applicable to 4-step CBRA procedure initiated by Msg1-based SI request and can be configured optionally by the network.** * **Each RSRP threshold is configured separately by RRC, which is associated with a repetition number if configured (for each carrier).** * **A single feature priority for MSG1 repetition is configured by RRC, i.e. all the MSG1 repetition numbers use the same feature priority.** * **For PDCCH order based CFRA and for CFRA for BFR ask RAN1 if MSG1 repetition is necessary and can be supported from RAN1 point of view. (also include in 801 offline email)** * For PDCCH order based CFRA and for CFRA for BFR ask RAN1 if MSG1 repetition is necessary and can be supported from RAN1 point of view. (also include in 801 offline email) * **NW indicates ONE MSG1 repetition number applicable for CFRA MSG1 repetition by RRC for Reconfiguration with sync.** * **For MSG1-based SI request with MSG1 repetition, separate SI-RequestConfig is introduced (details are FFS)** * **From the RRC configuration point, RAN2 to allow that MSG1 resource with repetition of MSG1-based SI request is NOT configured but MSG1 resource with repetition of MSG3-based SI request is configured.** * From the RRC configuration point, RAN2 to allow that MSG1 resource with repetition of MSG1-based SI request is NOT configured but MSG1 resource with repetition of MSG3-based SI request is configured. * **For a RACH partition associated with multiple Msg1 repetition numbers, the parameters defined in RACH-ConfigGeneric IE (except preambleReceiveTargetPower and powerRampingStep) are common for those repetition numbers. This will reuse existing IE. We will allow different ROs to be used for different repetitions in the signalling. If this complicates the RRC with option 2.2 too much we can revisit that agreement** * **Upon fallback from lower number to higher number, SCALING\_FACTOR\_BI is not reinitialized. PREAMBLE\_POWER\_RAMPING\_STEP is not reinitialized if the preambleRampingStep parameter is common for different repetition numbers.** * **UE does not reset counters: PREAMBLE\_TRANSMISSION\_COUNTER and PREAMBLE\_POWER\_RAMPING\_COUNTER upon fallback from lower number to higher number.** * **Introduce a RRC configured threshold (e.g. TransMax-Msg1RepNum), the field is used for deciding whether to trigger fallback from with lower number to higher number when the number of Msg1 transmission exceeds this threshold. This parameter is common for different repetition numbers configured in one RACH partition.** * **CFRA with Msg1 repetition for BFR and with PDCCH order are not supported (can be revisited if there is consensus to support this)** |

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| --- |
| RAN2#123bis   * **From RAN2 CE perspective, MSG1-based SI request can be applicable to SUL, RedCap and Positioning** * **CSI-RS resource for CFRA with MSG1 repetition is not supported in RAN2** * **From RAN2 CE perspective, deltaPreamble IE in FeatureCombinationPreambles are common for repetition number 2, 4 and 8 - FFS for groupBconfigured, rsrp-ThresholdSSB** * **RAN2 assumes that a separate UE capability for CFRA with MSG1 repetition is not needed** * **Separate SI-RequestResources is configured for different repetition number (2,4,8), under a common SI-RequestConfig which is different from legacy SI-RequestConfig** * **For a given feature combination, RAN2 assumes the same value of preambleReceiveTargetPower and powerRampingStep parameters can be applied for different Msg1 repetition numbers.** * **Reuse the existing UE counter (PREAMBLE\_TRANSMISSION\_COUNTER) to trigger fallback from lower number to higher number** * **Upon fallback from CFRA with repetition to CBRA with repetition, the UE only selects the RACH resources that associated the same repetition number that indicated for CFRA.** * **Depending on the complexity we can support fallback in the above case or not (try without the fallback first). Can be decided during the CR implementation phase.** * **For Rel-18 CE-only BWP, RAN2 confirms:**   + **Use featureCombinationPreamblesList-r17 in addiitonalRACH-ConfigList-r17 to configure Rel-18 CE-only BWP, and the legacy RACH-ConfigCommon is absent in such case**   + **CFRA w/wo Msg1 repetition are not supported in Rel-18 CE-only BWP** * **Rel-18 CE-only BWP includes the following types:**   + **Type 1: A dedicated BWP in which all the RACH resources are only associated with Msg3 repetition;**   + **Type 2: A dedicated BWP in which all the RACH resources are only associated with Msg1 repetition;**   + **Type 3: A dedicated BWP in which all the RACH resources are associated with both Msg1 repetition and Msg3 repetition** * **For Rel-18 CE-only BWP for Msg1 repetition, whether to use Alt1.1 or Alt.1.2 is up to network implementation.:**   + **Alt 1.1: If the selected dedicated BWP is configured with set of RACH resources that are all associated with Msg1 repetition and a specific repetition number, when RACH is triggered, the UE applies the Msg1 repetition number without evaluating the Msg1 repetition RSRP threshold.**   + **Alt 1.2: If the selected dedicated BWP is configured with sets of RACH resources that are all associated with Msg1 repetition but with different repetition numbers, when RACH is triggered, the UE selects the applicable repetition number and corresponding RACH resource based on the evaluation of Msg1 repetition RSRP threshold.** * **Adopt Alt 2.3 for Msg1 repetition framework** * **Separate RO for different number is supported;**   + **For sharedRO and separateRO case, different repetition numbers are configured via separate featureCombinationPreamble IEs only for CE.**   + **RACH resources of RACH partitions that are configured with the same “featureCombination” are considered to be within the same set of RACH resources;**   + **Fallback from lower number to higher number is performed within the selected set of RACH resources.**   + **Alt1: Fallback is only supported for sharedRO case** * **Agree option 1 above to be used as a model for MAC CR and review the details during the MAC CR** * **DL RSRP threshold is not checked when determining whether to trigger fallback from lower number to higher number** * **After UE fallsback from repetition number 2 to repetition number 4, the UE can then fallback to repetition number 8 when the fallback condition is met.** * **Introduce new DWS MAC CE for reporting PHR for assumed and non-assumed PUSCH transmissions (we will not introduce a separate MAC CE just containing the assumed PHR) – We will design this to support DC/CA scenario (can indicate this to RAN1 and let us know if this has any impact to their design)** * **No new PHR triggers will be defined in RAN2** |

### **List of RAN1 parameters**

Agreement

* *TimeOffsetBetweenStartingRO-r18* is configured separately for each configured number of multiple PRACH

**Agreement**

Adopt the following revision on RRC parameter.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Sub-feature group** | **Description** | **Value range** | **Default value aspect** | **Per (UE, cell, TRP, …)** |
| multiple PRACH transmissions | The number of preamble repetitions for a PRACH transmission | {2, 4, 8} |  |  |

Agreement

The candidate value of *TimeOffsetBetweenStartingRO-r18* is proposed as below

* {16, [32]}, for RO groups for 8 repetitions
* {8, 16, [32]}, for RO groups for 4 repetitions
* {4, 8, [16, 32]}, for RO groups for 2 repetitions

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|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **WI code** | **Sub-feature group** | **RAN1 specification** | **Section** | **RAN2 Parent IE** | **RAN2 ASN.1 name** | **Parameter name in the spec** | **New or existing?** | **Parameter name in the text** | **Description** | **Value range** | **Default value aspect** | **Per (UE, cell, TRP, …)** | **Required for initial access or IDLE/INACTIVE** | **Specification** | **Comment** |
| NR\_cov\_enh2 | multiple PRACH transmsissions |  |  |  |  | NumberOfMsg1-Repetitions-r18 | new |  | The number of repetitions for PRACH transmissions [with the same Tx beam]. | {2, 4, 8} |  |  | Cell-specific | 38.331 | Agreement (RAN1#112) For multiple PRACH transmissions with same Tx beam, gNB can configure one or multiple values for the number of multiple PRACH transmissions. • If multiple values are configured, PRACH resources differentiation between multiple PRACH transmissions with different number of multiple PRACH transmissions is supported. • FFS: details  Agreement (RAN1#112) Support {2, 4, 8} for the number of multiple PRACH transmissions with same Tx beams. |
| NR\_cov\_enh2 | multiple PRACH transmsissions |  |  |  |  | rsrp-ThresholdSSBMsg1 | new |  | This parameter indicates the RSRP threshold for performing Msg1 repetitions associated with the number of Msg1 repetitions indicated by corresponding NumberOfMsg1-Repetitions-r18. | RSRP-Range |  |  | Cell-specific | 38.331 | Agreement (RAN1 #111) • For multiple PRACH transmissions with same Tx beam, at least SSB-RSRP threshold(s) are used to determine the number of PRACH transmissions at least for the first RACH attempt. o Note: whether to support multiple numbers of PRACH transmissions is separately discussed. |
| NR\_cov\_enh2 | multiple PRACH transmsissions |  |  |  |  | TimeOffsetBetweenStartingRO-r18 | new |  | If this parameter is configured for a given number of N multiple PRACH transmissions, it is used to configure the time offset of the starting ROs between two successive RO groups for each frequency resource index within a time period X. If this parameter is not configured for a given number of N multiple PRACH transmissions, the starting RO of RO groups are implicitly determined according to TS 38.213. |  |  |  | Cell-specific | 38.331 | Agreement (RAN1 #114) For a given number of N multiple PRACH transmissions, to determine the starting RO of all the RO groups within a time period X: ‐ If a time offset is configured, then  the starting RO of the first RO group for each is determined from the first valid RO within the time period X, first in increasing order of frequency resource index for frequency multiplexed PRACH occasions; second in increasing order of time resource index.  the starting RO of the n-th RO group for each is determined as the RO at the time offset equal to a number of valid ROs from the starting RO of the (n-1)-th RO group for the same . ‐ If time offset is not configured, then   the starting RO of the first RO group is the first valid RO within the time period X.  the starting RO of other RO groups are determined as the first valid RO after the previous RO group in the following order within the time period X: first, in increasing order of frequency resource indexes for frequency multiplexed PRACH occasions; second, in increasing order of time resource indexes. |
| NR\_cov\_enh2 | Dynamic waveform switching | 38.212 38.214 | 7.3.1.1.2 6.1.3 |  |  | dynamicTransformPrecoderIndicationDCI-0-1 | New |  | Configures whether the field [Dynamic transform precoder indicator] is present or not in DCI format 0\_1. If the field is set to enabled, DWS field is present in DCI format 0\_1 and UE follows DWS field. If the field is set to disabled, DWS field is not present in DCI format 0\_1 and UE follows legacy parameter (transformPrecoder) when scheduled using DCI format 0\_1. | {enabled, disabled} |  | in PUSCH-Config | UE-specific |  | Agreement (RAN1#114) Introduce two new RRC parameters for configuration of DWS field in DCI formats 0\_1/0\_2: - Value range is {enabled, disabled} for each of DCI format 0\_1 and DCI format 0\_2: o “enabled” means that DWS field is present in the DCI format and UE follows DWS field. o “disabled means that DWS field is not present and UE follows legacy parameter (transformPrecoder) when scheduled using the DCI format.  Agreement (RAN1#113) Configuration of dynamic waveform switching indicator field, for a BWP, is separately configurable between DCI format 0\_1 and DCI format 0\_2.  Agreement (RAN1#112b-e) Dynamic waveform switching is configured separately for each BWP, within PUSCH-Config. |
| NR\_cov\_enh2 | Dynamic waveform switching | 38.212 38.214 | 7.3.1.1.2 6.1.3 |  |  | dynamicTransformPrecoderIndicationDCI-0-2 | New |  | Configures whether the field [Dynamic transform precoder indicator] is present or not in DCI format 0\_2. If the field is set to enabled, DWS field is present in DCI format 0\_2 and UE follows DWS field. If the field is set to disabled, DWS field is not present in DCI format 0\_2 and UE follows legacy parameter (transformPrecoder) when scheduled using DCI format 0\_2. | {enabled, disabled} |  | in PUSCH-Config | UE-specific |  | Agreement (RAN1#114) Introduce two new RRC parameters for configuration of DWS field in DCI formats 0\_1/0\_2: - Value range is {enabled, disabled} for each of DCI format 0\_1 and DCI format 0\_2: o “enabled” means that DWS field is present in the DCI format and UE follows DWS field. o “disabled means that DWS field is not present and UE follows legacy parameter (transformPrecoder) when scheduled using the DCI format.  Agreement (RAN1#113) Configuration of dynamic waveform switching indicator field, for a BWP, is separately configurable between DCI format 0\_1 and DCI format 0\_2.  Agreement (RAN1#112b-e) Dynamic waveform switching is configured separately for each BWP, within PUSCH-Config. |
| NR\_cov\_enh2 | Dynamic waveform switching |  |  |  |  | assumedPUSCHInfo | New |  | Indicates if power headroom information for an assumed PUSCH is reported. | ENUMERATED {enabled} |  | in PHR-Config | UE-specific |  | Agreement (RAN1#114) Introduce a new RRC parameter under PHR-Config for configuration of reporting of power headroom information for an assumed PUSCH: Value range is {enabled}  Agreement (RAN1#114) For reporting of power headroom information for assumed PUSCH using target waveform different from waveform of actual PUSCH, support the following: - Power headroom information for assumed PUSCH is based on an actual PUSCH transmission. o In case of no actual PUSCH transmission on a serving cell, power headroom information for assumed PUSCH is not supported. o DWS field needs to be configured for at least one DCI format for the BWP of the actual PUSCH, otherwise power headroom information for assumed PUSCH is not supported. - If actual PUSCH transmission is with DFT-S-OFDM waveform, UE computes power headroom information of an assumed PUSCH with CP-OFDM waveform. If actual PUSCH transmission is with CP-OFDM waveform, UE computes power headroom information of an assumed PUSCH with DFT-S-OFDM waveform. o All parameters that are used for the calculation of PCMAX,f,c(i), except waveform, are the same between assumed PUSCH and actual PUSCH. o In case assumed PUSCH transmission is not supported for the parameters that are used for the calculation of PCMAX,f,c(i), power headroom information for assumed PUSCH is not computed or reported. - Power headroom information for assumed PUSCH contains: o PCMAX,f,c(i) of assumed PUSCH § Accounting for applicable MPR, A-MPR and P-MPR for the assumed PUSCH. - If UE reports power headroom information for assumed PUSCH in a PUSCH transmission, legacy PHR is also reported in the same PUSCH transmission. o No consensus in RAN1 if the following applies or not: if UE reports legacy PHR in a PUSCH transmission, power headroom information for assumed PUSCH is also reported. - Note: RAN endorsed the following at RAN#100: “RAN2 will not work on PHR triggering procedure for dynamic waveform switching in Rel-18 UL Coverage enh WI” [RP-231498].  Agreement (RAN1#114) Support following enhancement to assist the scheduler in determining waveform switching: • Reporting of power headroom information for an assumed PUSCH using target waveform different from waveform of actual PUSCH.  • Note: Any MAC CE related design is up to RAN2 • Subject to separate UE capability  • Details FFS. Conclusion (Made in RAN#100, RP-231498) RAN2 will not work on PHR triggering procedure for dynamic waveform switching in Rel-18 UL Coverage enh WI Send LS to inform above agreement and conclusion. |