**3GPP TSG-RAN2 Meeting #121-bis-eR2-2304465**

**Online 17th – 26th April, 2023**

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| --- |
| *CR-Form-v12.2* |
| **CHANGE REQUEST** |
|  |
|  | **38.331** | **CR** | **4060** | **rev** | **1** | **Current version:** | **17.4.0** |  |
|  |
| *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:***  | Correction on pusch-RepetitionTypeB capability |
|  |  |
| ***Source to WG:*** | Huawei, HiSilicon |
| ***Source to TSG:*** | R2 |
|  |  |
| ***Work item code:*** | NR\_L1enh\_URLLC-Core |  | ***Date:*** | 2023-04-07 |
|  |  |  |  |  |
| ***Category:*** | **A** |  | ***Release:*** | Rel-17 |
|  | *Use one of the following categories:****F*** *(correction)****A*** *(mirror corresponding to a change in an earlier release)****B*** *(addition of feature),* ***C*** *(functional modification of feature)****D*** *(editorial modification)*Detailed explanations of the above categories canbe found in 3GPP [TR 21.900](http://www.3gpp.org/ftp/Specs/html-info/21900.htm). | *Use one of the following releases:Rel-8 (Release 8)Rel-9 (Release 9)Rel-10 (Release 10)Rel-11 (Release 11)…**Rel-15 (Release 15)Rel-16 (Release 16)Rel-17 (Release 17)Rel-18 (Release 18)**Rel-19 (Release 19)* |
|  |   |
| ***Reason for change:*** | In 38.822, the *pusch-RepetitionTypeB-r16* capability indicates the supported maximum number of PUSCH transmissions within a slot for all TB(s), with the candidate value of {2, 3, 4, 7, 8, 12}. Besides, the supported value should be separately reported for UE processing capability 1 and for UE processing capability 2 if the UE supports both processing capabilities. The processing capability 1 is mandatory supported without signalling, and the processing capability 2 is defined by *pusch-ProcessingType2.*However, in current 38.331, only one supported value can be reported by the UE without differentiation of processing capability 1 and processing capability 2. To align with the RAN1 feature list, new capability fields should be introduced to indicate the maximum PUSCH transmission number for processing capability 1 and processing capability 2 separately. To ensure backward compatibility, the value reported in the legacy field should be considered applicable for processing capability 1 if *pusch-ProcessingType2* is not included, or applicable for both processing capability 1 and processing capability 2 when both are supported. The new fields are only included when different values are supported for the two types of processing capabilities. When the new fields are included, the NW will ignore the legacy field. |
|  |  |
| ***Summary of change:*** | Add new fields to indicate the maximum PUSCH transmission number within a slot for all TB(s) for processing capability 1 and processing capability 2 separately. **Impact analysis**Impacted 5G architecture options:NR SA, (NG)EN-DC, NR-DCImpacted functionality:PUSCH repetition type BInter-operability: If the network is implemented according to this CR while the UE is not, there is no inter-operability issue. If the UE is implemented according to this CR while the network is not, there is no inter-operability issue. |
|  |  |
| ***Consequences if not approved:*** | The maximum PUSCH tranmission number cannot be reported by the UE for processing capability 1 and processing capability 2 separately when both are supported with different capabilities. |
|  |  |
| ***Clauses affected:*** | 6.3.3 |
|  |  |
|  | **Y** | **N** |  |  |
| ***Other specs*** | **x** |  |  Other core specifications  | TS/TR 38.306 CR 0902  |
| ***affected:*** |  | **x** |  Test specifications | TS/TR ... CR ...  |
| ***(show related CRs)*** |  | **x** |  O&M Specifications | TS/TR ... CR ...  |
|  |  |
| ***Other comments:*** |  |
|  |  |
| ***This CR's revision history:*** | Revision-11) Use the critical extention in UE-NR-capability-v16c0 to extend the new capability signalling |
|  |  |

<Start of modification>

6.3.3 UE capability information elements

– *FeatureSets*

The IE *FeatureSets* is used to provide pools of downlink and uplink features sets. A *FeatureSetCombination* refers to the IDs of the feature set(s) that the UE supports in that *FeatureSetCombination*. The *BandCombination* entries in the *BandCombinationList* then indicate the ID of the *FeatureSetCombination* that the UE supports for that band combination.

The entries in the lists in this IE are identified by their index position. For example, the *FeatureSetUplinkPerCC-Id* = 4 identifies the 4th element in the *featureSetsUplinkPerCC* list.

NOTE: When feature sets (per CC) IEs require extension in future versions of the specification, new versions of the *FeatureSetDownlink*, *FeatureSetUplink*, *FeatureSets*, *FeatureSetDownlinkPerCC* and/or *FeatureSetUplinkPerCC* will be created and instantiated in corresponding new lists in the *FeatureSets* IE. For example, if new capability bits are to be added to the *FeatureSetDownlink*, they will instead be defined in a new *FeatureSetDownlink-rxy* which will be instantiated in a new *featureSetDownlinkList-rxy* list. If a UE indicates in a *FeatureSetCombination* that it supports the *FeatureSetDownlink* with ID #5, it implies that it supports both the features in *FeatureSetDownlink* #5 and *FeatureSetDownlink-rxy* #5 (if present). The number of entries in the new list(s) shall be the same as in the original list(s).

***FeatureSets* information element**

-- ASN1START

-- TAG-FEATURESETS-START

FeatureSets ::= SEQUENCE {

 featureSetsDownlink SEQUENCE (SIZE (1..maxDownlinkFeatureSets)) OF FeatureSetDownlink OPTIONAL,

 featureSetsDownlinkPerCC SEQUENCE (SIZE (1..maxPerCC-FeatureSets)) OF FeatureSetDownlinkPerCC OPTIONAL,

 featureSetsUplink SEQUENCE (SIZE (1..maxUplinkFeatureSets)) OF FeatureSetUplink OPTIONAL,

 featureSetsUplinkPerCC SEQUENCE (SIZE (1..maxPerCC-FeatureSets)) OF FeatureSetUplinkPerCC OPTIONAL,

 ...,

 [[

 featureSetsDownlink-v1540 SEQUENCE (SIZE (1..maxDownlinkFeatureSets)) OF FeatureSetDownlink-v1540 OPTIONAL,

 featureSetsUplink-v1540 SEQUENCE (SIZE (1..maxUplinkFeatureSets)) OF FeatureSetUplink-v1540 OPTIONAL,

 featureSetsUplinkPerCC-v1540 SEQUENCE (SIZE (1..maxPerCC-FeatureSets)) OF FeatureSetUplinkPerCC-v1540 OPTIONAL

 ]],

 [[

 featureSetsDownlink-v15a0 SEQUENCE (SIZE (1..maxDownlinkFeatureSets)) OF FeatureSetDownlink-v15a0 OPTIONAL

 ]],

 [[

 featureSetsDownlink-v1610 SEQUENCE (SIZE (1..maxDownlinkFeatureSets)) OF FeatureSetDownlink-v1610 OPTIONAL,

 featureSetsUplink-v1610 SEQUENCE (SIZE (1..maxUplinkFeatureSets)) OF FeatureSetUplink-v1610 OPTIONAL,

 featureSetDownlinkPerCC-v1620 SEQUENCE (SIZE (1..maxPerCC-FeatureSets)) OF FeatureSetDownlinkPerCC-v1620 OPTIONAL

 ]],

 [[

 featureSetsUplink-v1630 SEQUENCE (SIZE (1..maxUplinkFeatureSets)) OF FeatureSetUplink-v1630 OPTIONAL

 ]],

 [[

 featureSetsUplink-v1640 SEQUENCE (SIZE (1..maxUplinkFeatureSets)) OF FeatureSetUplink-v1640 OPTIONAL

 ]],

 [[

 featureSetsDownlink-v1700 SEQUENCE (SIZE (1..maxDownlinkFeatureSets)) OF FeatureSetDownlink-v1700 OPTIONAL,

 featureSetsDownlinkPerCC-v1700 SEQUENCE (SIZE (1..maxPerCC-FeatureSets)) OF FeatureSetDownlinkPerCC-v1700 OPTIONAL,

 featureSetsUplink-v1710 SEQUENCE (SIZE (1..maxUplinkFeatureSets)) OF FeatureSetUplink-v1710 OPTIONAL,

 featureSetsUplinkPerCC-v1700 SEQUENCE (SIZE (1..maxPerCC-FeatureSets)) OF FeatureSetUplinkPerCC-v1700 OPTIONAL

 ]],

 [[

 featureSetsDownlink-v1720 SEQUENCE (SIZE (1..maxDownlinkFeatureSets)) OF FeatureSetDownlink-v1720 OPTIONAL,

 featureSetsDownlinkPerCC-v1720 SEQUENCE (SIZE (1..maxPerCC-FeatureSets)) OF FeatureSetDownlinkPerCC-v1720 OPTIONAL,

 featureSetsUplink-v1720 SEQUENCE (SIZE (1..maxUplinkFeatureSets)) OF FeatureSetUplink-v1720 OPTIONAL

 ]],

 [[

 featureSetsDownlink-v1730 SEQUENCE (SIZE (1..maxDownlinkFeatureSets)) OF FeatureSetDownlink-v1730 OPTIONAL,

 featureSetsDownlinkPerCC-v1730 SEQUENCE (SIZE (1..maxPerCC-FeatureSets)) OF FeatureSetDownlinkPerCC-v1730 OPTIONAL

 ]]

}

FeatureSets-v16xy ::= SEQUENCE {

 featureSetsUplink-v16xy SEQUENCE (SIZE (1..maxUplinkFeatureSets)) OF FeatureSetUplink-v16xy OPTIONAL

}

-- TAG-FEATURESETS-STOP

-- ASN1STOP

<Next modification>

– *FeatureSetUplink*

The IE *FeatureSetUplink* is used to indicate the features that the UE supports on the carriers corresponding to one band entry in a band combination.

***FeatureSetUplink* information element**

-- ASN1START

-- TAG-FEATURESETUPLINK-START

FeatureSetUplink ::= SEQUENCE {

 featureSetListPerUplinkCC SEQUENCE (SIZE (1.. maxNrofServingCells)) OF FeatureSetUplinkPerCC-Id,

 scalingFactor ENUMERATED {f0p4, f0p75, f0p8} OPTIONAL,

 dummy3 ENUMERATED {supported} OPTIONAL,

 intraBandFreqSeparationUL FreqSeparationClass OPTIONAL,

 searchSpaceSharingCA-UL ENUMERATED {supported} OPTIONAL,

 dummy1 DummyI OPTIONAL,

 supportedSRS-Resources SRS-Resources OPTIONAL,

 twoPUCCH-Group ENUMERATED {supported} OPTIONAL,

 dynamicSwitchSUL ENUMERATED {supported} OPTIONAL,

 simultaneousTxSUL-NonSUL ENUMERATED {supported} OPTIONAL,

 pusch-ProcessingType1-DifferentTB-PerSlot SEQUENCE {

 scs-15kHz ENUMERATED {upto2, upto4, upto7} OPTIONAL,

 scs-30kHz ENUMERATED {upto2, upto4, upto7} OPTIONAL,

 scs-60kHz ENUMERATED {upto2, upto4, upto7} OPTIONAL,

 scs-120kHz ENUMERATED {upto2, upto4, upto7} OPTIONAL

 } OPTIONAL,

 dummy2 DummyF OPTIONAL

}

FeatureSetUplink-v1540 ::= SEQUENCE {

 zeroSlotOffsetAperiodicSRS ENUMERATED {supported} OPTIONAL,

 pa-PhaseDiscontinuityImpacts ENUMERATED {supported} OPTIONAL,

 pusch-SeparationWithGap ENUMERATED {supported} OPTIONAL,

 pusch-ProcessingType2 SEQUENCE {

 scs-15kHz ProcessingParameters OPTIONAL,

 scs-30kHz ProcessingParameters OPTIONAL,

 scs-60kHz ProcessingParameters OPTIONAL

 } OPTIONAL,

 ul-MCS-TableAlt-DynamicIndication ENUMERATED {supported} OPTIONAL

}

FeatureSetUplink-v1610 ::= SEQUENCE {

 -- R1 11-5: PUsCH repetition Type B

 pusch-RepetitionTypeB-r16 SEQUENCE {

 maxNumberPUSCH-Tx-r16 ENUMERATED {n2, n3, n4, n7, n8, n12},

 hoppingScheme-r16 ENUMERATED {interSlotHopping, interRepetitionHopping, both}

 } OPTIONAL,

 -- R1 11-7: UL cancelation scheme for self-carrier

 ul-CancellationSelfCarrier-r16 ENUMERATED {supported} OPTIONAL,

 -- R1 11-7a: UL cancelation scheme for cross-carrier

 ul-CancellationCrossCarrier-r16 ENUMERATED {supported} OPTIONAL,

 -- R1 16-5c: The maximum number of SRS resources in one SRS resource set with usage set to 'codebook' for Mode 2

 ul-FullPwrMode2-MaxSRS-ResInSet-r16 ENUMERATED {n1, n2, n4} OPTIONAL,

 -- R1 22-4a/4b/4c/4d: CBG based transmission for UL with unicast PUSCH(s) per slot per CC with UE processing time Capability 1

 cbgPUSCH-ProcessingType1-DifferentTB-PerSlot-r16 SEQUENCE {

 scs-15kHz-r16 ENUMERATED {one-pusch, upto2, upto4, upto7} OPTIONAL,

 scs-30kHz-r16 ENUMERATED {one-pusch, upto2, upto4, upto7} OPTIONAL,

 scs-60kHz-r16 ENUMERATED {one-pusch, upto2, upto4, upto7} OPTIONAL,

 scs-120kHz-r16 ENUMERATED {one-pusch, upto2, upto4, upto7} OPTIONAL

 } OPTIONAL,

 -- R1 22-3a/3b/3c/3d: CBG based transmission for UL with unicast PUSCH(s) per slot per CC with UE processing time Capability 2

 cbgPUSCH-ProcessingType2-DifferentTB-PerSlot-r16 SEQUENCE {

 scs-15kHz-r16 ENUMERATED {one-pusch, upto2, upto4, upto7} OPTIONAL,

 scs-30kHz-r16 ENUMERATED {one-pusch, upto2, upto4, upto7} OPTIONAL,

 scs-60kHz-r16 ENUMERATED {one-pusch, upto2, upto4, upto7} OPTIONAL,

 scs-120kHz-r16 ENUMERATED {one-pusch, upto2, upto4, upto7} OPTIONAL

 } OPTIONAL,

 supportedSRS-PosResources-r16 SRS-AllPosResources-r16 OPTIONAL,

 intraFreqDAPS-UL-r16 SEQUENCE {

 dummy ENUMERATED {supported} OPTIONAL,

 intraFreqTwoTAGs-DAPS-r16 ENUMERATED {supported} OPTIONAL,

 dummy1 ENUMERATED {supported} OPTIONAL,

 dummy2 ENUMERATED {supported} OPTIONAL,

 dummy3 ENUMERATED {short, long} OPTIONAL

 } OPTIONAL,

 intraBandFreqSeparationUL-v1620 FreqSeparationClassUL-v1620 OPTIONAL,

 -- R1 11-3: More than one PUCCH for HARQ-ACK transmission within a slot

 multiPUCCH-r16 SEQUENCE {

 sub-SlotConfig-NCP-r16 ENUMERATED {set1, set2} OPTIONAL,

 sub-SlotConfig-ECP-r16 ENUMERATED {set1, set2} OPTIONAL

 } OPTIONAL,

 -- R1 11-3c: 2 PUCCH of format 0 or 2 for a single 7\*2-symbol subslot based HARQ-ACK codebook

 twoPUCCH-Type1-r16 ENUMERATED {supported} OPTIONAL,

 -- R1 11-3d: 2 PUCCH of format 0 or 2 for a single 2\*7-symbol subslot based HARQ-ACK codebook

 twoPUCCH-Type2-r16 ENUMERATED {supported} OPTIONAL,

 -- R1 11-3e: 1 PUCCH format 0 or 2 and 1 PUCCH format 1, 3 or 4 in the same subslot for a single 2\*7-symbol HARQ-ACK codebooks

 twoPUCCH-Type3-r16 ENUMERATED {supported} OPTIONAL,

 -- R1 11-3f: 2 PUCCH transmissions in the same subslot for a single 2\*7-symbol HARQ-ACK codebooks which are not covered by 11-3d and

 -- 11-3e

 twoPUCCH-Type4-r16 ENUMERATED {supported} OPTIONAL,

 -- R1 11-3g: SR/HARQ-ACK multiplexing once per subslot using a PUCCH (or HARQ-ACK piggybacked on a PUSCH) when SR/HARQ-ACK

 -- are supposed to be sent with different starting symbols in a subslot

 mux-SR-HARQ-ACK-r16 ENUMERATED {supported} OPTIONAL,

 dummy1 ENUMERATED {supported} OPTIONAL,

 dummy2 ENUMERATED {supported} OPTIONAL,

 -- R1 11-4c: 2 PUCCH of format 0 or 2 for two HARQ-ACK codebooks with one 7\*2-symbol sub-slot based HARQ-ACK codebook

 twoPUCCH-Type5-r16 ENUMERATED {supported} OPTIONAL,

 -- R1 11-4d: 2 PUCCH of format 0 or 2 in consecutive symbols for two HARQ-ACK codebooks with one 2\*7-symbol sub-slot based HARQ-ACK

 -- codebook

 twoPUCCH-Type6-r16 ENUMERATED {supported} OPTIONAL,

 -- R1 11-4e: 2 PUCCH of format 0 or 2 for two subslot based HARQ-ACK codebooks

 twoPUCCH-Type7-r16 ENUMERATED {supported} OPTIONAL,

 -- R1 11-4f: 1 PUCCH format 0 or 2 and 1 PUCCH format 1, 3 or 4 in the same subslot for HARQ-ACK codebooks with one 2\*7-symbol

 -- subslot based HARQ-ACK codebook

 twoPUCCH-Type8-r16 ENUMERATED {supported} OPTIONAL,

 -- R1 11-4g: 1 PUCCH format 0 or 2 and 1 PUCCH format 1, 3 or 4 in the same subslot for two subslot based HARQ-ACK codebooks

 twoPUCCH-Type9-r16 ENUMERATED {supported} OPTIONAL,

 -- R1 11-4h: 2 PUCCH transmissions in the same subslot for two HARQ-ACK codebooks with one 2\*7-symbol subslot which are not covered

 -- by 11-4c and 11-4e

 twoPUCCH-Type10-r16 ENUMERATED {supported} OPTIONAL,

 -- R1 11-4i: 2 PUCCH transmissions in the same subslot for two subslot based HARQ-ACK codebooks which are not covered by 11-4d and

 -- 11-4f

 twoPUCCH-Type11-r16 ENUMERATED {supported} OPTIONAL,

 -- R1 12-1: UL intra-UE multiplexing/prioritization of overlapping channel/signals with two priority levels in physical layer

 ul-IntraUE-Mux-r16 SEQUENCE {

 pusch-PreparationLowPriority-r16 ENUMERATED {sym0, sym1, sym2},

 pusch-PreparationHighPriority-r16 ENUMERATED {sym0, sym1, sym2}

 } OPTIONAL,

 -- R1 16-5a: Supported UL full power transmission mode of fullpower

 ul-FullPwrMode-r16 ENUMERATED {supported} OPTIONAL,

 -- R1 18-5d: Processing up to X unicast DCI scheduling for UL per scheduled CC

 crossCarrierSchedulingProcessing-DiffSCS-r16 SEQUENCE {

 scs-15kHz-120kHz-r16 ENUMERATED {n1,n2,n4} OPTIONAL,

 scs-15kHz-60kHz-r16 ENUMERATED {n1,n2,n4} OPTIONAL,

 scs-30kHz-120kHz-r16 ENUMERATED {n1,n2,n4} OPTIONAL,

 scs-15kHz-30kHz-r16 ENUMERATED {n2} OPTIONAL,

 scs-30kHz-60kHz-r16 ENUMERATED {n2} OPTIONAL,

 scs-60kHz-120kHz-r16 ENUMERATED {n2} OPTIONAL

 } OPTIONAL,

 -- R1 16-5b: Supported UL full power transmission mode of fullpowerMode1

 ul-FullPwrMode1-r16 ENUMERATED {supported} OPTIONAL,

 -- R1 16-5c-2: Ports configuration for Mode 2

 ul-FullPwrMode2-SRSConfig-diffNumSRSPorts-r16 ENUMERATED {p1-2, p1-4, p1-2-4} OPTIONAL,

 -- R1 16-5c-3: TPMI group for Mode 2

 ul-FullPwrMode2-TPMIGroup-r16 SEQUENCE {

 twoPorts-r16 BIT STRING(SIZE(2)) OPTIONAL,

 fourPortsNonCoherent-r16 ENUMERATED{g0, g1, g2, g3} OPTIONAL,

 fourPortsPartialCoherent-r16 ENUMERATED{g0, g1, g2, g3, g4, g5, g6} OPTIONAL

 } OPTIONAL

}

FeatureSetUplink-v1630 ::= SEQUENCE {

 -- R1 22-8: For SRS for CB PUSCH and antenna switching on FR1 with symbol level offset for aperiodic SRS transmission

 offsetSRS-CB-PUSCH-Ant-Switch-fr1-r16 ENUMERATED {supported} OPTIONAL,

 -- R1 22-8a: PDCCH monitoring on any span of up to 3 consecutive OFDM symbols of a slot and constrained timeline for SRS for CB

 -- PUSCH and antenna switching on FR1

 offsetSRS-CB-PUSCH-PDCCH-MonitorSingleOcc-fr1-r16 ENUMERATED {supported} OPTIONAL,

 -- R1 22-8b: For type 1 CSS with dedicated RRC configuration, type 3 CSS, and UE-SS, monitoring occasion can be any OFDM symbol(s)

 -- of a slot for Case 2 and constrained timeline for SRS for CB PUSCH and antenna switching on FR1

 offsetSRS-CB-PUSCH-PDCCH-MonitorAnyOccWithoutGap-fr1-r16 ENUMERATED {supported} OPTIONAL,

 -- R1 22-8c: For type 1 CSS with dedicated RRC configuration, type 3 CSS, and UE-SS, monitoring occasion can be any OFDM symbol(s)

 -- of a slot for Case 2 with a DCI gap and constrained timeline for SRS for CB PUSCH and antenna switching on FR1

 offsetSRS-CB-PUSCH-PDCCH-MonitorAnyOccWithGap-fr1-r16 ENUMERATED {supported} OPTIONAL,

 dummy ENUMERATED {supported} OPTIONAL,

 -- R1 22-9: Cancellation of PUCCH, PUSCH or PRACH with a DCI scheduling a PDSCH or CSI-RS or a DCI format 2\_0 for SFI

 partialCancellationPUCCH-PUSCH-PRACH-TX-r16 ENUMERATED {supported} OPTIONAL

}

FeatureSetUplink-v1640 ::= SEQUENCE {

 -- R1 11-4: Two HARQ-ACK codebooks with up to one sub-slot based HARQ-ACK codebook (i.e. slot-based + slot-based, or slot-based +

 -- sub-slot based) simultaneously constructed for supporting HARQ-ACK codebooks with different priorities at a UE

 twoHARQ-ACK-Codebook-type1-r16 SubSlot-Config-r16 OPTIONAL,

 -- R1 11-4a: Two sub-slot based HARQ-ACK codebooks simultaneously constructed for supporting HARQ-ACK codebooks with different

 -- priorities at a UE

 twoHARQ-ACK-Codebook-type2-r16 SubSlot-Config-r16 OPTIONAL,

 -- R1 22-8d: All PDCCH monitoring occasion can be any OFDM symbol(s) of a slot for Case 2 with a span gap and constrained timeline

 -- for SRS for CB PUSCH and antenna switching on FR1

 offsetSRS-CB-PUSCH-PDCCH-MonitorAnyOccWithSpanGap-fr1-r16 SEQUENCE {

 scs-15kHz-r16 ENUMERATED {set1, set2, set3} OPTIONAL,

 scs-30kHz-r16 ENUMERATED {set1, set2, set3} OPTIONAL,

 scs-60kHz-r16 ENUMERATED {set1, set2, set3} OPTIONAL

 } OPTIONAL

}

FeatureSetUplink-v16xy ::= SEQUENCE {

 pusch-RepetitionTypeB-v16xy SEQUENCE {

 maxNumberPUSCH-Tx-Cap1-r16 ENUMERATED {n2, n3, n4, n7, n8, n12},

 maxNumberPUSCH-Tx-Cap2-r16 ENUMERATED {n2, n3, n4, n7, n8, n12}

} OPTIONAL

}

FeatureSetUplink-v1710 ::= SEQUENCE {

 -- R1 23-3-1 Multi-TRP PUSCH repetition (type A) -codebook based

 mTRP-PUSCH-TypeA-CB-r17 ENUMERATED {n1,n2,n4} OPTIONAL,

 -- R1 23-3-1-2 Multi-TRP PUSCH repetition (type A) - non-codebook based

 mTRP-PUSCH-RepetitionTypeA-r17 ENUMERATED {n1,n2,n3,n4} OPTIONAL,

 -- R1 23-3-3 Multi-TRP PUCCH repetition-intra-slot

 mTRP-PUCCH-IntraSlot-r17 ENUMERATED {pf0-2, pf1-3-4, pf0-4} OPTIONAL,

 -- R1 23-8-4 Maximum 2 SP and 1 periodic SRS sets for antenna switching

 srs-AntennaSwitching2SP-1Periodic-r17 ENUMERATED {supported} OPTIONAL,

 -- R1 23-8-9 Extension of aperiodic SRS configuration for 1T4R, 1T2R and 2T4R

 srs-ExtensionAperiodicSRS-r17 ENUMERATED {supported} OPTIONAL,

 -- R1 23-8-10 1 aperiodic SRS resource set for 1T4R

 srs-OneAP-SRS-r17 ENUMERATED {supported} OPTIONAL,

 -- R4 16-8 UE power class per band per band combination

 ue-PowerClassPerBandPerBC-r17 ENUMERATED {pc1dot5, pc2, pc3} OPTIONAL,

 -- R4 17-8 UL transmission in FR2 bands within an UL gap when the UL gap is activated

 tx-Support-UL-GapFR2-r17 ENUMERATED {supported} OPTIONAL

}

FeatureSetUplink-v1720 ::= SEQUENCE {

 -- R1 25-3: Repetitions for PUCCH format 0, 1, 2, 3 and 4 over multiple PUCCH subslots with configured K = 2, 4, 8

 pucch-Repetition-F0-1-2-3-4-RRC-Config-r17 ENUMERATED {supported} OPTIONAL,

 -- R1 25-3a: Repetitions for PUCCH format 0, 1, 2, 3 and 4 over multiple PUCCH subslots using dynamic repetition indication

 pucch-Repetition-F0-1-2-3-4-DynamicIndication-r17 ENUMERATED {supported} OPTIONAL,

 -- R1 25-3b: Inter-subslot frequency hopping for PUCCH repetitions

 interSubslotFreqHopping-PUCCH-r17 ENUMERATED {supported} OPTIONAL,

 -- R1 25-8: Semi-static HARQ-ACK codebook for sub-slot PUCCH

 semiStaticHARQ-ACK-CodebookSub-SlotPUCCH-r17 ENUMERATED {supported} OPTIONAL,

 -- R1 25-14: PHY prioritization of overlapping low-priority DG-PUSCH and high-priority CG-PUSCH

 phy-PrioritizationLowPriorityDG-HighPriorityCG-r17 INTEGER(1..16) OPTIONAL,

 -- R1 25-15: PHY prioritization of overlapping high-priority DG-PUSCH and low-priority CG-PUSCH

 phy-PrioritizationHighPriorityDG-LowPriorityCG-r17 SEQUENCE {

 pusch-PreparationLowPriority-r17 ENUMERATED{sym0, sym1, sym2},

 additionalCancellationTime-r17 SEQUENCE {

 scs-15kHz-r17 ENUMERATED{sym0, sym1, sym2} OPTIONAL,

 scs-30kHz-r17 ENUMERATED{sym0, sym1, sym2, sym3, sym4} OPTIONAL,

 scs-60kHz-r17 ENUMERATED{sym0, sym1, sym2, sym3, sym4, sym5, sym6, sym7, sym8} OPTIONAL,

 scs-120kHz-r17 ENUMERATED{sym0, sym1, sym2, sym3, sym4, sym5, sym6, sym7, sym8, sym9,

 sym10, sym11, sym12, sym13, sym14, sym15, sym16} OPTIONAL

 },

 maxNumberCarriers-r17 INTEGER(1..16)

 } OPTIONAL,

 -- R4 17-5 Support of UL DC location(s) report

 extendedDC-LocationReport-r17 ENUMERATED {supported} OPTIONAL

}

SubSlot-Config-r16 ::= SEQUENCE {

 sub-SlotConfig-NCP-r16 ENUMERATED {n4,n5,n6,n7} OPTIONAL,

 sub-SlotConfig-ECP-r16 ENUMERATED {n4,n5,n6} OPTIONAL

}

SRS-AllPosResources-r16 ::= SEQUENCE {

 srs-PosResources-r16 SRS-PosResources-r16,

 srs-PosResourceAP-r16 SRS-PosResourceAP-r16 OPTIONAL,

 srs-PosResourceSP-r16 SRS-PosResourceSP-r16 OPTIONAL

}

SRS-PosResources-r16 ::= SEQUENCE {

 maxNumberSRS-PosResourceSetPerBWP-r16 ENUMERATED {n1, n2, n4, n8, n12, n16},

 maxNumberSRS-PosResourcesPerBWP-r16 ENUMERATED {n1, n2, n4, n8, n16, n32, n64},

 maxNumberSRS-ResourcesPerBWP-PerSlot-r16 ENUMERATED {n1, n2, n3, n4, n5, n6, n8, n10, n12, n14},

 maxNumberPeriodicSRS-PosResourcesPerBWP-r16 ENUMERATED {n1, n2, n4, n8, n16, n32, n64},

 maxNumberPeriodicSRS-PosResourcesPerBWP-PerSlot-r16 ENUMERATED {n1, n2, n3, n4, n5, n6, n8, n10, n12, n14}

}

SRS-PosResourceAP-r16 ::= SEQUENCE {

 maxNumberAP-SRS-PosResourcesPerBWP-r16 ENUMERATED {n1, n2, n4, n8, n16, n32, n64},

 maxNumberAP-SRS-PosResourcesPerBWP-PerSlot-r16 ENUMERATED {n1, n2, n3, n4, n5, n6, n8, n10, n12, n14}

}

SRS-PosResourceSP-r16 ::= SEQUENCE {

 maxNumberSP-SRS-PosResourcesPerBWP-r16 ENUMERATED {n1, n2, n4, n8, n16, n32, n64},

 maxNumberSP-SRS-PosResourcesPerBWP-PerSlot-r16 ENUMERATED {n1, n2, n3, n4, n5, n6, n8, n10, n12, n14}

}

SRS-Resources ::= SEQUENCE {

 maxNumberAperiodicSRS-PerBWP ENUMERATED {n1, n2, n4, n8, n16},

 maxNumberAperiodicSRS-PerBWP-PerSlot INTEGER (1..6),

 maxNumberPeriodicSRS-PerBWP ENUMERATED {n1, n2, n4, n8, n16},

 maxNumberPeriodicSRS-PerBWP-PerSlot INTEGER (1..6),

 maxNumberSemiPersistentSRS-PerBWP ENUMERATED {n1, n2, n4, n8, n16},

 maxNumberSemiPersistentSRS-PerBWP-PerSlot INTEGER (1..6),

 maxNumberSRS-Ports-PerResource ENUMERATED {n1, n2, n4}

}

DummyF ::= SEQUENCE {

 maxNumberPeriodicCSI-ReportPerBWP INTEGER (1..4),

 maxNumberAperiodicCSI-ReportPerBWP INTEGER (1..4),

 maxNumberSemiPersistentCSI-ReportPerBWP INTEGER (0..4),

 simultaneousCSI-ReportsAllCC INTEGER (5..32)

}

-- TAG-FEATURESETUPLINK-STOP

-- ASN1STOP

|  |
| --- |
| ***FeatureSetUplink* field descriptions** |
| ***featureSetListPerUplinkCC***Indicates which features the UE supports on the individual UL carriers of the feature set (and hence of a band entry that refers to the feature set). The UE shall hence include at least as many *FeatureSetUplinkPerCC-Id* in this list as the number of carriers it supports according to the *ca-BandwidthClassUL*, except if indicating additional functionality by reducing the number of *FeatureSetUplinkPerCC-Id* in the feature set (see NOTE 1 in *FeatureSetCombination* IE description). The order of the elements in this list is not relevant, i.e., the network may configure any of the carriers in accordance with any of the *FeatureSetUplinkPerCC-Id* in this list. |

<Next modification>

– *UE-NR-Capability*

The IE *UE-NR-Capability* is used to convey the NR UE Radio Access Capability Parameters, see TS 38.306 [26].

***UE-NR-Capability* information element**

-- ASN1START

-- TAG-UE-NR-CAPABILITY-START

UE-NR-Capability ::= SEQUENCE {

 accessStratumRelease AccessStratumRelease,

 pdcp-Parameters PDCP-Parameters,

 rlc-Parameters RLC-Parameters OPTIONAL,

 mac-Parameters MAC-Parameters OPTIONAL,

 phy-Parameters Phy-Parameters,

 rf-Parameters RF-Parameters,

 measAndMobParameters MeasAndMobParameters OPTIONAL,

 fdd-Add-UE-NR-Capabilities UE-NR-CapabilityAddXDD-Mode OPTIONAL,

 tdd-Add-UE-NR-Capabilities UE-NR-CapabilityAddXDD-Mode OPTIONAL,

 fr1-Add-UE-NR-Capabilities UE-NR-CapabilityAddFRX-Mode OPTIONAL,

 fr2-Add-UE-NR-Capabilities UE-NR-CapabilityAddFRX-Mode OPTIONAL,

 featureSets FeatureSets OPTIONAL,

 featureSetCombinations SEQUENCE (SIZE (1..maxFeatureSetCombinations)) OF FeatureSetCombination OPTIONAL,

 lateNonCriticalExtension OCTET STRING (CONTAINING UE-NR-Capability-v15c0) OPTIONAL,

 nonCriticalExtension UE-NR-Capability-v1530 OPTIONAL

}

-- Regular non-critical Rel-15 extensions:

UE-NR-Capability-v1530 ::= SEQUENCE {

 fdd-Add-UE-NR-Capabilities-v1530 UE-NR-CapabilityAddXDD-Mode-v1530 OPTIONAL,

 tdd-Add-UE-NR-Capabilities-v1530 UE-NR-CapabilityAddXDD-Mode-v1530 OPTIONAL,

 dummy ENUMERATED {supported} OPTIONAL,

 interRAT-Parameters InterRAT-Parameters OPTIONAL,

 inactiveState ENUMERATED {supported} OPTIONAL,

 delayBudgetReporting ENUMERATED {supported} OPTIONAL,

 nonCriticalExtension UE-NR-Capability-v1540 OPTIONAL

}

UE-NR-Capability-v1540 ::= SEQUENCE {

 sdap-Parameters SDAP-Parameters OPTIONAL,

 overheatingInd ENUMERATED {supported} OPTIONAL,

 ims-Parameters IMS-Parameters OPTIONAL,

 fr1-Add-UE-NR-Capabilities-v1540 UE-NR-CapabilityAddFRX-Mode-v1540 OPTIONAL,

 fr2-Add-UE-NR-Capabilities-v1540 UE-NR-CapabilityAddFRX-Mode-v1540 OPTIONAL,

 fr1-fr2-Add-UE-NR-Capabilities UE-NR-CapabilityAddFRX-Mode OPTIONAL,

 nonCriticalExtension UE-NR-Capability-v1550 OPTIONAL

}

UE-NR-Capability-v1550 ::= SEQUENCE {

 reducedCP-Latency ENUMERATED {supported} OPTIONAL,

 nonCriticalExtension UE-NR-Capability-v1560 OPTIONAL

}

UE-NR-Capability-v1560 ::= SEQUENCE {

 nrdc-Parameters NRDC-Parameters OPTIONAL,

 receivedFilters OCTET STRING (CONTAINING UECapabilityEnquiry-v1560-IEs) OPTIONAL,

 nonCriticalExtension UE-NR-Capability-v1570 OPTIONAL

}

UE-NR-Capability-v1570 ::= SEQUENCE {

 nrdc-Parameters-v1570 NRDC-Parameters-v1570 OPTIONAL,

 nonCriticalExtension UE-NR-Capability-v1610 OPTIONAL

}

-- Late non-critical Rel-15 extensions:

UE-NR-Capability-v15c0 ::= SEQUENCE {

 nrdc-Parameters-v15c0 NRDC-Parameters-v15c0 OPTIONAL,

 partialFR2-FallbackRX-Req ENUMERATED {true} OPTIONAL,

 nonCriticalExtension UE-NR-Capability-v15g0 OPTIONAL

}

UE-NR-Capability-v15g0 ::= SEQUENCE {

 rf-Parameters-v15g0 RF-Parameters-v15g0 OPTIONAL,

 nonCriticalExtension UE-NR-Capability-v15j0 OPTIONAL

}

UE-NR-Capability-v15j0 ::= SEQUENCE {

 -- Following field is only for REL-15 late non-critical extensions

 lateNonCriticalExtension OCTET STRING OPTIONAL,

 nonCriticalExtension UE-NR-Capability-v16a0 OPTIONAL

}

-- Regular non-critical Rel-16 extensions:

UE-NR-Capability-v1610 ::= SEQUENCE {

 inDeviceCoexInd-r16 ENUMERATED {supported} OPTIONAL,

 dl-DedicatedMessageSegmentation-r16 ENUMERATED {supported} OPTIONAL,

 nrdc-Parameters-v1610 NRDC-Parameters-v1610 OPTIONAL,

 powSav-Parameters-r16 PowSav-Parameters-r16 OPTIONAL,

 fr1-Add-UE-NR-Capabilities-v1610 UE-NR-CapabilityAddFRX-Mode-v1610 OPTIONAL,

 fr2-Add-UE-NR-Capabilities-v1610 UE-NR-CapabilityAddFRX-Mode-v1610 OPTIONAL,

 bh-RLF-Indication-r16 ENUMERATED {supported} OPTIONAL,

 directSN-AdditionFirstRRC-IAB-r16 ENUMERATED {supported} OPTIONAL,

 bap-Parameters-r16 BAP-Parameters-r16 OPTIONAL,

 referenceTimeProvision-r16 ENUMERATED {supported} OPTIONAL,

 sidelinkParameters-r16 SidelinkParameters-r16 OPTIONAL,

 highSpeedParameters-r16 HighSpeedParameters-r16 OPTIONAL,

 mac-Parameters-v1610 MAC-Parameters-v1610 OPTIONAL,

 mcgRLF-RecoveryViaSCG-r16 ENUMERATED {supported} OPTIONAL,

 resumeWithStoredMCG-SCells-r16 ENUMERATED {supported} OPTIONAL,

 resumeWithStoredSCG-r16 ENUMERATED {supported} OPTIONAL,

 resumeWithSCG-Config-r16 ENUMERATED {supported} OPTIONAL,

 ue-BasedPerfMeas-Parameters-r16 UE-BasedPerfMeas-Parameters-r16 OPTIONAL,

 son-Parameters-r16 SON-Parameters-r16 OPTIONAL,

 onDemandSIB-Connected-r16 ENUMERATED {supported} OPTIONAL,

 nonCriticalExtension UE-NR-Capability-v1640 OPTIONAL

}

UE-NR-Capability-v1640 ::= SEQUENCE {

 redirectAtResumeByNAS-r16 ENUMERATED {supported} OPTIONAL,

 phy-ParametersSharedSpectrumChAccess-r16 Phy-ParametersSharedSpectrumChAccess-r16 OPTIONAL,

 nonCriticalExtension UE-NR-Capability-v1650 OPTIONAL

}

UE-NR-Capability-v1650 ::= SEQUENCE {

 mpsPriorityIndication-r16 ENUMERATED {supported} OPTIONAL,

 highSpeedParameters-v1650 HighSpeedParameters-v1650 OPTIONAL,

 nonCriticalExtension UE-NR-Capability-v1690 OPTIONAL

}

UE-NR-Capability-v1690 ::= SEQUENCE {

 ul-RRC-Segmentation-r16 ENUMERATED {supported} OPTIONAL,

 nonCriticalExtension UE-NR-Capability-v1700 OPTIONAL

}

-- Late non-critical extensions from Rel-16 onwards:

UE-NR-Capability-v16a0 ::= SEQUENCE {

 phy-Parameters-v16a0 Phy-Parameters-v16a0 OPTIONAL,

 rf-Parameters-v16a0 RF-Parameters-v16a0 OPTIONAL,

 nonCriticalExtension UE-NR-Capability-v16c0 OPTIONAL

}

UE-NR-Capability-v16c0 ::= SEQUENCE {

 rf-Parameters-v16c0 RF-Parameters-v16c0 OPTIONAL,

 nonCriticalExtension UE-NR-Capability-v16xy OPTIONAL

}

UE-NR-Capability-v16xy ::= SEQUENCE {

 featureSets-v16xy FeatureSets-v16xy OPTIONAL,

nonCriticalExtension SEQUENCE {}

}

-- Regular non-critical Rel-17 extensions:

UE-NR-Capability-v1700 ::= SEQUENCE {

 inactiveStatePO-Determination-r17 ENUMERATED {supported} OPTIONAL,

 highSpeedParameters-v1700 HighSpeedParameters-v1700 OPTIONAL,

 powSav-Parameters-v1700 PowSav-Parameters-v1700 OPTIONAL,

 mac-Parameters-v1700 MAC-Parameters-v1700 OPTIONAL,

 ims-Parameters-v1700 IMS-Parameters-v1700 OPTIONAL,

 measAndMobParameters-v1700 MeasAndMobParameters-v1700,

 appLayerMeasParameters-r17 AppLayerMeasParameters-r17 OPTIONAL,

 redCapParameters-r17 RedCapParameters-r17 OPTIONAL,

 ra-SDT-r17 ENUMERATED {supported} OPTIONAL,

 srb-SDT-r17 ENUMERATED {supported} OPTIONAL,

 gNB-SideRTT-BasedPDC-r17 ENUMERATED {supported} OPTIONAL,

 bh-RLF-DetectionRecovery-Indication-r17 ENUMERATED {supported} OPTIONAL,

 nrdc-Parameters-v1700 NRDC-Parameters-v1700 OPTIONAL,

 bap-Parameters-v1700 BAP-Parameters-v1700 OPTIONAL,

 musim-GapPreference-r17 ENUMERATED {supported} OPTIONAL,

 musimLeaveConnected-r17 ENUMERATED {supported} OPTIONAL,

 mbs-Parameters-r17 MBS-Parameters-r17,

 nonTerrestrialNetwork-r17 ENUMERATED {supported} OPTIONAL,

 ntn-ScenarioSupport-r17 ENUMERATED {gso, ngso} OPTIONAL,

 sliceInfoforCellReselection-r17 ENUMERATED {supported} OPTIONAL,

 ue-RadioPagingInfo-r17 UE-RadioPagingInfo-r17 OPTIONAL,

 -- R4 17-2 UL gap pattern for Tx power management

 ul-GapFR2-Pattern-r17 BIT STRING (SIZE (4)) OPTIONAL,

 ntn-Parameters-r17 NTN-Parameters-r17 OPTIONAL,

 nonCriticalExtension UE-NR-Capability-v1740 OPTIONAL

}

UE-NR-Capability-v1740 ::= SEQUENCE {

 redCapParameters-v1740 RedCapParameters-v1740,

 nonCriticalExtension SEQUENCE {} OPTIONAL

}

UE-NR-CapabilityAddXDD-Mode ::= SEQUENCE {

 phy-ParametersXDD-Diff Phy-ParametersXDD-Diff OPTIONAL,

 mac-ParametersXDD-Diff MAC-ParametersXDD-Diff OPTIONAL,

 measAndMobParametersXDD-Diff MeasAndMobParametersXDD-Diff OPTIONAL

}

UE-NR-CapabilityAddXDD-Mode-v1530 ::= SEQUENCE {

 eutra-ParametersXDD-Diff EUTRA-ParametersXDD-Diff

}

UE-NR-CapabilityAddFRX-Mode ::= SEQUENCE {

 phy-ParametersFRX-Diff Phy-ParametersFRX-Diff OPTIONAL,

 measAndMobParametersFRX-Diff MeasAndMobParametersFRX-Diff OPTIONAL

}

UE-NR-CapabilityAddFRX-Mode-v1540 ::= SEQUENCE {

 ims-ParametersFRX-Diff IMS-ParametersFRX-Diff OPTIONAL

}

UE-NR-CapabilityAddFRX-Mode-v1610 ::= SEQUENCE {

 powSav-ParametersFRX-Diff-r16 PowSav-ParametersFRX-Diff-r16 OPTIONAL,

 mac-ParametersFRX-Diff-r16 MAC-ParametersFRX-Diff-r16 OPTIONAL

}

BAP-Parameters-r16 ::= SEQUENCE {

 flowControlBH-RLC-ChannelBased-r16 ENUMERATED {supported} OPTIONAL,

 flowControlRouting-ID-Based-r16 ENUMERATED {supported} OPTIONAL

}

BAP-Parameters-v1700 ::= SEQUENCE {

 bapHeaderRewriting-Rerouting-r17 ENUMERATED {supported} OPTIONAL,

 bapHeaderRewriting-Routing-r17 ENUMERATED {supported} OPTIONAL

}

MBS-Parameters-r17 ::= SEQUENCE {

 maxMRB-Add-r17 INTEGER (1..16) OPTIONAL

}

-- TAG-UE-NR-CAPABILITY-STOP

-- ASN1STOP

|  |
| --- |
| ***UE-NR-Capability* field descriptions** |
| ***featureSetCombinations***A list of *FeatureSetCombination:s* for *supportedBandCombinationList* in *UE-NR-Capability*. The *FeatureSetDownlink:s* and *FeatureSetUplink:s* referred to from these *FeatureSetCombination:s* are defined in the *featureSets* list in *UE-NR-Capability*. |

|  |
| --- |
| ***UE-NR-Capability-v1540 field descriptions*** |
| ***fr1-fr2-Add-UE-NR-Capabilities***This instance of *UE-NR-CapabilityAddFRX-Mode* does not include any other fields than *csi-RS-IM-ReceptionForFeedback*/ *csi-RS-ProcFrameworkForSRS*/ *csi-ReportFramework*. |

<End of modification>