**3GPP TSG- Meeting #**

**, , - , 2025**

|  |
| --- |
| *CR-Form-v12.3* |
| **CHANGE REQUEST** |
|  |
|  |  | **CR** | **5281** | **rev** | **-** | **Current version:** |  |  |
|  |
| *For* [***HE******LP***](http://www.3gpp.org/3G_Specs/CRs.htm#_blank)*on using this form: comprehensive instructions can be found at* [*http://www.3gpp.org/Change-Requests*](http://www.3gpp.org/Change-Requests)*.* |
|  |

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

|  |
| --- |
|  |
| ***Title:***  | Capability updates for RAN1 feature list |
|  |  |
| ***Source to WG:*** | Xiaomi |
| ***Source to TSG:*** | R2 |
|  |  |
| ***Work item code:*** | NR\_MIMO\_evo\_DL\_UL |  | ***Date:*** | 2025-02-28 |
|  |  |  |  |  |
| ***Category:*** | **B** |  | ***Release:*** |  |
|  | *Use one of the following categories:****F*** *(correction)****A*** *(mirror corresponding to a change in an earlier release)****B*** *(addition of feature),* ***C*** *(functional modification of feature)****D*** *(editorial modification)*Detailed explanations of the above categories canbe found in 3GPP [TR 21.900](http://www.3gpp.org/ftp/Specs/html-info/21900.htm). | *Use one of the following releases:Rel-8 (Release 8)Rel-9 (Release 9)Rel-10 (Release 10)Rel-11 (Release 11)…Rel-17 (Release 17)Rel-18 (Release 18)Rel-19 (Release 19) Rel-20 (Release 20)* |
|  |  |
| ***Reason for change:*** | 1. New MIMO capability implementation according to RAN1 feature list R1-2501388.

Impact Analysis:Impacted 5G architecture options: NR SA, NR-DC, NG(EN-DC), NE-DCImpacted functionality: MIMOInteroperability:If the network is implemented according to this CR and UE is not, UE will not be able to signal all the capability correctly and network may assume that UE does not support them and may not configure them. If the UE is implemented according to the CR and network is not, network will not be aware of the UE capability and may not configure the UE for these supported features.  |
|  |  |
| ***Summary of change:*** | 1. Add new MIMO capabilities according to R1-2501388.
 |
|  |  |
| ***Consequences if not approved:*** | 1. UE cannot support new MIMO capabilities added in R1-2501388.
 |
|  |  |
| ***Clauses affected:*** | 6.3.3 |
|  |  |
|  | **Y** | **N** |  |  |
| ***Other specs*** | **X** |  |  Other core specifications  | TS/TR 38.306 CR 1225  |
| ***affected:*** |  | **x** |  Test specifications | TS/TR ... CR ...  |
| ***(show related CRs)*** |  | **x** |  O&M Specifications | TS/TR ... CR ...  |
|  |  |
| ***Other comments:*** |  |
|  |  |
| ***This CR's revision history:*** |  |

# 6 Protocol data units, formats and parameters (ASN.1)

## 6.3 RRC information elements

### 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

 ]],

 [[

 featureSetsDownlinkPerCC-v1780 SEQUENCE (SIZE (1..maxPerCC-FeatureSets)) OF FeatureSetDownlinkPerCC-v1780 OPTIONAL,

 featureSetsUplinkPerCC-v1780 SEQUENCE (SIZE (1..maxPerCC-FeatureSets)) OF FeatureSetUplinkPerCC-v1780 OPTIONAL

 ]],

 [[

 featureSetsDownlink-v1800 SEQUENCE (SIZE (1..maxDownlinkFeatureSets)) OF FeatureSetDownlink-v1800 OPTIONAL,

 featureSetsDownlinkPerCC-v1800 SEQUENCE (SIZE (1..maxPerCC-FeatureSets)) OF FeatureSetDownlinkPerCC-v1800 OPTIONAL,

 featureSetsUplink-v1800 SEQUENCE (SIZE (1..maxUplinkFeatureSets)) OF FeatureSetUplink-v1800 OPTIONAL,

 featureSetsUplinkPerCC-v1800 SEQUENCE (SIZE (1..maxPerCC-FeatureSets)) OF FeatureSetUplinkPerCC-v1800 OPTIONAL

 ]],

 [[

 featureSetsDownlink-v1830 SEQUENCE (SIZE (1..maxDownlinkFeatureSets)) OF FeatureSetDownlink-v1830 OPTIONAL

 ]],

 [[

 featureSetsDownlinkPerCC-v1840 SEQUENCE (SIZE (1..maxPerCC-FeatureSets)) OF FeatureSetDownlinkPerCC-v1840 OPTIONAL,

 featureSetsUplinkPerCC-v1840 SEQUENCE (SIZE (1..maxPerCC-FeatureSets)) OF FeatureSetUplinkPerCC-v1840 OPTIONAL

 ]],

 [[

 featureSetsUplink-v1850 SEQUENCE (SIZE (1..maxUplinkFeatureSets)) OF FeatureSetUplink-v1850 OPTIONAL,

 featureSetsUplinkPerCC-v1850 SEQUENCE (SIZE (1..maxPerCC-FeatureSets)) OF FeatureSetUplinkPerCC-v1850 OPTIONAL

 ]]

}

FeatureSets-v16d0 ::= SEQUENCE {

 featureSetsUplink-v16d0 SEQUENCE (SIZE (1..maxUplinkFeatureSets)) OF FeatureSetUplink-v16d0 OPTIONAL

}

-- TAG-FEATURESETS-STOP

-- ASN1STOP

#### – *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-v16d0 ::= SEQUENCE {

 pusch-RepetitionTypeB-v16d0 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

}

FeatureSetUplink-v1800 ::= SEQUENCE {

 -- R1 40-3-3-1a: Supported maximum delay value larger than D\_basic

 maxDelayValueBeyondD-Basic-r18 ENUMERATED {sl2,sl3,sl4,sl5,sl6,sl10} OPTIONAL,

 -- R1 40-3-3-2: Number of delay values

 tdcp-NumberDelayValue-r18 INTEGER (2..4) OPTIONAL,

 -- R1 40-3-3-4: Phase report

 phaseReportMoreThanOne-r18 ENUMERATED {supported} OPTIONAL,

 -- R1 40-3-3-6: Maximum number of TRS resource sets in a report configuration

 maxNumberTRS-ResourceSet-r18 INTEGER (2..3) OPTIONAL,

 -- R1 40-3-3-7: Maximum number of TDCP report settings per-BWP

 maxNumberTDCP-PerBWP-r18 INTEGER (1..4) OPTIONAL,

 -- R1 40-4-6c: DMRS type for Rel.18 enhanced DMRS ports for PUSCH

 pusch-DMRS-TypeEnh-r18 SEQUENCE {

 dmrs-Type-r18 ENUMERATED {etype1, both},

 pusch-TypeA-DMRS-r18 SEQUENCE {

 -- R1 40-4-6: Basic feature of Rel.18 enhanced DMRS ports for PUSCH for scheduling mapping of type A for Rel.18 enhanced

 -- DMRS ports

 dmrs-TypeA-r18 ENUMERATED {supported},

 -- R1 40-4-6d: 2 symbols front-loaded DMRS (uplink) for Rel.18 enhanced DMRS ports for PUSCH

 pusch-2SymbolFL-DMRS-r18 ENUMERATED {supported} OPTIONAL,

 -- R1 40-4-6e: 2-symbol FL DMRS + one additional 2-symbols DMRS for Rel.18 enhanced DMRS ports for PUSCH

 pusch-2SymbolFL-DMRS-Addition2Symbol-r18 ENUMERATED {supported} OPTIONAL,

 -- R1 40-4-6f: 1 symbol FL DMRS and 3 additional DMRS symbols for Rel.18 enhanced DMRS ports for PUSCH

 pusch-1SymbolFL-DMRS-Addition3Symbol-r18 ENUMERATED {supported} OPTIONAL,

 -- R1 40-4-6k: 1 symbol FL DMRS and 2 additional DMRS symbols for more than one port for Rel.18 enhanced DMRS ports for

 -- PUSCH

 pusch-1SymbolFL-DMRS-BeyondOnePort-r18 ENUMERATED {supported} OPTIONAL

 } OPTIONAL,

 -- R1 40-4-10: DMRS port configuration for PUSCH with 8Tx

 pusch-DMRS8Tx-r18 ENUMERATED {rel15, both} OPTIONAL,

 -- R1 40-4-6a: Basic feature of Rel.18 enhanced DMRS ports for PUSCH for scheduling type B for Rel.18 enhanced DMRS ports

 pusch-TypeB-DMRS-r18 ENUMERATED {supported} OPTIONAL,

 -- R1 40-4-6g: 1 port UL PTRS for Rel.18 enhanced DMRS ports for PUSCH with rank 1-4

 pusch-rank-1-4-1Port-r18 ENUMERATED {supported} OPTIONAL,

 -- R1 40-4-6h: 1 port UL PTRS for Rel.18 enhanced DMRS ports for PUSCH with rank 5-8

 pusch-rank-5-8-1Port-r18 ENUMERATED {supported} OPTIONAL,

 -- R1 40-4-6i: 2 port UL PTRS for Rel.18 enhanced DMRS ports for PUSCH with rank 1-4

 pusch-rank-1-4-2Port-r18 ENUMERATED {supported} OPTIONAL,

 -- R1 40-4-6j: 2 port UL PTRS for Rel.18 enhanced DMRS ports for PUSCH with rank 5-8

 pusch-rank-5-8-2Port-r18 ENUMERATED {supported} OPTIONAL

 } OPTIONAL,

 -- R1 40-4-13: Support Rel-18 UL DMRS with single-DCI based M-TRP

 ul-DMRS-SingleDCI-M-TRP-r18 ENUMERATED {supported} OPTIONAL,

 -- R1 40-4-14: Support Rel-18 UL DMRS with M-DCI based M-TRP

 ul-DMRS-M-DCI-M-TRP-r18 ENUMERATED {supported} OPTIONAL,

 -- R1 40-5-5: Maximum 2 SP and 1 periodic SRS sets for 8T8R antenna switching

 srs-AntennaSwitching8T8R2SP-1Periodic-r18 ENUMERATED {supported} OPTIONAL,

 -- R1 40-6-4: Single-DCI based STx2P SFN scheme for PUCCH

 pucch-SingleDCI-STx2P-SFN-r18 ENUMERATED {pf0-2, pf1-3-4, pf0-4} OPTIONAL,

 -- R1 41-4-6: Positioning SRS bandwidth aggregation in RRC\_CONNECTED

 posSRS-BWA-RRC-Connected-r18 PosSRS-BWA-RRC-Connected-r18 OPTIONAL,

 -- R1 41-4-7: Positioning SRS bandwidth aggregation independent from UL communication CA in RRC\_CONNECTED

 posSRS-BWA-IndependentCA-RRC-Connected-r18 PosSRS-BWA-IndependentCA-RRC-Connected-r18 OPTIONAL,

 -- R1 41-4-9: Indicate which other bands in the band combination are affected due to the need of a guard period

 posSRS-BWA-AffectedBandList-r18 SEQUENCE (SIZE (1..maxBands)) OF FreqBandIndicatorNR OPTIONAL,

 -- R1 45-5a: RACH-based early TA acquisition with simultaneous transmission

 rach-EarlyTA-BandList-r18 SEQUENCE (SIZE (1..maxBandsMRDC)) OF BOOLEAN OPTIONAL,

 -- R1 49-6: Two HARQ-ACK codebooks with up to one sub-slot based HARQ-ACK codebook simultaneously constructed for supporting

 -- HARQ-ACK codebooks with different priorities by DCI format 1\_3

 simultaneous-2-1-HARQ-ACK-CB-r18 SubSlot-Config-r16 OPTIONAL,

 -- R1 49-6a: Two HARQ-ACK codebooks with two sub-slot based HARQ-ACK codebook simultaneously constructed for supporting

 -- HARQ-ACK codebooks with different priorities by DCI format 1\_3

 simultaneous-2-2-HARQ-ACK-CB-r18 SubSlot-Config-r16 OPTIONAL,

 -- R1 49-7: UL intra-UE multiplexing/prioritization of overlapping channel/signals with two priority levels in physical

 -- layer for DCI format 1\_3/0\_3

 ul-IntraUE-MuxEnh-r18 SEQUENCE {

 pusch-PreparationLowPriority-r18 ENUMERATED {sym0, sym1, sym2},

 pusch-PreparationHighPriority-r18 ENUMERATED {sym0, sym1, sym2}

 } OPTIONAL,

 -- R4 27-1 TxDiversity for 4Tx

 txDiversity4Tx-r18 ENUMERATED {supported} OPTIONAL,

 -- R4 41-2: Power boosting for DFT-s-OFDM pi/2 BPSK and QPSK transmissions without modified spectrum flatness requirement

 powerBoosting-pi2BPSK-QPSK-r18 ENUMERATED {supported} OPTIONAL,

 -- R4 41-3: Power boosting for DFT-s-OFDM pi/2 BPSK and QPSK transmissions with modified spectrum flatness requirement shaping

 powerBoosting-pi2BPSK-QPSK-Modified-r18 ENUMERATED {supported} OPTIONAL,

 -- R4 44-1 TxDiversity for 2Tx

 txDiversity2Tx-r18 ENUMERATED {supported} OPTIONAL,

 ue-PowerClassPerBandPerBC-v1820 ENUMERATED {pc5} OPTIONAL

}

FeatureSetUplink-v1850 ::= SEQUENCE {

 -- R1 40-7-1h: UE 8Tx PUSCH processing capability for codebook

 additionalTime-CB-8TxPUSCH-r18 SEQUENCE {

 scs-15kHz-r18 ENUMERATED {sym1, sym2, sym4} OPTIONAL,

 scs-30kHz-r18 ENUMERATED {sym1, sym2, sym4, sym8} OPTIONAL,

 scs-60kHz-r18 ENUMERATED {sym2, sym4, sym8, sym16} OPTIONAL,

 scs-120kHz-r18 ENUMERATED {sym4, sym8, sym16, sym32} OPTIONAL,

 scs-480kHz-r18 ENUMERATED {sym16, sym32, sym64, sym128} OPTIONAL,

 scs-960kHz-r18 ENUMERATED {sym32, sym64, sym128, sym256} OPTIONAL

 } OPTIONAL,

 -- R1 40-7-2b: UE 8Tx PUSCH processing capability for non-codebook

 additionalTime-NonCB-8TxPUSCH-r18 SEQUENCE {

 scs-15kHz-r18 ENUMERATED {sym1, sym2, sym4} OPTIONAL,

 scs-30kHz-r18 ENUMERATED {sym1, sym2, sym4, sym8} OPTIONAL,

 scs-60kHz-r18 ENUMERATED {sym2, sym4, sym8, sym16} OPTIONAL,

 scs-120kHz-r18 ENUMERATED {sym4, sym8, sym16, sym32} OPTIONAL,

 scs-480kHz-r18 ENUMERATED {sym16, sym32, sym64, sym128} OPTIONAL,

 scs-960kHz-r18 ENUMERATED {sym32, sym64, sym128, sym256} OPTIONAL

 } 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)

}

PosSRS-BWA-RRC-Connected-r18 ::= SEQUENCE {

 numOfCarriersIntraBandContiguous-r18 ENUMERATED {two, three, twoandthree},

 maximumAggregatedBW-TwoCarriersFR1-r18 ENUMERATED {mhz20, mhz40, mhz50, mhz80, mhz100,

 mhz160, mhz180, mhz190, mhz200} OPTIONAL,

 maximumAggregatedBW-TwoCarriersFR2-r18 ENUMERATED {mhz50, mhz100, mhz200, mhz400, mhz600, mhz800} OPTIONAL,

 maximumAggregatedBW-ThreeCarriersFR1-r18 ENUMERATED {mhz80, mhz100, mhz160, mhz200, mhz240, mhz300} OPTIONAL,

 maximumAggregatedBW-ThreeCarriersFR2-r18 ENUMERATED {mhz50, mhz100, mhz200, mhz300, mhz400,

 mhz600, mhz800, mhz1000, mhz1200}

 OPTIONAL,

 maximumAggregatedResourceSet-r18 ENUMERATED {n1, n2, n4, n8, n12, n16},

 maximumAggregatedResourcePeriodic-r18 ENUMERATED {n1, n2, n4, n8, n16, n32, n64},

 maximumAggregatedResourceAperiodic-r18 ENUMERATED {n0, n1, n2, n4, n8, n16, n32, n64},

 maximumAggregatedResourceSemi-r18 ENUMERATED {n0, n1, n2, n4, n8, n16, n32, n64},

 maximumAggregatedResourcePeriodicPerSlot-r18 ENUMERATED {n1, n2, n3, n4, n5, n6, n8, n10, n12, n14},

 maximumAggregatedResourceAperiodicPerSlot-r18 ENUMERATED {n0, n1, n2, n3, n4, n5, n6, n8, n10, n12, n14},

 maximumAggregatedResourceSemiPerSlot-r18 ENUMERATED {n0, n1, n2, n3, n4, n5, n6, n8, n10, n12, n14},

 ...

}

PosSRS-BWA-IndependentCA-RRC-Connected-r18 ::= SEQUENCE {

 numOfCarriersIntraBandContiguous-r18 ENUMERATED {two, three, twoandthree},

 maximumAggregatedBW-TwoCarriersFR1-r18 ENUMERATED {mhz20, mhz40, mhz50, mhz80, mhz100,

 mhz160, mhz180, mhz190, mhz200} OPTIONAL,

 maximumAggregatedBW-TwoCarriersFR2-r18 ENUMERATED {mhz50, mhz100, mhz200, mhz400, mhz600, mhz800} OPTIONAL,

 maximumAggregatedBW-ThreeCarriersFR1-r18 ENUMERATED {mhz80, mhz100, mhz160, mhz200, mhz240, mhz300} OPTIONAL,

 maximumAggregatedBW-ThreeCarriersFR2-r18 ENUMERATED {mhz50, mhz100, mhz200, mhz300, mhz400,

 mhz600, mhz800, mhz1000, mhz1200}

 OPTIONAL,

 maximumAggregatedResourceSet-r18 ENUMERATED {n1, n2, n4, n8, n12, n16},

 maximumAggregatedResourcePeriodic-r18 ENUMERATED {n1, n2, n4, n8, n16, n32, n64},

 maximumAggregatedResourceAperiodic-r18 ENUMERATED {n0, n1, n2, n4, n8, n16, n32, n64},

 maximumAggregatedResourceSemi-r18 ENUMERATED {n0, n1, n2, n4, n8, n16, n32, n64},

 maximumAggregatedResourcePeriodicPerSlot-r18 ENUMERATED {n1, n2, n3, n4, n5, n6, n8, n10, n12, n14},

 maximumAggregatedResourceAperiodicPerSlot-r18 ENUMERATED {n0, n1, n2, n3, n4, n5, n6, n8, n10, n12, n14},

 maximumAggregatedResourceSemiPerSlot-r18 ENUMERATED {n0, n1, n2, n3, n4, n5, n6, n8, n10, n12, n14},

 guardPeriod-r18 ENUMERATED {n0, n30, n100, n140, n200},

 powerClassForTwoAggregatedCarriers-r18 ENUMERATED {pc2, pc3} OPTIONAL,

 powerClassForThreeAggregatedCarriers-r18 ENUMERATED {pc2, pc3} OPTIONAL,

 ...

}

-- 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. |

#### – *FeatureSetUplinkId*

The IE *FeatureSetUplinkId* identifies an uplink feature set. The *FeatureSetUplinkId* of a *FeatureSetUplink* is the index position of the *FeatureSetUplink* in the *featureSetsUplink* list in the *FeatureSets* IE. The first element in the list is referred to by *FeatureSetUplinkId* = 1, and so on. The *FeatureSetUplinkId =0* is not used by an actual *FeatureSetUplink* but means that the UE does not support a carrier in this band of a band combination.

*FeatureSetUplinkId* information element

-- ASN1START

-- TAG-FEATURESETUPLINKID-START

FeatureSetUplinkId ::= INTEGER (0..maxUplinkFeatureSets)

-- TAG-FEATURESETUPLINKID-STOP

-- ASN1STOP

#### – *FeatureSetUplinkPerCC*

The IE *FeatureSetUplinkPerCC* indicates a set of features that the UE supports on the corresponding carrier of one band entry of a band combination.

*FeatureSetUplinkPerCC* information element

-- ASN1START

-- TAG-FEATURESETUPLINKPERCC-START

FeatureSetUplinkPerCC ::= SEQUENCE {

 supportedSubcarrierSpacingUL SubcarrierSpacing,

 supportedBandwidthUL SupportedBandwidth,

 channelBW-90mhz ENUMERATED {supported} OPTIONAL,

 mimo-CB-PUSCH SEQUENCE {

 maxNumberMIMO-LayersCB-PUSCH MIMO-LayersUL OPTIONAL,

 maxNumberSRS-ResourcePerSet INTEGER (1..2)

 } OPTIONAL,

 maxNumberMIMO-LayersNonCB-PUSCH MIMO-LayersUL OPTIONAL,

 supportedModulationOrderUL ModulationOrder OPTIONAL

}

FeatureSetUplinkPerCC-v1540 ::= SEQUENCE {

 mimo-NonCB-PUSCH SEQUENCE {

 maxNumberSRS-ResourcePerSet INTEGER (1..4),

 maxNumberSimultaneousSRS-ResourceTx INTEGER (1..4)

 } OPTIONAL

}

FeatureSetUplinkPerCC-v1700 ::= SEQUENCE {

 supportedMinBandwidthUL-r17 SupportedBandwidth-v1700 OPTIONAL,

 -- R1 23-3-1-3 FeMIMO: Multi-TRP PUSCH repetition (type B) - non-codebook based

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

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

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

 supportedBandwidthUL-v1710 SupportedBandwidth-v1700 OPTIONAL

}

FeatureSetUplinkPerCC-v1780 ::= SEQUENCE {

 supportedBandwidthUL-v1780 SupportedBandwidth-v1700 OPTIONAL

}

FeatureSetUplinkPerCC-v1800 ::= SEQUENCE {

 -- R1 40-2-7: Two TAs for multi-DCI STxMP PUSCH+PUSCH

 twoPUSCH-MultiDCI-STx2P-TwoTA-r18 ENUMERATED {supported} OPTIONAL,

 -- R1 40-6-1: Single-DCI based STx2P SDM scheme for PUSCH-codebook

 pusch-CB-SingleDCI-STx2P-SDM-r18 SEQUENCE {

 maxNumberSRS-ResourcePerSet-r18 ENUMERATED {n1,n2,n4},

 maxNumberLayerPerPanel-r18 INTEGER (1..2),

 maxNumberNZP-PUSCH-PortsPerSet-r18 ENUMERATED {n1,n2,n4},

 maxNumberSRS-AntennaPortsPerSet-r18 ENUMERATED {n1,n2,n4}

 } OPTIONAL,

 -- R1 40-6-1a: Single-DCI based STx2P SDM scheme for PUSCH-noncodebook

 pusch-NonCB-SingleDCI-STx2P-SDM-r18 SEQUENCE {

 maxNumberSRS-ResourcePerSet-r18 INTEGER (1..4),

 maxNumberLayerPerPanel-r18 INTEGER (1..2),

 maxNumberSimulSRS-OneResourcePerSet-r18 INTEGER (1..4),

 maxNumberSimulSRS-TwoResourcePerSet-r18 INTEGER (1..8)

 } OPTIONAL,

 -- R1 40-6-2: Single-DCI based STx2P SFN scheme for PUSCH-codebook

 pusch-CB-SingleDCI-STx2P-SFN-r18 SEQUENCE {

 maxNumberSRS-ResourcePerSet-r18 ENUMERATED {n1,n2,n4},

 maxNumberLayerPerSet-r18 INTEGER (1..2),

 maxNumberSRS-AntennaPortsPerSet-r18 ENUMERATED {n1,n2,n4},

 maxNumberNZP-PUSCH-PortsPerSet-r18 ENUMERATED {n1,n2,n4}

 } OPTIONAL,

 -- R1 40-6-2a: Single-DCI based STx2P SFN scheme for PUSCH-noncodebook

 pusch-NonCB-SingleDCI-STx2P-SFN-r18 SEQUENCE {

 maxNumberSRS-ResourcePerSet-r18 INTEGER (1..4),

 maxNumberLayerPerSet-r18 INTEGER (1..2),

 maxNumberSimulSRS-OneResourcePerSet-r18 INTEGER (1..4),

 maxNumberSimulSRS-TwoResourcePerSet-r18 INTEGER (1..8)

 } OPTIONAL,

 -- R1 40-6-3a: codebook multi-DCI based STx2P PUSCH+PUSCH for DG+DG

 twoPUSCH-CB-MultiDCI-STx2P-DG-DG-r18 SEQUENCE {

 maxNumberSRS-ResourcePerSet-r18 ENUMERATED {n1, n2, n4},

 maxNumberLayerOverlapping-r18 INTEGER (1..2),

 maxNumberNZP-PUSCH-Overlapping-r18 ENUMERATED {n1, n2, n4},

 maxNumberPUSCH-PerCORESET-PerSlot-r18 SEQUENCE {

 scs-60kHz-r18 ENUMERATED {n1,n2,n3,n4,n7} OPTIONAL,

 scs-120kHz-r18 ENUMERATED {n1,n2,n3,n4,n7} OPTIONAL

 } OPTIONAL,

 maxNumberTotalLayerOverlapping-r18 INTEGER (2..4),

 maxNumberSRS-AntennaPortsPerSet-r18 ENUMERATED {n1,n2,n4}

 } OPTIONAL,

 -- R1 40-6-3b: Noncodebook multi-DCI based STx2P PUSCH+PUSCH for DG+DG

 twoPUSCH-NonCB-MultiDCI-STx2P-DG-DG-r18 SEQUENCE {

 maxNumberSRS-ResourcePerSet-r18 INTEGER (1..4),

 maxNumberLayerOverlapping-r18 INTEGER (1..2),

 maxNumberSimulSRS-ResourcePerSet-r18 INTEGER (1..4),

 maxNumberPUSCH-PerCORESET-PerSlot-r18 SEQUENCE {

 scs-60kHz-r18 ENUMERATED {n1,n2,n3,n4,n7} OPTIONAL,

 scs-120kHz-r18 ENUMERATED {n1,n2,n3,n4,n7} OPTIONAL

 } OPTIONAL,

 maxNumberTotalLayerOverlapping-r18 INTEGER (2..4)

 } OPTIONAL,

 -- R1 40-6-6: Out-of-order operation for multi-DCI based STx2P PUSCH+PUSCH

 twoPUSCH-MultiDCI-STx2P-OutOfOrder-r18 ENUMERATED {supported} OPTIONAL,

 codebookParameter8TxPUSCH-r18 SEQUENCE {

 -- R1 40-7-1: Basic features for Codebook-based 8Tx PUSCH

 codebook-8TxBasic-r18 SEQUENCE {

 maxNumberPUSCH-MIMO-Layer-r18 INTEGER (1..8),

 maxNumberSRS-Resource-r18 INTEGER (1..2),

 srs-8TxPorts-r18 ENUMERATED {noTDM, both}

 },

 -- R1 40-7-1a: Codebook-based 8Tx PUSCH-codebook1

 codebook1-8TxPUSCH-r18 SEQUENCE {

 codebookN1N4-r18 ENUMERATED {ng1n4n1,ng1n2n2,both} OPTIONAL,

 srs-8TxPorts-r18 ENUMERATED {noTDM, both}

 },

 -- R1 40-7-1b: Codebook-based 8Tx PUSCH-codebook2

 codebook2-8TxPUSCH-r18 ENUMERATED {supported} OPTIONAL,

 -- R1 40-7-1c: Codebook-based 8Tx PUSCH-codebook3

 codebook3-8TxPUSCH-r18 ENUMERATED {supported} OPTIONAL,

 -- R1 40-7-1d: Codebook-based 8Tx PUSCH-codebook4

 codebook4-8TxPUSCH-r18 ENUMERATED {supported} OPTIONAL,

 -- R1 40-7-1e: UL full power transmission mode 0

 ul-FullPwrTransMode0-r18 ENUMERATED {supported} OPTIONAL,

 -- R1 40-7-1f: UL full power transmission mode 1

 ul-FullPwrTransMode1-r18 ENUMERATED {supported} OPTIONAL,

 -- R1 40-7-1g: UL full power transmission mode 2 with 1/2/4 resources

 ul-FullPwrTransMode2-r18 ENUMERATED {n1,n2,n4} OPTIONAL,

 -- R1 40-7-1g-1: SRS resources for UL full power transmission mode 2

 ul-SRS-TransMode2-r18 BIT STRING (SIZE(3)) OPTIONAL,

 -- R1 40-7-1g-2: TPMI group(s) which delivers full power for codebook2

 tpmi-FullPwrCodebook2-r18 ENUMERATED {first, second} OPTIONAL

 } OPTIONAL,

 -- R1 40-7-2: Basic features for Non-Codebook-based 8Tx PUSCH

 nonCodebook-8TxPUSCH-r18 SEQUENCE {

 maxNumberPUSCH-MIMO-Layer-r18 INTEGER (1..8),

 maxNumberSRS-Resource-r18 INTEGER (1..8),

 maxNumberSimultaneousSRS-r18 INTEGER (1..8)

 } OPTIONAL,

 -- R1 40-7-2a: Association between CSI-RS and SRS for non-codebook case

 nonCodebook-CSI-RS-SRS-r18 ENUMERATED {supported} OPTIONAL,

 -- R1 40-7-3: CBG based 2 CWs PUSCH with rank >4

 cgb-2CW-PUSCH-r18 ENUMERATED {supported} OPTIONAL

}

FeatureSetUplinkPerCC-v1840 ::= SEQUENCE {

 supportedBandwidthUL-v1840 SupportedBandwidth-v1840 OPTIONAL,

 supportedMinBandwidthUL-v1840 SupportedBandwidth-v1840 OPTIONAL

}

FeatureSetUplinkPerCC-v1850 ::= SEQUENCE {

 -- R1 40-6-3a-1: UE STxMP processing capability for codebook

 twoPUSCH-CB-MultiDCI-STx2P-AdditionalTime-r18 CHOICE {

 scs-60kHz-r18 ENUMERATED {sym1, sym4, sym8, sym16},

 scs-120kHz-r18 ENUMERATED {sym4, sym8, sym16, sym32},

 scs-480kHz-r18 ENUMERATED {sym16, sym32, sym64, sym128},

 scs-960kHz-r18 ENUMERATED {sym32, sym64, sym128,sym256}

 } OPTIONAL,

 -- R1 40-6-3b-2: UE STxMP processing capability for non-codebook

 twoPUSCH-NonCB-MultiDCI-STx2P-AdditionalTime-r18 CHOICE {

 scs-60kHz-r18 ENUMERATED {sym1, sym4, sym8, sym16},

 scs-120kHz-r18 ENUMERATED {sym4, sym8, sym16, sym32},

 scs-480kHz-r18 ENUMERATED {sym16, sym32, sym64, sym128},

 scs-960kHz-r18 ENUMERATED {sym32, sym64, sym128,sym256}

 } OPTIONAL

}

-- TAG-FEATURESETUPLINKPERCC-STOP

-- ASN1STOP

#### – *FeatureSetUplinkPerCC-Id*

The IE *FeatureSetUplinkPerCC-Id* identifies a set of features applicable to one carrier of a feature set. The *FeatureSetUplinkPerCC-Id* of a *FeatureSetUplinkPerCC* is the index position of the *FeatureSetUplinkPerCC* in the *featureSetsUplinkPerCC*. The first element in the list is referred to by *FeatureSetUplinkPerCC-Id* = 1, and so on.

*FeatureSetUplinkPerCC-Id* information element

-- ASN1START

-- TAG-FEATURESETUPLINKPERCC-ID-START

FeatureSetUplinkPerCC-Id ::= INTEGER (1..maxPerCC-FeatureSets)

-- TAG-FEATURESETUPLINKPERCC-ID-STOP

-- ASN1STOP

#### – *MIMO-ParametersPerBand*

The IE *MIMO-ParametersPerBand* is used to convey MIMO related parameters specific for a certain band (not per feature set or band combination).

*MIMO-ParametersPerBand* information element

-- ASN1START

-- TAG-MIMO-PARAMETERSPERBAND-START

MIMO-ParametersPerBand ::= SEQUENCE {

 tci-StatePDSCH SEQUENCE {

 maxNumberConfiguredTCI-StatesPerCC ENUMERATED {n4, n8, n16, n32, n64, n128} OPTIONAL,

 maxNumberActiveTCI-PerBWP ENUMERATED {n1, n2, n4, n8} OPTIONAL

 } OPTIONAL,

 additionalActiveTCI-StatePDCCH ENUMERATED {supported} OPTIONAL,

 pusch-TransCoherence ENUMERATED {nonCoherent, partialCoherent, fullCoherent} OPTIONAL,

 beamCorrespondenceWithoutUL-BeamSweeping ENUMERATED {supported} OPTIONAL,

 periodicBeamReport ENUMERATED {supported} OPTIONAL,

 aperiodicBeamReport ENUMERATED {supported} OPTIONAL,

 sp-BeamReportPUCCH ENUMERATED {supported} OPTIONAL,

 sp-BeamReportPUSCH ENUMERATED {supported} OPTIONAL,

 dummy1 DummyG OPTIONAL,

 maxNumberRxBeam INTEGER (2..8) OPTIONAL,

 maxNumberRxTxBeamSwitchDL SEQUENCE {

 scs-15kHz ENUMERATED {n4, n7, n14} OPTIONAL,

 scs-30kHz ENUMERATED {n4, n7, n14} OPTIONAL,

 scs-60kHz ENUMERATED {n4, n7, n14} OPTIONAL,

 scs-120kHz ENUMERATED {n4, n7, n14} OPTIONAL,

 scs-240kHz ENUMERATED {n4, n7, n14} OPTIONAL

 } OPTIONAL,

 maxNumberNonGroupBeamReporting ENUMERATED {n1, n2, n4} OPTIONAL,

 groupBeamReporting ENUMERATED {supported} OPTIONAL,

 uplinkBeamManagement SEQUENCE {

 maxNumberSRS-ResourcePerSet-BM ENUMERATED {n2, n4, n8, n16},

 maxNumberSRS-ResourceSet INTEGER (1..8)

 } OPTIONAL,

 maxNumberCSI-RS-BFD INTEGER (1..64) OPTIONAL,

 maxNumberSSB-BFD INTEGER (1..64) OPTIONAL,

 maxNumberCSI-RS-SSB-CBD INTEGER (1..256) OPTIONAL,

 dummy2 ENUMERATED {supported} OPTIONAL,

 twoPortsPTRS-UL ENUMERATED {supported} OPTIONAL,

 dummy5 SRS-Resources OPTIONAL,

 dummy3 INTEGER (1..4) OPTIONAL,

 beamReportTiming SEQUENCE {

 scs-15kHz ENUMERATED {sym2, sym4, sym8} OPTIONAL,

 scs-30kHz ENUMERATED {sym4, sym8, sym14, sym28} OPTIONAL,

 scs-60kHz ENUMERATED {sym8, sym14, sym28} OPTIONAL,

 scs-120kHz ENUMERATED {sym14, sym28, sym56} OPTIONAL

 } OPTIONAL,

 ptrs-DensityRecommendationSetDL SEQUENCE {

 scs-15kHz PTRS-DensityRecommendationDL OPTIONAL,

 scs-30kHz PTRS-DensityRecommendationDL OPTIONAL,

 scs-60kHz PTRS-DensityRecommendationDL OPTIONAL,

 scs-120kHz PTRS-DensityRecommendationDL OPTIONAL

 } OPTIONAL,

 ptrs-DensityRecommendationSetUL SEQUENCE {

 scs-15kHz PTRS-DensityRecommendationUL OPTIONAL,

 scs-30kHz PTRS-DensityRecommendationUL OPTIONAL,

 scs-60kHz PTRS-DensityRecommendationUL OPTIONAL,

 scs-120kHz PTRS-DensityRecommendationUL OPTIONAL

 } OPTIONAL,

 dummy4 DummyH OPTIONAL,

 aperiodicTRS ENUMERATED {supported} OPTIONAL,

 ...,

 [[

 dummy6 ENUMERATED {true} OPTIONAL,

 beamManagementSSB-CSI-RS BeamManagementSSB-CSI-RS OPTIONAL,

 beamSwitchTiming SEQUENCE {

 scs-60kHz ENUMERATED {sym14, sym28, sym48, sym224, sym336} OPTIONAL,

 scs-120kHz ENUMERATED {sym14, sym28, sym48, sym224, sym336} OPTIONAL

 } OPTIONAL,

 codebookParameters CodebookParameters OPTIONAL,

 csi-RS-IM-ReceptionForFeedback CSI-RS-IM-ReceptionForFeedback OPTIONAL,

 csi-RS-ProcFrameworkForSRS CSI-RS-ProcFrameworkForSRS OPTIONAL,

 csi-ReportFramework CSI-ReportFramework OPTIONAL,

 csi-RS-ForTracking CSI-RS-ForTracking OPTIONAL,

 srs-AssocCSI-RS SEQUENCE (SIZE (1.. maxNrofCSI-RS-Resources)) OF SupportedCSI-RS-Resource OPTIONAL,

 spatialRelations SpatialRelations OPTIONAL

 ]],

 [[

 -- R1 16-2b-0: Support of default QCL assumption with two TCI states

 defaultQCL-TwoTCI-r16 ENUMERATED {supported} OPTIONAL,

 codebookParametersPerBand-r16 CodebookParameters-v1610 OPTIONAL,

 -- R1 16-1b-3: Support of PUCCH resource groups per BWP for simultaneous spatial relation update

 simul-SpatialRelationUpdatePUCCHResGroup-r16 ENUMERATED {supported} OPTIONAL,

 -- R1 16-1f: Maximum number of SCells configured for SCell beam failure recovery simultaneously

 maxNumberSCellBFR-r16 ENUMERATED {n1,n2,n4,n8} OPTIONAL,

 -- R1 16-2c: Supports simultaneous reception with different Type-D for FR2 only

 simultaneousReceptionDiffTypeD-r16 ENUMERATED {supported} OPTIONAL,

 -- R1 16-1a-1: SSB/CSI-RS for L1-SINR measurement

 ssb-csirs-SINR-measurement-r16 SEQUENCE {

 maxNumberSSB-CSIRS-OneTx-CMR-r16 ENUMERATED {n8, n16, n32, n64},

 maxNumberCSI-IM-NZP-IMR-res-r16 ENUMERATED {n8, n16, n32, n64},

 maxNumberCSIRS-2Tx-res-r16 ENUMERATED {n0, n4, n8, n16, n32, n64},

 maxNumberSSB-CSIRS-res-r16 ENUMERATED {n8, n16, n32, n64, n128},

 maxNumberCSI-IM-NZP-IMR-res-mem-r16 ENUMERATED {n8, n16, n32, n64, n128},

 supportedCSI-RS-Density-CMR-r16 ENUMERATED {one, three, oneAndThree},

 maxNumberAperiodicCSI-RS-Res-r16 ENUMERATED {n2, n4, n8, n16, n32, n64},

 supportedSINR-meas-r16 ENUMERATED {ssbWithCSI-IM, ssbWithNZP-IMR, csirsWithNZP-IMR, csi-RSWithoutIMR} OPTIONAL

 } OPTIONAL,

 -- R1 16-1a-2: Non-group based L1-SINR reporting

 nonGroupSINR-reporting-r16 ENUMERATED {n1, n2, n4} OPTIONAL,

 -- R1 16-1a-3: Non-group based L1-SINR reporting

 groupSINR-reporting-r16 ENUMERATED {supported} OPTIONAL,

 multiDCI-multiTRP-Parameters-r16 SEQUENCE {

 -- R1 16-2a-0: Overlapping PDSCHs in time and fully overlapping in frequency and time

 overlapPDSCHsFullyFreqTime-r16 INTEGER (1..2) OPTIONAL,

 -- R1 16-2a-1: Overlapping PDSCHs in time and partially overlapping in frequency and time

 overlapPDSCHsInTimePartiallyFreq-r16 ENUMERATED {supported} OPTIONAL,

 -- R1 16-2a-2: Out of order operation for DL

 outOfOrderOperationDL-r16 SEQUENCE {

 supportPDCCH-ToPDSCH-r16 ENUMERATED {supported} OPTIONAL,

 supportPDSCH-ToHARQ-ACK-r16 ENUMERATED {supported} OPTIONAL

 } OPTIONAL,

 -- R1 16-2a-3: Out of order operation for UL

 outOfOrderOperationUL-r16 ENUMERATED {supported} OPTIONAL,

 -- R1 16-2a-5: Separate CRS rate matching

 separateCRS-RateMatching-r16 ENUMERATED {supported} OPTIONAL,

 -- R1 16-2a-6: Default QCL enhancement for multi-DCI based multi-TRP

 defaultQCL-PerCORESETPoolIndex-r16 ENUMERATED {supported} OPTIONAL,

 -- R1 16-2a-7: Maximum number of activated TCI states

 maxNumberActivatedTCI-States-r16 SEQUENCE {

 maxNumberPerCORESET-Pool-r16 ENUMERATED {n1, n2, n4, n8},

 maxTotalNumberAcrossCORESET-Pool-r16 ENUMERATED {n2, n4, n8, n16}

 } OPTIONAL

 } OPTIONAL,

 singleDCI-SDM-scheme-Parameters-r16 SEQUENCE {

 -- R1 16-2b-1b: Single-DCI based SDM scheme - Support of new DMRS port entry

 supportNewDMRS-Port-r16 ENUMERATED {supported1, supported2, supported3} OPTIONAL,

 -- R1 16-2b-1a: Support of s-port DL PTRS

 supportTwoPortDL-PTRS-r16 ENUMERATED {supported} OPTIONAL

 } OPTIONAL,

 -- R1 16-2b-2: Support of single-DCI based FDMSchemeA

 supportFDM-SchemeA-r16 ENUMERATED {supported} OPTIONAL,

 -- R1 16-2b-3a: Single-DCI based FDMSchemeB CW soft combining

 supportCodeWordSoftCombining-r16 ENUMERATED {supported} OPTIONAL,

 -- R1 16-2b-4: Single-DCI based TDMSchemeA

 supportTDM-SchemeA-r16 ENUMERATED {kb3, kb5, kb10, kb20, noRestriction} OPTIONAL,

 -- R1 16-2b-5: Single-DCI based inter-slot TDM

 supportInter-slotTDM-r16 SEQUENCE {

 supportRepNumPDSCH-TDRA-r16 ENUMERATED {n2, n3, n4, n5, n6, n7, n8, n16},

 maxTBS-Size-r16 ENUMERATED {kb3, kb5, kb10, kb20, noRestriction},

 maxNumberTCI-states-r16 INTEGER (1..2)

 } OPTIONAL,

 -- R1 16-4: Low PAPR DMRS for PDSCH

 lowPAPR-DMRS-PDSCH-r16 ENUMERATED {supported} OPTIONAL,

 -- R1 16-6a: Low PAPR DMRS for PUSCH without transform precoding

 lowPAPR-DMRS-PUSCHwithoutPrecoding-r16 ENUMERATED {supported} OPTIONAL,

 -- R1 16-6b: Low PAPR DMRS for PUCCH

 lowPAPR-DMRS-PUCCH-r16 ENUMERATED {supported} OPTIONAL,

 -- R1 16-6c: Low PAPR DMRS for PUSCH with transform precoding & pi/2 BPSK

 lowPAPR-DMRS-PUSCHwithPrecoding-r16 ENUMERATED {supported} OPTIONAL,

 -- R1 16-7: Extension of the maximum number of configured aperiodic CSI report settings

 csi-ReportFrameworkExt-r16 CSI-ReportFrameworkExt-r16 OPTIONAL,

 -- R1 16-3a, 16-3a-1, 16-3b, 16-3b-1, 16-8: Individual new codebook types

 codebookParametersAddition-r16 CodebookParametersAddition-r16 OPTIONAL,

 -- R1 16-8: Mixed codebook types

 codebookComboParametersAddition-r16 CodebookComboParametersAddition-r16 OPTIONAL,

 -- R4 8-2: SSB based beam correspondence

 beamCorrespondenceSSB-based-r16 ENUMERATED {supported} OPTIONAL,

 -- R4 8-3: CSI-RS based beam correspondence

 beamCorrespondenceCSI-RS-based-r16 ENUMERATED {supported} OPTIONAL,

 beamSwitchTiming-r16 SEQUENCE {

 scs-60kHz-r16 ENUMERATED {sym224, sym336} OPTIONAL,

 scs-120kHz-r16 ENUMERATED {sym224, sym336} OPTIONAL

 } OPTIONAL

 ]],

 [[

 -- R1 16-1a-4: Semi-persistent L1-SINR report on PUCCH

 semi-PersistentL1-SINR-Report-PUCCH-r16 SEQUENCE {

 supportReportFormat1-2OFDM-syms-r16 ENUMERATED {supported} OPTIONAL,

 supportReportFormat4-14OFDM-syms-r16 ENUMERATED {supported} OPTIONAL

 } OPTIONAL,

 -- R1 16-1a-5: Semi-persistent L1-SINR report on PUSCH

 semi-PersistentL1-SINR-Report-PUSCH-r16 ENUMERATED {supported} OPTIONAL

 ]],

 [[

 -- R1 16-1h: Support of 64 configured PUCCH spatial relations

 spatialRelations-v1640 SEQUENCE {

 maxNumberConfiguredSpatialRelations-v1640 ENUMERATED {n96, n128, n160, n192, n224, n256, n288, n320}

 } OPTIONAL,

 -- R1 16-1i: Support of 64 configured candidate beam RSs for BFR

 support64CandidateBeamRS-BFR-r16 ENUMERATED {supported} OPTIONAL

 ]],

 [[

 -- R1 16-2a-9: Interpretation of maxNumberMIMO-LayersPDSCH for multi-DCI based mTRP

 maxMIMO-LayersForMulti-DCI-mTRP-r16 ENUMERATED {supported} OPTIONAL

 ]],

 [[

 supportedSINR-meas-v1670 BIT STRING (SIZE (4)) OPTIONAL

 ]],

 [[

 -- R1 23-8-5 Increased repetition for SRS

 srs-increasedRepetition-r17 ENUMERATED {supported} OPTIONAL,

 -- R1 23-8-6 Partial frequency sounding of SRS

 srs-partialFrequencySounding-r17 ENUMERATED {supported} OPTIONAL,

 -- R1 23-8-7 Start RB location hopping for partial frequency SRS

 srs-startRB-locationHoppingPartial-r17 ENUMERATED {supported} OPTIONAL,

 -- R1 23-8-8 Comb-8 SRS

 srs-combEight-r17 ENUMERATED {supported} OPTIONAL,

 -- R1 23-9-1 Basic Features of Further Enhanced Port-Selection Type II Codebook (FeType-II) per band information

 codebookParametersfetype2-r17 CodebookParametersfetype2-r17 OPTIONAL,

 -- R1 23-3-1-2a Two associated CSI-RS resources

 mTRP-PUSCH-twoCSI-RS-r17 ENUMERATED {supported} OPTIONAL,

 -- R1 23-3-2 Multi-TRP PUCCH repetition scheme 1 (inter-slot)

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

 -- R1 23-3-2b Cyclic mapping for multi-TRP PUCCH repetition

 mTRP-PUCCH-CyclicMapping-r17 ENUMERATED {supported} OPTIONAL,

 -- R1 23-3-2c Second TPC field for multi-TRP PUCCH repetition

 mTRP-PUCCH-SecondTPC-r17 ENUMERATED {supported} OPTIONAL,

 -- R1 23-5-2 MTRP BFR based on two BFD-RS set

 mTRP-BFR-twoBFD-RS-Set-r17 SEQUENCE {

 maxBFD-RS-resourcesPerSetPerBWP-r17 ENUMERATED {n1, n2},

 maxBFR-r17 INTEGER (1..9),

 maxBFD-RS-resourcesAcrossSetsPerBWP-r17 ENUMERATED {n2, n3, n4}

 } OPTIONAL,

 -- R1 23-5-2a PUCCH-SR resources for MTRP BFRQ - Max number of PUCCH-SR resources for MTRP BFRQ per cell group

 mTRP-BFR-PUCCH-SR-perCG-r17 ENUMERATED{n1, n2} OPTIONAL,

 -- R1 23-5-2b Association between a BFD-RS resource set on SpCell and a PUCCH SR resource

 mTRP-BFR-association-PUCCH-SR-r17 ENUMERATED {supported} OPTIONAL,

 -- R1 23-6-3 Simultaneous activation of two TCI states for PDCCH across multiple CCs (HST/URLLC)

 sfn-SimulTwoTCI-AcrossMultiCC-r17 ENUMERATED {supported} OPTIONAL,

 -- R1 23-6-4 Default DL beam setup for SFN

 sfn-DefaultDL-BeamSetup-r17 ENUMERATED {supported} OPTIONAL,

 -- R1 23-6-4a Default UL beam setup for SFN PDCCH(FR2 only)

 sfn-DefaultUL-BeamSetup-r17 ENUMERATED {supported} OPTIONAL,

 -- R1 23-8-1 SRS triggering offset enhancement

 srs-TriggeringOffset-r17 ENUMERATED {n1, n2, n4} OPTIONAL,

 -- R1 23-8-2 Triggering SRS only in DCI 0\_1/0\_2

 srs-TriggeringDCI-r17 ENUMERATED {supported} OPTIONAL,

 -- R1 23-9-5 Active CSI-RS resources and ports for mixed codebook types in any slot per band information

 codebookComboParameterMixedType-r17 CodebookComboParameterMixedType-r17 OPTIONAL,

 -- R1 23-1-1 Unified TCI [with joint DL/UL TCI update] for intra-cell beam management

 unifiedJointTCI-r17 SEQUENCE{

 maxConfiguredJointTCI-r17 ENUMERATED {n8, n12, n16, n24, n32, n48, n64, n128},

 maxActivatedTCIAcrossCC-r17 ENUMERATED {n1, n2, n4, n8, n16}

 } OPTIONAL,

 -- R1 23-1-1b Unified TCI with joint DL/UL TCI update for intra- and inter-cell beam management with more than one MAC-CE

 unifiedJointTCI-multiMAC-CE-r17 SEQUENCE{

 minBeamApplicationTime-r17 ENUMERATED {n1, n2, n4, n7, n14, n28, n42, n56, n70, n84, n98, n112, n224, n336}

 OPTIONAL,

 maxNumMAC-CE-PerCC ENUMERATED {n2, n3, n4, n5, n6, n7, n8}

 } OPTIONAL,

 -- R1 23-1-1d Per BWP TCI state pool configuration for CA mode

 unifiedJointTCI-perBWP-CA-r17 ENUMERATED {supported} OPTIONAL,

 -- R1 23-1-1e TCI state pool configuration with TCI pool sharing for CA mode

 unifiedJointTCI-ListSharingCA-r17 ENUMERATED {n1,n2,n4,n8} OPTIONAL,

 -- R1 23-1-1f Common multi-CC TCI state ID update and activation

 unifiedJointTCI-commonMultiCC-r17 ENUMERATED {supported} OPTIONAL,

 -- R1 23-1-1g Beam misalignment between the DL source RS in the TCI state

 unifiedJointTCI-BeamAlignDLRS-r17 ENUMERATED {supported} OPTIONAL,

 -- R1 23-1-1h Association between TCI state and UL PC settings for PUCCH, PUSCH, and SRS

 unifiedJointTCI-PC-association-r17 ENUMERATED {supported} OPTIONAL,

 -- R1 23-1-1i Indication/configuration of R17 TCI states for aperiodic CSI-RS, PDCCH, PDSCH

 unifiedJointTCI-Legacy-r17 ENUMERATED {supported} OPTIONAL,

 -- 23-1-1m Indication/configuration of R17 TCI states for SRS

 unifiedJointTCI-Legacy-SRS-r17 ENUMERATED {supported} OPTIONAL,

 -- R1 23-1-1j Indication/configuration of R17 TCI states for CORESET #0

 unifiedJointTCI-Legacy-CORESET0-r17 ENUMERATED {supported} OPTIONAL,

 -- R1 23-1-1c SCell BFR with unified TCI framework (NOTE; pre-requisite is empty)

 unifiedJointTCI-SCellBFR-r17 ENUMERATED {supported} OPTIONAL,

 -- R1 23-1-1a Unified TCI with joint DL/UL TCI update for inter-cell beam management

 unifiedJointTCI-InterCell-r17 SEQUENCE{

 additionalMAC-CE-PerCC-r17 ENUMERATED {n0, n1, n2, n4},

 additionalMAC-CE-AcrossCC-r17 ENUMERATED {n0, n1, n2, n4}

 } OPTIONAL,

 -- R1 23-10-1 Unified TCI with separate DL/UL TCI update for intra-cell beam management

 unifiedSeparateTCI-r17 SEQUENCE{

 maxConfiguredDL-TCI-r17 ENUMERATED {n4, n8, n12, n16, n24, n32, n48, n64, n128},

 maxConfiguredUL-TCI-r17 ENUMERATED {n4, n8, n12, n16, n24, n32, n48, n64},

 maxActivatedDL-TCIAcrossCC-r17 ENUMERATED {n1, n2, n4, n8, n16},

 maxActivatedUL-TCIAcrossCC-r17 ENUMERATED {n1, n2, n4, n8, n16}

 } OPTIONAL,

 -- R1 23-10-1b Unified TCI with separate DL/UL TCI update for intra-cell beam management with more than one MAC-CE

 unifiedSeparateTCI-multiMAC-CE-r17 SEQUENCE{

 minBeamApplicationTime-r17 ENUMERATED {n1, n2, n4, n7, n14, n28, n42, n56, n70, n84, n98, n112, n224, n336},

 maxActivatedDL-TCIPerCC-r17 INTEGER (2..8),

 maxActivatedUL-TCIPerCC-r17 INTEGER (2..8)

 } OPTIONAL,

 -- R1 23-10-1d Per BWP DL/UL-TCI state pool configuration for CA mode

 unifiedSeparateTCI-perBWP-CA-r17 ENUMERATED {supported} OPTIONAL,

 -- R1 23-10-1e TCI state pool configuration with DL/UL-TCI pool sharing for CA mode

 unifiedSeparateTCI-ListSharingCA-r17 SEQUENCE {

 maxNumListDL-TCI-r17 ENUMERATED {n1,n2,n4,n8} OPTIONAL,

 maxNumListUL-TCI-r17 ENUMERATED {n1,n2,n4,n8} OPTIONAL

 } OPTIONAL,

 -- R1 23-10-1f Common multi-CC DL/UL-TCI state ID update and activation with separate DL/UL TCI update

 unifiedSeparateTCI-commonMultiCC-r17 ENUMERATED {supported} OPTIONAL,

 -- 23-10-1m Unified TCI with separate DL/UL TCI update for inter-cell beam management with more than one MAC-CE

 unifiedSeparateTCI-InterCell-r17 SEQUENCE {

 k-DL-PerCC-r17 ENUMERATED {n0, n1, n2, n4},

 k-UL-PerCC-r17 ENUMERATED {n0, n1, n2, n4},

 k-DL-AcrossCC-r17 ENUMERATED {n0, n1, n2, n4},

 k-UL-AcrossCC-r17 ENUMERATED {n0, n1, n2, n4}

 } OPTIONAL,

 -- R1 23-1-2 Inter-cell beam measurement and reporting (for inter-cell BM and mTRP)

 unifiedJointTCI-mTRP-InterCell-BM-r17 SEQUENCE {

 maxNumAdditionalPCI-L1-RSRP-r17 INTEGER (1..7),

 maxNumSSB-ResourceL1-RSRP-AcrossCC-r17 ENUMERATED {n1,n2,n4,n8}

 } OPTIONAL,

 -- R1 23-1-3 MPE mitigation

 mpe-Mitigation-r17 SEQUENCE {

 maxNumP-MPR-RI-pairs-r17 INTEGER (1..4),

 maxNumConfRS-r17 ENUMERATED {n1, n2, n4, n8, n12, n16, n28, n32, n48, n64}

 } OPTIONAL,

 -- R1 23-1-4 UE capability value reporting

 srs-PortReport-r17 SEQUENCE {

 capVal1-r17 ENUMERATED {n1, n2, n4} OPTIONAL,

 capVal2-r17 ENUMERATED {n1, n2, n4} OPTIONAL,

 capVal3-r17 ENUMERATED {n1, n2, n4} OPTIONAL,

 capVal4-r17 ENUMERATED {n1, n2, n4} OPTIONAL

 } OPTIONAL,

 -- R1 23-2-1a Monitoring of individual candidates

 mTRP-PDCCH-individual-r17 ENUMERATED {supported} OPTIONAL,

 -- R1 23-2-1b PDCCH repetition with PDCCH monitoring on any span of up to 3 consecutive OFDM symbols of a slot

 mTRP-PDCCH-anySpan-3Symbols-r17 ENUMERATED {supported} OPTIONAL,

 -- R1 23-2-2 Two QCL TypeD for CORESET monitoring in PDCCH repetition

 mTRP-PDCCH-TwoQCL-TypeD-r17 ENUMERATED {supported} OPTIONAL,

 -- R1 23-3-1-2b CSI-RS processing framework for SRS with two associated CSI-RS resources

 mTRP-PUSCH-CSI-RS-r17 SEQUENCE {

 maxNumPeriodicSRS-r17 INTEGER (1..8),

 maxNumAperiodicSRS-r17 INTEGER (1..8),

 maxNumSP-SRS-r17 INTEGER (0..8),

 numSRS-ResourcePerCC-r17 INTEGER (1..16),

 numSRS-ResourceNonCodebook-r17 INTEGER (1..2)

 } OPTIONAL,

 -- R1 23-3-1a Cyclic mapping for Multi-TRP PUSCH repetition

 mTRP-PUSCH-cyclicMapping-r17 ENUMERATED {typeA,typeB,both} OPTIONAL,

 -- R1 23-3-1b Second TPC field for Multi-TRP PUSCH repetition

 mTRP-PUSCH-secondTPC-r17 ENUMERATED {supported} OPTIONAL,

 -- R1 23-3-1c Two PHR reporting

 mTRP-PUSCH-twoPHR-Reporting-r17 ENUMERATED {supported} OPTIONAL,

 -- R1 23-3-1e A-CSI report

 mTRP-PUSCH-A-CSI-r17 ENUMERATED {supported} OPTIONAL,

 -- R1 23-3-1f SP-CSI report

 mTRP-PUSCH-SP-CSI-r17 ENUMERATED {supported} OPTIONAL,

 -- R1 23-3-1g CG PUSCH transmission

 mTRP-PUSCH-CG-r17 ENUMERATED {supported} OPTIONAL,

 -- R1 23-3-2d Updating two Spatial relation or two sets of power control parameters for PUCCH group

 mTRP-PUCCH-MAC-CE-r17 ENUMERATED {supported} OPTIONAL,

 -- R1 23-3-2e Maximum number of power control parameter sets configured for multi-TRP PUCCH repetition in FR1

 mTRP-PUCCH-maxNum-PC-FR1-r17 INTEGER (3..8) OPTIONAL,

 -- R1 23-4 IntCell-mTRP

 mTRP-inter-Cell-r17 SEQUENCE {

 maxNumAdditionalPCI-Case1-r17 INTEGER (1..7),

 maxNumAdditionalPCI-Case2-r17 INTEGER (0..7)

 } OPTIONAL,

 -- R1 23-5-1 Group based L1-RSRP reporting enhancements

 mTRP-GroupBasedL1-RSRP-r17 SEQUENCE {

 maxNumBeamGroups-r17 INTEGER (1..4),

 maxNumRS-WithinSlot-r17 ENUMERATED {n2,n3,n4,n8,n16,n32,n64},

 maxNumRS-AcrossSlot-r17 ENUMERATED {n8, n16, n32, n64, n128}

 } OPTIONAL,

 -- R1 23-5-2c MAC-CE based update of explicit BFD-RS mTRP-PUCCH-IntraSlot-r17 => per band

 mTRP-BFD-RS-MAC-CE-r17 ENUMERATED {n4, n8, n12, n16, n32, n48, n64 } OPTIONAL,

 -- R1 23-7-1 Basic Features of CSI Enhancement for Multi-TRP

 mTRP-CSI-EnhancementPerBand-r17 SEQUENCE {

 maxNumNZP-CSI-RS-r17 INTEGER (2..8),

 cSI-Report-mode-r17 ENUMERATED {mode1, mode2, both},

 supportedComboAcrossCCs-r17 SEQUENCE (SIZE (1..16)) OF CSI-MultiTRP-SupportedCombinations-r17,

 codebookModeNCJT-r17 ENUMERATED{mode1,mode1And2}

 } OPTIONAL,

 -- R1 23-7-1b Active CSI-RS resources and ports in the presence of multi-TRP CSI

 codebookComboParameterMultiTRP-r17 CodebookComboParameterMultiTRP-r17 OPTIONAL,

 -- R1 23-7-1a Additional CSI report mode 1

 mTRP-CSI-additionalCSI-r17 ENUMERATED{x1,x2} OPTIONAL,

 -- R1 23-7-4 Support of Nmax=2 for Multi-TRP CSI

 mTRP-CSI-N-Max2-r17 ENUMERATED {supported} OPTIONAL,

 -- R1 23-7-5 CMR sharing

 mTRP-CSI-CMR-r17 ENUMERATED {supported} OPTIONAL,

 -- R1 23-8-11 Partial frequency sounding of SRS for non-frequency hopping case

 srs-partialFreqSounding-r17 ENUMERATED {supported} OPTIONAL,

 -- R1-24 feature: Extend beamSwitchTiming for FR2-2

 beamSwitchTiming-v1710 SEQUENCE {

 scs-480kHz ENUMERATED {sym56, sym112, sym192, sym896, sym1344} OPTIONAL,

 scs-960kHz ENUMERATED {sym112, sym224, sym384, sym1792, sym2688} OPTIONAL

 } OPTIONAL,

 -- R1-24 feature: Extend beamSwitchTiming-r16 for FR2-2

 beamSwitchTiming-r17 SEQUENCE {

 scs-480kHz-r17 ENUMERATED {sym896, sym1344} OPTIONAL,

 scs-960kHz-r17 ENUMERATED {sym1792, sym2688} OPTIONAL

 } OPTIONAL,

 -- R1-24 feature: Extend beamReportTiming for FR2-2

 beamReportTiming-v1710 SEQUENCE {

 scs-480kHz-r17 ENUMERATED {sym56, sym112, sym224} OPTIONAL,

 scs-960kHz-r17 ENUMERATED {sym112, sym224, sym448} OPTIONAL

 } OPTIONAL,

 -- R1-24 feature: Extend maximum number of RX/TX beam switch DL for FR2-2

 maxNumberRxTxBeamSwitchDL-v1710 SEQUENCE {

 scs-480kHz-r17 ENUMERATED {n2, n4, n7} OPTIONAL,

 scs-960kHz-r17 ENUMERATED {n1, n2, n4, n7} OPTIONAL

 } OPTIONAL

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 -- R1-23-1-4a: Semi-persistent/aperiodic capability value report

 srs-PortReportSP-AP-r17 ENUMERATED {supported} OPTIONAL,

 maxNumberRxBeam-v1720 INTEGER (9..12) OPTIONAL,

 -- R1-23-6-5 Support implicit configuration of RS(s) with two TCI states for beam failure detection

 sfn-ImplicitRS-twoTCI-r17 ENUMERATED {supported} OPTIONAL,

 -- R1-23-6-6 QCL-TypeD collision handling with CORESET with 2 TCI states

 sfn-QCL-TypeD-Collision-twoTCI-r17 ENUMERATED {supported} OPTIONAL,

 -- R1-23-7-1c Basic Features of CSI Enhancement for Multi-TRP - number of CPUs

 mTRP-CSI-numCPU-r17 ENUMERATED {n2, n3, n4} OPTIONAL

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 supportRepNumPDSCH-TDRA-DCI-1-2-r17 ENUMERATED {n2, n3, n4, n5, n6, n7, n8, n16} OPTIONAL

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 codebookParametersetype2DopplerCSI-r18 CodebookParametersetype2DopplerCSI-r18 OPTIONAL,

 codebookParametersfetype2DopplerCSI-r18 CodebookParametersfetype2DopplerCSI-r18 OPTIONAL,

 codebookParametersetype2CJT-r18 CodebookParametersetype2CJT-r18 OPTIONAL,

 codebookParametersfetype2CJT-r18 CodebookParametersfetype2CJT-r18 OPTIONAL,

 codebookComboParametersCJT-r18 CodebookComboParametersCJT-r18 OPTIONAL,

 codebookParametersHARQ-ACK-PUSCH-r18 CodebookParametersHARQ-ACK-PUSCH-r18 OPTIONAL,

 -- R1 40-1-1: Unified TCI with joint DL/UL TCI update for single-DCI based intra-cell multi-TRP with single activated TCI

 -- codepoint per CC

 tci-JointTCI-UpdateSingleActiveTCI-PerCC-r18 SEQUENCE {

 maxNumberConfigJointTCIPerCC-PerBWP-r18 ENUMERATED {n8,n12,n16,n24,n32,n48,n64,n128},

 maxNumberActiveJointTCI-AcrossCC-r18 ENUMERATED {n2,n4,n6,n8,n16,n32}

 } OPTIONAL,

 -- R1 40-1-1a: Unified TCI with joint DL/UL TCI update for single-DCI based intra-cell multi-TRP with multiple activated TCI

 -- codepoints per CC

 tci-JointTCI-UpdateMultiActiveTCI-PerCC-r18 SEQUENCE {

 tci-StateInd-r18 ENUMERATED {withAssignment, withoutAssignment},

 maxNumberActiveJointTCI-PerCC-r18 INTEGER (2..8)

 } OPTIONAL,

 -- R1 40-1-1c: DCI format 1\_1 and if supported 1\_2 configured with TCI selection field

 tci-SelectionDCI-r18 ENUMERATED {supported} OPTIONAL,

 -- R1 40-1-2: Unified TCI with separate DL/UL TCI update for single-DCI based intra-cell multi-TRP with single activated TCI

 -- codepoint per CC

 tci-SeparateTCI-UpdateSingleActiveTCI-PerCC-r18 SEQUENCE {

 maxNumConfigDL-TCI-PerCC-PerBWP-r18 ENUMERATED {n4, n8, n12, n16, n24, n32, n48, n64, n128},

 maxNumConfigUL-TCI-PerCC-PerBWP-r18 ENUMERATED {n4, n8, n12, n16, n24, n32, n48, n64},

 maxNumActiveDL-TCI-AcrossCC-r18 ENUMERATED {n2, n4, n8, n16},

 maxNumActiveUL-TCI-AcrossCC-r18 ENUMERATED {n2, n4, n8, n16}

 } OPTIONAL,

 -- R1 40-1-2a: Unified TCI with separate DL/UL TCI update for single-DCI based intra-cell multi-TRP with multiple

 -- activated TCI codepoints per CC

 tci-SeparateTCI-UpdateMultiActiveTCI-PerCC-r18 SEQUENCE {

 maxNumActiveDL-TCI-AcrossCC-r18 ENUMERATED {n2, n4, n8, n16},

 maxNumActiveUL-TCI-AcrossCC-r18 ENUMERATED {n2, n4, n8, n16}

 } OPTIONAL,

 -- R1 40-1-3: Per aperiodic CSI-RS resource/resource set configuration for TCI selection in S-DCI based MTRP

 tci-SelectionAperiodicCSI-RS-r18 ENUMERATED {perResource, perResourceSet, both} OPTIONAL,

 -- R1 40-1-3a: Per aperiodic CSI-RS resource/resource set configuration for TCI selection in M-DCI based MTRP

 tci-SelectionAperiodicCSI-RS-M-DCI-r18 ENUMERATED {perResource, perResourceSet, both} OPTIONAL,

 -- R1 40-1-4: Two TCI states for CJT Tx scheme for PDSCH

 twoTCI-StatePDSCH-CJT-TxScheme-r18 ENUMERATED {cjtSchemeA, cjtSchemeB, both} OPTIONAL,

 -- R1 40-1-7: Unified TCI with joint DL/UL TCI update for multi-DCI based multi-TRP with single activated TCI

 -- codepoint per CORESETPoolIndex per CC

 tci-JointTCI-UpdateSingleActiveTCI-PerCC-PerCORESET-r18 SEQUENCE {

 mTRP-Operation-r18 ENUMERATED {intraCell, intraCellAndInterCell},

 maxNumberConfigJointTCIPerCC-PerBWP-r18 ENUMERATED {n8,n12,n16,n24,n32,n48,n64,n128},

 maxNumberActiveJointTCIAcrossCC-PerCORESET-r18 ENUMERATED {n1,n2,n4,n8,n16}

 } OPTIONAL,

 -- R1 40-1-7a: Unified TCI with joint DL/UL TCI update for multi-DCI based multi-TRP with multiple activated TCI

 -- codepoints per CORESETPoolIndex per CC

 tci-JointTCI-UpdateMultiActiveTCI-PerCC-PerCORESET-r18 INTEGER (2..8) OPTIONAL,

 -- R1 40-1-8: TRP-specific BFR with unified TCI framework with Unified TCI

 tci-TRP-BFR-r18 ENUMERATED {supported} OPTIONAL,

 -- R1 40-1-9: Unified TCI with separate DL/UL TCI update for multi-DCI based multi-TRP with single activated TCI

 -- codepoint per CORESETPoolIndex per CC

 tci-SeparateTCI-UpdateSingleActiveTCI-PerCC-PerCORESET-r18 SEQUENCE {

 mTRP-Operation-r18 ENUMERATED {intraCell, intraCellAndInterCell},

 maxNumConfigDL-TCI-PerCC-PerBWP-r18 ENUMERATED {n8, n12, n16, n24, n32, n48, n64, n128},

 maxNumConfigUL-TCI-PerCC-PerBWP-r18 ENUMERATED {n8, n12, n16, n24, n32, n48, n64},

 maxNumActiveDL-TCI-AcrossCC-r18 ENUMERATED {n1, n2, n4, n8, n16},

 maxNumActiveUL-TCI-AcrossCC-r18 ENUMERATED {n1, n2, n4, n8, n16}

 } OPTIONAL,

 -- R1 40-1-9a: Unified TCI with separate DL/UL TCI update for multi-DCI based multi-TRP with multiple activated TCI

 -- codepoints per CORESETPoolIndex per CC

 tci-SeparateTCI-UpdateMultiActiveTCI-PerCC-PerCORESET-r18 SEQUENCE {

 maxNumConfigDL-TCI-PerCC-PerBWP-r18 INTEGER (1..8),

 maxNumConfigUL-TCI-PerCC-PerBWP-r18 INTEGER (1..8)

 } OPTIONAL,

 -- R1 40-1-12: Common multi-CC TCI state ID update and activation for single-DCI based multi-TRP

 commonTCI-SingleDCI-r18 INTEGER (1..4) OPTIONAL,

 -- R1 40-1-13: Common multi-CC TCI state ID update and activation for multi-DCI based multi-TRP

 commonTCI-MultiDCI-r18 INTEGER (1..4) OPTIONAL,

 -- R1 40-1-14: Two PHR reporting for STx2P

 twoPHR-Reporting-r18 ENUMERATED {supported} OPTIONAL,

 -- R1 40-2-3: TAG ID indication via absolute TA command MAC CE

 spCell-TAG-Ind-r18 ENUMERATED {supported} OPTIONAL,

 -- R1 40-2-4: PDCCH order sent by one TRP triggers RACH procedure (specifically PRACH) towards a different TRP based on CFRA for

 -- inter-cell

 interCellCrossTRP-PDCCH-OrderCFRA-r18 ENUMERATED {supported} OPTIONAL,

 -- R1 40-2-4a: PDCCH order sent by one TRP triggers RACH procedure (specifically PRACH) towards a different TRP based on CFRA for

 -- intra-cell

 intraCellCrossTRP-PDCCH-OrderCFRA-r18 ENUMERATED {supported} OPTIONAL,

 -- R1 40-2-9: Overlapping UL transmission reduction

 overlapUL-TransReduction-r18 ENUMERATED {supported} OPTIONAL,

 -- R1 40-3-2-12: Supported maximum periodicity of CMR when configured as periodic CSI-RS

 maxPeriodicityCMR-r18 ENUMERATED {sl4, sl5, sl8, sl10, sl20} OPTIONAL,

 -- R1 40-3-3-1: TDCP (Time Domain Channel Properties) report

 tdcp-Report-r18 SEQUENCE {

 valueX-r18 INTEGER (1..2),

 maxNumberActiveResource-r18 INTEGER (2..32)

 } OPTIONAL,

 -- R1 40-3-3-5: Number of CSI-RS resources for TDCP

 tdcp-Resource-r18 SEQUENCE {

 maxNumberConfigPerCC-r18 ENUMERATED {n2,n4,n6,n8,n10,n12},

 maxNumberConfigAcrossCC-r18 INTEGER (1..32),

 maxNumberSimultaneousPerCC-r18 ENUMERATED {n2, n4, n6, n8, n12, n16, n20, n24, n28, n32}

 } OPTIONAL,

 -- R1 40-3-1-24: Timeline for regular eType-II-CJT CSI, or for port selection FeType-II-CJT CSI

 timelineRelax-CJT-CSI-r18 ENUMERATED {n0,n2} OPTIONAL,

 -- R1 40-4-11: Joint configuration of Rel.18 DMRS ports and Rel.18 dynamic switching between DFT-S-OFDM and CP-OFDM for PUSCH

 jointConfigDMRSPortDynamicSwitching-r18 ENUMERATED {supported} OPTIONAL,

 -- R1 40-5-1: SRS comb offset hopping

 srs-combOffsetHopping-r18 ENUMERATED {supported} OPTIONAL,

 -- R1 40-5-1a: Comb offset hopping time-domain behavior when repetition factor R>1

 srs-combOffsetInTime-r18 ENUMERATED {srs, rsrs, both} OPTIONAL,

 -- R1 40-5-1b: SRS comb offset hopping combined with group/sequence hopping

 srs-combOffsetCombinedGroupSequence-r18 ENUMERATED {supported} OPTIONAL,

 -- R1 40-5-1c: Comb offset hopping within a subset

 srs-combOffsetHoppingWithinSubset-r18 ENUMERATED {supported} OPTIONAL,

 -- R1 40-5-2: SRS cyclic shift hopping

 srs-cyclicShiftHopping-r18 ENUMERATED {supported} OPTIONAL,

 -- R1 40-5-2a: Smaller cyclic shift granularity for cyclic shift hopping

 srs-cyclicShiftHoppingSmallGranularity-r18 ENUMERATED {supported} OPTIONAL,

 -- R1 40-5-2b: SRS cyclic shift hopping combined with group/sequence hopping

 srs-cyclicShiftCombinedGroupSequence-r18 ENUMERATED {supported} OPTIONAL,

 -- R1 40-5-2c: Cyclic shift hopping within a subset

 cyclicShiftHoppingWithinSubset-r18 ENUMERATED {supported} OPTIONAL,

 -- R1 40-5-3: SRS cyclic shift hopping combined with SRS comb offset hopping

 srs-cyclicShiftCombinedCombOffset-r18 ENUMERATED {supported} OPTIONAL,

 -- R1 40-6-1-1: 2 PTRS ports for single-DCI based STx2P SDM scheme for PUSCH-codebook

 pusch-CB-2PTRS-SingleDCI-STx2P-SDM-r18 ENUMERATED {supported} OPTIONAL,

 -- R1 40-6-1a-1: 2 PTRS ports for single-DCI based STx2P SDM scheme for PUSCH-noncodebook

 pusch-NonCB-2PTRS-SingleDCI-STx2P-SDM-r18 ENUMERATED {supported} OPTIONAL,

 -- R1 40-6-1b: Association between CSI-RS and SRS for noncodebook single-DCI based STx2P SDM scheme for PUSCH

 pusch-NonCB-SingleDCI-STx2P-SDM-CSI-RS-SRS-r18 SEQUENCE {

 maxNumberPeriodicSRS-Resource-PerBWP-r18 INTEGER (1..8),

 maxNumberAperiodicSRS-Resource-PerBWP-r18 INTEGER (1..8),

 maxNumberSemiPersistentSRS-ResourcePerBWP-r18 INTEGER (0..8),

 valueY-SRS-ResourceAssociate-r18 INTEGER (1..16),

 valueX-CSI-RS-ResourceAssociate-r18 INTEGER (1..2)

 } OPTIONAL,

 -- R1 40-6-3b-1: Associated CSI-RS resources for noncodebook multi-DCI based STx2P PUSCH+PUSCH

 twoPUSCH-NonCB-Multi-DCI-STx2P-CSI-RS-Resource-r18 SEQUENCE {

 maxNumberPeriodicSRS-r18 INTEGER (1..8),

 maxNumberAperiodicSRS-r18 INTEGER (1..8),

 maxNumberSemiPersistentSRS-r18 INTEGER (0..8),

 simultaneousSRS-PerCC-r18 INTEGER (1..16),

 simultaneousCSI-RS-NonCB-r18 INTEGER (1..2)

 } OPTIONAL,

 -- R1 40-6-1-2: New UL DMRS port entry for single-DCI based SDM scheme for Rel-15 DMRS port and/or Rel-18 DMRS port

 dmrs-PortEntrySingleDCI-SDM-r18 ENUMERATED {supported} OPTIONAL,

 -- R1 40-6-2-1: 2 PTRS ports for single-DCI based STx2P SFN scheme for PUSCH-codebook

 pusch-CB-2PTRS-SingleDCI-STx2P-SFN-r18 ENUMERATED {supported} OPTIONAL,

 -- R1 40-6-2a-1: 2 PTRS ports for single-DCI based STx2P SFN scheme for PUSCH-codebook

 pusch-NonCB-2PTRS-SingleDCI-STx2P-SFN-r18 ENUMERATED {supported} OPTIONAL,

 -- R1 40-6-2b: Association between CSI-RS and SRS for noncodebook single-DCI based STx2P SFN scheme for PUSCH

 pusch-NonCB-SingleDCI-STx2P-SFN-CSI-RS-SRS-r18 SEQUENCE {

 maxNumberPeriodicSRS-Resource-PerBWP-r18 INTEGER (1..8),

 maxNumberAperiodicSRS-Resource-PerBWP-r18 INTEGER (1..8),

 maxNumberSemiPersistentSRS-ResourcePerBWP-r18 INTEGER (0..8),

 valueY-SRS-ResourceAssociate-r18 INTEGER (1..16),

 valueX-CSI-RS-ResourceAssociate-r18 INTEGER (1..2)

 } OPTIONAL,

 -- R1 40-6-3c: Codebook multi-DCI based STx2P PUSCH+PUSCH - Fully overlapping PUSCHs in time and fully overlapping in frequency

 twoPUSCH-CB-MultiDCI-STx2P-FullTimeFullFreqOverlap-r18 ENUMERATED {supported} OPTIONAL,

 -- R1 40-6-3d: Codebook multi-DCI based STx2P PUSCH+PUSCH - Fully overlapping PUSCHs in time and partially overlapping in frequency

 twoPUSCH-CB-MultiDCI-STx2P-FullTimePartialFreqOverlap-r18 ENUMERATED {supported} OPTIONAL,

 -- R1 40-6-3e: Codebook multi-DCI based STx2P PUSCH+PUSCH - Partially overlapping PUSCHs in time and fully overlapping in frequency

 twoPUSCH-CB-MultiDCI-STx2P-PartialTimeFullFreqOverlap-r18 ENUMERATED {supported} OPTIONAL,

 -- R1 40-6-3f: Codebook multi-DCI based STx2P PUSCH+PUSCH - Partially overlapping PUSCHs in time, partially overlapping in frequency

 twoPUSCH-CB-MultiDCI-STx2P-PartialTimePartialFreqOverlap-r18 ENUMERATED {supported} OPTIONAL,

 -- R1 40-6-3g: Codebook multi-DCI based STx2P PUSCH+PUSCH - Partially overlapping PUSCHs in time, partially or non-overlapping

 -- in frequency

 twoPUSCH-CB-MultiDCI-STx2P-PartialTimeNonFreqOverlap-r18 ENUMERATED {supported} OPTIONAL,

 -- R1 40-6-3h: Codebook multi-DCI based STx2P PUSCH+PUSCH for CG+CG

 twoPUSCH-CB-MultiDCI-STx2P-CG-CG-r18 ENUMERATED {supported} OPTIONAL,

 -- R1 40-6-3i: Codebook multi-DCI based STx2P PUSCH+PUSCH for DG+CG

 twoPUSCH-CB-MultiDCI-STx2P-CG-DG-r18 ENUMERATED {supported} OPTIONAL,

 -- R1 40-6-3j: Noncodebook multi-DCI based STx2P PUSCH+PUSCH - Fully overlapping PUSCHs in time and fully overlapping in frequency

 twoPUSCH-NonCB-MultiDCI-STx2P-FullTimeFullFreqOverlap-r18 ENUMERATED {supported} OPTIONAL,

 -- R1 40-6-3k: Noncodebook multi-DCI based STx2P PUSCH+PUSCH - Fully overlapping PUSCHs in time and partially overlapping in

 -- frequency

 twoPUSCH-NonCB-MultiDCI-STx2P-FullTimePartialFreqOverlap-r18 ENUMERATED {supported} OPTIONAL,

 -- R1 40-6-3l: Noncodebook multi-DCI based STx2P PUSCH+PUSCH - Partially overlapping PUSCHs in time and fully overlapping in

 -- frequency

 twoPUSCH-NonCB-MultiDCI-STx2P-PartialTimeFullFreqOverlap-r18 ENUMERATED {supported} OPTIONAL,

 -- R1 40-6-3m: Noncodebook multi-DCI based STx2P PUSCH+PUSCH - Partially overlapping PUSCHs in time, partially overlapping in

 -- frequency

 twoPUSCH-NonCB-MultiDCI-STx2P-PartialTimePartialFreqOverlap-r18 ENUMERATED {supported} OPTIONAL,

 -- R1 40-6-3n: Noncodebook multi-DCI based STx2P PUSCH+PUSCH - Partially overlapping PUSCHs in time, non-overlapping in frequency

 twoPUSCH-NonCB-MultiDCI-STx2P-PartialTimeNonFreqOverlap-r18 ENUMERATED {supported} OPTIONAL,

 -- R1 40-6-3o: Noncodebook multi-DCI based STx2P PUSCH+PUSCH for CG+CG

 twoPUSCH-NonCB-MultiDCI-STx2P-CG-CG-r18 ENUMERATED {supported} OPTIONAL,

 -- R1 40-6-3p: Noncodebook multi-DCI based STx2P PUSCH+PUSCH for DG+CG

 twoPUSCH-NonCB-MultiDCI-STx2P-CG-DG-r18 ENUMERATED {supported} OPTIONAL,

 -- R1 40-6-4a: Dynamic indication of repetition number for SFN scheme for PUCCH

 pucch-RepetitionDynamicIndicationSFN-r18 ENUMERATED {supported} OPTIONAL,

 -- R1 40-6-5: Support grouped-based beam reporting for STx2P

 groupBeamReporting-STx2P-r18 SEQUENCE {

 groupL1-RSRP-Reporting-r18 ENUMERATED {jointULandDL, ulOnly, both},

 maxNumberBeamGroups-r18 INTEGER (1..4),

 maxNumberResWithinSlotAcrossCC-r18 ENUMERATED {n2,n3,n4,n8,n16,n32,n64},

 maxNumberResAcrossCC-r18 ENUMERATED {n8,n16,n32,n64,n128}

 } OPTIONAL

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 -- R1 40-4-1k: Simultaneous Configuration of Rel-18 DL DMRS and DCI format 1\_3

 simulConfigDMRS-DCI-1-3-r18 ENUMERATED {supported} OPTIONAL

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}

MIMO-ParametersPerBand-v17b0 ::= SEQUENCE {

 -- R1 23-1-1b Unified TCI with joint DL/UL TCI update for intra- and inter-cell beam management with more than one MAC-CE

 unifiedJointTCI-multiMAC-CE-v17b0 SEQUENCE{

 minBeamApplicationTimeJointTCI-v17b0 CHOICE {

 fr1-v17b0 SEQUENCE {

 scs-15kHz-v17b0 ENUMERATED {sym1, sym2, sym4, sym7, sym14, sym28, sym42, sym56, sym70} OPTIONAL,

 scs-30kHz-v17b0 ENUMERATED {sym1, sym2, sym4, sym7, sym14, sym28, sym42, sym56, sym70} OPTIONAL,

 scs-60kHz-v17b0 ENUMERATED {sym1, sym2, sym4, sym7, sym14, sym28, sym42, sym56, sym70} OPTIONAL

 },

 fr2-v17b0 SEQUENCE {

 scs-60kHz-v17b0 ENUMERATED {sym1, sym2, sym4, sym7, sym14, sym28, sym42, sym56, sym70,

 sym84, sym98, sym112, sym224, sym336} OPTIONAL,

 scs-120kHz-v17b0 ENUMERATED {sym1, sym2, sym4, sym7, sym14, sym28, sym42, sym56, sym70,

 sym84, sym98, sym112, sym224, sym336} OPTIONAL

 }

 },

 maxNumMAC-CE-PerCC-v17b0 ENUMERATED {n2, n3, n4, n5, n6, n7, n8}

 } OPTIONAL,

 -- R1 23-10-1b Unified TCI with separate DL/UL TCI update for intra-cell beam management with more than one MAC-CE

 unifiedSeparateTCI-multiMAC-CE-v17b0 SEQUENCE{

 minBeamApplicationTimeSeparateTCI-v17b0 CHOICE {

 fr1-v17b0 SEQUENCE {

 scs-15kHz-v17b0 ENUMERATED {sym1, sym2, sym4, sym7, sym14, sym28, sym42, sym56, sym70} OPTIONAL,

 scs-30kHz-v17b0 ENUMERATED {sym1, sym2, sym4, sym7, sym14, sym28, sym42, sym56, sym70} OPTIONAL,

 scs-60kHz-v17b0 ENUMERATED {sym1, sym2, sym4, sym7, sym14, sym28, sym42, sym56, sym70} OPTIONAL

 },

 fr2-v17b0 SEQUENCE {

 scs-60kHz-v17b0 ENUMERATED {sym1, sym2, sym4, sym7, sym14, sym28, sym42, sym56, sym70,

 sym84, sym98, sym112, sym224, sym336} OPTIONAL,

 scs-120kHz-v17b0 ENUMERATED {sym1, sym2, sym4, sym7, sym14, sym28, sym42, sym56, sym70,

 sym84, sym98, sym112, sym224, sym336} OPTIONAL

 }

 },

 maxActivatedDL-TCIPerCC-v17b0 INTEGER (2..8),

 maxActivatedUL-TCIPerCC-v17b0 INTEGER (2..8)

 } OPTIONAL

}

DummyG ::= SEQUENCE {

 maxNumberSSB-CSI-RS-ResourceOneTx ENUMERATED {n8, n16, n32, n64},

 maxNumberSSB-CSI-RS-ResourceTwoTx ENUMERATED {n0, n4, n8, n16, n32, n64},

 supportedCSI-RS-Density ENUMERATED {one, three, oneAndThree}

}

BeamManagementSSB-CSI-RS ::= SEQUENCE {

 maxNumberSSB-CSI-RS-ResourceOneTx ENUMERATED {n0, n8, n16, n32, n64},

 maxNumberCSI-RS-Resource ENUMERATED {n0, n4, n8, n16, n32, n64},

 maxNumberCSI-RS-ResourceTwoTx ENUMERATED {n0, n4, n8, n16, n32, n64},

 supportedCSI-RS-Density ENUMERATED {one, three, oneAndThree} OPTIONAL,

 maxNumberAperiodicCSI-RS-Resource ENUMERATED {n0, n1, n4, n8, n16, n32, n64}

}

DummyH ::= SEQUENCE {

 burstLength INTEGER (1..2),

 maxSimultaneousResourceSetsPerCC INTEGER (1..8),

 maxConfiguredResourceSetsPerCC INTEGER (1..64),

 maxConfiguredResourceSetsAllCC INTEGER (1..128)

}

CSI-RS-ForTracking ::= SEQUENCE {

 maxBurstLength INTEGER (1..2),

 maxSimultaneousResourceSetsPerCC INTEGER (1..8),

 maxConfiguredResourceSetsPerCC INTEGER (1..64),

 maxConfiguredResourceSetsAllCC INTEGER (1..256)

}

CSI-RS-IM-ReceptionForFeedback ::= SEQUENCE {

 maxConfigNumberNZP-CSI-RS-PerCC INTEGER (1..64),

 maxConfigNumberPortsAcrossNZP-CSI-RS-PerCC INTEGER (2..256),

 maxConfigNumberCSI-IM-PerCC ENUMERATED {n1, n2, n4, n8, n16, n32},

 maxNumberSimultaneousNZP-CSI-RS-PerCC INTEGER (1..64),

 totalNumberPortsSimultaneousNZP-CSI-RS-PerCC INTEGER (2..256)

}

CSI-RS-ProcFrameworkForSRS ::= SEQUENCE {

 maxNumberPeriodicSRS-AssocCSI-RS-PerBWP INTEGER (1..4),

 maxNumberAperiodicSRS-AssocCSI-RS-PerBWP INTEGER (1..4),

 maxNumberSP-SRS-AssocCSI-RS-PerBWP INTEGER (0..4),

 simultaneousSRS-AssocCSI-RS-PerCC INTEGER (1..8)

}

CSI-ReportFramework ::= SEQUENCE {

 maxNumberPeriodicCSI-PerBWP-ForCSI-Report INTEGER (1..4),

 maxNumberAperiodicCSI-PerBWP-ForCSI-Report INTEGER (1..4),

 maxNumberSemiPersistentCSI-PerBWP-ForCSI-Report INTEGER (0..4),

 maxNumberPeriodicCSI-PerBWP-ForBeamReport INTEGER (1..4),

 maxNumberAperiodicCSI-PerBWP-ForBeamReport INTEGER (1..4),

 maxNumberAperiodicCSI-triggeringStatePerCC ENUMERATED {n3, n7, n15, n31, n63, n128},

 maxNumberSemiPersistentCSI-PerBWP-ForBeamReport INTEGER (0..4),

 simultaneousCSI-ReportsPerCC INTEGER (1..8)

}

CSI-ReportFrameworkExt-r16 ::= SEQUENCE {

 maxNumberAperiodicCSI-PerBWP-ForCSI-ReportExt-r16 INTEGER (5..8)

}

PTRS-DensityRecommendationDL ::= SEQUENCE {

 frequencyDensity1 INTEGER (1..276),

 frequencyDensity2 INTEGER (1..276),

 timeDensity1 INTEGER (0..29),

 timeDensity2 INTEGER (0..29),

 timeDensity3 INTEGER (0..29)

}

PTRS-DensityRecommendationUL ::= SEQUENCE {

 frequencyDensity1 INTEGER (1..276),

 frequencyDensity2 INTEGER (1..276),

 timeDensity1 INTEGER (0..29),

 timeDensity2 INTEGER (0..29),

 timeDensity3 INTEGER (0..29),

 sampleDensity1 INTEGER (1..276),

 sampleDensity2 INTEGER (1..276),

 sampleDensity3 INTEGER (1..276),

 sampleDensity4 INTEGER (1..276),

 sampleDensity5 INTEGER (1..276)

}

SpatialRelations ::= SEQUENCE {

 maxNumberConfiguredSpatialRelations ENUMERATED {n4, n8, n16, n32, n64, n96},

 maxNumberActiveSpatialRelations ENUMERATED {n1, n2, n4, n8, n14},

 additionalActiveSpatialRelationPUCCH ENUMERATED {supported} OPTIONAL,

 maxNumberDL-RS-QCL-TypeD ENUMERATED {n1, n2, n4, n8, n14}

}

DummyI ::= SEQUENCE {

 supportedSRS-TxPortSwitch ENUMERATED {t1r2, t1r4, t2r4, t1r4-t2r4, tr-equal},

 txSwitchImpactToRx ENUMERATED {true} OPTIONAL

}

CSI-MultiTRP-SupportedCombinations-r17 ::= SEQUENCE {

 maxNumTx-Ports-r17 ENUMERATED {n2, n4, n8, n12, n16, n24, n32},

 maxTotalNumCMR-r17 INTEGER (2..64),

 maxTotalNumTx-PortsNZP-CSI-RS-r17 INTEGER (2..256)

}

-- TAG-MIMO-PARAMETERSPERBAND-STOP

-- ASN1STOP

|  |
| --- |
| *MIMO-ParametersPerBand* field descriptions |
| ***codebookParametersPerBand***For a given frequency band, this field this field indicates the alternative list of *SupportedCSI-RS-Resource* supported for each codebook type. The supported CSI-RS resources indicated by this field are referred by *codebookParametersperBC* in *CA-ParametersNR* to indicate the supported CSI-RS resource per band combination. |
| ***csi-RS-IM-ReceptionForFeedback/ csi-RS-ProcFrameworkForSRS/ csi-ReportFramework***CSI related capabilities which the UE supports on each of the carriers operated on this band. If the network configures the UE with serving cells on both FR1 and FR2 bands these values may be further limited by the corresponding fields in *fr1-fr2-Add-UE-NR-Capabilities*. |
| ***supportNewDMRS-Port***Presence of this field set to *supported1*, *supported2* or *supported3* indicates that the UE supports the new DMRS port entry {0,2,3}. |