**3GPP TSG-RAN WG2 Meeting #123bis *R2-230xxxx***

**Xiamen, China, October 09-13, 2023**

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

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | | | | | | | | | | |
| ***Title:*** | UE capabilities for Rel-18 NR NTN Enhancements | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Source to WG:*** | Intel Corporation | | | | | | | | | |
| ***Source to TSG:*** | R2 | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Work item code:*** | NR\_NTN\_enh-Core | | | | |  | ***Date:*** | | | 2023-10-xy |
|  |  | | | |  | |  | | |  |
| ***Category:*** | **B** |  | | | | | ***Release:*** | | | Rel-18 |
|  | *Use one of the following categories:* ***F*** *(correction)* ***A*** *(mirror corresponding to a change in an earlier release)* ***B*** *(addition of feature),* ***C*** *(functional modification of feature)* ***D*** *(editorial modification)*  Detailed explanations of the above categories can be found in 3GPP [TR 21.900](http://www.3gpp.org/ftp/Specs/html-info/21900.htm). | | | | | | | | *Use one of the following releases: Rel-8 (Release 8) Rel-9 (Release 9) Rel-10 (Release 10) Rel-11 (Release 11) … Rel-16 (Release 16) Rel-17 (Release 17) Rel-18 (Release 18) Rel-19 (Release 19)* | |
|  |  | | | | | | | | | |
| ***Reason for change:*** | | Introduction of UE capabilities for NR NTN Enhancemets | | | | | | | | |
|  | |  | | | | | | | | |
| ***Summary of change:*** | | 1. A UE Capability *rach-LessHandoverNTN-r18* is defined as part of IE *RF-Parameters* to indicate UE support of RACH-less HO in NTN. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Consequences if not approved:*** | | Rel-18 NR NTN Enhancement feature is not completed | | | | | | | | |
|  | |  | | | | | | | | |
| ***Clauses affected:*** | | 6.3.3 | | | | | | | | |
|  | |  | | | | | | | | |
|  | | **Y** | **N** |  | | | |  | | |
| ***Other specs*** | | **x** |  | Other core specifications | | | | TS/TR 38.306 CR ... | | |
| ***affected:*** | |  | **xx** | Test specifications | | | | TS/TR ... CR ... | | |
| ***(show related CRs)*** | |  |  | O&M Specifications | | | | TS/TR ... CR ... | | |
|  | |  | | | | | | | | |
| ***Other comments:*** | |  | | | | | | | | |
|  | |  | | | | | | | | |
| ***This CR's revision history:*** | |  | | | | | | | | |

1. ***Modified section***

### 6.3.3 UE capability information elements

\*\*\* OMITTED TEXT \*\*\*

– *RF-Parameters*

The IE *RF-Parameters* is used to convey RF-related capabilities for NR operation.

***RF-Parameters* information element**

-- ASN1START

-- TAG-RF-PARAMETERS-START

RF-Parameters ::= SEQUENCE {

supportedBandListNR SEQUENCE (SIZE (1..maxBands)) OF BandNR,

supportedBandCombinationList BandCombinationList OPTIONAL,

appliedFreqBandListFilter FreqBandList OPTIONAL,

...,

[[

supportedBandCombinationList-v1540 BandCombinationList-v1540 OPTIONAL,

srs-SwitchingTimeRequested ENUMERATED {true} OPTIONAL

]],

[[

supportedBandCombinationList-v1550 BandCombinationList-v1550 OPTIONAL

]],

[[

supportedBandCombinationList-v1560 BandCombinationList-v1560 OPTIONAL

]],

[[

supportedBandCombinationList-v1610 BandCombinationList-v1610 OPTIONAL,

supportedBandCombinationListSidelinkEUTRA-NR-r16 BandCombinationListSidelinkEUTRA-NR-r16 OPTIONAL,

supportedBandCombinationList-UplinkTxSwitch-r16 BandCombinationList-UplinkTxSwitch-r16 OPTIONAL

]],

[[

supportedBandCombinationList-v1630 BandCombinationList-v1630 OPTIONAL,

supportedBandCombinationListSidelinkEUTRA-NR-v1630 BandCombinationListSidelinkEUTRA-NR-v1630 OPTIONAL,

supportedBandCombinationList-UplinkTxSwitch-v1630 BandCombinationList-UplinkTxSwitch-v1630 OPTIONAL

]],

[[

supportedBandCombinationList-v1640 BandCombinationList-v1640 OPTIONAL,

supportedBandCombinationList-UplinkTxSwitch-v1640 BandCombinationList-UplinkTxSwitch-v1640 OPTIONAL

]],

[[

supportedBandCombinationList-v1650 BandCombinationList-v1650 OPTIONAL,

supportedBandCombinationList-UplinkTxSwitch-v1650 BandCombinationList-UplinkTxSwitch-v1650 OPTIONAL

]],

[[

extendedBand-n77-r16 ENUMERATED {supported} OPTIONAL

]],

[[

supportedBandCombinationList-UplinkTxSwitch-v1670 BandCombinationList-UplinkTxSwitch-v1670 OPTIONAL

]],

[[

supportedBandCombinationList-v1680 BandCombinationList-v1680 OPTIONAL

]],

[[

supportedBandCombinationList-v1690 BandCombinationList-v1690 OPTIONAL,

supportedBandCombinationList-UplinkTxSwitch-v1690 BandCombinationList-UplinkTxSwitch-v1690 OPTIONAL

]],

[[

supportedBandCombinationList-v1700 BandCombinationList-v1700 OPTIONAL,

supportedBandCombinationList-UplinkTxSwitch-v1700 BandCombinationList-UplinkTxSwitch-v1700 OPTIONAL,

supportedBandCombinationListSL-RelayDiscovery-r17 OCTET STRING OPTIONAL, -- Contains PC5 BandCombinationListSidelinkNR-r16

supportedBandCombinationListSL-NonRelayDiscovery-r17 OCTET STRING OPTIONAL, -- Contains PC5 BandCombinationListSidelinkNR-r16

supportedBandCombinationListSidelinkEUTRA-NR-v1710 BandCombinationListSidelinkEUTRA-NR-v1710 OPTIONAL,

sidelinkRequested-r17 ENUMERATED {true} OPTIONAL,

extendedBand-n77-2-r17 ENUMERATED {supported} OPTIONAL

]],

[[

supportedBandCombinationList-v1720 BandCombinationList-v1720 OPTIONAL,

supportedBandCombinationList-UplinkTxSwitch-v1720 BandCombinationList-UplinkTxSwitch-v1720 OPTIONAL

]],

[[

supportedBandCombinationList-v1730 BandCombinationList-v1730 OPTIONAL,

supportedBandCombinationList-UplinkTxSwitch-v1730 BandCombinationList-UplinkTxSwitch-v1730 OPTIONAL,

supportedBandCombinationListSL-RelayDiscovery-v1730 BandCombinationListSL-Discovery-r17 OPTIONAL,

supportedBandCombinationListSL-NonRelayDiscovery-v1730 BandCombinationListSL-Discovery-r17 OPTIONAL

]],

[[

supportedBandCombinationList-v1740 BandCombinationList-v1740 OPTIONAL,

supportedBandCombinationList-UplinkTxSwitch-v1740 BandCombinationList-UplinkTxSwitch-v1740 OPTIONAL

]],

[[

supportedBandCombinationList-v1760 BandCombinationList-v1760 OPTIONAL,

supportedBandCombinationList-UplinkTxSwitch-v1760 BandCombinationList-UplinkTxSwitch-v1760 OPTIONAL

]]

}

RF-Parameters-v15g0 ::= SEQUENCE {

supportedBandCombinationList-v15g0 BandCombinationList-v15g0 OPTIONAL

}

RF-Parameters-v16a0 ::= SEQUENCE {

supportedBandCombinationList-v16a0 BandCombinationList-v16a0 OPTIONAL,

supportedBandCombinationList-UplinkTxSwitch-v16a0 BandCombinationList-UplinkTxSwitch-v16a0 OPTIONAL

}

RF-Parameters-v16c0 ::= SEQUENCE {

supportedBandListNR-v16c0 SEQUENCE (SIZE (1..maxBands)) OF BandNR-v16c0

}

BandNR ::= SEQUENCE {

bandNR FreqBandIndicatorNR,

modifiedMPR-Behaviour BIT STRING (SIZE (8)) OPTIONAL,

mimo-ParametersPerBand MIMO-ParametersPerBand OPTIONAL,

extendedCP ENUMERATED {supported} OPTIONAL,

multipleTCI ENUMERATED {supported} OPTIONAL,

bwp-WithoutRestriction ENUMERATED {supported} OPTIONAL,

bwp-SameNumerology ENUMERATED {upto2, upto4} OPTIONAL,

bwp-DiffNumerology ENUMERATED {upto4} OPTIONAL,

crossCarrierScheduling-SameSCS ENUMERATED {supported} OPTIONAL,

pdsch-256QAM-FR2 ENUMERATED {supported} OPTIONAL,

pusch-256QAM ENUMERATED {supported} OPTIONAL,

ue-PowerClass ENUMERATED {pc1, pc2, pc3, pc4} OPTIONAL,

rateMatchingLTE-CRS ENUMERATED {supported} OPTIONAL,

channelBWs-DL CHOICE {

fr1 SEQUENCE {

scs-15kHz BIT STRING (SIZE (10)) OPTIONAL,

scs-30kHz BIT STRING (SIZE (10)) OPTIONAL,

scs-60kHz BIT STRING (SIZE (10)) OPTIONAL

},

fr2 SEQUENCE {

scs-60kHz BIT STRING (SIZE (3)) OPTIONAL,

scs-120kHz BIT STRING (SIZE (3)) OPTIONAL

}

} OPTIONAL,

channelBWs-UL CHOICE {

fr1 SEQUENCE {

scs-15kHz BIT STRING (SIZE (10)) OPTIONAL,

scs-30kHz BIT STRING (SIZE (10)) OPTIONAL,

scs-60kHz BIT STRING (SIZE (10)) OPTIONAL

},

fr2 SEQUENCE {

scs-60kHz BIT STRING (SIZE (3)) OPTIONAL,

scs-120kHz BIT STRING (SIZE (3)) OPTIONAL

}

} OPTIONAL,

...,

[[

maxUplinkDutyCycle-PC2-FR1 ENUMERATED {n60, n70, n80, n90, n100} OPTIONAL

]],

[[

pucch-SpatialRelInfoMAC-CE ENUMERATED {supported} OPTIONAL,

powerBoosting-pi2BPSK ENUMERATED {supported} OPTIONAL

]],

[[

maxUplinkDutyCycle-FR2 ENUMERATED {n15, n20, n25, n30, n40, n50, n60, n70, n80, n90, n100} OPTIONAL

]],

[[

channelBWs-DL-v1590 CHOICE {

fr1 SEQUENCE {

scs-15kHz BIT STRING (SIZE (16)) OPTIONAL,

scs-30kHz BIT STRING (SIZE (16)) OPTIONAL,

scs-60kHz BIT STRING (SIZE (16)) OPTIONAL

},

fr2 SEQUENCE {

scs-60kHz BIT STRING (SIZE (8)) OPTIONAL,

scs-120kHz BIT STRING (SIZE (8)) OPTIONAL

}

} OPTIONAL,

channelBWs-UL-v1590 CHOICE {

fr1 SEQUENCE {

scs-15kHz BIT STRING (SIZE (16)) OPTIONAL,

scs-30kHz BIT STRING (SIZE (16)) OPTIONAL,

scs-60kHz BIT STRING (SIZE (16)) OPTIONAL

},

fr2 SEQUENCE {

scs-60kHz BIT STRING (SIZE (8)) OPTIONAL,

scs-120kHz BIT STRING (SIZE (8)) OPTIONAL

}

} OPTIONAL

]],

[[

asymmetricBandwidthCombinationSet BIT STRING (SIZE (1..32)) OPTIONAL

]],

[[

-- R1 10: NR-unlicensed

sharedSpectrumChAccessParamsPerBand-r16 SharedSpectrumChAccessParamsPerBand-r16 OPTIONAL,

-- R1 11-7b: Independent cancellation of the overlapping PUSCHs in an intra-band UL CA

cancelOverlappingPUSCH-r16 ENUMERATED {supported} OPTIONAL,

-- R1 14-1: Multiple LTE-CRS rate matching patterns

multipleRateMatchingEUTRA-CRS-r16 SEQUENCE {

maxNumberPatterns-r16 INTEGER (2..6),

maxNumberNon-OverlapPatterns-r16 INTEGER (1..3)

} OPTIONAL,

-- R1 14-1a: Two LTE-CRS overlapping rate matching patterns within a part of NR carrier using 15 kHz overlapping with a LTE carrier

overlapRateMatchingEUTRA-CRS-r16 ENUMERATED {supported} OPTIONAL,

-- R1 14-2: PDSCH Type B mapping of length 9 and 10 OFDM symbols

pdsch-MappingTypeB-Alt-r16 ENUMERATED {supported} OPTIONAL,

-- R1 14-3: One slot periodic TRS configuration for FR1

oneSlotPeriodicTRS-r16 ENUMERATED {supported} OPTIONAL,

olpc-SRS-Pos-r16 OLPC-SRS-Pos-r16 OPTIONAL,

spatialRelationsSRS-Pos-r16 SpatialRelationsSRS-Pos-r16 OPTIONAL,

simulSRS-MIMO-TransWithinBand-r16 ENUMERATED {n2} OPTIONAL,

channelBW-DL-IAB-r16 CHOICE {

fr1-100mhz SEQUENCE {

scs-15kHz ENUMERATED {supported} OPTIONAL,

scs-30kHz ENUMERATED {supported} OPTIONAL,

scs-60kHz ENUMERATED {supported} OPTIONAL

},

fr2-200mhz SEQUENCE {

scs-60kHz ENUMERATED {supported} OPTIONAL,

scs-120kHz ENUMERATED {supported} OPTIONAL

}

} OPTIONAL,

channelBW-UL-IAB-r16 CHOICE {

fr1-100mhz SEQUENCE {

scs-15kHz ENUMERATED {supported} OPTIONAL,

scs-30kHz ENUMERATED {supported} OPTIONAL,

scs-60kHz ENUMERATED {supported} OPTIONAL

},

fr2-200mhz SEQUENCE {

scs-60kHz ENUMERATED {supported} OPTIONAL,

scs-120kHz ENUMERATED {supported} OPTIONAL

}

} OPTIONAL,

rasterShift7dot5-IAB-r16 ENUMERATED {supported} OPTIONAL,

ue-PowerClass-v1610 ENUMERATED {pc1dot5} OPTIONAL,

condHandover-r16 ENUMERATED {supported} OPTIONAL,

condHandoverFailure-r16 ENUMERATED {supported} OPTIONAL,

condHandoverTwoTriggerEvents-r16 ENUMERATED {supported} OPTIONAL,

condPSCellChange-r16 ENUMERATED {supported} OPTIONAL,

condPSCellChangeTwoTriggerEvents-r16 ENUMERATED {supported} OPTIONAL,

mpr-PowerBoost-FR2-r16 ENUMERATED {supported} OPTIONAL,

-- R1 11-9: Multiple active configured grant configurations for a BWP of a serving cell

activeConfiguredGrant-r16 SEQUENCE {

maxNumberConfigsPerBWP-r16 ENUMERATED {n1, n2, n4, n8, n12},

maxNumberConfigsAllCC-r16 INTEGER (2..32)

} OPTIONAL,

-- R1 11-9a: Joint release in a DCI for two or more configured grant Type 2 configurations for a given BWP of a serving cell

jointReleaseConfiguredGrantType2-r16 ENUMERATED {supported} OPTIONAL,

-- R1 12-2: Multiple SPS configurations

sps-r16 SEQUENCE {

maxNumberConfigsPerBWP-r16 INTEGER (1..8),

maxNumberConfigsAllCC-r16 INTEGER (2..32)

} OPTIONAL,

-- R1 12-2a: Joint release in a DCI for two or more SPS configurations for a given BWP of a serving cell

jointReleaseSPS-r16 ENUMERATED {supported} OPTIONAL,

-- R1 13-19: Simultaneous positioning SRS and MIMO SRS transmission within a band across multiple CCs

simulSRS-TransWithinBand-r16 ENUMERATED {n2} OPTIONAL,

trs-AdditionalBandwidth-r16 ENUMERATED {trs-AddBW-Set1, trs-AddBW-Set2} OPTIONAL,

handoverIntraF-IAB-r16 ENUMERATED {supported} OPTIONAL

]],

[[

-- R1 22-5a: Simultaneous transmission of SRS for antenna switching and SRS for CB/NCB /BM for intra-band UL CA

-- R1 22-5c: Simultaneous transmission of SRS for antenna switching and SRS for antenna switching for intra-band UL CA

simulTX-SRS-AntSwitchingIntraBandUL-CA-r16 SimulSRS-ForAntennaSwitching-r16 OPTIONAL,

-- R1 10: NR-unlicensed

sharedSpectrumChAccessParamsPerBand-v1630 SharedSpectrumChAccessParamsPerBand-v1630 OPTIONAL

]],

[[

handoverUTRA-FDD-r16 ENUMERATED {supported} OPTIONAL,

-- R4 7-4: Report the shorter transient capability supported by the UE: 2, 4 or 7us

enhancedUL-TransientPeriod-r16 ENUMERATED {us2, us4, us7} OPTIONAL,

sharedSpectrumChAccessParamsPerBand-v1640 SharedSpectrumChAccessParamsPerBand-v1640 OPTIONAL

]],

[[

type1-PUSCH-RepetitionMultiSlots-v1650 ENUMERATED {supported} OPTIONAL,

type2-PUSCH-RepetitionMultiSlots-v1650 ENUMERATED {supported} OPTIONAL,

pusch-RepetitionMultiSlots-v1650 ENUMERATED {supported} OPTIONAL,

configuredUL-GrantType1-v1650 ENUMERATED {supported} OPTIONAL,

configuredUL-GrantType2-v1650 ENUMERATED {supported} OPTIONAL,

sharedSpectrumChAccessParamsPerBand-v1650 SharedSpectrumChAccessParamsPerBand-v1650 OPTIONAL

]],

[[

enhancedSkipUplinkTxConfigured-v1660 ENUMERATED {supported} OPTIONAL,

enhancedSkipUplinkTxDynamic-v1660 ENUMERATED {supported} OPTIONAL

]],

[[

maxUplinkDutyCycle-PC1dot5-MPE-FR1-r16 ENUMERATED {n10, n15, n20, n25, n30, n40, n50, n60, n70, n80, n90, n100} OPTIONAL,

txDiversity-r16 ENUMERATED {supported} OPTIONAL

]],

[[

-- R1 36-1: Support of 1024QAM for PDSCH for FR1

pdsch-1024QAM-FR1-r17 ENUMERATED {supported} OPTIONAL,

-- R4 22-1 support of FR2 HST operation

ue-PowerClass-v1700 ENUMERATED {pc5, pc6, pc7} OPTIONAL,

-- R1 24: NR extension to 71GHz (FR2-2)

fr2-2-AccessParamsPerBand-r17 FR2-2-AccessParamsPerBand-r17 OPTIONAL,

rlm-Relaxation-r17 ENUMERATED {supported} OPTIONAL,

bfd-Relaxation-r17 ENUMERATED {supported} OPTIONAL,

cg-SDT-r17 ENUMERATED {supported} OPTIONAL,

locationBasedCondHandover-r17 ENUMERATED {supported} OPTIONAL,

timeBasedCondHandover-r17 ENUMERATED {supported} OPTIONAL,

eventA4BasedCondHandover-r17 ENUMERATED {supported} OPTIONAL,

mn-InitiatedCondPSCellChangeNRDC-r17 ENUMERATED {supported} OPTIONAL,

sn-InitiatedCondPSCellChangeNRDC-r17 ENUMERATED {supported} OPTIONAL,

-- R1 29-3a: PDCCH skipping

pdcch-SkippingWithoutSSSG-r17 ENUMERATED {supported} OPTIONAL,

-- R1 29-3b: 2 search space sets group switching

sssg-Switching-1BitInd-r17 ENUMERATED {supported} OPTIONAL,

-- R1 29-3c: 3 search space sets group switching

sssg-Switching-2BitInd-r17 ENUMERATED {supported} OPTIONAL,

-- R1 29-3d: 2 search space sets group switching with PDCCH skipping

pdcch-SkippingWithSSSG-r17 ENUMERATED {supported} OPTIONAL,

-- R1 29-3e: Support Search space set group switching capability 2 for FR1

searchSpaceSetGrp-switchCap2-r17 ENUMERATED {supported} OPTIONAL,

-- R1 26-1: Uplink Time and Frequency pre-compensation and timing relationship enhancements

uplinkPreCompensation-r17 ENUMERATED {supported} OPTIONAL,

-- R1 26-4: UE reporting of information related to TA pre-compensation

uplink-TA-Reporting-r17 ENUMERATED {supported} OPTIONAL,

-- R1 26-5: Increasing the number of HARQ processes

max-HARQ-ProcessNumber-r17 ENUMERATED {u16d32, u32d16, u32d32} OPTIONAL,

-- R1 26-6: Type-2 HARQ codebook enhancement

type2-HARQ-Codebook-r17 ENUMERATED {supported} OPTIONAL,

-- R1 26-6a: Type-1 HARQ codebook enhancement

type1-HARQ-Codebook-r17 ENUMERATED {supported} OPTIONAL,

-- R1 26-6b: Type-3 HARQ codebook enhancement

type3-HARQ-Codebook-r17 ENUMERATED {supported} OPTIONAL,

-- R1 26-9: UE-specific K\_offset

ue-specific-K-Offset-r17 ENUMERATED {supported} OPTIONAL,

-- R1 24-1f: Multiple PDSCH scheduling by single DCI for 120kHz in FR2-1

multiPDSCH-SingleDCI-FR2-1-SCS-120kHz-r17 ENUMERATED {supported} OPTIONAL,

-- R1 24-1g: Multiple PUSCH scheduling by single DCI for 120kHz in FR2-1

multiPUSCH-SingleDCI-FR2-1-SCS-120kHz-r17 ENUMERATED {supported} OPTIONAL,

-- R4 14-4: Parallel PRS measurements in RRC\_INACTIVE state, FR1/FR2 diff

parallelPRS-MeasRRC-Inactive-r17 ENUMERATED {supported} OPTIONAL,

-- R1 27-1-2: Support of UE-TxTEGs for UL TDOA

nr-UE-TxTEG-ID-MaxSupport-r17 ENUMERATED {n1, n2, n3, n4, n6, n8} OPTIONAL,

-- R1 27-17: PRS processing in RRC\_INACTIVE

prs-ProcessingRRC-Inactive-r17 ENUMERATED {supported} OPTIONAL,

-- R1 27-3-2: DL PRS measurement outside MG and in a PRS processing window

prs-ProcessingWindowType1A-r17 ENUMERATED {option1, option2, option3} OPTIONAL,

prs-ProcessingWindowType1B-r17 ENUMERATED {option1, option2, option3} OPTIONAL,

prs-ProcessingWindowType2-r17 ENUMERATED {option1, option2, option3} OPTIONAL,

-- R1 27-15: Positioning SRS transmission in RRC\_INACTIVE state for initial UL BWP

srs-AllPosResourcesRRC-Inactive-r17 SRS-AllPosResourcesRRC-Inactive-r17 OPTIONAL,

-- R1 27-16: OLPC for positioning SRS in RRC\_INACTIVE state - gNB

olpc-SRS-PosRRC-Inactive-r17 OLPC-SRS-Pos-r16 OPTIONAL,

-- R1 27-19: Spatial relation for positioning SRS in RRC\_INACTIVE state - gNB

spatialRelationsSRS-PosRRC-Inactive-r17 SpatialRelationsSRS-Pos-r16 OPTIONAL,

-- R1 30-1: Increased maximum number of PUSCH Type A repetitions

maxNumberPUSCH-TypeA-Repetition-r17 ENUMERATED {supported} OPTIONAL,

-- R1 30-2: PUSCH Type A repetitions based on available slots

puschTypeA-RepetitionsAvailSlot-r17 ENUMERATED {supported} OPTIONAL,

-- R1 30-3: TB processing over multi-slot PUSCH

tb-ProcessingMultiSlotPUSCH-r17 ENUMERATED {supported} OPTIONAL,

-- R1 30-3a: Repetition of TB processing over multi-slot PUSCH

tb-ProcessingRepMultiSlotPUSCH-r17 ENUMERATED {supported} OPTIONAL,

-- R1 30-4: The maximum duration for DM-RS bundling

maxDurationDMRS-Bundling-r17 SEQUENCE {

fdd-r17 ENUMERATED {n4, n8, n16, n32} OPTIONAL,

tdd-r17 ENUMERATED {n2, n4, n8, n16} OPTIONAL

} OPTIONAL,

-- R1 30-6: Repetition of PUSCH transmission scheduled by RAR UL grant and DCI format 0\_0 with CRC scrambled by TC-RNTI

pusch-RepetitionMsg3-r17 ENUMERATED {supported} OPTIONAL,

sharedSpectrumChAccessParamsPerBand-v1710 SharedSpectrumChAccessParamsPerBand-v1710 OPTIONAL,

-- R4 25-2: Parallel measurements on cells belonging to a different NGSO satellite than a serving satellite without scheduling restrictions

-- on normal operations with the serving cell

parallelMeasurementWithoutRestriction-r17 ENUMERATED {supported} OPTIONAL,

-- R4 25-5: Parallel measurements on multiple NGSO satellites within a SMTC

maxNumber-NGSO-SatellitesWithinOneSMTC-r17 ENUMERATED {n1, n2, n3, n4} OPTIONAL,

-- R1 26-10: K1 range extension

k1-RangeExtension-r17 ENUMERATED {supported} OPTIONAL,

-- R1 35-1: Aperiodic CSI-RS for tracking for fast SCell activation

aperiodicCSI-RS-FastScellActivation-r17 SEQUENCE {

maxNumberAperiodicCSI-RS-PerCC-r17 ENUMERATED {n8, n16, n32, n48, n64, n128, n255},

maxNumberAperiodicCSI-RS-AcrossCCs-r17 ENUMERATED {n8, n16, n32, n64, n128, n256, n512, n1024}

} OPTIONAL,

-- R1 35-2: Aperiodic CSI-RS bandwidth for tracking for fast SCell activation for 10MHz UE channel bandwidth

aperiodicCSI-RS-AdditionalBandwidth-r17 ENUMERATED {addBW-Set1, addBW-Set2} OPTIONAL,

-- R1 28-1a: RRC-configured DL BWP without CD-SSB or NCD-SSB

bwp-WithoutCD-SSB-OrNCD-SSB-RedCap-r17 ENUMERATED {supported} OPTIONAL,

-- R1 28-3: Half-duplex FDD operation type A for RedCap UE

halfDuplexFDD-TypeA-RedCap-r17 ENUMERATED {supported} OPTIONAL,

-- R1 27-15b: Positioning SRS transmission in RRC\_INACTIVE state configured outside initial UL BWP

posSRS-RRC-Inactive-OutsideInitialUL-BWP-r17 PosSRS-RRC-Inactive-OutsideInitialUL-BWP-r17 OPTIONAL,

-- R4 15-3 UE support of CBW for 480kHz SCS

channelBWs-DL-SCS-480kHz-FR2-2-r17 BIT STRING (SIZE (8)) OPTIONAL,

channelBWs-UL-SCS-480kHz-FR2-2-r17 BIT STRING (SIZE (8)) OPTIONAL,

-- R4 15-4 UE support of CBW for 960kHz SCS

channelBWs-DL-SCS-960kHz-FR2-2-r17 BIT STRING (SIZE (8)) OPTIONAL,

channelBWs-UL-SCS-960kHz-FR2-2-r17 BIT STRING (SIZE (8)) OPTIONAL,

-- R4 17-1 UL gap for Tx power management

ul-GapFR2-r17 ENUMERATED {supported} OPTIONAL,

-- R1 25-4: One-shot HARQ ACK feedback triggered by DCI format 1\_2

oneShotHARQ-feedbackTriggeredByDCI-1-2-r17 ENUMERATED {supported} OPTIONAL,

-- R1 25-5: PHY priority handling for one-shot HARQ ACK feedback

oneShotHARQ-feedbackPhy-Priority-r17 ENUMERATED {supported} OPTIONAL,

-- R1 25-6: Enhanced type 3 HARQ-ACK codebook feedback

enhancedType3-HARQ-CodebookFeedback-r17 SEQUENCE {

enhancedType3-HARQ-Codebooks-r17 ENUMERATED {n1, n2, n4, n8},

maxNumberPUCCH-Transmissions-r17 ENUMERATED {n1, n2, n3, n4, n5, n6, n7}

} OPTIONAL,

-- R1 25-7: Triggered HARQ-ACK codebook re-transmission

triggeredHARQ-CodebookRetx-r17 SEQUENCE {

minHARQ-Retx-Offset-r17 ENUMERATED {n-7, n-5, n-3, n-1, n1},

maxHARQ-Retx-Offset-r17 ENUMERATED {n4, n6, n8, n10, n12, n14, n16, n18, n20, n22, n24}

} OPTIONAL

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-- R4 22-2 support of one shot large UL timing adjustment

ue-OneShotUL-TimingAdj-r17 ENUMERATED {supported} OPTIONAL,

-- R1 25-2: Repetitions for PUCCH format 0, and 2 over multiple slots with K = 2, 4, 8

pucch-Repetition-F0-2-r17 ENUMERATED {supported} OPTIONAL,

-- R1 25-11a: 4-bits subband CQI for NTN and unlicensed

cqi-4-BitsSubbandNTN-SharedSpectrumChAccess-r17 ENUMERATED {supported} OPTIONAL,

-- R1 25-16: HARQ-ACK with different priorities multiplexing on a PUCCH/PUSCH

mux-HARQ-ACK-DiffPriorities-r17 ENUMERATED {supported} OPTIONAL,

-- R1 25-20a: Propagation delay compensation based on legacy TA procedure for NTN and unlicensed

ta-BasedPDC-NTN-SharedSpectrumChAccess-r17 ENUMERATED {supported} OPTIONAL,

-- R1 33-2b: DCI-based enabling/disabling ACK/NACK-based feedback for dynamic scheduling for multicast

ack-NACK-FeedbackForMulticastWithDCI-Enabler-r17 ENUMERATED {supported} OPTIONAL,

-- R1 33-2e: Multiple G-RNTIs for group-common PDSCHs

maxNumberG-RNTI-r17 INTEGER (2..8) OPTIONAL,

-- R1 33-2f: Dynamic multicast with DCI format 4\_2

dynamicMulticastDCI-Format4-2-r17 ENUMERATED {supported} OPTIONAL,

-- R1 33-2i: Supported maximal modulation order for multicast PDSCH

maxModulationOrderForMulticast-r17 CHOICE {

fr1-r17 ENUMERATED {qam256, qam1024},

fr2-r17 ENUMERATED {qam64, qam256}

} OPTIONAL,

-- R1 33-3-1: Dynamic Slot-level repetition for group-common PDSCH for TN and licensed

dynamicSlotRepetitionMulticastTN-NonSharedSpectrumChAccess-r17 ENUMERATED {n8, n16} OPTIONAL,

-- R1 33-3-1a: Dynamic Slot-level repetition for group-common PDSCH for NTN and unlicensed

dynamicSlotRepetitionMulticastNTN-SharedSpectrumChAccess-r17 ENUMERATED {n8, n16} OPTIONAL,

-- R1 33-4-1: DCI-based enabling/disabling NACK-only based feedback for dynamic scheduling for multicast

nack-OnlyFeedbackForMulticastWithDCI-Enabler-r17 ENUMERATED {supported} OPTIONAL,

-- R1 33-5-1b: DCI-based enabling/disabling ACK/NACK-based feedback for dynamic scheduling for multicast

ack-NACK-FeedbackForSPS-MulticastWithDCI-Enabler-r17 ENUMERATED {supported} OPTIONAL,

-- R1 33-5-1h: Multiple G-CS-RNTIs for SPS group-common PDSCHs

maxNumberG-CS-RNTI-r17 INTEGER (2..8) OPTIONAL,

-- R1 33-10: Support group-common PDSCH RE-level rate matching for multicast

re-LevelRateMatchingForMulticast-r17 ENUMERATED {supported} OPTIONAL,

-- R1 36-1a: Support of 1024QAM for PDSCH with maximum 2 MIMO layers for FR1

pdsch-1024QAM-2MIMO-FR1-r17 ENUMERATED {supported} OPTIONAL,

-- R4 14-3 PRS measurement without MG

prs-MeasurementWithoutMG-r17 ENUMERATED {cpLength, quarterSymbol, halfSymbol, halfSlot} OPTIONAL,

-- R4 25-7: The number of target LEO satellites the UE can monitor per carrier

maxNumber-LEO-SatellitesPerCarrier-r17 INTEGER (3..4) OPTIONAL,

-- R1 27-3-3 DL PRS Processing Capability outside MG - buffering capability

prs-ProcessingCapabilityOutsideMGinPPW-r17 SEQUENCE (SIZE(1..3)) OF PRS-ProcessingCapabilityOutsideMGinPPWperType-r17 OPTIONAL,

-- R1 27-15a: Positioning SRS transmission in RRC\_INACTIVE state for initial UL BWP with semi-persistent SRS

srs-SemiPersistent-PosResourcesRRC-Inactive-r17 SEQUENCE {

maxNumOfSemiPersistentSRSposResources-r17 ENUMERATED {n1, n2, n4, n8, n16, n32, n64},

maxNumOfSemiPersistentSRSposResourcesPerSlot-r17 ENUMERATED {n1, n2, n3, n4, n5, n6, n8, n10, n12, n14}

} OPTIONAL,

-- R2: UE support of CBW for 120kHz SCS

channelBWs-DL-SCS-120kHz-FR2-2-r17 BIT STRING (SIZE (8)) OPTIONAL,

channelBWs-UL-SCS-120kHz-FR2-2-r17 BIT STRING (SIZE (8)) OPTIONAL

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-- R1 30-4a: DM-RS bundling for PUSCH repetition type A

dmrs-BundlingPUSCH-RepTypeA-r17 ENUMERATED {supported} OPTIONAL,

-- R1 30-4b: DM-RS bundling for PUSCH repetition type B

dmrs-BundlingPUSCH-RepTypeB-r17 ENUMERATED {supported} OPTIONAL,

-- R1 30-4c: DM-RS bundling for TB processing over multi-slot PUSCH

dmrs-BundlingPUSCH-multiSlot-r17 ENUMERATED {supported} OPTIONAL,

-- R1 30-4d: DMRS bundling for PUCCH repetitions

dmrs-BundlingPUCCH-Rep-r17 ENUMERATED {supported} OPTIONAL,

-- R1 30-4e: Enhanced inter-slot frequency hopping with inter-slot bundling for PUSCH

interSlotFreqHopInterSlotBundlingPUSCH-r17 ENUMERATED {supported} OPTIONAL,

-- R1 30-4f: Enhanced inter-slot frequency hopping for PUCCH repetitions with DMRS bundling

interSlotFreqHopPUCCH-r17 ENUMERATED {supported} OPTIONAL,

-- R1 30-4g: Restart DM-RS bundling

dmrs-BundlingRestart-r17 ENUMERATED {supported} OPTIONAL,

-- R1 30-4h: DM-RS bundling for non-back-to-back transmission

dmrs-BundlingNonBackToBackTX-r17 ENUMERATED {supported} OPTIONAL

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-- R1 33-5-1e: Dynamic Slot-level repetition for SPS group-common PDSCH for multicast

maxDynamicSlotRepetitionForSPS-Multicast-r17 ENUMERATED {n8, n16} OPTIONAL,

-- R1 33-5-1g: DCI-based enabling/disabling NACK-only based feedback for SPS group-common PDSCH for multicast

nack-OnlyFeedbackForSPS-MulticastWithDCI-Enabler-r17 ENUMERATED {supported} OPTIONAL,

-- R1 33-5-1i: Multicast SPS scheduling with DCI format 4\_2

sps-MulticastDCI-Format4-2-r17 ENUMERATED {supported} OPTIONAL,

-- R1 33-5-2: Multiple SPS group-common PDSCH configuration on PCell

sps-MulticastMultiConfig-r17 INTEGER (1..8) OPTIONAL,

-- R1 33-6-1: DL priority indication for multicast in DCI

priorityIndicatorInDCI-Multicast-r17 ENUMERATED {supported} OPTIONAL,

-- R1 33-6-1a: DL priority configuration for SPS multicast

priorityIndicatorInDCI-SPS-Multicast-r17 ENUMERATED {supported} OPTIONAL,

-- R1 33-6-2: Two HARQ-ACK codebooks simultaneously constructed for supporting HARQ-ACK codebooks with different priorities

-- for unicast and multicast at a UE

twoHARQ-ACK-CodebookForUnicastAndMulticast-r17 ENUMERATED {supported} OPTIONAL,

-- R1 33-6-3: More than one PUCCH for HARQ-ACK transmission for multicast or for unicast and multicast within a slot

multiPUCCH-HARQ-ACK-ForMulticastUnicast-r17 ENUMERATED {supported} OPTIONAL,

-- R1 33-9: Supporting unicast PDCCH to release SPS group-common PDSCH

releaseSPS-MulticastWithCS-RNTI-r17 ENUMERATED {supported} OPTIONAL

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rach-LessHandoverNTN-r18 ENUMERATED {supported} OPTIONAL

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}

BandNR-v16c0 ::= SEQUENCE {

pusch-RepetitionTypeA-v16c0 ENUMERATED {supported} OPTIONAL,

...

}

-- TAG-RF-PARAMETERS-STOP

-- ASN1STOP

|  |
| --- |
| ***RF-Parameters* field descriptions** |
| ***appliedFreqBandListFilter***  In this field the UE mirrors the *FreqBandList* that the NW provided in the capability enquiry, if any. The UE filtered the band combinations in the *supportedBandCombinationList* in accordance with this *appliedFreqBandListFilter*. The UE does not include this field if the UE capability is requested by E-UTRAN and the network request includes the field *eutra-nr-only* [10]. |
| ***supportedBandCombinationList***  A list of band combinations that the UE supports for NR (and NR-DC, if requested). The *FeatureSetCombinationId*:s in this list refer to the *FeatureSetCombination* entries in the *featureSetCombinations* list in the *UE-NR-Capability* IE. The UE does not include this field if the UE capability is requested by E-UTRAN and the network request includes the field *eutra-nr-only* [10]. |
| ***supportedBandCombinationListSidelinkEUTRA-NR***  A list of band combinations that the UE supports for NR sidelink communication only, for joint NR sidelink communication and V2X sidelink communication, or for V2X sidelink communication only. The UE does not include this field if the UE capability is requested by E-UTRAN (see TS 36.331[10]) and the network request includes the field *eutra-nr-only*. |
| ***supportedBandCombinationListSL-NonRelayDiscovery***  A list of band combinations that the UE supports for NR sidelink non-relay discovery. The encoding is defined in PC5 *BandCombinationListSidelinkNR-r16.* |
| ***supportedBandCombinationListSL-RelayDiscovery***  A list of band combinations that the UE supports for NR sidelink relay discovery. The encoding is defined in PC5 *BandCombinationListSidelinkNR-r16.* |
| ***supportedBandCombinationList-UplinkTxSwitch***  A list of band combinations that the UE supports dynamic uplink Tx switching for NR UL CA and SUL. The *FeatureSetCombinationId*:s in this list refer to the *FeatureSetCombination* entries in the *featureSetCombinations* list in the *UE-NR-Capability* IE. The UE does not include this field if the UE capability is requested by E-UTRAN and the network request includes the field *eutra-nr-only* [10]. |
| ***supportedBandListNR***  A list of NR bands supported by the UE. If *supportedBandListNR-v16c0* is included, the UE shall include the same number of entries, and listed in the same order, as in *supportedBandListNR* (without suffix). |

***End of the modified section***