**3GPP TSG-RAN WG2 Meeting #112-e *R2-20xxxxx***

**Online, November 2nd - 13th, 2020**

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| *CR-Form-v12.1* | | | | | | | | |
| **CHANGE REQUEST** | | | | | | | | |
|  | | | | | | | | |
|  | **38.331** | **CR** | **DraftCR** | **rev** | **-** | **Current version:** | **16.2.0** |  |
|  | | | | | | | | |
| *For* [***HE******LP***](http://www.3gpp.org/3G_Specs/CRs.htm#_blank)*on using this form: comprehensive instructions can be found at* [*http://www.3gpp.org/Change-Requests*](http://www.3gpp.org/Change-Requests)*.* | | | | | | | | |
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| ***Proposed change affects:*** | UICC apps |  | ME | **x** | Radio Access Network | **x** | Core Network |  |

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| ***Title:*** | Out-of-order CBG-based re-transmission | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Source to WG:*** | Ericsson | | | | | | | | | |
| ***Source to TSG:*** | RAN WG2 | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Work item code:*** | NR\_L1enh\_URLLC-Core | | | | |  | ***Date:*** | | | 2020-11-12 |
|  |  | | | |  | |  | | |  |
| ***Category:*** | **F ?** |  | | | | | ***Release:*** | | | Rel-16 |
|  | *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-15 (Release 15) Rel-16 (Release 16) Rel-17 (Release 17) Rel-18 (Release 18)* | |
|  |  | | | | | | | | | |
| ***Reason for change:*** | | RAN1 has introduced a new FG 11-12 to resolve the issue identified in RAN plenary#89e. In RAN plenary#89, it is agreed with the below conclusion.  Conclusion: Introduce a new FG "Out-of-order CBG-based re-transmission(s) with cancelled initial PUSCH transmission". Details are to be finalised by RAN1 and RAN2. | | | | | | | | |
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| ***Summary of change:*** | | 1. Add the FG 11-12 for in-order CBG-based re-tx in LS R2-2011120 | | | | | | | | |
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| ***Consequences if not approved:*** | | The support of CBG-based retransmission capability signalling is incomplete | | | | | | | | |
|  | |  | | | | | | | | |
| ***Clauses affected:*** | | 6.3.3 | | | | | | | | |
|  | |  | | | | | | | | |
|  | | **Y** | **N** |  | | | |  | | |
| ***Other specs*** | |  | **X** | Other core specifications | | | | TS/TR ... CR ... | | |
| ***affected:*** | |  | **X** | Test specifications | | | | TS/TR ... CR ... | | |
| ***(show related CRs)*** | |  | **X** | O&M Specifications | | | | TS/TR ... CR ... | | |
|  | |  | | | | | | | | |
| ***Other comments:*** | |  | | | | | | | | |
|  | |  | | | | | | | | |
| ***This CR's revision history:*** | |  | | | | | | | | |

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| ***Start of the change*** |

#### 6.3.3 UE capability information elements

#### – *Phy-Parameters*

The IE *Phy-Parameters* is used to convey the physical layer capabilities.

*Phy-Parameters* information element

-- ASN1START

-- TAG-PHY-PARAMETERS-START

Phy-Parameters ::= SEQUENCE {

phy-ParametersCommon Phy-ParametersCommon OPTIONAL,

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

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

phy-ParametersFR1 Phy-ParametersFR1 OPTIONAL,

phy-ParametersFR2 Phy-ParametersFR2 OPTIONAL

}

Phy-ParametersCommon ::= SEQUENCE {

csi-RS-CFRA-ForHO ENUMERATED {supported} OPTIONAL,

dynamicPRB-BundlingDL ENUMERATED {supported} OPTIONAL,

sp-CSI-ReportPUCCH ENUMERATED {supported} OPTIONAL,

sp-CSI-ReportPUSCH ENUMERATED {supported} OPTIONAL,

nzp-CSI-RS-IntefMgmt ENUMERATED {supported} OPTIONAL,

type2-SP-CSI-Feedback-LongPUCCH ENUMERATED {supported} OPTIONAL,

precoderGranularityCORESET ENUMERATED {supported} OPTIONAL,

dynamicHARQ-ACK-Codebook ENUMERATED {supported} OPTIONAL,

semiStaticHARQ-ACK-Codebook ENUMERATED {supported} OPTIONAL,

spatialBundlingHARQ-ACK ENUMERATED {supported} OPTIONAL,

dynamicBetaOffsetInd-HARQ-ACK-CSI ENUMERATED {supported} OPTIONAL,

pucch-Repetition-F1-3-4 ENUMERATED {supported} OPTIONAL,

ra-Type0-PUSCH ENUMERATED {supported} OPTIONAL,

dynamicSwitchRA-Type0-1-PDSCH ENUMERATED {supported} OPTIONAL,

dynamicSwitchRA-Type0-1-PUSCH ENUMERATED {supported} OPTIONAL,

pdsch-MappingTypeA ENUMERATED {supported} OPTIONAL,

pdsch-MappingTypeB ENUMERATED {supported} OPTIONAL,

interleavingVRB-ToPRB-PDSCH ENUMERATED {supported} OPTIONAL,

interSlotFreqHopping-PUSCH ENUMERATED {supported} OPTIONAL,

type1-PUSCH-RepetitionMultiSlots ENUMERATED {supported} OPTIONAL,

type2-PUSCH-RepetitionMultiSlots ENUMERATED {supported} OPTIONAL,

pusch-RepetitionMultiSlots ENUMERATED {supported} OPTIONAL,

pdsch-RepetitionMultiSlots ENUMERATED {supported} OPTIONAL,

downlinkSPS ENUMERATED {supported} OPTIONAL,

configuredUL-GrantType1 ENUMERATED {supported} OPTIONAL,

configuredUL-GrantType2 ENUMERATED {supported} OPTIONAL,

pre-EmptIndication-DL ENUMERATED {supported} OPTIONAL,

cbg-TransIndication-DL ENUMERATED {supported} OPTIONAL,

cbg-TransIndication-UL ENUMERATED {supported} OPTIONAL,

cbg-FlushIndication-DL ENUMERATED {supported} OPTIONAL,

dynamicHARQ-ACK-CodeB-CBG-Retx-DL ENUMERATED {supported} OPTIONAL,

rateMatchingResrcSetSemi-Static ENUMERATED {supported} OPTIONAL,

rateMatchingResrcSetDynamic ENUMERATED {supported} OPTIONAL,

bwp-SwitchingDelay ENUMERATED {type1, type2} OPTIONAL,

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dummy ENUMERATED {supported} OPTIONAL

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[[

maxNumberSearchSpaces ENUMERATED {n10} OPTIONAL,

rateMatchingCtrlResrcSetDynamic ENUMERATED {supported} OPTIONAL,

maxLayersMIMO-Indication ENUMERATED {supported} OPTIONAL

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spCellPlacement CarrierAggregationVariant OPTIONAL

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-- R1 9-1: Basic channel structure and procedure of 2-step RACH

twoStepRACH-r16 ENUMERATED {supported} OPTIONAL,

-- R1 11-1: Monitoring DCI format 1\_2 and DCI format 0\_2

dci-Format1-2And0-2-r16 ENUMERATED {supported} OPTIONAL,

-- R1 11-1a: Monitoring both DCI format 0\_1/1\_1 and DCI format 0\_2/1\_2 in the same search space

monitoringDCI-SameSearchSpace-r16 ENUMERATED {supported} OPTIONAL,

-- R1 11-10: Type 2 configured grant release by DCI format 0\_1

type2-CG-ReleaseDCI-0-1-r16 ENUMERATED {supported} OPTIONAL,

-- R1 11-11: Type 2 configured grant release by DCI format 0\_2

type2-CG-ReleaseDCI-0-2-r16 ENUMERATED {supported} OPTIONAL,

-- R1 12-3: SPS release by DCI format 1\_1

sps-ReleaseDCI-1-1-r16 ENUMERATED {supported} OPTIONAL,

-- R1 12-3a: SPS release by DCI format 1\_2

sps-ReleaseDCI-1-2-r16 ENUMERATED {supported} OPTIONAL,

-- R1 14-8: CSI trigger states containing non-active BWP

csi-TriggerStateNon-ActiveBWP-r16 ENUMERATED {supported} OPTIONAL,

-- R1 20-2: Support up to 4 SMTCs configured for an IAB node MT per frequency location, including IAB-specific SMTC window periodicities

seperateSMTC-InterIAB-Support-r16 ENUMERATED {supported} OPTIONAL,

-- R1 20-3: Support RACH configuration separately from the RACH configuration for UE access, including new IAB-specific offset and scaling factors

seperateRACH-IAB-Support-r16 ENUMERATED {supported} OPTIONAL,

-- R1 20-5a: Support semi-static configuration/indication of UL-Flexible-DL slot formats for IAB-MT resources

ul-flexibleDL-SlotFormatSemiStatic-IAB-r16 ENUMERATED {supported} OPTIONAL,

-- R1 20-5b: Support dynamic indication of UL-Flexible-DL slot formats for IAB-MT resources

ul-flexibleDL-SlotFormatDynamics-IAB-r16 ENUMERATED {supported} OPTIONAL,

dft-S-OFDM-WaveformUL-IAB-r16 ENUMERATED {supported} OPTIONAL,

-- R1 20-6: Support DCI Format 2\_5 based indication of soft resource availability to an IAB node

dci-25-AI-RNTI-Support-IAB-r16 ENUMERATED {supported} OPTIONAL,

-- R1 20-7: Support T\_delta reception.

t-DeltaReceptionSupport-IAB-r16 ENUMERATED {supported} OPTIONAL,

-- R1 20-8: Support of Desired guard symbol reporting and provided guard symbok reception.

guardSymbolReportReception-IAB-r16 ENUMERATED {supported} OPTIONAL,

-- R1 18-8 HARQ-ACK codebook type and spatial bundling per PUCCH group

harqACK-CB-SpatialBundlingPUCCH-Group-r16 ENUMERATED {supported} OPTIONAL,

-- R1 19-2: Cross Slot Scheduling

crossSlotScheduling-r16 SEQUENCE {

non-SharedSpectrumChAccess-r16 ENUMERATED {supported} OPTIONAL,

sharedSpectrumChAccess-r16 ENUMERATED {supported} OPTIONAL

} OPTIONAL,

maxNumberSRS-PosPathLossEstimateAllServingCells-r16 ENUMERATED {n1, n4, n8, n16} OPTIONAL,

extendedCG-Periodicities-r16 ENUMERATED {supported} OPTIONAL,

extendedSPS-Periodicities-r16 ENUMERATED {supported} OPTIONAL,

codebookVariantsList-r16 CodebookVariantsList-r16 OPTIONAL,

-- R1 11-6: PUSCH repetition Type A

pusch-RepetitionTypeA-r16 SEQUENCE {

sharedSpectrumChAccess-r16 ENUMERATED {supported} OPTIONAL,

non-SharedSpectrumChAccess-r16 ENUMERATED {supported} OPTIONAL

} OPTIONAL,

-- R1 11-4b: DL priority indication in DCI with mixed DCI formats

dci-DL-PriorityIndicator-r16 ENUMERATED {supported} OPTIONAL,

-- R1 12-1a: UL priority indication in DCI with mixed DCI formats

dci-UL-PriorityIndicator-r16 ENUMERATED {supported} OPTIONAL,

-- R1 16-1e: Maximum number of configured pathloss reference RSs for PUSCH/PUCCH/SRS by RRC for MAC-CE based pathloss reference RS update

maxNumberPathlossRS-Update-r16 ENUMERATED {n4, n8, n16, n32, n64} OPTIONAL,

-- R1 18-9: Usage of the PDSCH starting time for HARQ-ACK type 2 codebook

type2-HARQ-ACK-Codebook-r16 ENUMERATED {supported} OPTIONAL,

-- R1 16-1g-1: Resources for beam management, pathloss measurement, BFD, RLM and new beam identification across frequency ranges

maxTotalResourcesForAcrossFreqRanges-r16 SEQUENCE {

maxNumberResWithinSlotAcrossCC-AcrossFR-r16 ENUMERATED {n2, n4, n8, n12, n16, n32, n64, n128} OPTIONAL,

maxNumberResAcrossCC-AcrossFR-r16 ENUMERATED {n2, n4, n8, n12, n16, n32, n40, n48, n64, n72, n80, n96, n128, n256}

OPTIONAL

} OPTIONAL,

-- R1 16-2a-4: HARQ-ACK for multi-DCI based multi-TRP – separate

harqACK-separateMultiDCI-MultiTRP-r16 SEQUENCE {

maxNumberLongPUCCHs-r16 ENUMERATED {longAndLong, longAndShort, shortAndShort} OPTIONAL

} OPTIONAL,

-- R1 16-2a-4: HARQ-ACK for multi-DCI based multi-TRP – joint

harqACK-jointMultiDCI-MultiTRP-r16 ENUMERATED {supported} OPTIONAL,

-- R4 9-1: BWP switching on multiple CCs RRM requirements

bwp-SwitchingMultiCCs-r16 CHOICE {

type1-r16 ENUMERATED {us100, us200},

type2-r16 ENUMERATED {us200, us400, us800, us1000}

} OPTIONAL

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-- R1 11-12: in-order CBG-based re-transmission

cbg-TransInOrderPUSCH-UL-r16 ENUMERATED {supported} OPTIONAL

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}

Phy-ParametersXDD-Diff ::= SEQUENCE {

dynamicSFI ENUMERATED {supported} OPTIONAL,

twoPUCCH-F0-2-ConsecSymbols ENUMERATED {supported} OPTIONAL,

twoDifferentTPC-Loop-PUSCH ENUMERATED {supported} OPTIONAL,

twoDifferentTPC-Loop-PUCCH ENUMERATED {supported} OPTIONAL,

...,

[[

dl-SchedulingOffset-PDSCH-TypeA ENUMERATED {supported} OPTIONAL,

dl-SchedulingOffset-PDSCH-TypeB ENUMERATED {supported} OPTIONAL,

ul-SchedulingOffset ENUMERATED {supported} OPTIONAL

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}

Phy-ParametersFRX-Diff ::= SEQUENCE {

dynamicSFI ENUMERATED {supported} OPTIONAL,

dummy1 BIT STRING (SIZE (2)) OPTIONAL,

twoFL-DMRS BIT STRING (SIZE (2)) OPTIONAL,

dummy2 BIT STRING (SIZE (2)) OPTIONAL,

dummy3 BIT STRING (SIZE (2)) OPTIONAL,

supportedDMRS-TypeDL ENUMERATED {type1, type1And2} OPTIONAL,

supportedDMRS-TypeUL ENUMERATED {type1, type1And2} OPTIONAL,

semiOpenLoopCSI ENUMERATED {supported} OPTIONAL,

csi-ReportWithoutPMI ENUMERATED {supported} OPTIONAL,

csi-ReportWithoutCQI ENUMERATED {supported} OPTIONAL,

onePortsPTRS BIT STRING (SIZE (2)) OPTIONAL,

twoPUCCH-F0-2-ConsecSymbols ENUMERATED {supported} OPTIONAL,

pucch-F2-WithFH ENUMERATED {supported} OPTIONAL,

pucch-F3-WithFH ENUMERATED {supported} OPTIONAL,

pucch-F4-WithFH ENUMERATED {supported} OPTIONAL,

pucch-F0-2WithoutFH ENUMERATED {notSupported} OPTIONAL,

pucch-F1-3-4WithoutFH ENUMERATED {notSupported} OPTIONAL,

mux-SR-HARQ-ACK-CSI-PUCCH-MultiPerSlot ENUMERATED {supported} OPTIONAL,

uci-CodeBlockSegmentation ENUMERATED {supported} OPTIONAL,

onePUCCH-LongAndShortFormat ENUMERATED {supported} OPTIONAL,

twoPUCCH-AnyOthersInSlot ENUMERATED {supported} OPTIONAL,

intraSlotFreqHopping-PUSCH ENUMERATED {supported} OPTIONAL,

pusch-LBRM ENUMERATED {supported} OPTIONAL,

pdcch-BlindDetectionCA INTEGER (4..16) OPTIONAL,

tpc-PUSCH-RNTI ENUMERATED {supported} OPTIONAL,

tpc-PUCCH-RNTI ENUMERATED {supported} OPTIONAL,

tpc-SRS-RNTI ENUMERATED {supported} OPTIONAL,

absoluteTPC-Command ENUMERATED {supported} OPTIONAL,

twoDifferentTPC-Loop-PUSCH ENUMERATED {supported} OPTIONAL,

twoDifferentTPC-Loop-PUCCH ENUMERATED {supported} OPTIONAL,

pusch-HalfPi-BPSK ENUMERATED {supported} OPTIONAL,

pucch-F3-4-HalfPi-BPSK ENUMERATED {supported} OPTIONAL,

almostContiguousCP-OFDM-UL ENUMERATED {supported} OPTIONAL,

sp-CSI-RS ENUMERATED {supported} OPTIONAL,

sp-CSI-IM ENUMERATED {supported} OPTIONAL,

tdd-MultiDL-UL-SwitchPerSlot ENUMERATED {supported} OPTIONAL,

multipleCORESET ENUMERATED {supported} OPTIONAL,

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

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

csi-ReportFramework CSI-ReportFramework OPTIONAL,

mux-SR-HARQ-ACK-CSI-PUCCH-OncePerSlot SEQUENCE {

sameSymbol ENUMERATED {supported} OPTIONAL,

diffSymbol ENUMERATED {supported} OPTIONAL

} OPTIONAL,

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

mux-MultipleGroupCtrlCH-Overlap ENUMERATED {supported} OPTIONAL,

dl-SchedulingOffset-PDSCH-TypeA ENUMERATED {supported} OPTIONAL,

dl-SchedulingOffset-PDSCH-TypeB ENUMERATED {supported} OPTIONAL,

ul-SchedulingOffset ENUMERATED {supported} OPTIONAL,

dl-64QAM-MCS-TableAlt ENUMERATED {supported} OPTIONAL,

ul-64QAM-MCS-TableAlt ENUMERATED {supported} OPTIONAL,

cqi-TableAlt ENUMERATED {supported} OPTIONAL,

oneFL-DMRS-TwoAdditionalDMRS-UL ENUMERATED {supported} OPTIONAL,

twoFL-DMRS-TwoAdditionalDMRS-UL ENUMERATED {supported} OPTIONAL,

oneFL-DMRS-ThreeAdditionalDMRS-UL ENUMERATED {supported} OPTIONAL

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pdcch-BlindDetectionNRDC SEQUENCE {

pdcch-BlindDetectionMCG-UE INTEGER (1..15),

pdcch-BlindDetectionSCG-UE INTEGER (1..15)

} OPTIONAL,

mux-HARQ-ACK-PUSCH-DiffSymbol ENUMERATED {supported} OPTIONAL

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-- R1 11-1b: Type 1 HARQ-ACK codebook support for relative TDRA for DL

type1-HARQ-ACK-Codebook-r16 ENUMERATED {supported} OPTIONAL,

-- R1 11-8: Enhanced UL power control scheme

enhancedPowerControl-r16 ENUMERATED {supported} OPTIONAL,

-- R1 16-1b-1: TCI state activation across multiple CCs

simultaneousTCI-ActMultipleCC-r16 ENUMERATED {supported} OPTIONAL,

-- R1 16-1b-2: Spatial relation update across multiple CCs

simultaneousSpatialRelationMultipleCC-r16 ENUMERATED {supported} OPTIONAL,

cli-RSSI-FDM-DL-r16 ENUMERATED {supported} OPTIONAL,

cli-SRS-RSRP-FDM-DL-r16 ENUMERATED {supported} OPTIONAL,

-- R1 19-3: Maximum MIMO Layer Adaptation

maxLayersMIMO-Adaptation-r16 ENUMERATED {supported} OPTIONAL,

-- R1 12-5: Configuration of aggregation factor per SPS configuration

aggregationFactorSPS-DL-r16 ENUMERATED {supported} OPTIONAL,

-- R1 16-1g: Resources for beam management, pathloss measurement, BFD, RLM and new beam identification

maxTotalResourcesForOneFreqRange-r16 SEQUENCE {

maxNumberResWithinSlotAcrossCC-OneFR-r16 ENUMERATED {n2, n4, n8, n12, n16, n32, n64, n128} OPTIONAL,

maxNumberResAcrossCC-OneFR-r16 ENUMERATED {n2, n4, n8, n12, n16, n32, n40, n48, n64, n72, n80, n96, n128, n256}

OPTIONAL

} OPTIONAL,

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

csi-ReportFrameworkExt-r16 CSI-ReportFrameworkExt-r16 OPTIONAL

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}

Phy-ParametersFR1 ::= SEQUENCE {

pdcch-MonitoringSingleOccasion ENUMERATED {supported} OPTIONAL,

scs-60kHz ENUMERATED {supported} OPTIONAL,

pdsch-256QAM-FR1 ENUMERATED {supported} OPTIONAL,

pdsch-RE-MappingFR1-PerSymbol ENUMERATED {n10, n20} OPTIONAL,

...,

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pdsch-RE-MappingFR1-PerSlot ENUMERATED {n16, n32, n48, n64, n80, n96, n112, n128,

n144, n160, n176, n192, n208, n224, n240, n256} OPTIONAL

]]

}

Phy-ParametersFR2 ::= SEQUENCE {

dummy ENUMERATED {supported} OPTIONAL,

pdsch-RE-MappingFR2-PerSymbol ENUMERATED {n6, n20} OPTIONAL,

...,

[[

pCell-FR2 ENUMERATED {supported} OPTIONAL,

pdsch-RE-MappingFR2-PerSlot ENUMERATED {n16, n32, n48, n64, n80, n96, n112, n128,

n144, n160, n176, n192, n208, n224, n240, n256} OPTIONAL

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-- R1 16-1c: Support of default spatial relation and pathloss reference RS for dedicated-PUCCH/SRS and PUSCH

defaultSpatialRelationPathlossRS-r16 ENUMERATED {supported} OPTIONAL,

-- R1 16-1d: Support of spatial relation update for AP-SRS via MAC CE

spatialRelationUpdateAP-SRS-r16 ENUMERATED {supported} OPTIONAL,

maxNumberSRS-PosSpatialRelationsAllServingCells-r16 ENUMERATED {n0, n1, n2, n4, n8, n16} OPTIONAL

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}

-- TAG-PHY-PARAMETERS-STOP

-- ASN1STOP

|  |
| --- |
| *Phy-ParametersFRX-Diff field description* |
| ***csi-RS-IM-ReceptionForFeedback/ csi-RS-ProcFrameworkForSRS/ csi-ReportFramework***  These fields are optionally present in *fr1-fr2-Add-UE-NR-Capabilities* in *UE-NR-Capability*. They shall not be set in any other instance of the IE *Phy-ParametersFRX-Diff*. If the network configures the UE with serving cells on both FR1 and FR2 bands, these parameters, if present, limit the corresponding parameters in *MIMO-ParametersPerBand*. |