**3GPP TSG-RAN WG Meeting #96 *RP-22xxxx***

**Budapest, Hungary, 06 – 09 June 2022 *RP-221477***

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| *CR-Form-v12.2* |
| **CHANGE REQUEST** |
|  |
|  | **38.331** | **CR** | **3203** | **rev** | **1** | **Current version:** | **16.8.0** |  |
|  |
| *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:***  | HARQ-ACK multiplexing on PUSCH in the absence of PUCCH |
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| ***Source to WG:*** | - |
| ***Source to TSG:*** | Nokia, Nokia Shanghai Bell, Ericsson |
|  |  |
| ***Work item code:*** | TEI16, NR\_newRAT-Core |  | ***Date:*** | 2022-06-06 |
|  |  |  |  |  |
| ***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 canbe found in 3GPP [TR 21.900](http://www.3gpp.org/ftp/Specs/html-info/21900.htm). | *Use one of the following releases:Rel-8 (Release 8)Rel-9 (Release 9)Rel-10 (Release 10)Rel-11 (Release 11)…Rel-15 (Release 15)Rel-16 (Release 16)Rel-17 (Release 17)Rel-18 (Release 18)Rel-19 (Release 19)* |
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| ***Reason for change:*** | Release 15 TS 38.213 was missing a behaviour for multiplexing HARQ-ACK bits in a PUSCH in a PUCCH slot when the UE has no HARQ-ACK to transmit in any PUCCH but it receives UL grant(s) with UL-TDAI field to transmit multiple PUSCHs in the PUCCH slot.RAN1#109 agreed to introduce the missing behaviour to TS38.213 as part of the CRs 0316/0317 to TS38.213 in R1-2205628/5629 starting from Rel-16, and in addition introduce a new UE capability indicating that the UE behaviour is according to the CR.LS on the UE capability in R1-2205634. |
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| ***Summary of change:*** | Introduce new per-UE capability mux-HARQ-ACK-withoutPUCCH-onPUSCH-r16 for the RAN1-specified UCI on PUSCH multiplexing case**Impact analysis**Impacted functionality: HARQ-ACK multiplexing on a PUSCH triggered by a DAI-field on the PUSCH-scheduling DCI twhen the UE ransmits multiple PUSCHs in the PUCCH slot.Inter-operability: Since this is a new UE capability, no inter-operability issues are foreseen  |
|  |  |
| ***Consequences if not approved:*** | It is not possible for the network to know if the UE has implemented the behaviour introduced by the 38.213 CR |
|  |  |
| ***Clauses affected:*** |  |
|  |  |
|  | **Y** | **N** |  |  |
| ***Other specs*** | **x** |  |  Other core specifications  | TS38.213 CR0316, TS38.306 CR0755 |
| ***affected:*** |  | **x** |  Test specifications | TS/TR ... CR ...  |
| ***(show related CRs)*** |  | **x** |  O&M Specifications | TS/TR ... CR ...  |
|  |  |
| ***Other comments:*** |  |
|  |  |
| ***This CR's revision history:*** | Rev1: Updated based on comments provided over RAN2 reflector after RAN submission deadline |

*First Modified Subclause*

#### – *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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 targetSMTC-SCG-r16 ENUMERATED {supported} OPTIONAL,

 supportRepetitionZeroOffsetRV-r16 ENUMERATED {supported} OPTIONAL,

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

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

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 -- R4 6-3: Dormant BWP switching on multiple CCs RRM requirements

 bwp-SwitchingMultiDormancyCCs-r16 CHOICE {

 type1-r16 ENUMERATED {us100, us200},

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

 } OPTIONAL,

 -- R1 16-2a-8: Indicates that retransmission scheduled by a different CORESETPoolIndex for multi-DCI multi-TRP is not supported.

 supportRetx-Diff-CoresetPool-Multi-DCI-TRP-r16 ENUMERATED {notSupported} OPTIONAL,

 -- R1 22-10: Support of pdcch-MonitoringAnyOccasionsWithSpanGap in case of cross-carrier scheduling with different SCSs

 pdcch-MonitoringAnyOccasionsWithSpanGapCrossCarrierSch-r16 ENUMERATED {mode2, mode3} OPTIONAL

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 -- R1 16-1j-1: Support of 2 port CSI-RS for new beam identification

 newBeamIdentifications2PortCSI-RS-r16 ENUMERATED {supported} OPTIONAL,

 -- R1 16-1j-2: Support of 2 port CSI-RS for pathloss estimation

 pathlossEstimation2PortCSI-RS-r16 ENUMERATED {supported} OPTIONAL

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 mux-HARQ-ACK-withoutPUCCH-onPUSCH-r16 ENUMERATED {supported} OPTIONAL

 ]]

}

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,

 ...,

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

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

 ul-SchedulingOffset ENUMERATED {supported} OPTIONAL

 ]]

}

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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 twoTCI-Act-servingCellInCC-List-r16 ENUMERATED {supported} OPTIONAL

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 -- R1 22-11: Support of ‘cri-RI-CQI’ report without non-PMI-PortIndication

 cri-RI-CQI-WithoutNon-PMI-PortInd-r16 ENUMERATED {supported} 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,

 ...,

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 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

 ]]

}

-- TAG-PHY-PARAMETERS-STOP

-- ASN1STOP

|  |
| --- |
| *Phy-ParametersFRX-Diff* field descriptions |
| ***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*. |

*End of Changes*