**3GPP TSG-RAN WG2 Meeting #131 R2-250xxxx**

**Bengaluru, India, Aug 25th – 29th, 2025**

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| *CR-Form-v12.3* | | | | | | | | |
| **CHANGE REQUEST** | | | | | | | | |
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|  | **38.331** | **CR** | **-** | **rev** | **-** | **Current version:** | **18.6.0** |  |
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| *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:*** | Introduction of extension ratio configuration for MPR reduction | | | | | | | | | |
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| ***Source to WG:*** | Huawei, HiSilicon | | | | | | | | | |
| ***Source to TSG:*** | R2 | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Work item code:*** | NR\_ENDC\_RF\_Ph4-Core | | | | |  | ***Date:*** | | | 2025-09-05 |
|  |  | | | |  | |  | | |  |
| ***Category:*** | **B** |  | | | | | ***Release:*** | | | Rel-19 |
|  | *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-17 (Release 17) Rel-18 (Release 18) Rel-19 (Release 19)  Rel-20 (Release 20)* | |
|  |  | | | | | | | | | |
| ***Reason for change:*** | | RAN4 LS (R2-2506472/R4-2511759) asked RAN2 to design the signalling for MPR reduction configuration.   |  | | --- | | For Rel-19 MPR reduction for single carrier, RAN4 agrees that the location of extension and the extension ratio should be informed to UE from network per UE capability. Specifically, if 46-4 is indicated by UE, it means that the UE supports 1/2 extension ratio including 3 permutations in total, which are (1/2, 0), (0, 1/2) and (1/2, 1/2). If 46-5 is indicated, the UE supports both 1/4 and 1/2 extension ratios then 6 permutations can be configured, which are (1/4, 0), (0, 1/4), (1/4, 1/4), (1/2, 0), (0, 1/2), (1/2, 1/2). In case no extension is configured, it does not need to be signaled. It is up to RAN2 to design the signaling. |   If the UE supports 46-4, the network can configure one of {(1/2, 0), (0, 1/2) and (1/2, 1/2)} to the UE to indicate the extension ratio for both lower side and higher side. If the UE supports 46-5, the network can configure one of {(1/4, 0), (0, 1/4), (1/4, 1/4), (1/2, 0), (0, 1/2), (1/2, 1/2)} to the UE to indicate the extension ratio for both lower side and higher side. If such configuration is absent, it means no extension is configured. Note that the Rel-19 MPR reduction is only for non-CA case in a cell group. | | | | | | | | |
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| ***Summary of change:*** | | Add signalling for lower-sided and higher-sided extension ratio configuration. | | | | | | | | |
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| ***Consequences if not approved:*** | | The signalling for extension ratio configuration is missing, the feature of MPR reduction defined in RAN4 cannot be supported. | | | | | | | | |
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| ***Clauses affected:*** | | 6.3.2 | | | | | | | | |
|  | |  | | | | | | | | |
|  | | **Y** | **N** |  | | | |  | | |
| ***Other specs*** | | **x** |  | Other core specifications | | | | TS 38.101-1 CR#2988 | | |
| ***affected:*** | |  | **x** | Test specifications | | | | TS/TR ... CR ... | | |
| ***(show related CRs)*** | |  | **x** | O&M Specifications | | | | TS/TR ... CR ... | | |
|  | |  | | | | | | | | |
| ***Other comments:*** | |  | | | | | | | | |
|  | |  | | | | | | | | |
| ***This CR's revision history:*** | |  | | | | | | | | |

Start of Change

### 6.3.2 Radio resource control information elements

*[Text omitted]*

#### – *CellGroupConfig*

The *CellGroupConfig* IE is used to configure a master cell group (MCG) or secondary cell group (SCG). A cell group comprises of one MAC entity, a set of logical channels with associated RLC entities and of a primary cell (SpCell) and one or more secondary cells (SCells). For an NCR-MT, the *CellGroupConfig* IE is also used to provide the configuration of side control information for the NCR-Fwd access link.

*CellGroupConfig* information element

-- ASN1START

-- TAG-CELLGROUPCONFIG-START

-- Configuration of one Cell-Group:

CellGroupConfig ::= SEQUENCE {

cellGroupId CellGroupId,

rlc-BearerToAddModList SEQUENCE (SIZE(1..maxLC-ID)) OF RLC-BearerConfig OPTIONAL, -- Need N

rlc-BearerToReleaseList SEQUENCE (SIZE(1..maxLC-ID)) OF LogicalChannelIdentity OPTIONAL, -- Need N

mac-CellGroupConfig MAC-CellGroupConfig OPTIONAL, -- Need M

physicalCellGroupConfig PhysicalCellGroupConfig OPTIONAL, -- Need M

spCellConfig SpCellConfig OPTIONAL, -- Need M

sCellToAddModList SEQUENCE (SIZE (1..maxNrofSCells)) OF SCellConfig OPTIONAL, -- Need N

sCellToReleaseList SEQUENCE (SIZE (1..maxNrofSCells)) OF SCellIndex OPTIONAL, -- Need N

...,

[[

reportUplinkTxDirectCurrent ENUMERATED {true} OPTIONAL -- Cond BWP-Reconfig

]],

[[

bap-Address-r16 BIT STRING (SIZE (10)) OPTIONAL, -- Need M

bh-RLC-ChannelToAddModList-r16 SEQUENCE (SIZE(1..maxBH-RLC-ChannelID-r16)) OF BH-RLC-ChannelConfig-r16 OPTIONAL, -- Need N

bh-RLC-ChannelToReleaseList-r16 SEQUENCE (SIZE(1..maxBH-RLC-ChannelID-r16)) OF BH-RLC-ChannelID-r16 OPTIONAL, -- Need N

f1c-TransferPath-r16 ENUMERATED {lte, nr, both} OPTIONAL, -- Need M

simultaneousTCI-UpdateList1-r16 SEQUENCE (SIZE (1..maxNrofServingCellsTCI-r16)) OF ServCellIndex OPTIONAL, -- Need R

simultaneousTCI-UpdateList2-r16 SEQUENCE (SIZE (1..maxNrofServingCellsTCI-r16)) OF ServCellIndex OPTIONAL, -- Need R

simultaneousSpatial-UpdatedList1-r16 SEQUENCE (SIZE (1..maxNrofServingCellsTCI-r16)) OF ServCellIndex OPTIONAL, -- Need R

simultaneousSpatial-UpdatedList2-r16 SEQUENCE (SIZE (1..maxNrofServingCellsTCI-r16)) OF ServCellIndex OPTIONAL, -- Need R

uplinkTxSwitchingOption-r16 ENUMERATED {switchedUL, dualUL} OPTIONAL, -- Need R

uplinkTxSwitchingPowerBoosting-r16 ENUMERATED {enabled} OPTIONAL -- Need R

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[[

reportUplinkTxDirectCurrentTwoCarrier-r16 ENUMERATED {true} OPTIONAL -- Need N

]],

[[

f1c-TransferPathNRDC-r17 ENUMERATED {mcg, scg, both} OPTIONAL, -- Need M

uplinkTxSwitching-2T-Mode-r17 ENUMERATED {enabled} OPTIONAL, -- Cond 2Tx

uplinkTxSwitching-DualUL-TxState-r17 ENUMERATED {oneT, twoT} OPTIONAL, -- Cond 2Tx

uu-RelayRLC-ChannelToAddModList-r17 SEQUENCE (SIZE(1..maxUu-RelayRLC-ChannelID-r17)) OF Uu-RelayRLC-ChannelConfig-r17

OPTIONAL, -- Need N

uu-RelayRLC-ChannelToReleaseList-r17 SEQUENCE (SIZE(1..maxUu-RelayRLC-ChannelID-r17)) OF Uu-RelayRLC-ChannelID-r17

OPTIONAL, -- Need N

simultaneousU-TCI-UpdateList1-r17 SEQUENCE (SIZE (1..maxNrofServingCellsTCI-r16)) OF ServCellIndex OPTIONAL, -- Need R

simultaneousU-TCI-UpdateList2-r17 SEQUENCE (SIZE (1..maxNrofServingCellsTCI-r16)) OF ServCellIndex OPTIONAL, -- Need R

simultaneousU-TCI-UpdateList3-r17 SEQUENCE (SIZE (1..maxNrofServingCellsTCI-r16)) OF ServCellIndex OPTIONAL, -- Need R

simultaneousU-TCI-UpdateList4-r17 SEQUENCE (SIZE (1..maxNrofServingCellsTCI-r16)) OF ServCellIndex OPTIONAL, -- Need R

rlc-BearerToReleaseListExt-r17 SEQUENCE (SIZE(1..maxLC-ID)) OF LogicalChannelIdentityExt-r17 OPTIONAL, -- Need N

iab-ResourceConfigToAddModList-r17 SEQUENCE (SIZE(1..maxNrofIABResourceConfig-r17)) OF IAB-ResourceConfig-r17 OPTIONAL, -- Need N

iab-ResourceConfigToReleaseList-r17 SEQUENCE (SIZE(1..maxNrofIABResourceConfig-r17)) OF IAB-ResourceConfigID-r17 OPTIONAL -- Need N

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[[

reportUplinkTxDirectCurrentMoreCarrier-r17 ReportUplinkTxDirectCurrentMoreCarrier-r17 OPTIONAL -- Need N

]],

[[

prioSCellPRACH-OverSP-PeriodicSRS-r17 ENUMERATED {enabled} OPTIONAL -- Need R

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[[

ncr-FwdConfig-r18 SetupRelease { NCR-FwdConfig-r18 } OPTIONAL, -- Cond NCR

autonomousDenialParameters-r18 SetupRelease {AutonomousDenialParameters-r18} OPTIONAL, -- Need M

nonCollocatedTypeMRDC-r18 ENUMERATED { true } OPTIONAL, -- Need R

nonCollocatedTypeNR-CA-r18 ENUMERATED { true } OPTIONAL, -- Need R

uplinkTxSwitchingMoreBands-r18 SetupRelease { UplinkTxSwitchingMoreBands-r18 } OPTIONAL -- Need M

]]

}

-- Serving cell specific MAC and PHY parameters for a SpCell:

SpCellConfig ::= SEQUENCE {

servCellIndex ServCellIndex OPTIONAL, -- Cond SCG

reconfigurationWithSync ReconfigurationWithSync OPTIONAL, -- Cond ReconfWithSync

rlf-TimersAndConstants SetupRelease { RLF-TimersAndConstants } OPTIONAL, -- Need M

rlmInSyncOutOfSyncThreshold ENUMERATED {n1} OPTIONAL, -- Need S

spCellConfigDedicated ServingCellConfig OPTIONAL, -- Need M

...,

[[

lowMobilityEvaluationConnected-r17 SEQUENCE {

s-SearchDeltaP-Connected-r17 ENUMERATED {dB3, dB6, dB9, dB12, dB15, spare3, spare2, spare1},

t-SearchDeltaP-Connected-r17 ENUMERATED {s5, s10, s20, s30, s60, s120, s180, s240, s300, spare7, spare6, spare5,

spare4, spare3, spare2, spare1}

} OPTIONAL, -- Need R

goodServingCellEvaluationRLM-r17 GoodServingCellEvaluation-r17 OPTIONAL, -- Need R

goodServingCellEvaluationBFD-r17 GoodServingCellEvaluation-r17 OPTIONAL, -- Need R

deactivatedSCG-Config-r17 SetupRelease { DeactivatedSCG-Config-r17 } OPTIONAL -- Cond SCG-Opt

]],

[[

mprReductionExtensionRatio-r19 ENUMERATED {ratio1, ratio2, ratio3, ratio4, ratio5, ratio6, spare2, spare1} OPTIONAL -- Need R

]]

}

ReconfigurationWithSync ::= SEQUENCE {

spCellConfigCommon ServingCellConfigCommon OPTIONAL, -- Need M

newUE-Identity RNTI-Value,

t304 ENUMERATED {ms50, ms100, ms150, ms200, ms500, ms1000, ms2000, ms10000},

rach-ConfigDedicated CHOICE {

uplink RACH-ConfigDedicated,

supplementaryUplink RACH-ConfigDedicated

} OPTIONAL, -- Need N

...,

[[

smtc SSB-MTC OPTIONAL -- Need S

]],

[[

daps-UplinkPowerConfig-r16 DAPS-UplinkPowerConfig-r16 OPTIONAL -- Need N

]],

[[

sl-PathSwitchConfig-r17 SL-PathSwitchConfig-r17 OPTIONAL -- Cond DirectToIndirect-PathSwitch

]],

[[

rach-LessHO-r18 RACH-LessHO-r18 OPTIONAL, -- Need N

sl-IndirectPathMaintain-r18 ENUMERATED{true} OPTIONAL -- Cond MP

]]

}

DAPS-UplinkPowerConfig-r16 ::= SEQUENCE {

p-DAPS-Source-r16 P-Max,

p-DAPS-Target-r16 P-Max,

uplinkPowerSharingDAPS-Mode-r16 ENUMERATED {semi-static-mode1, semi-static-mode2, dynamic }

}

SCellConfig ::= SEQUENCE {

sCellIndex SCellIndex,

sCellConfigCommon ServingCellConfigCommon OPTIONAL, -- Cond SCellAdd

sCellConfigDedicated ServingCellConfig OPTIONAL, -- Cond SCellAddMod

...,

[[

smtc SSB-MTC OPTIONAL -- Need S

]],

[[

sCellState-r16 ENUMERATED {activated} OPTIONAL, -- Cond SCellAddSync

secondaryDRX-GroupConfig-r16 ENUMERATED {true} OPTIONAL -- Need S

]],

[[

preConfGapStatus-r17 BIT STRING (SIZE (maxNrofGapId-r17)) OPTIONAL, -- Cond PreConfigMG

goodServingCellEvaluationBFD-r17 GoodServingCellEvaluation-r17 OPTIONAL, -- Need R

sCellSIB20-r17 SetupRelease { SCellSIB20-r17 } OPTIONAL -- Need M

]],

[[

plmn-IdentityInfoList-r17 SetupRelease {PLMN-IdentityInfoList} OPTIONAL, -- Cond SCellSIB20-Opt

npn-IdentityInfoList-r17 SetupRelease {NPN-IdentityInfoList-r16} OPTIONAL -- Cond SCellSIB20-Opt

]]

}

SCellSIB20-r17 ::= OCTET STRING (CONTAINING SystemInformation)

DeactivatedSCG-Config-r17 ::= SEQUENCE {

bfd-and-RLM-r17 BOOLEAN,

...

}

GoodServingCellEvaluation-r17 ::= SEQUENCE {

offset-r17 ENUMERATED {db2, db4, db6, db8} OPTIONAL -- Need S

}

SL-PathSwitchConfig-r17 ::= SEQUENCE {

targetRelayUE-Identity-r17 SL-SourceIdentity-r17,

t420-r17 ENUMERATED {ms50, ms100, ms150, ms200, ms500, ms1000, ms2000, ms10000},

...

}

IAB-ResourceConfig-r17 ::= SEQUENCE {

iab-ResourceConfigID-r17 IAB-ResourceConfigID-r17,

slotList-r17 SEQUENCE (SIZE (1..5120)) OF INTEGER (0..5119) OPTIONAL, -- Need M

periodicitySlotList-r17 ENUMERATED {ms0p5, ms0p625, ms1, ms1p25, ms2, ms2p5, ms5, ms10, ms20, ms40, ms80, ms160} OPTIONAL, -- Need M

slotListSubcarrierSpacing-r17 SubcarrierSpacing OPTIONAL, -- Need M

...

}

IAB-ResourceConfigID-r17 ::= INTEGER(0..maxNrofIABResourceConfig-1-r17)

ReportUplinkTxDirectCurrentMoreCarrier-r17 ::= SEQUENCE (SIZE(1.. maxSimultaneousBands)) OF IntraBandCC-CombinationReqList-r17

IntraBandCC-CombinationReqList-r17::= SEQUENCE {

servCellIndexList-r17 SEQUENCE (SIZE(1.. maxNrofServingCells)) OF ServCellIndex,

cc-CombinationList-r17 SEQUENCE (SIZE(1.. maxNrofReqComDC-Location-r17)) OF IntraBandCC-Combination-r17

}

IntraBandCC-Combination-r17::= SEQUENCE (SIZE(1.. maxNrofServingCells)) OF CC-State-r17

CC-State-r17::= SEQUENCE {

dlCarrier-r17 CarrierState-r17 OPTIONAL, -- Need N

ulCarrier-r17 CarrierState-r17 OPTIONAL -- Need N

}

CarrierState-r17::= CHOICE {

deActivated-r17 NULL,

activeBWP-r17 INTEGER (0..maxNrofBWPs)

}

AutonomousDenialParameters-r18 ::= SEQUENCE {

autonomousDenialSlots-r18 ENUMERATED {n2, n5, n10, n15, n20, n30, spare2, spare1},

autonomousDenialValidity-r18 ENUMERATED {n200, n500, n1000, n2000}

}

RACH-LessHO-r18 ::= SEQUENCE {

targetNTA-r18 ENUMERATED {zero, source} OPTIONAL, -- Need N

beamIndication-r18 CHOICE {

tci-StateID-r18 TCI-StateId,

ssb-Index-r18 SSB-Index

} OPTIONAL, -- Need N

...

}

UplinkTxSwitchingMoreBands-r18::= SEQUENCE {

uplinkTxSwitchingBandList-r18 SEQUENCE (SIZE (1..maxSimultaneousBands)) OF FreqBandIndicatorNR OPTIONAL, -- Need M

uplinkTxSwitchingBandPairList-r18 UplinkTxSwitchingBandPairList-r18 OPTIONAL, -- Need M

uplinkTxSwitchingAssociatedBandDualUL-List-r18 UplinkTxSwitchingAssociatedBandDualUL-List-r18 OPTIONAL, -- Need M

...

}

UplinkTxSwitchingBandPairList-r18::= SEQUENCE (SIZE (1.. maxULTxSwitchingBandPairs)) OF UplinkTxSwitchingBandPairConfig-r18

UplinkTxSwitchingBandPairConfig-r18::= SEQUENCE {

bandInfoUL1-r18 UplinkTxSwitchingBandIndex-r18,

bandInfoUL2-r18 UplinkTxSwitchingBandIndex-r18,

switchingOptionConfigForBandPair-r18 ENUMERATED {switchedUL, dualUL},

switching2T-Mode-r18 ENUMERATED {enabled} OPTIONAL, -- Need S

switchingPeriodConfigForBandPair-r18 ENUMERATED {n35us, n140us} OPTIONAL, -- Need S

...

}

UplinkTxSwitchingAssociatedBandDualUL-List-r18::= SEQUENCE (SIZE (0..maxSimultaneousBands)) OF UplinkTxSwitchingAssociatedBandDualUL-r18

UplinkTxSwitchingAssociatedBandDualUL-r18::= SEQUENCE {

transmitBand-r18 UplinkTxSwitchingBandIndex-r18,

associatedBand-r18 UplinkTxSwitchingBandIndex-r18

}

UplinkTxSwitchingBandIndex-r18::= INTEGER (1..maxSimultaneousBands)

-- TAG-CELLGROUPCONFIG-STOP

-- ASN1STOP

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| *AutonomousDenialParamters* field descriptions |
| ***autonomousDenialSlots***  Indicates the maximum number of the UL slots for which the UE is allowed to deny any UL transmission. Value *n2* corresponds to 2 slots, value *n5* to 5 slots and so on. |
| ***autonomousDenialValidity***  Indicates the validity period over which the UL autonomous denial slots shall be counted. Value *n200* corresponds to 200 slots, value *n500* corresponds to 500 slots and so on. |

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| *CC-State* field descriptions |
| ***dlCarrier***  Indicates DL carrier activation state for this carrier and the related active BWP Index, if activated. |
| ***ulCarrier***  Indicates UL carrier activation state for this carrier and the related active BWP Index, if activated. |

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| *CellGroupConfig* field descriptions |
| ***bap-Address***  BAP address of the parent node in cell group. |
| ***bh-RLC-ChannelToAddModList***  Configuration of the backhaul RLC entities and the corresponding MAC Logical Channels to be added and modified. |
| ***bh-RLC-ChannelToReleaseList***  List of the backhaul RLC entities and the corresponding MAC Logical Channels to be released. |
| ***f1c-TransferPath***  The F1-C transfer path that an EN-DC IAB-MT should use for transferring F1-C packets to the IAB-donor-CU. If IAB-MT is configured with *lte*, IAB-MT can only use LTE leg for F1-C transfer. If IAB-MT is configured with *nr*, IAB-MT can only use NR leg for F1-C transfer. If IAB-MT is configured with *both*, it is up to IAB-MT to select an LTE leg or a NR leg for F1-C transfer. If the field is not configured, the IAB node uses the NR leg as the default one. |
| ***f1c-TransferPathNRDC***  The F1-C transfer path that an NR-DC IAB-MT should use for transferring F1-C packets to the IAB-donor-CU. If IAB-MT is configured with *mcg*, IAB-MT can only use the MCG for F1-C transfer. If IAB-MT is configured with *scg*, IAB-MT can only use the SCG for F1-C transfer. If IAB-MT is configured with *both*, it is up to IAB-MT to select the MCG or the SCG for F1-C transfer. |
| ***mac-CellGroupConfig***  MAC parameters applicable for the entire cell group. |
| ***ncr-FwdConfig***  Configuration of side control information for the NCR-Fwd access link. |
| ***nonCollocatedTypeMRDC***  This field is only present for a UE configured with *maxMIMO-Layers* with value less than or equal to 2 for all corresponding serving cells, in case of TDD-TDD inter-band (NG) EN-DC with overlapping or partially overlapping bands. If this field is present, the UE applies (NG)EN-DC MTTD/MRTD according to clause 7.5.3/7.6.3 in TS 38.133 [14] and inter-band RF requirements (i.e. Type 1 UE requirement). If this field is absent, the UE applies (NG)EN-DC MTTD/MRTD according to clause 7.5.2/7.6.2 in TS 38.133 [14] and inter-band RF requirements (i.e. Type 2 UE requirement) when indicating support of *interBandMRDC-WithOverlapDL-Bands-r16*. |
| ***nonCollocatedTypeNR-CA***  This field is only present for a UE configured with *maxMIMO-Layers* with value less than or equal to 2 for all corresponding serving cells, in case of TDD-TDD intra-band NR-CA. If this field is present, the UE applies MRTD according to Table 7.6.4-1 in TS 38.133 [14] and UE RF requirements for intra-band NR-CA except for 7.10A in TS 38.101-1 [15] (i.e. Type 1 UE requirement). If this field is absent, the UE applies MTTD/MRTD requirements according to Table 7.5.4-1/Table 7.6.4-2 in TS 38.133 [14] and UE RF requirements for intra-band non-collocated NR-CA including 7.10A in TS 38.101-1 [15] (i.e. Type 2 UE requirement) when indicating support of *intraBandNR-CA-non-collocated-r18*. |
| ***npn-IdentityInfoList***  This field is used to transfer *npn-IdentityInfoList* in *SIB1* of the SCell. The UE uses this field to translate the *plmn-Index* in MCCH of SCell to SNPN Identity. If this field and *plmn-IdentityInfoList* are both absent, the UE uses the *npn-IdentityInfoList* in *SIB1* of the PCell. |
| ***plmn-IdentityInfoList***  This field is used to transfer *plmn-IdentityInfoList* in *SIB1* of the SCell. The UE uses this field to translate the *plmn-Index* in MCCH of SCell to PLMN Identity. If this field and *npn-IdentityInfoList* are both absent, the UE uses the *plmn-IdentityInfoList* in *SIB1* of the PCell. |
| ***prioSCellPRACH-OverSP-PeriodicSRS***  When configured, the UE applies UL power control prioritization by prioritizing PRACH transmission on SCell over semi-persistent and/or periodic SRS transmission as defined in clause 7.5 of TS 38.213 [13]. |
| ***rlc-BearerToAddModList***  Configuration of the MAC Logical Channel, the corresponding RLC entities and association with radio bearers. |
| ***reportUplinkTxDirectCurrent***  Enables reporting of uplink and supplementary uplink Direct Current location information upon BWP configuration and reconfiguration. This field is only present when the BWP configuration is modified or any serving cell is added or removed. This field is absent in the IE *CellGroupConfig* when provided as part of *RRCSetup* message. If UE is configured with SUL carrier, UE reports both UL and SUL Direct Current locations. |
| ***reportUplinkTxDirectCurrentMoreCarrier***  Enables reporting of uplink Direct Current location information when the UE is configured with intra-band CA. This field is absent in the IE *CellGroupConfig* when provided as part of *RRCSetup* message. The UE only reports the uplink Direct Current location information that are related to the indicated *cc-CombinationList*. The network does not include carriers which locate in DL only spectrum described in TS 38.101-2 [39], clause 5.3A.4 and defined by Fsd according to Table 5.3A.4-3 in FR2 in the *IntraBandCC-CombinationReqList*. I.e. DL-only carrier in FR2 frequency spectrum is not used to calculate the default DC location. |
| ***reportUplinkTxDirectCurrentTwoCarrier***  Enables reporting of uplink Direct Current location information when the UE is configured with uplink intra-band CA with two carriers. This field is absent in the IE *CellGroupConfig* when provided as part of *RRCSetup* message. |
| ***rlc-BearerToReleaseListExt***  List of the RLC entities and the corresponding MAC Logical Channels to be released for multicast MRBs. |
| ***rlmInSyncOutOfSyncThreshold***  BLER threshold pair index for IS/OOS indication generation, see TS 38.133 [14]. *n1* corresponds to the value 1. When the field is absent, the UE applies the value 0. Whenever this is reconfigured, UE resets N310 and N311, and stops T310, if running. Network does not include this field. |
| ***sCellSIB20***  This field is used to transfer *SIB20* of the SCell in order to allow the UE for MBS broadcast reception on SCell. The network configures this field only for a single SCell at a time. |
| ***sCellToAddModList***  List of secondary serving cells (SCells) to be added or modified. |
| ***sCellToReleaseList***  List of secondary serving cells (SCells) to be released. |
| ***simultaneousSpatial-UpdatedList1, simultaneousSpatial-UpdatedList2***  List of serving cells which can be updated simultaneously for spatial relation with a MAC CE. The *simultaneousSpatial-UpdatedList1* and *simultaneousSpatial-UpdatedList2* shall not contain same serving cells. Network should not configure serving cells that are configured with a BWP with two different values for the *coresetPoolIndex* in these lists. |
| ***simultaneousTCI-UpdateList1, simultaneousTCI-UpdateList2***  List of serving cells which can be updated simultaneously for TCI relation with a MAC CE. The *simultaneousTCI-UpdateList1* and *simultaneousTCI-UpdateList2* shall not contain same serving cells. Network should not configure serving cells that are configured with a BWP with two different values for the *coresetPoolIndex* in these lists. |
| ***simultaneousU-TCI-UpdateList1, simultaneousU-TCI-UpdateList2, simultaneousU-TCI-UpdateList3, simultaneousU-TCI-UpdateList4***  List of serving cells for which the Unified TCI States Activation/Deactivation MAC CE, the Enhanced Unified TCI States Activation/Deactivation MAC CE for Joint TCI States or the Enhanced Unified TCI States Activation/Deactivation MAC CE for Separate TCI States apply simultaneously, as specified in TS 38.321 [3] clauses 6.1.3.47, 6.1.3.70 and 6.1.3.71, respectively. The different lists shall not contain same serving cells. Network only configures in these lists serving cells that are configured with *unifiedTCI-StateType*. Network should not configure serving cells that are configured with a BWP with different number of *coresetPoolIndexes* in the same list. |
| ***spCellConfig***  Parameters for the SpCell of this cell group (PCell of MCG or PSCell of SCG). |
| ***uplinkTxSwitchingOption***  Indicates which option is configured for dynamic UL Tx switching for inter-band UL CA or (NG)EN-DC. The field is set to *switchedUL* if network configures option 1 as specified in TS 38.214 [19], or *dualUL* if network configures option 2 as specified in TS 38.214 [19]. Network always configures UE with a value for this field in inter-band UL CA case and (NG)EN-DC case where UE supports dynamic UL Tx switching. |
| ***uplinkTxSwitchingPowerBoosting***  Indicates whether the UE is allowed to enable 3dB boosting on the maximum output power for transmission on carrier2 under the operation state in which 2-port transmission can be supported on carrier2 for inter-band UL CA case with dynamic UL Tx switching as defined in TS 38.101-1 [15]. Network can only configure this field for dynamic UL Tx switching in inter-band UL CA case with power Class 3 as defined in TS 38.101-1 [15]. |
| ***uplinkTxSwitching-2T-Mode***  Indicates 2Tx-2Tx switching mode is configured for inter-band UL CA or SUL, in which the switching gap duration for a triggered uplink switching (as specified in TS 38.214 [19]) is equal to the switching time capability value reported for the switching mode.  If this field is absent and *uplinkTxSwitching* is configured, it is interpreted that 1Tx-2Tx UL Tx switching is configured as specified in TS 38.214 [19]. In this case, there is one uplink (or one uplink band in case of intra-band) configured with *uplinkTxSwitching*, on which the maximum number of antenna ports among all configured P-SRS/A-SRS and activated SP-SRS resources should be 1 and non-codebook based UL MIMO is not configured. |
| ***uplinkTxSwitching-DualUL-TxState***  Indicates the state of Tx chains if the state of Tx chains after the UL Tx switching is not unique (as specified in TS 38.214 [19]) in case of 2Tx-2Tx switching is configured and *uplinkTxSwitchingOption* is set to *dualUL*. Value *oneT* indicates 1Tx is assumed to be supported on the carriers on each band, value *twoT* indicates 2Tx is assumed to be supported on that carrier.  This field applies for all band pairs if *uplinkTxSwitchingMoreBands* is configured. |
| ***uplinkTxSwitchingMoreBands***  Indicates UL band list, band pair list and other configurations for ULTx switching. |
| ***uu-RelayRLC-ChannelToAddModList***  List of the Uu RLC entities and the corresponding MAC Logical Channels to be added or modified. |
| ***uu-RelayRLC-ChannelToReleaseList***  List of the Uu RLC entities and the corresponding MAC Logical Channels to be released. |

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| *DeactivatedSCG-Config* field descriptions |
| ***bfd-and-RLM***  If the field is set to *true*, the UE shall perform RLM and BFD on the PSCell when the SCG is deactivated and the network ensures that *beamFailure-r17* is not configured in the *radioLinkMonitoringConfig* of the DL BWP of the PSCell in which the UE performs BFD. If set to *false*, the UE is not required to perform RLM and BFD on the PSCell when the SCG is deactivated. |

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| *DAPS-UplinkPowerConfig* field descriptions |
| ***p-DAPS-Source***  The maximum total transmit power to be used by the UE in the source cell group during DAPS handover. |
| ***p-DAPS-Target***  The maximum total transmit power to be used by the UE in the target cell group during DAPS handover. |
| ***uplinkPowerSharingDAPS-Mode***  Indicates the uplink power sharing mode that the UE uses in DAPS handover (see TS 38.213 [13]). |

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| *GoodServingCellEvaluation* field descriptions |
| ***offset***  The parameter "X" (dB) for the good serving cell quality criterion in RRC\_CONNECTED, for a cell operating in FR1 and FR2, respectively. If this field is absent, the UE applies the (default) value of 0 dB for "X". |

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| *IAB-ResourceConfig* field descriptions |
| ***iab-ResourceConfigID***  This ID is used to indicate the specific resource configuration addressed by the MAC CEs specified in TS 38.321 [3]. |
| ***periodicitySlotList***  Indicates the periodicity in ms of the list of slot indexes indicated in *slotList*. |
| ***slotList***  Indicates the list of slot indexes to which the information indicated in the specific MAC CE applies to, as specified in TS 38.321 [3]. The values of the entries in the *slotList* are strictly less than the value of the *periodicitySlotList*. |
| ***slotListSubcarrierSpacing***  Subcarrier spacing used as reference for the *slotList* configuration.  Only the following values are applicable depending on the used frequency:  FR1: 15 or 30 kHz  FR2-1: 60 or 120 kHz  FR2-2: 120 or 480 kHz |

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| *RACH-LessHO* field descriptions |
| ***ssb-Index***  This field indicates a beam that the UE should use in the target cell to monitor PDCCH for initial uplink transmission, see TS 38.321 [3]. The network configures this field when *cg-RRC-Configuration* is not configured for the initial uplink transmission in RACH-less handover in NTN or in case this cell is not a mobile IAB cell. |
| ***targetNTA***  This field refers to the timing adjustment, see TS 38.213 [13] and TS 38.321 [3], indicating the NTA value which the UE shall use for the target PTAG of handover. The value *zero* corresponds to NTA=0, while the value *source* corresponds to the NTA value of the source PTAG indicated by the *tag-Id*. Only value *source* is configured by the network in case source cell is a mobile IAB cell. In this version of the specification, the network shall always configure this field if *rach-LessHO* is part of an *RRCReconfiguration* message. |
| ***tci-StateID***  This field indicates a beam that the UE should use in the target cell to monitor PDCCH for initial uplink transmission and also indicates the TCI state information to be used in the target cell. The network configures this field in case this cell is not a NTN cell. |

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| *ReconfigurationWithSync* field descriptions |
| ***rach-ConfigDedicated***  Random access configuration to be used for the reconfiguration with sync (e.g. handover). The UE performs the RA according to these parameters in the *firstActiveUplinkBWP* (see *UplinkConfig*). |
| ***sl-IndirectPathMaintain***  Indicates that the L2 U2N Remote UE keeps the PC5 connection with its connected L2 U2N Relay UE. |
| ***smtc***  The SSB periodicity/offset/duration configuration of target cell for NR PSCell change and NR PCell change. The network sets the *periodicityAndOffset* to indicate the same periodicity as *ssb-periodicityServingCell* in *spCellConfigCommon* or sets to the same periodicity as *ssb-Periodicity-r17* in *nonCellDefiningSSB-r17* if the first active DL BWP included in this RRC message is configured with *nonCellDefiningSSB-r17*.  For case of NR PCell change, the *smtc* is based on the timing reference of (source) PCell. For case of NR PSCell change, it is based on the timing reference of source PSCell.  If both this field and *targetCellSMTC-SCG* are absent, the UE uses the SMTC in the *measObjectNR* having the same SSB frequency and subcarrier spacing, as configured before the reception of the RRC message. If the first active DL BWP included in this RRC message is configured with *nonCellDefiningSSB-r17*, this field corresponds to the NCD-SSB indicated by *nonCellDefiningSSB-r17*, otherwise, this field corresponds to the CD-SSB indicated by *absoluteFrequencySSB* in *frequencyInfoDL*. |

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| *ReportUplinkTxDirectCurrentMoreCarrier* field descriptions |
| ***IntraBandCC-Combination***  Indicates the state of the carriers and BWPs indexes of the carriers in a CC combination, each carrier in this combination corresponds to an entry in *servCellIndexList* with same order. This IE shall have the same size as *servCellIndexList*. |
| ***IntraBandCC-CombinationReqList***  Indicates the list of the requested carriers/BWPs combinations for an intra-band CA component. |
| ***servCellIndexList***  indicates the list of cell index for an intra-band CA component. |

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| *SCellConfig* field descriptions |
| ***goodServingCellEvaluationBFD***  Indicates the criterion for a UE to detect the good serving cell quality for BFD relaxation in an SCell in RRC\_CONNECTED. This field is always configured when the network enables BFD relaxation for the UE in this SCell. This field is absent if *failureDetectionSetN* is present for the SCell. |
| ***preConfGapStatus***  Indicates whether the pre-configured measurement gaps (i.e. the gaps configured with *preConfigInd*) are activated or deactivated while this SCell is deactivated. If this field is configured, the UE shall apply network-controlled mechanism for activation and deactivation of the pre-configured measurement gaps, otherwise the UE shall apply the autonomous activation/deactivation mechanism, as specified in TS 38.133 [14]. The first/leftmost bit corresponds to the measurement gap with gap ID 1, the second bit corresponds to measurement gap with gap ID 2, and so on. Value 0 indicates that the corresponding pre-configured measurement gap is deactivated while value 1 indicates that the corresponding pre-configured measurement gap is activated. The UE shall ignore the bit if the corresponding measurement gap is not a pre-configured measurement gap. |
| ***sCellState***  Indicates whether the SCell shall be considered to be in activated state upon SCell configuration. If the field is included for an SCell configured with TRS for fast activation of the SCell, such TRS is not used for the corresponding SCell. |
| ***secondaryDRX-GroupConfig***  The field is used to indicate whether the SCell belongs to the secondary DRX group. All serving cells in the secondary DRX group shall belong to one Frequency Range and all serving cells in the default DRX group shall belong to another Frequency Range. If *drx-ConfigSecondaryGroup* is configured, the field is optionally present. The network always includes the field if the field was previously configured for this SCell and the SCell remains in the secondary DRX group. Removal of an individual SCell from the secondary DRX group is supported by using an SCell release and addition. Otherwise, if *drx-ConfigSecondaryGroup* is not configured, the field is absent and the UE shall release the field. The UE shall also release the field if *drx-ConfigSecondaryGroup* is released without including *sCellToAddModList*. |
| ***smtc***  The SSB periodicity/offset/duration configuration of target cell for NR SCell addition. The network sets the *periodicityAndOffset* to indicate the same periodicity as *ssb-periodicityServingCell* in *sCellConfigCommon*. The *smtc* is based on the timing of the SpCell of associated cell group. In case of inter-RAT handover to NR, the timing reference is the NR PCell. In case of intra-NR PCell change (standalone NR) or NR PSCell change (EN-DC), the timing reference is the target SpCell. If the field is absent and *absoluteFrequencySSB* is included, the UE uses the SMTC in the *measObjectNR* having the same SSB frequency and subcarrier spacing, as configured before the reception of the RRC message. If the SCell is an SSB-less SCell (i.e., the IE *absoluteFrequencySSB* in *ServingCellConfigCommon* is absent), this field is absent. |

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| *SpCellConfig* field descriptions |
| ***deactivatedSCG-Config***  Configuration applicable when the SCG is deactivated. The network always configures this field before or when indicating that the SCG is deactivated in an *RRCReconfiguration*, *RRCResume*, E-UTRA *RRCConnectionReconfiguration* or E-UTRA *RRCConnectionResume* message. |
| ***goodServingCellEvaluationBFD***  Indicates the criterion for a UE to detect the good serving cell quality for BFD relaxation in the SpCell in RRC\_CONNECTED. The field is always configured when the network enables BFD relaxation for the UE in this SpCell. This field is absent if *failureDetectionSetN* is present for the SpCell. |
| ***goodServingCellEvaluationRLM***  Indicates the criterion for a UE to detect the good serving cell quality for RLM relaxation in the SpCell in RRC\_CONNECTED. The field is always configured when the network enables RLM relaxation for the UE in this SpCell. |
| ***lowMobilityEvaluationConnected***  Indicates the criterion for a UE to detect low mobility in RRC\_CONNECTED in an SpCell. The *s-SearchDeltaP-Connected* is the parameter "SSearchDeltaP-connected". Value *dB*3 corresponds to 3 dB, *dB*6 corresponds to 6 dB and so on. The *t-SearchDeltaP-Connected* is the parameter "TSearchDeltaP-Connected". Value *s5* means 5 seconds, value *s10* means 10 seconds and so on. Low mobility criterion is configured in NR PCell for the case of NR SA/ NR CA/ NE-DC/NR-DC, and in the NR PSCell for the case of EN-DC. |
| ***mprReductionExtensionRatio***  Indicates the pair of lower-sided and higher-sided extension ratio as specified in TS 38.101-1 [15]. The *ratio1* represents (1/2, 0), the *ratio2* represents (0, 1/2), *ratio3* represents (1/2, 1/2), *ratio4* represents (1/4, 0), *ratio5* represents (0, 1/4), *ratio6* represents (1/4, 1/4). The first value of the pair represents the lower-sided extension ratio, the second value of the pair represents the higher-sided extension ratio. The network can only configure this field in case of non-CA in a cell group. |
| ***reconfigurationWithSync***  Parameters for the synchronous reconfiguration to the target SpCell. |
| ***rlf-TimersAndConstants***  Timers and constants for detecting and triggering cell-level radio link failure. For the SCG, *rlf-TimersAndConstants* can only be set to *setup* and is always included at SCG addition. |
| ***servCellIndex***  Serving cell ID of a PSCell. The PCell of the Master Cell Group uses ID = 0. |

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| *SL-PathSwitchConfig* field descriptions |
| ***targetRelayUE-Identity***  Indicates the L2 source ID of the target L2 U2N Relay UE during path switch. |
| ***t420***  Indicates the timer value of *T420* to be used during path switch. |

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| *UplinkTxSwitchingMoreBands* field descriptions |
| ***uplinkTxSwitchingBandList***  Indicates the NR frequency band number of the UL bands for UL Tx switching. If the UE needs to determine location of switching period as specified in TS 38.101-1 [15], the UE considers that the bands are listed in decreasing order of priority, i.e. the first/leftmost entry corresponds to the band with the highest priority, the next entry corresponds to the band with the second highest priority, and so on. The last entry corresponds the band with the lowest priority. |
| ***uplinkTxSwitchingBandPairList***  Indicates the band pairs involved in UL Tx switching, as well as the per band pair configurations. |
| ***uplinkTxSwitchingAssociatedBandDualUL-List***  Indicates the associated band for the transmitting band indicated by *transmitBand* which the transmitting carrier(s) is on as specified in TS 38.214 [19], clause 6.1.6. The network ensures that each band pair of a transmitting band and an associated band supports the *dualUL* switching option. |
| ***UplinkTxSwitchingBandIndex***  The value n indicates the band included at the n-th entry of *uplinkTxSwitchingBandList*. |

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| *UplinkTxSwitchingBandPairConfig* field descriptions |
| ***bandInfoUL1, bandInfoUL2***  Indicates the band index for a band pair. The value n indicates the band included at the n-th entry of *uplinkTxSwitchingBandList*. |
| ***switching2T-Mode***  Indicates 2Tx-2Tx switching mode is configured to the band pair.  If this field is absent when uplink Tx switching is configured, it is interpreted that 1Tx-2Tx/1Tx-1Tx UL Tx switching is configured as specified in TS 38.214 [19]. |
| ***switchingOptionConfigForBandPair***  Indicates the switching option for the band pair as specified in TS 38.214 [19], clause 6.1.6. |
| ***switchingPeriodConfigForBandPair***  Indicates the value of switching period for the band pair as specified in TS 38.214 [19], clause 6.1.6. Value *n35us* represents 35 us, *n140us* represents 140us. If the field is absent, 210 us is applied. |

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| Conditional Presence | Explanation |
| *2Tx* | The field is optionally present, Need R, if *uplinkTxSwitching* is configured; otherwise it is absent, Need R. |
| *BWP-Reconfig* | The field is optionally present, Need N, if the BWPs are reconfigured or if serving cells are added or removed. Otherwise it is absent. |
| *DirectToIndirect-PathSwitch* | The field is mandatory present for the L2 U2N remote UE at path switch to the target L2 U2N Relay UE (including direct to indirect path switch and indirect to indirect path switch). It is absent otherwise.  Note: the target L2 U2N Relay UE should not be the same as serving L2 U2N Relay UE for inter-gNB indirect to indirect path switch. |
| *MP* | This field is optionally present, Need N, if a L2 U2N remote UE is configured to perform MP direct path addition during indirect-to-direct path swith procedure, or to perform MP direct path release during direct-to-indirect path switch procedure. It is absent otherwise. |
| *NCR* | The field is optionally present, Need M, for NCR-MT. It is absent otherwise. |
| *PreConfigMG* | The field is optionally present, Need R, if there is at least one per UE gap configured with *preConfigInd* or there is at least one per FR gap of the same FR which the SCell belongs to and configured with *preConfigInd*. It is absent, Need R, otherwise. |
| *ReconfWithSync* | The field is mandatory present in the *RRCReconfiguration* message:  - in each configured *CellGroupConfig* for which the SpCell changes,  - in the *masterCellGroup:*  - at change of AS security key derived from KgNB,  - in an *RRCReconfiguration* message contained in a *DLInformationTransferMRDC* message,  - path switch of L2 U2N remote UE to the target PCell,  - path switch of L2 U2N remote UE to the target L2 U2N Relay UE,  - in the *secondaryCellGroup* at:  - PSCell addition,  - SCG resume with NR-DC or (NG)EN-DC,  - update of required SI for PSCell,  - change of AS security key derived from S-KgNB in NR-DC while the UE is configured with at least one radio bearer with *keyToUse* set to *secondary* and that is not released by this *RRCReconfiguration* message,  - MN handover in (NG)EN-DC.  Otherwise, it is optionally present, need M. The field is absent in the *masterCellGroup* in *RRCResume* and *RRCSetup* messages and is absent in the *masterCellGroup* in *RRCReconfiguration* messages if source configuration is not released during DAPS handover. |
| *SCellAdd* | The field is mandatory present upon SCell addition; otherwise it is absent, Need M. |
| *SCellAddMod* | The field is mandatory present upon SCell addition; otherwise it is optionally present, need M. |
| *SCellAddSync* | The field is optionally present, Need N:  - in the *masterCellGroup* at  - SCell addition,  - reconfiguration with sync,  - resume of an RRC connection.  - in the *secondaryCellGroup*, when the SCG is not indicated as deactivated at:  - SCG activation while the SCG was previously deactivated,  - SCell addition,  - reconfiguration with sync.  It is absent otherwise. |
| *SCG* | The field is mandatory present in an *SpCellConfig* for the PSCell. It is absent otherwise. |
| *SCellSIB20-Opt* | This field is optionally present, Need M, if the field sCellSIB20 is configured. It is absent otherwise. |
| *SCG-Opt* | The field is optionally present, Need M, in an SpCellConfig for the PSCell. It is absent otherwise. |

NOTE: In case of change of AS security key derived from S-KgNB/S-KeNB, if *reconfigurationWithSync* is not included in the *masterCellGroup*, the network releases all existing MCG RLC bearers associated with a radio bearer with *keyToUse* set to *secondary*. In case of change of AS security key derived from KgNB/KeNB, if *reconfigurationWithSync* is not included in the *secondaryCellGroup*, the network releases all existing SCG RLC bearers associated with a radio bearer with *keyToUse* set to *master*.

*[Text omitted]*

End of Change