**3GPP TSG-RAN2 Meeting #111-e *R2-200xxxx***

**E-Meeting, 17 – 28 August 2020**

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| *CR-Form-v12.0* | | | | | | | | |
| **CHANGE REQUEST** | | | | | | | | |
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|  | **38.331** | **CR** | **1745** | **rev** | **1** | **Current version:** | **15.10.0** |  |
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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 |  | Radio Access Network | **X** | Core Network |  |

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| ***Title:*** | Clarification on CG-ConfigInfo for NR-DC and NE-DC | | | | | | | | | |
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| ***Source to WG:*** | Google Inc., Ericsson, Huawei | | | | | | | | | |
| ***Source to TSG:*** | R2 | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Work item code:*** | NR\_newRAT-Core | | | | |  | ***Date:*** | | | 2020-08-20 |
|  |  | | | |  | |  | | |  |
| ***Category:*** | **F** |  | | | | | ***Release:*** | | | Rel-15 |
|  | *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-12 (Release 12)* *Rel-13 (Release 13) Rel-14 (Release 14) Rel-15 (Release 15) Rel-16 (Release 16)* | |
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| ***Reason for change:*** | | Clarify which RAT capabilities are included in CG-ConfigInfo for NR-DC and NE-DC. | | | | | | | | |
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| ***Summary of change:*** | | 1. For NE-DC, EUTRA capabilities and MR-DC capabilities are included and NR capabilities are not included. 2. For NR-DC, NR capabilities are included, and MR-DC capabilities and EUTRA capabilities are not included.   **Impact analysis**  Impacted 5G architecture options:  NR-DC and NE-DC  Impacted functionality:  SN addtion and change  Inter-operability:  There is no inter-operability issue. | | | | | | | | |
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| ***Consequences if not approved:*** | | It may be unclear which RAT capabilities are included in CG-ConfigInfo for NR-DC and NE-DC. | | | | | | | | |
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| ***Clauses affected:*** | | 11.2.2 | | | | | | | | |
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|  | | **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:*** | |  | | | | | | | | |

#### *– CG-ConfigInfo*

This message is used by master eNB or gNB to request the SgNB or SeNB to perform certain actions e.g. to establish, modify or release an SCG. The message may include additional information e.g. to assist the SgNB or SeNB to set the SCG configuration. It can also be used by a CU to request a DU to perform certain actions, e.g. to establish, or modify an MCG or SCG.

Direction: Master eNB or gNB to secondary gNB or eNB, alternatively CU to DU.

*CG-ConfigInfo* message

-- ASN1START

-- TAG-CG-CONFIG-INFO-START

CG-ConfigInfo ::= SEQUENCE {

criticalExtensions CHOICE {

c1 CHOICE{

cg-ConfigInfo CG-ConfigInfo-IEs,

spare3 NULL, spare2 NULL, spare1 NULL

},

criticalExtensionsFuture SEQUENCE {}

}

}

CG-ConfigInfo-IEs ::= SEQUENCE {

ue-CapabilityInfo OCTET STRING (CONTAINING UE-CapabilityRAT-ContainerList) OPTIONAL,-- Cond SN-AddMod

candidateCellInfoListMN MeasResultList2NR OPTIONAL,

candidateCellInfoListSN OCTET STRING (CONTAINING MeasResultList2NR) OPTIONAL,

measResultCellListSFTD-NR MeasResultCellListSFTD-NR OPTIONAL,

scgFailureInfo SEQUENCE {

failureType ENUMERATED { t310-Expiry, randomAccessProblem,

rlc-MaxNumRetx, synchReconfigFailure-SCG,

scg-reconfigFailure,

srb3-IntegrityFailure},

measResultSCG OCTET STRING (CONTAINING MeasResultSCG-Failure)

} OPTIONAL,

configRestrictInfo ConfigRestrictInfoSCG OPTIONAL,

drx-InfoMCG DRX-Info OPTIONAL,

measConfigMN MeasConfigMN OPTIONAL,

sourceConfigSCG OCTET STRING (CONTAINING RRCReconfiguration) OPTIONAL,

scg-RB-Config OCTET STRING (CONTAINING RadioBearerConfig) OPTIONAL,

mcg-RB-Config OCTET STRING (CONTAINING RadioBearerConfig) OPTIONAL,

mrdc-AssistanceInfo MRDC-AssistanceInfo OPTIONAL,

nonCriticalExtension CG-ConfigInfo-v1540-IEs OPTIONAL

}

CG-ConfigInfo-v1540-IEs ::= SEQUENCE {

ph-InfoMCG PH-TypeListMCG OPTIONAL,

measResultReportCGI SEQUENCE {

ssbFrequency ARFCN-ValueNR,

cellForWhichToReportCGI PhysCellId,

cgi-Info CGI-InfoNR

} OPTIONAL,

nonCriticalExtension CG-ConfigInfo-v1560-IEs OPTIONAL

}

CG-ConfigInfo-v1560-IEs ::= SEQUENCE {

candidateCellInfoListMN-EUTRA OCTET STRING OPTIONAL,

candidateCellInfoListSN-EUTRA OCTET STRING OPTIONAL,

sourceConfigSCG-EUTRA OCTET STRING OPTIONAL,

scgFailureInfoEUTRA SEQUENCE {

failureTypeEUTRA ENUMERATED { t313-Expiry, randomAccessProblem,

rlc-MaxNumRetx, scg-ChangeFailure},

measResultSCG-EUTRA OCTET STRING

} OPTIONAL,

drx-ConfigMCG DRX-Config OPTIONAL,

measResultReportCGI-EUTRA SEQUENCE {

eutraFrequency ARFCN-ValueEUTRA,

cellForWhichToReportCGI-EUTRA EUTRA-PhysCellId,

cgi-InfoEUTRA CGI-InfoEUTRA

} OPTIONAL,

measResultCellListSFTD-EUTRA MeasResultCellListSFTD-EUTRA OPTIONAL,

fr-InfoListMCG FR-InfoList OPTIONAL,

nonCriticalExtension CG-ConfigInfo-v1570-IEs OPTIONAL

}

CG-ConfigInfo-v1570-IEs ::= SEQUENCE {

sftdFrequencyList-NR SFTD-FrequencyList-NR OPTIONAL,

sftdFrequencyList-EUTRA SFTD-FrequencyList-EUTRA OPTIONAL,

nonCriticalExtension CG-ConfigInfo-v1590-IEs OPTIONAL

}

CG-ConfigInfo-v1590-IEs ::= SEQUENCE {

servFrequenciesMN-NR SEQUENCE (SIZE (1.. maxNrofServingCells-1)) OF ARFCN-ValueNR OPTIONAL,

nonCriticalExtension SEQUENCE {} OPTIONAL

}

SFTD-FrequencyList-NR ::= SEQUENCE (SIZE (1..maxCellSFTD)) OF ARFCN-ValueNR

SFTD-FrequencyList-EUTRA ::= SEQUENCE (SIZE (1..maxCellSFTD)) OF ARFCN-ValueEUTRA

ConfigRestrictInfoSCG ::= SEQUENCE {

allowedBC-ListMRDC BandCombinationInfoList OPTIONAL,

powerCoordination-FR1 SEQUENCE {

p-maxNR-FR1 P-Max OPTIONAL,

p-maxEUTRA P-Max OPTIONAL,

p-maxUE-FR1 P-Max OPTIONAL

} OPTIONAL,

servCellIndexRangeSCG SEQUENCE {

lowBound ServCellIndex,

upBound ServCellIndex

} OPTIONAL, -- Cond SN-AddMod

maxMeasFreqsSCG INTEGER(1..maxMeasFreqsMN) OPTIONAL,

dummy INTEGER(1..maxMeasIdentitiesMN) OPTIONAL,

...,

[[

selectedBandEntriesMNList SEQUENCE (SIZE (1..maxBandComb)) OF SelectedBandEntriesMN OPTIONAL,

pdcch-BlindDetectionSCG INTEGER (1..15) OPTIONAL,

maxNumberROHC-ContextSessionsSN INTEGER(0.. 16384) OPTIONAL

]],

[[

maxIntraFreqMeasIdentitiesSCG INTEGER(1..maxMeasIdentitiesMN) OPTIONAL,

maxInterFreqMeasIdentitiesSCG INTEGER(1..maxMeasIdentitiesMN) OPTIONAL

]]

}

SelectedBandEntriesMN ::= SEQUENCE (SIZE (1..maxSimultaneousBands)) OF BandEntryIndex

BandEntryIndex ::= INTEGER (0.. maxNrofServingCells)

PH-TypeListMCG ::= SEQUENCE (SIZE (1..maxNrofServingCells)) OF PH-InfoMCG

PH-InfoMCG ::= SEQUENCE {

servCellIndex ServCellIndex,

ph-Uplink PH-UplinkCarrierMCG,

ph-SupplementaryUplink PH-UplinkCarrierMCG OPTIONAL,

...

}

PH-UplinkCarrierMCG ::= SEQUENCE{

ph-Type1or3 ENUMERATED {type1, type3},

...

}

BandCombinationInfoList ::= SEQUENCE (SIZE (1..maxBandComb)) OF BandCombinationInfo

BandCombinationInfo ::= SEQUENCE {

bandCombinationIndex BandCombinationIndex,

allowedFeatureSetsList SEQUENCE (SIZE (1..maxFeatureSetsPerBand)) OF FeatureSetEntryIndex

}

FeatureSetEntryIndex ::= INTEGER (1.. maxFeatureSetsPerBand)

DRX-Info ::= SEQUENCE {

drx-LongCycleStartOffset CHOICE {

ms10 INTEGER(0..9),

ms20 INTEGER(0..19),

ms32 INTEGER(0..31),

ms40 INTEGER(0..39),

ms60 INTEGER(0..59),

ms64 INTEGER(0..63),

ms70 INTEGER(0..69),

ms80 INTEGER(0..79),

ms128 INTEGER(0..127),

ms160 INTEGER(0..159),

ms256 INTEGER(0..255),

ms320 INTEGER(0..319),

ms512 INTEGER(0..511),

ms640 INTEGER(0..639),

ms1024 INTEGER(0..1023),

ms1280 INTEGER(0..1279),

ms2048 INTEGER(0..2047),

ms2560 INTEGER(0..2559),

ms5120 INTEGER(0..5119),

ms10240 INTEGER(0..10239)

},

shortDRX SEQUENCE {

drx-ShortCycle ENUMERATED {

ms2, ms3, ms4, ms5, ms6, ms7, ms8, ms10, ms14, ms16, ms20, ms30, ms32,

ms35, ms40, ms64, ms80, ms128, ms160, ms256, ms320, ms512, ms640, spare9,

spare8, spare7, spare6, spare5, spare4, spare3, spare2, spare1 },

drx-ShortCycleTimer INTEGER (1..16)

} OPTIONAL

}

MeasConfigMN ::= SEQUENCE {

measuredFrequenciesMN SEQUENCE (SIZE (1..maxMeasFreqsMN)) OF NR-FreqInfo OPTIONAL,

measGapConfig SetupRelease { GapConfig } OPTIONAL,

gapPurpose ENUMERATED {perUE, perFR1} OPTIONAL,

...,

[[ measGapConfigFR2 SetupRelease { GapConfig } OPTIONAL

]]

}

MRDC-AssistanceInfo ::= SEQUENCE {

affectedCarrierFreqCombInfoListMRDC SEQUENCE (SIZE (1..maxNrofCombIDC)) OF AffectedCarrierFreqCombInfoMRDC,

...

}

AffectedCarrierFreqCombInfoMRDC ::= SEQUENCE {

victimSystemType VictimSystemType,

interferenceDirectionMRDC ENUMERATED {eutra-nr, nr, other, utra-nr-other, nr-other, spare3, spare2, spare1},

affectedCarrierFreqCombMRDC SEQUENCE {

affectedCarrierFreqCombEUTRA AffectedCarrierFreqCombEUTRA OPTIONAL,

affectedCarrierFreqCombNR AffectedCarrierFreqCombNR

} OPTIONAL

}

VictimSystemType ::= SEQUENCE {

gps ENUMERATED {true} OPTIONAL,

glonass ENUMERATED {true} OPTIONAL,

bds ENUMERATED {true} OPTIONAL,

galileo ENUMERATED {true} OPTIONAL,

wlan ENUMERATED {true} OPTIONAL,

bluetooth ENUMERATED {true} OPTIONAL

}

AffectedCarrierFreqCombEUTRA ::= SEQUENCE (SIZE (1..maxNrofServingCellsEUTRA)) OF ARFCN-ValueEUTRA

AffectedCarrierFreqCombNR ::= SEQUENCE (SIZE (1..maxNrofServingCells)) OF ARFCN-ValueNR

-- TAG-CG-CONFIG-INFO-STOP

-- ASN1STOP

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| *CG-ConfigInfo* field descriptions |
| ***allowedBC-ListMRDC***  A list of indices referring to band combinations in MR-DC capabilities from which SN is allowed to select the SCG band combination. Each entry refers to:  - a band combination numbered according to *supportedBandCombinationList* in the *UE-MRDC-Capability* (in case of (NG)EN-DC), or according to *supportedBandCombinationList* and *supportedBandCombinationListNEDC-Only* in the *UE-MRDC-Capability* (in case of NE-DC), or according to *supportedBandCombinationList* in the UE-NR-Capability (in case of NR-DC),  - and the Feature Sets allowed for each band entry. All MR-DC band combinations indicated by this field comprise the MCG band combination, which is a superset of the MCG band(s) selected by MN. |
| ***candidateCellInfoListMN***, ***candidateCellInfoListSN***  Contains information regarding cells that the master node or the source node suggests the target gNB or DU to consider configuring.  For (NG)EN-DC, including CSI-RS measurement results in *candidateCellInfoListMN* is not supported in this version of the specification. For NR-DC, including SSB and/or CSI-RS measurement results in *candidateCellInfoListMN* is supported. |
| ***candidateCellInfoListMN-EUTRA***, ***candidateCellInfoListSN-EUTRA***  Includes the *MeasResultList3EUTRA* as specified in TS 36.331 [10]. Contains information regarding cells that the master node or the source node suggests the target secondary eNB to consider configuring. These fields are only used in NE-DC. |
| ***configRestrictInfo***  Includes fields for which SgNB is explictly indicated to observe a configuration restriction. |
| ***drx-ConfigMCG***  This field contains the complete DRX configuration of the MCG. This field is only used in NR-DC. |
| ***drx-InfoMCG***  This field contains the DRX long and short cycle configuration of the MCG. This field is used in (NG)EN-DC and NE-DC. |
| ***fr-InfoListMCG***  Contains information of FR information of serving cells that include PCell and SCell(s) configured in MCG. |
| ***maxMeasFreqsSCG***  Indicates the maximum number of NR inter-frequency carriers the SN is allowed to configure with PSCell for measurements. |
| ***dummy***  This field is not used in the specification and SN ignores the received value. |
| ***maxInterFreqMeasIdentitiesSCG***  Indicates the maximum number of allowed measurement identities that the SCG is allowed to configure for inter-frequency measurement. The maximum value for this field is 10. If the field is absent, the SCG is allowed to configure inter-frequency measurements up to the maximum value. This field is only used in NR-DC. |
| ***maxIntraFreqMeasIdentitiesSCG***  Indicates the maximum number of allowed measurement identities that the SCG is allowed to configure for intra-frequency measurement on each serving frequency. The maximum value for this field is 9 (in case of (NG)EN-DC or NR-DC) or 10 (in case of NE-DC). If the field is absent, the SCG is allowed to configure intra-frequency measurements up to the maximum value on each serving frequency. |
| ***maxNumberROHC-ContextSessionsSN***  Indicates the maximum number of context sessions allowed to SN terminated bearer, excluding context sessions that leave all headers uncompressed. |
| ***measuredFrequenciesMN***  Used by MN to indicate a list of frequencies measured by the UE. |
| ***measGapConfig***  Indicates the FR1 and perUE measurement gap configuration configured by MN. |
| ***measGapConfigFR2***  Indicates the FR2 measurement gap configuration configured by MN. |
| ***mcg-RB-Config***  Contains all of the fields in the IE *RadioBearerConfig* used in MCG, used by the SN to support delta configuration to UE, for bearer type change between MN terminated bearer with NR PDCP to SN terminated bearer. It is also used to indicate the PDCP duplication related information for MN terminated split bearer (whether duplication is configured and if so, whether it is initially activated) in SN Addition/Modification procedure. Otherwise, this field is absent. |
| ***measResultReportCGI, measResultReportCGI-EUTRA***  Used by MN to provide SN with CGI-Info for the cell as per SN′s request. In this version of the specification, the *measResultReportCGI* is used for (NG)EN-DC and NR-DC and the *measResultReportCGI-EUTRA* is used only for NE-DC. |
| ***measResultSCG-EUTRA***  This field includes the *MeasResultSCG-FailureMRDC* IE as specified in TS 36.331 [10]. This field is only used in NE-DC. |
| ***measResultSFTD-EUTRA***  SFTD measurement results between the PCell and the E-UTRA PScell in NE-DC. This field is only used in NE-DC. |
| ***mrdc-AssistanceInfo***  Contains the IDC assistance information for MR-DC reported by the UE (see TS 36.331 [10]). |
| ***p-maxEUTRA***  Indicates the maximum total transmit power to be used by the UE in the E-UTRA cell group (see TS 36.104 [33]). This field is used in (NG)EN-DC and NE-DC. |
| ***p-maxNR-FR1***  Indicates the maximum total transmit power to be used by the UE in the NR cell group across all serving cells in frequency range 1 (FR1) (see TS 38.104 [12]). The field is used in (NG)EN-DC and NE-DC. |
| ***p-maxUE-FR1***  Indicates the maximum total transmit power to be used by the UE across all serving cells in frequency range 1 (FR1). |
| ***pdcch-BlindDetectionSCG***  Indicates the maximum value of the reference number of cells for PDCCH blind detection allowed to be configured for the SCG. |
| ***ph-InfoMCG***  Power headroom information in MCG that is needed in the reception of PHR MAC CE in SCG. |
| ***ph-SupplementaryUplink***  Power headroom information for supplementary uplink. For UE in (NG)EN-DC, this field is absent. |
| ***ph-Type1or3***  Type of power headroom for a serving cell in MCG (PCell and activated SCells). *type1* refers to type 1 power headroom, *type3* refers to type 3 power headroom. (See TS 38.321 [3]). |
| ***ph-Uplink***  Power headroom information for uplink. |
| ***powerCoordination-FR1***  Indicates the maximum power that the UE can use in FR1. |
| ***scgFailureInfo***  Contains SCG failure type and measurement results. In case the sender has no measurement results available, the sender may include one empty entry (i.e. without any optional fields present) in *measResultPerMOList*. This field is used in (NG)EN-DC and NR-DC. |
| ***scgFailureInfoEUTRA***  Contains SCG failure type and measurement results of the EUTRA secondary cell group. This field is only used in NE-DC. |
| ***scg-RB-Config***  Contains all of the fields in the IE RadioBearerConfig used in SCG, used to allow the target SN to use delta configuration to the UE, e.g. during SN change. The field is signalled upon change of SN. Otherwise, the field is absent. This field is also absent when master eNB uses full configuration option. |
| ***selectedBandEntriesMNList***  A list of indices referring to the position of a band entry selected by the MN, in each band combination entry in *allowedBC-ListMRDC* IE. *BandEntryIndex* 0 identifies the first band in the *bandList* of the *BandCombination*, *BandEntryIndex* 1 identifies the second band in the *bandList* of the *BandCombination*, and so on. This *selectedBandEntriesMNList* includes the same number of entries, and listed in the same order as in *allowedBC-ListMRDC*. The SN uses this information to determine which bands out of the NR band combinations in *allowedBC-ListMRDC* it can configure in SCG. This field is only used in NR-DC. |
| ***servCellIndexRangeSCG***  Range of serving cell indices that SN is allowed to configure for SCG serving cells. |
| ***servFrequenciesMN-NR***  Indicates the frequency of all serving cells that include PCell and SCell(s) configured in MCG. This field is only used in NR-DC. |
| ***sftdFrequencyList-NR***  Includes a list of SSB frequencies. Each entry identifies the SSB frequency of a PSCell, which corresponds to one *MeasResultCellSFTD-NR* entry in the *MeasResultCellListSFTD-NR*. |
| ***sftdFrequencyList-EUTRA***  Includes a list of E-UTRA frequencies. Each entry identifies the carrier frequency of a PSCell, which corresponds to one *MeasResultSFTD-EUTRA* entry in the *MeasResultCellListSFTD-EUTRA*. |
| ***sourceConfigSCG***  Includes all of the current SCG configurations used by the target SN to build delta configuration to be sent to UE, e.g. during SN change. The field contains the *RRCReconfiguration* message, i.e. including *secondaryCellGroup* and *measConfig*. The field is signalled upon change of SN, unless MN uses full configuration option. Otherwise, the field is absent. |
| ***sourceConfigSCG-EUTRA***  Includes the E-UTRA *RRCConnectionReconfiguration* message as specified in TS 36.331 [10]. In this version of the specification, the E-UTRA RRC message can only include the field *scg-Configuration.* In this version of the specification, this field is absent when master gNB uses full configuration option. This field is only used in NE-DC. |
| ***ue-CapabilityInfo***  Contains the IE *UE-CapabilityRAT-ContainerList* supported by the UE (see NOTE 3). A gNB that retrieves MRDC related capability containers ensures that the set of included MRDC containers is consistent w.r.t. the feature set related information. |

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| *BandCombinationInfo* field descriptions |
| ***allowedFeatureSetsList***  Defines a subset of the entries in a *FeatureSetCombination*. Each index identifies a position in the *FeatureSetCombination*, which corresponds to one *FeatureSetUplink*/*Downlink* for each band entry in the associated band combination. |
| ***bandCombinationIndex***  In case of (NG)EN-DC and NR-DC, this field indicates the position of a band combination in the *supportedBandCombinationList*. In case of NE-DC, this field indicates the position of a band combination in the *supportedBandCombinationList* and/or *supportedBandCombinationListNEDC-Only*. Band combination entries in *supportedBandCombinationList* are referred by an index which corresponds to the position of a band combination in the *supportedBandCombinationList*. Band combination entries in *supportedBandCombinationListNEDC-Only* are referred by an index which corresponds to the position of a band combination in the *supportedBandCombinationListNEDC-Only* increased by the number of entries in *supportedBandCombinationList*. |

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| Conditional Presence | Explanation |
| *SN-AddMod* | The field is mandatory present upon SN addition and SN change. It is optionally present upon SN modification and inter-MN handover without SN change. Otherwise, the field is absent. |

NOTE 3: The following table indicates per MN RAT and SN RAT whether RAT capabilities are included or not in *ue-CapabilityInfo*.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| MN RAT | SN RAT | NR capabilities | E-UTRA capabilities | MR-DC capabilities |
| E-UTRA | NR | Included | Not included | Included |
| NR | E-UTRA | Not included | Included | Included |
| NR | NR | Included | Not included | Not included |