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

**Toulouse, France, 21 – 25 August 2023 R2-2309012**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| *CR-Form-v12.2* | | | | | | | | |
| **CHANGE REQUEST** | | | | | | | | |
|  | | | | | | | | |
|  | **38.331** | **CR** | **3991** | **rev** | **6** | **Current version:** | **17.5.0** |  |
|  | | | | | | | | |
| *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)*.* | | | | | | | | |
|  | | | | | | | | |

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| ***Proposed change affects:*** | UICC apps |  | ME |  | Radio Access Network | **x** | Core Network |  |

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | | | | | | | | | | |
| ***Title:*** | CSI-RS resource coordination in NR-DC | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Source to WG:*** | Nokia, Nokia Shanghai Bell | | | | | | | | | |
| ***Source to TSG:*** | R2 | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Work item code:*** | NR\_NewRAT-Core, TEI17 | | | | |  | ***Date:*** | | | 2023-08-11 |
|  |  | | | |  | |  | | |  |
| ***Category:*** | **F** |  | | | | | ***Release:*** | | | Rel-17 |
|  | *Use one of the following categories:* ***F*** *(correction)* ***A*** *(mirror corresponding to a change in an earlier release)* ***B*** *(addition of feature),* ***C*** *(functional modification of feature)* ***D*** *(editorial modification)*  Detailed explanations of the above categories can be found in 3GPP [TR 21.900](http://www.3gpp.org/ftp/Specs/html-info/21900.htm). | | | | | | | | *Use one of the following releases: Rel-8 (Release 8) Rel-9 (Release 9) Rel-10 (Release 10) Rel-11 (Release 11) … Rel-16 (Release 16) Rel-17 (Release 17) Rel-18 (Release 18) Rel-19 (Release 19)* | |
|  |  | | | | | | | | | |
| ***Reason for change:*** | | RRC inter-node messages are used for MN-SN coordination of resources for MR-DC, with certain aspects (e.g. measIDs, frequencies) that are per-UE or per-carrier being part of the signalling. For example, CSI-RS/SRS resource coordination is not currently possible, but is still required according to UE capabilities, making it impossible for network in some cases to utlize the UE capabilities. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Summary of change:*** | | 1. Add inter-node message allowing MN to indicate allowed resources for SN usage. 2. Add inter-node message element to allow SN to indicate the used resources based on the MN-indicated restrictions. 3. Add inter-node message element allowing SN to request resources from MN.   **Impact analysis**  Impacted functionality: Inter-node messages  Impacted 5G architecture options: NR-DC  Inter-operability:   1. If the MN is implemented according to the CR and the SN is not, the SN may not take the MN limitations into account, which could lead to overutilization fo CSI-RS resources, potentially causing RLF. 2. If the SN is implemented according to the CR and the MN is not, the SN will not know the amount of CSI-RS resources and NR-DC setup may fail or be overly restricted. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Consequences if not approved:*** | | It is not possible for MN and SN to coordinate the amount of used CSI-RS/SRS resources for NR-DC | | | | | | | | |
|  | |  | | | | | | | | |
| ***Clauses affected:*** | | 11.2.2 | | | | | | | | |
|  | |  | | | | | | | | |
|  | | **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:*** | |  | | | | | | | | |

*First Modified Subclause*

### 11.2.2 Message definitions

<UNNECESSARY PARTS OMITTED>

#### – *CG-Config*

This message is used to transfer the SCG radio configuration as generated by the SgNB or SeNB. It can also be used by a CU to request a DU to perform certain actions, e.g. to request the DU to perform a new lower layer configuration.

Direction: Secondary gNB or eNB to master gNB or eNB, alternatively CU to DU.

*CG-Config* message

-- ASN1START

-- TAG-CG-CONFIG-START

CG-Config ::= SEQUENCE {

criticalExtensions CHOICE {

c1 CHOICE{

cg-Config CG-Config-IEs,

spare3 NULL, spare2 NULL, spare1 NULL

},

criticalExtensionsFuture SEQUENCE {}

}

}

CG-Config-IEs ::= SEQUENCE {

scg-CellGroupConfig OCTET STRING (CONTAINING RRCReconfiguration) OPTIONAL,

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

configRestrictModReq ConfigRestrictModReqSCG OPTIONAL,

drx-InfoSCG DRX-Info OPTIONAL,

candidateCellInfoListSN OCTET STRING (CONTAINING MeasResultList2NR) OPTIONAL,

measConfigSN MeasConfigSN OPTIONAL,

selectedBandCombination BandCombinationInfoSN OPTIONAL,

fr-InfoListSCG FR-InfoList OPTIONAL,

candidateServingFreqListNR CandidateServingFreqListNR OPTIONAL,

nonCriticalExtension CG-Config-v1540-IEs OPTIONAL

}

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

pSCellFrequency ARFCN-ValueNR OPTIONAL,

reportCGI-RequestNR SEQUENCE {

requestedCellInfo SEQUENCE {

ssbFrequency ARFCN-ValueNR,

cellForWhichToReportCGI PhysCellId

} OPTIONAL

} OPTIONAL,

ph-InfoSCG PH-TypeListSCG OPTIONAL,

nonCriticalExtension CG-Config-v1560-IEs OPTIONAL

}

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

pSCellFrequencyEUTRA ARFCN-ValueEUTRA OPTIONAL,

scg-CellGroupConfigEUTRA OCTET STRING OPTIONAL,

candidateCellInfoListSN-EUTRA OCTET STRING OPTIONAL,

candidateServingFreqListEUTRA CandidateServingFreqListEUTRA OPTIONAL,

needForGaps ENUMERATED {true} OPTIONAL,

drx-ConfigSCG DRX-Config OPTIONAL,

reportCGI-RequestEUTRA SEQUENCE {

requestedCellInfoEUTRA SEQUENCE {

eutraFrequency ARFCN-ValueEUTRA,

cellForWhichToReportCGI-EUTRA EUTRA-PhysCellId

} OPTIONAL

} OPTIONAL,

nonCriticalExtension CG-Config-v1590-IEs OPTIONAL

}

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

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

scellFrequenciesSN-EUTRA SEQUENCE (SIZE (1.. maxNrofServingCells-1)) OF ARFCN-ValueEUTRA OPTIONAL,

nonCriticalExtension CG-Config-v1610-IEs OPTIONAL

}

CG-Config-v1610-IEs ::= SEQUENCE {

drx-InfoSCG2 DRX-Info2 OPTIONAL,

nonCriticalExtension CG-Config-v1620-IEs OPTIONAL

}

CG-Config-v1620-IEs ::= SEQUENCE {

ueAssistanceInformationSCG-r16 OCTET STRING (CONTAINING UEAssistanceInformation) OPTIONAL,

nonCriticalExtension CG-Config-v1630-IEs OPTIONAL

}

CG-Config-v1630-IEs ::= SEQUENCE {

selectedToffset-r16 T-Offset-r16 OPTIONAL,

nonCriticalExtension CG-Config-v1640-IEs OPTIONAL

}

CG-Config-v1640-IEs ::= SEQUENCE {

servCellInfoListSCG-NR-r16 ServCellInfoListSCG-NR-r16 OPTIONAL,

servCellInfoListSCG-EUTRA-r16 ServCellInfoListSCG-EUTRA-r16 OPTIONAL,

nonCriticalExtension CG-Config-v1700-IEs OPTIONAL

}

CG-Config-v1700-IEs ::= SEQUENCE {

candidateCellInfoListCPC-r17 CandidateCellInfoListCPC-r17 OPTIONAL,

twoPHRModeSCG-r17 ENUMERATED {enabled} OPTIONAL,

nonCriticalExtension CG-Config-v1730-IEs OPTIONAL

}

CG-Config-v1730-IEs ::= SEQUENCE {

fr1-Carriers-SCG-r17 INTEGER (1..32) OPTIONAL,

fr2-Carriers-SCG-r17 INTEGER (1..32) OPTIONAL,

nonCriticalExtension SEQUENCE {} OPTIONAL

}

ServCellInfoListSCG-NR-r16 ::= SEQUENCE (SIZE (1.. maxNrofServingCells)) OF ServCellInfoXCG-NR-r16

ServCellInfoXCG-NR-r16 ::= SEQUENCE {

dl-FreqInfo-NR-r16 FrequencyConfig-NR-r16 OPTIONAL,

ul-FreqInfo-NR-r16 FrequencyConfig-NR-r16 OPTIONAL, -- Cond FDD

...

}

FrequencyConfig-NR-r16 ::= SEQUENCE {

freqBandIndicatorNR-r16 FreqBandIndicatorNR,

carrierCenterFreq-NR-r16 ARFCN-ValueNR,

carrierBandwidth-NR-r16 INTEGER (1..maxNrofPhysicalResourceBlocks),

subcarrierSpacing-NR-r16 SubcarrierSpacing

}

ServCellInfoListSCG-EUTRA-r16 ::= SEQUENCE (SIZE (1.. maxNrofServingCellsEUTRA)) OF ServCellInfoXCG-EUTRA-r16

ServCellInfoXCG-EUTRA-r16 ::= SEQUENCE {

dl-CarrierFreq-EUTRA-r16 ARFCN-ValueEUTRA OPTIONAL,

ul-CarrierFreq-EUTRA-r16 ARFCN-ValueEUTRA OPTIONAL, -- Cond FDD

transmissionBandwidth-EUTRA-r16 TransmissionBandwidth-EUTRA-r16 OPTIONAL,

...

}

TransmissionBandwidth-EUTRA-r16 ::= ENUMERATED {rb6, rb15, rb25, rb50, rb75, rb100}

PH-TypeListSCG ::= SEQUENCE (SIZE (1..maxNrofServingCells)) OF PH-InfoSCG

PH-InfoSCG ::= SEQUENCE {

servCellIndex ServCellIndex,

ph-Uplink PH-UplinkCarrierSCG,

ph-SupplementaryUplink PH-UplinkCarrierSCG OPTIONAL,

...,

[[

twoSRS-PUSCH-Repetition-r17 ENUMERATED{enabled} OPTIONAL

]]

}

PH-UplinkCarrierSCG ::= SEQUENCE{

ph-Type1or3 ENUMERATED {type1, type3},

...

}

MeasConfigSN ::= SEQUENCE {

measuredFrequenciesSN SEQUENCE (SIZE (1..maxMeasFreqsSN)) OF NR-FreqInfo OPTIONAL,

...

}

NR-FreqInfo ::= SEQUENCE {

measuredFrequency ARFCN-ValueNR OPTIONAL,

...

}

ConfigRestrictModReqSCG ::= SEQUENCE {

requestedBC-MRDC BandCombinationInfoSN OPTIONAL,

requestedP-MaxFR1 P-Max OPTIONAL,

...,

[[

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

requestedP-MaxEUTRA P-Max OPTIONAL

]],

[[

requestedP-MaxFR2-r16 P-Max OPTIONAL,

requestedMaxInterFreqMeasIdSCG-r16 INTEGER(1..maxMeasIdentitiesMN) OPTIONAL,

requestedMaxIntraFreqMeasIdSCG-r16 INTEGER(1..maxMeasIdentitiesMN) OPTIONAL,

requestedToffset-r16 T-Offset-r16 OPTIONAL

]],

[[

reservedResourceConfig-r17 ResourceConfigNRDC-r17 OPTIONAL

]]

}

BandCombinationIndex ::= INTEGER (1..maxBandComb)

BandCombinationInfoSN ::= SEQUENCE {

bandCombinationIndex BandCombinationIndex,

requestedFeatureSets FeatureSetEntryIndex

}

FR-InfoList ::= SEQUENCE (SIZE (1..maxNrofServingCells-1)) OF FR-Info

FR-Info ::= SEQUENCE {

servCellIndex ServCellIndex,

fr-Type ENUMERATED {fr1, fr2}

}

CandidateServingFreqListNR ::= SEQUENCE (SIZE (1.. maxFreqIDC-MRDC)) OF ARFCN-ValueNR

CandidateServingFreqListEUTRA ::= SEQUENCE (SIZE (1.. maxFreqIDC-MRDC)) OF ARFCN-ValueEUTRA

T-Offset-r16 ::= ENUMERATED {ms0dot5, ms0dot75, ms1, ms1dot5, ms2, ms2dot5, ms3, spare1}

CandidateCellInfoListCPC-r17 ::= SEQUENCE (SIZE (1..maxFreq)) OF CandidateCellInfo-r17

CandidateCellInfo-r17 ::= SEQUENCE {

ssbFrequency-r17 ARFCN-ValueNR,

candidateList-r17 SEQUENCE (SIZE (1..maxNrofCondCells-r16)) OF CandidateCell-r17

}

CandidateCell-r17 ::= SEQUENCE {

physCellId-r17 PhysCellId,

condExecutionCondSCG-r17 OCTET STRING (CONTAINING CondReconfigExecCondSCG-r17) OPTIONAL

}

-- TAG-CG-CONFIG-STOP

-- ASN1STOP

|  |
| --- |
| *CG-Config* field descriptions |
| ***candidateCellInfoListCPC***  Contains information regarding candidate target cells for Conditional PSCell Change (CPC) that the source secondary gNB suggests the target secondary gNB to consider configuring for CPC. |
| ***candidateCellInfoListSN***  Contains information regarding cells that the source secondary node suggests the target secondary gNB to consider configuring. |
| ***candidateCellInfoListSN-EUTRA***  Includes the *MeasResultList3EUTRA* as specified in TS 36.331 [10]. Contains information regarding cells that the source secondary node suggests the target secondary eNB to consider configuring. This field is only used in NE-DC. |
| ***candidateServingFreqListNR, candidateServingFreqListEUTRA***  Indicates frequencies of candidate serving cells for In-Device Co-existence Indication (see TS 36.331 [10]). |
| ***configRestrictModReq***  Used by SN to request changes to SCG configuration restrictions previously set by MN to ensure UE capabilities are respected. E.g. can be used to request configuring an NR band combination whose use MN has previously forbidden. SN only includes this field in SN-initiated procedures. |
| ***drx-ConfigSCG***  This field contains the complete DRX configuration of the SCG. This field is only used in NR-DC. |
| ***drx-InfoSCG***  This field contains the DRX long and short cycle configuration of the SCG. This field is used in (NG)EN-DC and NE-DC. |
| ***drx-InfoSCG2***  This field contains the drx-onDurationTimer configuration of the SCG. This field is only used in (NG)EN-DC. |
| ***fr-InfoListSCG***  Contains information of FR information of serving cells that include PScell and SCells configured in SCG. |
| ***fr1-Carriers-SCG, fr2-Carriers-SCG***  Indicates the number of FR1 or FR2 serving cells configured in SCG. |
| ***measuredFrequenciesSN***  Used by SN to indicate a list of frequencies measured by the UE. |
| ***needForGaps***  In NE-DC, indicates whether the SN requests gNB to configure measurements gaps. |
| ***ph-InfoSCG***  Power headroom information in SCG that is needed in the reception of PHR MAC CE of MCG |
| ***ph-SupplementaryUplink***  Power headroom information for supplementary uplink. In the case of (NG)EN-DC and NR-DC, this field is only present when two UL carriers are configured for a serving cell and one UL carrier reports type1 PH while the other reports type 3 PH. |
| ***ph-Type1or3***  Type of power headroom for a certain serving cell in SCG (PSCell and activated SCells). Value *type1* refers to type 1 power headroom, value *type3* refers to type 3 power headroom. (See TS 38.321 [3]). |
| ***ph-Uplink***  Power headroom information for uplink. |
| ***pSCellFrequency, pSCellFrequencyEUTRA***  Indicates the frequency of PSCell in NR (i.e., *pSCellFrequency*) or E-UTRA (i.e., *pSCellFrequencyEUTRA*). In this version of the specification, *pSCellFrequency* is not used in NE-DC whereas *pSCellFrequencyEUTRA* is only used in NE-DC. *pSCellFrequency* indicates the *absoluteFrequencySSB*. |
| ***reportCGI-RequestNR, reportCGI-RequestEUTRA***  Used by SN to indicate to MN about configuring *reportCGI* procedure. The request may optionally contain information about the cell for which SN intends to configure *reportCGI* procedure. In this version of the specification, the *reportCGI-RequestNR* is used in (NG)EN-DC and NR-DC whereas *reportCGI-RequestEUTRA* is used only for NE-DC. |
| ***requestedBC-MRDC***  Used to request configuring a band combination and corresponding feature sets which are forbidden to use by MN (i.e. outside of the *allowedBC-ListMRDC*) to allow re-negotiation of the UE capabilities for SCG configuration. |
| ***reservedResources***  Used to request the maximum number of CSI-RS and/or SSB resources allowed to be configured for the SCG. This field is only used in NR-DC. |
| ***requestedMaxInterFreqMeasIdSCG***  Used to request the maximum number of allowed measurement identities to configure for inter-frequency measurement. This field is only used in NR-DC. |
| ***requestedMaxIntraFreqMeasIdSCG***  Used to request the maximum number of allowed measurement identities to configure for intra-frequency measurement on each serving frequency. |
| ***requestedPDCCH-BlindDetectionSCG***  Requested value of the reference number of cells for PDCCH blind detection allowed to be configured for the SCG. |
| ***requestedP-MaxEUTRA***  Requested value for the maximum power for the serving cells the UE can use in E-UTRA SCG. This field is only used in NE-DC. |
| ***requestedP-MaxFR1***  Requested value for the maximum power for the serving cells on frequency range 1 (FR1) in this secondary cell group (see TS 38.104 [12]) the UE can use in NR SCG. |
| ***requestedP-MaxFR2***  Requested value for the maximum power for the serving cells on frequency range 2 (FR2) in this secondary cell group the UE can use in NR SCG. This field is only used in NR-DC. |
| ***requestedToffset***  Requests the new value for the time offset restriction used by the SN for scheduling SCG transmissions (i.e. see TS 38.213 [13]). This field is used in NR-DC only when the fields *nrdc-PC-mode-FR1-r16* or *nrdc-PC-mode-FR2-r16* are set to dynamic. Value ms0dot5 corresponds to 0.5 ms, value ms0dot75 corresponds to 0.75 ms, value ms1 corresponds to 1ms and so on. |
| ***scellFrequenciesSN-EUTRA, scellFrequenciesSN-NR***  Indicates the frequency of all SCells with SSB configured in SCG. The field *scellFrequenciesSN-EUTRA* is used in NE-DC; the field *scellFrequenciesSN-NR* is used in (NG)EN-DC and NR-DC. In (NG)EN-DC, the field is optionally provided to the MN. *scellFrequenciesSN-NR* indicates *absoluteFrequencySSB*. |
| ***scg-CellGroupConfig***  Contains the *RRCReconfiguration* message (containing only *secondaryCellGroup* and/or *measConfig* and/or *otherConfig* and/or *conditionalReconfiguration* and/or *bap-Config* and/or *iab-IP-AddressConfigurationList*):  - to be sent to the UE, used upon SCG establishment or modification (only when the SCG is not released by the SN), as generated (entirely) by the (target) SgNB. In this case, the SN sets the *RRCReconfiguration* message in accordance with clause 6 e.g. regarding the "Need" or "Cond" statements.  or  - including the current SCG configuration of the UE, when provided in response to a query from MN, or in SN triggered SN change in order to enable delta signaling by the target SN, or in SN triggered modification procedure in order to coordinate CHO or MN-initiated CPC with SCG reconfigurations (see TS 38.423 [35]). In this case, the SN sets the *RRCReconfiguration* message in accordance with clause 11.2.3.  The field is absent if neither SCG (re)configuration nor SCG configuration query nor SN triggered modification procedure in order to coordinate CHO or MN-initiated CPC with SCG reconfigurations (see TS 38.423 [35]) nor SN triggered SN change is performed, e.g. at inter-node capability/configuration coordination which does not result in SCG (re)configuration towards the UE. The field is also absent upon an SCG release triggered by the SN. This field is not applicable in NE-DC. |
| ***scg-CellGroupConfigEUTRA***  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*:  - to be sent to the UE, used to (re-)configure the SCG configuration upon SCG establishment or modification (only when the SCG is not released by the SN), as generated (entirely) by the (target) SeNB. In this case, the SN sets the *scg-Configuration* within the EUTRA *RRCConnectionReconfiguration* message in accordance with clause 6 in TS 36.331 [10] e.g. regarding the "Need" or "Cond" statements.  or  - including the current SCG configuration of the UE, when provided in response to a query from MN, or in SN triggered SN change in order to enable delta signalling by the target SN.  The field is absent if neither SCG (re)configuration nor SCG configuration query nor SN triggered SN change is performed, e.g. at inter-node capability/configuration coordination which does not result in SCG (re)configuration towards the UE. The field is also absent upon an SCG release triggered by the SN. This field is only used in NE-DC. |
| ***scg-RB-Config***  Contains the IE *RadioBearerConfig*:  - to be sent to the UE, used to (re-)configure the SCG RB configuration upon SCG establishment or modification, as generated (entirely) by the (target) SgNB or SeNB. In this case, the SN sets the *RadioBearerConfig* in accordance with clause 6, e.g. regarding the "Need" or "Cond" statements.  or  - including the current SCG RB configuration of the UE, when provided in response to a query from MN or in SN triggered SN change or in SN triggered SN release or bearer type change between SN terminated bearer to MN terminated bearer in order to enable delta signaling by the MN or target SN. In this case, the SN sets the *RadioBearerConfig* in accordance with clause 11.2.3.  The field is absent if neither SCG (re)configuration nor SCG configuration query nor SN triggered SN change nor SN triggered SN release is performed, e.g. at inter-node capability/configuration coordination which does not result in SCG RB (re)configuration. |
| ***selectedBandCombination***  Indicates the band combination selected by SN in (NG)EN-DC, NE-DC, and NR-DC. The SN should inform the MN with this field whenever the band combination and/or feature set it selected for the SCG changes (i.e. even if the new selection concerns a band combination and/or feature set that is allowed by the *allowedBC-ListMRDC*) |
| ***selectedToffset***  Indicates the value used by the SN for scheduling SCG transmissions (i.e. see TS 38.213 [13]). This field is used in NR-DC only when the fields *nrdc-PC-mode-FR1-r16* or *nrdc-PC-mode-FR2-r16* are set to dynamic. The SN can only indicate a value that is less than or equal to *maxToffset* received from MN. This field is used in NR-DC only when MN has included the field *maxToffset* in *CG-ConfigInfo*. Value *ms0dot5* corresponds to 0.5 ms, value *ms0dot75* corresponds to 0.75 ms, value *ms1* corresponds to 1ms and so on. |
| ***servCellInfoListSCG-EUTRA***  Indicates the carrier frequency and the transmission bandwidth of the serving cell(s) in the SCG in intra-band NE-DC. The field is needed when MN and SN operate serving cells in the same band for either contiguous or non-contiguous intra-band band combination or LTE NR inter-band band combinations where the frequency range of the E-UTRA band is a subset of the frequency range of the NR band (as specified in Table 5.5B.4.1-1 of TS 38.101-3 [34]) in NE-DC. |
| ***servCellInfoListSCG-NR***  Indicates the frequency band indicator, carrier center frequency, UE specific channel bandwidth and SCS of the serving cell(s) in the SCG in intra-band (NG)EN-DC. The field is needed when MN and SN operate serving cells in the same band for either contiguous or non-contiguous intra-band band combination or LTE NR inter-band band combinations where the frequency range of the E-UTRA band is a subset of the frequency range of the NR band (as specified in Table 5.5B.4.1-1 of TS 38.101-3 [34]) in (NG)EN-DC. |
| ***twoPHRModeSCG***  Indicates if the power headroom for SCG shall be reported as two PHRs (each PHR associated with a SRS resource set) is enabled or not. |
| ***twoSRS-PUSCH-Repetition***  Indicates whether the indicated serving cell is configured for PUSCH repetition corresponding to two SRS resource sets configured in either *srs-ResourceSetToAddModList* or *srs-ResourceSetToAddModListDCI-0-2* with usage 'codebook' or 'noncodebook'. |
| ***transmissionBandwidth-EUTRA***  Indicates the transmission bandwidth on an E-UTRA carrier frequency as defined by the parameter Transmission Bandwidth Configuration "NRB" TS 36.104 [33]. The values rb6, rb15, rb25, rb50, rb75, rb100 indicate 6, 15, 25, 50, 75 and 100 resource blocks respectively. |
| ***ueAssistanceInformationSCG***  Includes for each UE assistance feature associated with the SCG, the information last reported by the UE in the NR *UEAssistanceInformation* message for the SCG, if any. |

|  |
| --- |
| *BandCombinationInfoSN* field descriptions |
| ***bandCombinationIndex***  In case of 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*. In case of (NG)EN-DC, this field indicates the position of a band combination in the *supportedBandCombinationList* and/or *supportedBandCombinationList-UplinkTxSwitch*. 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*. Band combination entries in *supportedBandCombinationList-UplinkTxSwitch* are referred by an index which corresponds to the position of a band combination in the *supportedBandCombinationList-UplinkTxSwitch* increased by the number of entries in *supportedBandCombinationList*. |
| ***requestedFeatureSets***  The position in the *FeatureSetCombination* which identifies one *FeatureSetUplink*/*Downlink* for each band entry in the associated band combination |

|  |  |
| --- | --- |
| Conditional Presence | Explanation |
| *FDD* | This field is mandatory present if dl-FreqInfo-NR is included and concerns an FDD carrier; otherwise the field is absent. |

#### *– 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 CG-ConfigInfo-v1610-IEs OPTIONAL

}

CG-ConfigInfo-v1610-IEs ::= SEQUENCE {

drx-InfoMCG2 DRX-Info2 OPTIONAL,

alignedDRX-Indication ENUMERATED {true} OPTIONAL,

scgFailureInfo-r16 SEQUENCE {

failureType-r16 ENUMERATED { scg-lbtFailure-r16, beamFailureRecoveryFailure-r16,

t312-Expiry-r16, bh-RLF-r16,

beamFailure-r17, spare3, spare2, spare1},

measResultSCG-r16 OCTET STRING (CONTAINING MeasResultSCG-Failure)

} OPTIONAL,

dummy1 SEQUENCE {

failureTypeEUTRA-r16 ENUMERATED { scg-lbtFailure-r16, beamFailureRecoveryFailure-r16,

t312-Expiry-r16, spare5,

spare4, spare3, spare2, spare1},

measResultSCG-EUTRA-r16 OCTET STRING

} OPTIONAL,

sidelinkUEInformationNR-r16 OCTET STRING (CONTAINING SidelinkUEInformationNR-r16) OPTIONAL,

sidelinkUEInformationEUTRA-r16 OCTET STRING OPTIONAL,

nonCriticalExtension CG-ConfigInfo-v1620-IEs OPTIONAL

}

CG-ConfigInfo-v1620-IEs ::= SEQUENCE {

ueAssistanceInformationSourceSCG-r16 OCTET STRING (CONTAINING UEAssistanceInformation) OPTIONAL,

nonCriticalExtension CG-ConfigInfo-v1640-IEs OPTIONAL

}

CG-ConfigInfo-v1640-IEs ::= SEQUENCE {

servCellInfoListMCG-NR-r16 ServCellInfoListMCG-NR-r16 OPTIONAL,

servCellInfoListMCG-EUTRA-r16 ServCellInfoListMCG-EUTRA-r16 OPTIONAL,

nonCriticalExtension CG-ConfigInfo-v1700-IEs OPTIONAL

}

CG-ConfigInfo-v1700-IEs ::= SEQUENCE {

candidateCellListCPC-r17 CandidateCellListCPC-r17 OPTIONAL,

twoPHRModeMCG-r17 ENUMERATED {enabled} OPTIONAL,

lowMobilityEvaluationConnectedInPCell-r17 ENUMERATED {enabled} OPTIONAL,

nonCriticalExtension CG-ConfigInfo-v1730-IEs OPTIONAL

}

CG-ConfigInfo-v1730-IEs ::= SEQUENCE {

fr1-Carriers-MCG-r17 INTEGER (1..32) OPTIONAL,

fr2-Carriers-MCG-r17 INTEGER (1..32) OPTIONAL,

nonCriticalExtension SEQUENCE {} OPTIONAL

}

ServCellInfoListMCG-NR-r16 ::= SEQUENCE (SIZE (1.. maxNrofServingCells)) OF ServCellInfoXCG-NR-r16

ServCellInfoListMCG-EUTRA-r16 ::= SEQUENCE (SIZE (1.. maxNrofServingCellsEUTRA)) OF ServCellInfoXCG-EUTRA-r16

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

]],

[[

p-maxNR-FR1-MCG-r16 P-Max OPTIONAL,

powerCoordination-FR2-r16 SEQUENCE {

p-maxNR-FR2-MCG-r16 P-Max OPTIONAL,

p-maxNR-FR2-SCG-r16 P-Max OPTIONAL,

p-maxUE-FR2-r16 P-Max OPTIONAL

} OPTIONAL,

nrdc-PC-mode-FR1-r16 ENUMERATED {semi-static-mode1, semi-static-mode2, dynamic} OPTIONAL,

nrdc-PC-mode-FR2-r16 ENUMERATED {semi-static-mode1, semi-static-mode2, dynamic} OPTIONAL,

maxMeasSRS-ResourceSCG-r16 INTEGER(0..maxNrofCLI-SRS-Resources-r16) OPTIONAL,

maxMeasCLI-ResourceSCG-r16 INTEGER(0..maxNrofCLI-RSSI-Resources-r16) OPTIONAL,

maxNumberEHC-ContextsSN-r16 INTEGER(0..65536) OPTIONAL,

allowedReducedConfigForOverheating-r16 OverheatingAssistance OPTIONAL,

maxToffset-r16 T-Offset-r16 OPTIONAL

]],

[[

allowedReducedConfigForOverheating-r17 OverheatingAssistance-r17 OPTIONAL,

maxNumberUDC-DRB-r17 INTEGER(0..2) OPTIONAL,

maxNumberCPCCandidates-r17 INTEGER(0..maxNrofCondCells-1-r17) OPTIONAL

]],

[[

allowedResourceConfigNRDC-r17 ResourceConfigNRDC-r17 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,

...,

[[

twoSRS-PUSCH-Repetition-r17 ENUMERATED{enabled} 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

}

DRX-Info2 ::= SEQUENCE {

drx-onDurationTimer CHOICE {

subMilliSeconds INTEGER (1..31),

milliSeconds ENUMERATED {

ms1, ms2, ms3, ms4, ms5, ms6, ms8, ms10, ms20, ms30, ms40, ms50, ms60,

ms80, ms100, ms200, ms300, ms400, ms500, ms600, ms800, ms1000, ms1200,

ms1600, spare8, spare7, spare6, spare5, spare4, spare3, spare2, spare1 }

}

}

MeasConfigMN ::= SEQUENCE {

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

measGapConfig SetupRelease { GapConfig } OPTIONAL,

gapPurpose ENUMERATED {perUE, perFR1} OPTIONAL,

...,

[[

measGapConfigFR2 SetupRelease { GapConfig } OPTIONAL

]],

[[

interFreqNoGap-r16 ENUMERATED {true} OPTIONAL

]]

}

MRDC-AssistanceInfo ::= SEQUENCE {

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

...,

[[

overheatingAssistanceSCG-r16 OCTET STRING (CONTAINING OverheatingAssistance) OPTIONAL

]],

[[

overheatingAssistanceSCG-FR2-2-r17 OCTET STRING (CONTAINING OverheatingAssistance-r17) OPTIONAL

]]

}

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

CandidateCellListCPC-r17 ::= SEQUENCE (SIZE (1..maxFreq)) OF CandidateCellCPC-r17

CandidateCellCPC-r17 ::= SEQUENCE {

ssbFrequency-r17 ARFCN-ValueNR,

candidateCellList-r17 SEQUENCE (SIZE (1..maxNrofCondCells-r16)) OF PhysCellId

}

-- TAG-CG-CONFIG-INFO-STOP

-- ASN1STOP

|  |
| --- |
| *CG-ConfigInfo* field descriptions |
| ***alignedDRX-Indication***  This field is signalled upon MN triggered CGI reporting by the UE that requires aligned DRX configurations between the MCG and the SCG (i.e. same DRX cycle and on-duration configured by MN completely contains on-duration configured by SN). |
| ***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* and *supportedBandCombinationList-UplinkTxSwitch* 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. |
| ***allowedReducedConfigForOverheating***  Indicates the reduced configuration that the SCG is allowed to configure.  *reducedMaxCCs* in *allowedReducedConfigForOverheating* indicates the maximum number of downlink/uplink PSCell/SCells that the SCG is allowed to configure. This field is used in (NG)EN-DC and NR-DC.  *reducedMaxBW-FR1* and *reducedMaxBW-FR2* in *allowedReducedConfigForOverheating* indicates the maximum aggregated bandwidth across all downlink/uplink carriers of FR1 and FR2-1, respectively that the SCG is allowed to configure. *reducedMaxBW-FR2-2* in *allowedReducedConfigForOverheating-r17* indicates the maximum aggregated bandwidth across all downlink/uplink carriers of FR2-2 that the SCG is allowed to configure. This field is only used in NR-DC.  *reducedMaxMIMO-LayersFR1* and *reducedMaxMIMO-LayersFR2* in *allowedReducedConfigForOverheating* indicates the maximum number of downlink/uplink MIMO layers of each serving cell operating on FR1 and FR2-1, respectively that the SCG is allowed to configure. *reducedMaxMIMO-LayersFR2-2* in *allowedReducedConfigForOverheating-r17* indicates the maximum number of downlink/uplink MIMO layers of each serving cell operating on FR2-2 that the SCG is allowed to configure. This field is only used in NR-DC. |
| ***allowedResourceConfigNRDC***  indicates the maximum number of resources that SCG is allowed to configure. This field is only applicable for NR-DC. |
| ***candidateCellInfoListMN***, ***candidateCellInfoListSN***  Contains information regarding cells that the master node or the source node suggests the target gNB or DU to consider configuring. In case of MN initiated CPA or CPC, the field *candidateCellInfoListMN* contains information regarding cells that the MN suggests the candidate target secondary node to consider configuring for MN initiated CPA or CPC.  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. |
| ***candidateCellListCPC***  Contains information regarding cells that the source secondary node suggests the candidate target secondary node to consider configuring for SN initiated Conditional PSCell Change (CPC). |
| ***configRestrictInfo***  Includes fields for which SgNB is explicitly 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. |
| ***drx-InfoMCG2***  This field contains the *drx-onDurationTimer* configuration of the MCG. This field is only used in (NG)EN-DC. |
| ***dummy, dummy1***  These fields are not used in the specification and SN ignores the received value(s). |
| ***fr-InfoListMCG***  Contains information of FR information of serving cells that include PCell and SCell(s) configured in MCG. |
| ***fr1-Carriers-MCG, fr2-Carriers-MCG***  Indicates the number of FR1 or FR2 serving cells configured in MCG. |
| ***interFreqNoGap***  Indicates that the field *interFrequencyConfig-NoGap-r16* has been included within the *MeasConfig* IE generated by the MN. |
| ***lowMobilityEvaluationConnectedInPCell***  Indicates if low mobility criterion has been configured in NR PCell. |
| ***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. |
| ***maxMeasCLI-ResourceSCG***  Indicates the maximum number of CLI RSSI resources that the SCG is allowed to configure. |
| ***maxMeasFreqsSCG***  Indicates the maximum number of NR inter-frequency carriers the SN is allowed to configure with PSCell for measurements. |
| ***maxMeasSRS-ResourceSCG***  Indicates the maximum number of SRS resources that the SCG is allowed to configure for CLI measurement. |
| ***maxNumberCPCCandidates***  Indicates the maximum numbers of conditional reconfigurations the SN is allowed to configure for SN initiated CPC. Value 0 indicates that the SN is not allowed to configure SN initiated CPC. If the field is absent, the SN is allowed to configure up to *maxNrofCondCells-r16* conditional reconfigurations for SN-initiated CPC. |
| ***maxNumberROHC-ContextSessionsSN***  Indicates the maximum number of ROHC context sessions allowed to SN terminated bearer, excluding context sessions that leave all headers uncompressed. |
| ***maxNumberEHC-ContextsSN***  Indicates the maximum number of EHC contexts allowed to the SN terminated bearer. The field indicates the number of contexts in addition to CID = "all zeros", as specified in TS 38.323 [5]. |
| ***maxNumberUDC-DRB***  Indicates the maximum number of UDC DRBs allowed to SN terminated bearer. This field is used in NGEN-DC, NR-DC and NE-DC. |
| ***maxToffset***  Indicates the maximum Toffset value the SN is allowed to use for scheduling SCG transmissions (see TS 38.213 [13]). This field is used in NR-DC only when the fields *nrdc-PC-mode-FR1-r16* or *nrdc-PC-mode-FR2-r16* are set to dynamic. Value *ms0dot5* corresponds to 0.5 ms, value *ms0dot75* corresponds to 0.75 ms, value *ms1* corresponds to 1 ms and so on. |
| ***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 MN, used by the SN to support delta configuration to UE (i.e. when MN does not use full configuration option), 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]). |
| ***nrdc-PC-mode-FR1***  Indicates the uplink power sharing mode that the UE uses in NR-DC FR1 (see TS 38.213 [13], clause 7.6). |
| ***nrdc-PC-mode-FR2***  Indicates the uplink power sharing mode that the UE uses in NR-DC FR2 (see TS 38.213 [13], clause 7.6). |
| ***overheatingAssistanceSCG***  Contains the UE's preference on reduced configuration for NR SCG to address overheating. This field is only used in (NG)EN-DC. |
| ***overheatingAssistanceSCG-FR2-2***  Contains the UE's preference on reduced configuration for NR SCG on FR2-2 to address overheating. This field is only used in (NG)EN-DC. |
| ***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***  For (NG)EN-DC and NE-DC, the field 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]). For NR-DC, it 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 UE can use in NR SCG. |
| ***p-maxUE-FR1***  Indicates the maximum total transmit power to be used by the UE across all serving cells in frequency range 1 (FR1). |
| ***p-maxNR-FR1-MCG***  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 UE can use in NR MCG. This field is only used in NR-DC. |
| ***p-maxNR-FR2-SCG***  Indicates the maximum total transmit power to be used by the UE in the NR cell group across all serving cells in frequency range 2 (FR2) (see TS 38.104 [12]) the UE can use in NR SCG. |
| ***p-maxUE-FR2***  Indicates the maximum total transmit power to be used by the UE across all serving cells in frequency range 2 (FR2). |
| ***p-maxNR-FR2-MCG***  Indicates the maximum total transmit power to be used by the UE in the NR cell group across all serving cells in frequency range 2 (FR2) (see TS 38.104 [12]) the UE can use in NR MCG. |
| ***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. |
| ***powerCoordination-FR2***  Indicates the maximum power that the UE can use in frequency range 2 (FR2). This field is only used in NR-DC. |
| ***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. |
| ***scg-RB-Config***  Contains all of the fields in the IE RadioBearerConfig used in SN, 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 unless MN uses full configuration option. Otherwise, the field is absent. |
| ***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 in NR-DC. The SN can use this information to determine for which band pair(s) it should check *SimultaneousRxTxPerBandPair*. |
| ***servCellIndexRangeSCG***  Range of serving cell indices that SN is allowed to configure for SCG serving cells. |
| ***servCellInfoListMCG-EUTRA***  Indicates the carrier frequency and the transmission bandwidth of the serving cell(s) in the MCG in intra-band (NG)EN-DC. The field is needed when MN and SN operate serving cells in the same band for either contiguous or non-contiguous intra-band band combination or LTE NR inter-band band combinations where the frequency range of the E-UTRA band is a subset of the frequency range of the NR band (as specified in Table 5.5B.4.1-1 of TS 38.101-3 [34]) in (NG)EN-DC. |
| ***servCellInfoListMCG-NR***  Indicates the frequency band indicator, carrier center frequency, UE specific channel bandwidth and SCS of the serving cell(s) in the MCG in intra-band NE-DC. The field is needed when MN and SN operate serving cells in the same band for either contiguous or non-contiguous intra-band band combination or LTE NR inter-band band combinations where the frequency range of the E-UTRA band is a subset of the frequency range of the NR band (as specified in Table 5.5B.4.1-1 of TS 38.101-3 [34]) in NE-DC. |
| ***servFrequenciesMN-NR***  Indicates the frequency of all serving cells that include PCell and SCell(s) with SSB configured in MCG. This field is only used in NR-DC. servFrequenciesMN-NR indicates absoluteFrequencySSB. |
| ***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*. |
| ***sidelinkUEInformationEUTRA***  This field contains the E-UTRA *SidelinkUEInformation* message as specified in TS 36.331 [10]. |
| ***sidelinkUEInformationNR***  This field contains the NR *SidelinkUEInformationNR* message. |
| ***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. |
| ***twoPHRModeMCG***  Indicates if the power headroom for MCG shall be reported as two PHRs (each PHR associated with a SRS resource set) is enabled or not. |
| ***twoSRS-PUSCH-Repetition***  Indicates whether the indicated serving cell is configured for PUSCH repetition corresponding to two SRS resource sets configured in either *srs-ResourceSetToAddModList* or *srs-ResourceSetToAddModListDCI-0-2* with usage 'codebook' or 'noncodebook'. |
| ***ueAssistanceInformationSourceSCG***  Includes for each UE assistance feature associated with the SCG, the information last reported by the UE in the NR *UEAssistanceInformation* message for the source SCG, if any. |
| ***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. |

|  |
| --- |
| *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 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*. In case of (NG)EN-DC, this field indicates the position of a band combination in the *supportedBandCombinationList* and/or *supportedBandCombinationList-UplinkTxSwitch*. 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*. Band combination entries in *supportedBandCombinationList-UplinkTxSwitch* are referred by an index which corresponds to the position of a band combination in the *supportedBandCombinationList-UplinkTxSwitch* increased by the number of entries in *supportedBandCombinationList*. |

|  |  |
| --- | --- |
| 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 | Need not be included if the UE Radio Capability ID as specified in 23.502 [43] is used. Included otherwise | Not included | Need not be included if the UE Radio Capability ID as specified in 23.502 [43] is used. Included otherwise |
| NR | E-UTRA | Not included | Need not be included if the UE Radio Capability ID as specified in 23.502 [43] is used. Included otherwise | Need not be included if the UE Radio Capability ID as specified in 23.502 [43] is used. Included otherwise |
| NR | NR | Need not be included if the UE Radio Capability ID as specified in 23.502 [43] is used. Included otherwise | Not included | Not included |

#### *– ResourceConfigNRDC*

This IE is used to indicate or request by maximum values to be used by the SN, with each value equal to or lower than the value of the field corresponding to the same FR in the UE capability, as reported by the UE, unless specified otherwise.

*ResourceConfigNRDC* message

-- ASN1START

-- TAG-RESOURCECONFIGNRDC-START

ResourceConfigNRDC-r17 ::= SEQUENCE {

fr1-ResourceConfig-r17 ResourceConfigPerFR-r17 OPTIONAL,

fr2-ResourceConfig-r17 ResourceConfigPerFR-r17 OPTIONAL,

maxNumberResAcrossCC-AcrossFR-r17 INTEGER (0..256) OPTIONAL,

...

}

ResourceConfigPerFR-r17 ::= SEQUENCE {

bm-MaxNumberCSI-RS-Resource-r17 INTEGER (0..64) OPTIONAL,

bm-maxNumberAperiodicCSI-RS-Resource-r17 INTEGER (0..64) OPTIONAL,

cg-MaxNumberConfigsAllCC-r17 INTEGER (0..32) OPTIONAL,

maxNumberCSI-RS-BFD-r17 INTEGER (0..64) OPTIONAL,

maxNumberCSI-RS-SSB-CBD-r17 INTEGER (0..256) OPTIONAL,

maxNumberSSB-BFD-r17 INTEGER (0..64) OPTIONAL,

sps-MaxNumberConfigsAllCC-r17 INTEGER (0..32) OPTIONAL,

trs-maxConfResourceSetsAllCC-r17 INTEGER (0..256) OPTIONAL,

...

}

-- TAG-RESOURCECONFIGNRDC-STOP

-- ASN1STOP

|  |
| --- |
| *ResourceConfigPerUE* field descriptions |
| ***fr1-ResourceConfig, fr2-ResourceConfig***  indicates the maximum number of resources that SCG is allowed to configure for FR1/FR2, respectively. |
| ***maxNumberResAcrossCC-AcrossFR***  indicates the maximum number of configured CSI-RS resources across SCG. |

|  |
| --- |
| *ResourceConfig-CG* field descriptions |
| ***bm-maxNumberAperiodicCSI-RS-Resource***  Indicates the maximum number of aperiodic CSI-RS resources that the SCG is allowed to configure for UE to measure L1-RSRP across the SCG. Corresponds to the UE capability *beamManagementSSB-CSI-RS-r16::maxNumberAperiodicCSI-RS-Resource*. |
| ***bm-MaxNumberCSI-RS-Resource***  Indicates indicates maximum total number of NZP-CSI-RS resources that can be configured for UE to measure L1-RSRP across the SCG. Corresponds to the UE capability *beamManagementSSB-CSI-RS-r16::maxNumberCSI-RS-Resource-r16*. |
| ***cg-MaxNumberConfigsAllCC***  Indicates the maximum number of active configured grant configurations across SCG. Corresponds to the UE capability *activeConfiguredGrant-r16::maxNumberConfigsAllCC-r16*. |
| ***maxNumberCSI-RS-BFD***  Indicates the maximal number of different CSI-RS resources across SCG NR-DC for UE to monitor PDCCH quality. Corresponds to the UE capability *maxNumberCSI-RS-BFD-r16*. |
| ***maxNumberCSI-RS-SSB-CBD***  Indicates maximal number of different CSI-RS (and/or SSB) resources across SCG for new beam identifications. Corresponds to the UE capability *maxNumberCSI-RS-SSB-CBD-r16*. |
| ***maxNumberSSB-BFD***  Indicates the maximal number of different SSBs across SCG for UE to monitor PDCCH quality. Corresponds to the UE capability *maxNumberSSB-BFD-r16*. |
| ***sps-MaxNumberConfigsAllCC***  Indicates the maximum number of SPS configurations across SCG. Corresponds to the UE capability *sps-r16::maxNumberConfigsAllCC-r16*. |
| ***trs-maxConfResourceSetsAllCC-r17***  Indicates the maximum configured CSI-RS for tracking (i.e. TRS) resource sets for the corresponding FR across the SCG in case of NR-DC. Corresponds to the UE capability *csi-RS-ForTracking-r16::maxConfiguredResourceSetsAllCC-r16*. |

*End of Changes*