**3GPP TSG-RAN WG2 Meeting #127** **R2-2407584**

Maastricht, Netherlands, 19th – 23th Aug, 2024

**Agenda item: 7.4.2**

**Source: MediaTek, ZTE**

**Title:** **Summary of [AT127][104][MOB] (MediaTek, ZTE)**

**Document for: Discussion and Decision**

# Introduction

This document is a summary of:

[AT127][104][MOB] (MediaTek, ZTE)

 **Scope:** Discuss proposals in R2-2406355 and R2-2406418. Make agreeable proposals based on companies’ understanding and inputs. F2F offline discussion is asked (i.e. need to decide date/time and reserve a room for f2f offline discussion -> Send an email to Juha)

 **Intended outcome:** Discussion summary (including TP if possible) in R2-2407584.

**Deadline:** Comeback in Thursday CB session.

# 2. Discussion

## 2.1 Clarification on R4 39-6

The capability ltm-FastProcessingConfig-r18 (R4 39-6) that has UE granularity with FR differentiation. This capability is implemented as per band granularity with the description stating that the capability value remains consistent across all FDD-FR1 bands, all TDD-FR1 bands, all TDD-FR2-1 bands and all TDD-FR2-2 bands.

However, this capability also includes parameters for the maximum number of some functionality. Given the per-band granularity, there is a potential for misunderstanding that these values are for the current band but not cross-band, even the value is consistent for all bands.

Therefore, the following propose is made for clarification:

**Proposal 1: Clarify that the capability value of *ltm-FastProcessingConfig-r18* indicates the maximum number across all the supported bands, rather than the current band.** **Adopt the TP 1 in the following.**

|  |
| --- |
| [Discussion]* Majority think it is acceptable.
* [Huawei]: We should also clarify this in each component. (This has been updated in the following TP, as well as some editorial modifications.)

[Outcome]**The proposal 1 and the following TP 1 is agreeable.** |

A TP can be found as below:

### TP 1

---- Begin TP ----

| ***ltm-FastProcessingConfig-r18***Indicates whether the UE supports fast processing of LTM candidate cell RRC configuration. This capability signalling comprises the following parameters:- *maxNumberStoredConfigCells-r18* indicates the maximum number of serving cell(s) and candidate cell(s), including serving SpCell(s), serving SCell(s) in MCG and SCG, SpCell in *LTM-CandidateConfig*(s) and Scell(s) in *LTM-CandidateConfig*(s) for MCG and SCG, that UE can storeacross all the supported bands.- *maxNumberConfigs-r18* indicates the maximum number of *LTMCandidateConfigs* that UE can support fast processing across all the supported bands.A UE supporting this capability shall also indicate support of *ltm-MAC-CE-JointTCI-r18* or *ltm-MAC-CE-SeparateTCI-r18*. UE shall set the capability value consistently for all FDD-FR1 bands, all TDD-FR1 bands, all TDD-FR2-1 bands and all TDD-FR2-2 bands respectively. The capability value represents the maximum number across all the supported bands.NOTE: The conditions for fast processing of an LTM candidate cell RRC configuration is defined in section 6.3 in TS 38.133 [5]. | Band | No | N/A | No |
| --- | --- | --- | --- | --- |

---- End TP ----

## 2.2 Correction on R4 39-7

R4 39-7 is defined as "Faster UE processing time during LTM cell switch," which includes components for the reduced time values in FR1 to FR1, FR2 to FR2, and FR1/FR1 to FR2/FR1. This is designated as an optional feature group with capability signalling.

However, in the latest TS 38.331, this capability is implemented with a unified optional marker for these three components, which means that the feature in all three cases must be either supported or not supported.

**Observation: R4 39-7 is implemented with only one unified optional marker for three components, which is not aligned with the intention of this feature**.

Therefore, we propose:

**Proposal 2: Add separate optional markers for the three components of the feature R4 39-7 (*ltm-FastUE-Processing*). Adopt the TP 2 in the following.**

|  |
| --- |
| [Discussion]* Rapporteur highlight that this is an NBC change, but it is important. Think NBC change at this stage should be acceptable.
* Majority think it is acceptable.

[Outcome]**The** **proposal 2 and the following TP 2 is agreeable.** |

A TP can be found as below:

### TP 2

---- Begin TP ----

MeasAndMobParametersCommon ::= SEQUENCE {

 …

-- R4 39-7: Faster UE processing time during cell switch

 ltm-FastUE-Processing-r18 SEQUENCE {

 fr1-r18 ENUMERATED {ms10, ms15} OPTIONAL,

 fr2-r18 ENUMERATED {ms10, ms15} OPTIONAL,

 fr1-AndFR2-r18 ENUMERATED {ms20, ms30} OPTIONAL

 } OPTIONAL,

---- End TP ----

## 2.3 Per band pair per band combination granularity

Regarding the LTM UE capabilities with per band pair per band combination:

* R1 45-5a RACH-based early TA acquisition with simultaneous transmission
* R4 39-4 Interruption on DL slot(s) due to PDCCH- ordered RACH transmission
* R4 39-4a Interruption due to RF retuning for PDCCH- ordered RACH
* R4 39-5 RF/BB preparation time for PDCCH-order RACHR

Rapporteur suggest a optimization to current signalling structure that directly indicate the target band of the band pair (as option2 below), instead of the current bitmap structure (as option1 below) from the appliedFreqBandListFilter indicate by the network.

Option1(bitmap-like, current structure), take R1 45-5a as example:

FeatureSetUplink-v1800 ::= SEQUENCE {

 …

 -- R1 45-5a: RACH-based early TA acquisition with simultaneous transmission

 rach-EarlyTA-BandList-r18 SEQUENCE (SIZE (1..maxBandsMRDC)) OF BOOLEAN OPTIONAL,

Note: The sequence should be equal and listed in the same order as the *applied**FreqBandListFilter*, which is a mirror to FreqBandListFilter indicated by the network.

Option2 (Indicate target band list directly. Rapporteur’s suggestion), take R1 45-5a as example:

FeatureSetUplink-v18xx ::= SEQUENCE {

 …

 -- R1 45-5a: RACH-based early TA acquisition with simultaneous transmission

 rach-EarlyTA-BandList-r18 SEQUENCE (SIZE (1.. maxBands)) OF RACH-EarlyTA-TargetBand OPTIONAL,

…

RACH-EarlyTA-TargetBand ::= SEQUENCE {

 TargetbandNR FreqBandIndicatorNR

}

|  |
| --- |
| [Discussion]* Rapporteur think the current structure need network to always send *FreqBandListFilter* into Capability enquiry, which is an extra request to network and we cannot ensure. Nokia think it should not be a problem.
* Not too much view was collected from the offline discussion. After further discuss with UE capability Rapporteur (Intel). The current structure is preferred.
* Note: Capability enquiry without frequencyBandListFilter is not supported.

[Outcome]**Proposal 3: The signalling structure in option2 is not pursued. Keep the current signalling structure for the capabilities with per band pair per band combination granularity** |

The current structure is kept, then some corrections is further needed:

Issue1: For R4 39-4, 39-4a and 39-5, as per RAN4 FL, these three capabilities are mutually independent. (Not pre-requisite to each other). However, there is only one “notsupported” for these three capabilities. This implies UE need to report both supported or not supported to these three capabilities.

FeatureSetDownlink-v1800 ::= SEQUENCE {

 …

 pdcch-RACH-DL-InfoList-r18 SEQUENCE (SIZE (1..maxBandsMRDC)) OF PDCCH-RACH-DL-Info-r18

 OPTIONAL,

…

PDCCH-RACH-DL-Info-r18 ::= CHOICE {

 notSupported NULL,

 supported SEQUENCE {

 -- R4 39-4: Interruption on DL slot(s) due to PDCCH- ordered RACH transmission

 pdcch-RACH-AffectedBands-r18 ENUMERATED {noIntrruption, interruption},

 -- R4 39-4a: Interruption on DL slot(s) due to PDCCH- ordered RACH transmission

  pdcch-RACH-SwitchingTimeList-r18 ENUMERATED {ms0, ms0dot25, ms0dot5 , ms1, ms2} OPTIONAL,

 -- R4 39-5: the RF/BB preparation time for PDCCH ordered RACH of which the resources are not fully contained

 -- in any of UE's configured UL BWP(s) of active serving cells

 pdcch-RACH-PrepTime-r18  ENUMERATED {ms1, ms3, ms5, ms10} OPTIONAL

 }

}

|  |
| --- |
| [Discussion]* [Nokia]: These three IEs should be the components of one capability, so they should be some dependencies and should be indicated together or not.
* Rapporteur think we should follow RAN4’s FL and should not change the dependencies.
* Companies have different views on whether these three capabilities can be decoupled or not. This can be further confirmed with RAN4 internally and comeback on Thursday.

[Outcome]**Proposal 4: RAN2 people ask internally to RAN4 to see whether the capabilities R4 39-4, 39-4a and 39-5 can be indicated independently, and come back on Thursday:*** **If** **these capabilities can be indicated independently, adopt the TP 3 in the following.**
* **If these capabilities are always coupled, no correction is needed.**
 |

### TP 3

---- Begin TP ----

FeatureSetDownlink-v1800 ::= SEQUENCE {

 …

 pdcch-RACH-DL-InfoList-r18 SEQUENCE (SIZE (1..maxBandsMRDC)) OF PDCCH-RACH-DL-Info-r18

 OPTIONAL,

…

PDCCH-RACH-DL-Info-r18 ::= CHOICE {

 -- R4 39-4: Interruption on DL slot(s) due to PDCCH- ordered RACH transmission

 pdcch-RACH-AffectedBands-r18 ENUMERATED {noIntrruption, interruption},

 -- R4 39-4a: Interruption on DL slot(s) due to PDCCH- ordered RACH transmission

 pdcch-RACH-SwitchingTimeList-r18 ENUMERATED {ms0, ms0dot25, ms0dot5 , ms1, ms2, notSupported} OPTIONAL,

 -- R4 39-5: the RF/BB preparation time for PDCCH ordered RACH of which the resources are not fully contained

 -- in any of UE's configured UL BWP(s) of active serving cells

 pdcch-RACH-PrepTime-r18 ENUMERATED {ms1, ms3, ms5, ms10, notSupported} OPTIONAL

 }

}

2.4 Inter-node coordination on L1 measurement

 After face-to-face discussions, we think the following proposals are agreeable:

Proposal 5: In order to ensure that UE capabilities on L1 measurement are not exceeded, the MN indicates the maximum number of L1 measurement resources/configurations the SN is allowed to configure for SCG LTM, including:

* + The max number of frequency layers UE can measure for intra- and inter-frequency without measurement gaps L1-RSRP measurement;
	+ The max number of frequency layers UE can measure for inter-frequency L1-RSRP measurement with measurement gaps;
	+ The max number of total cells of serving cells and neighboring cells across all frequency layers of intra-frequency and inter-frequency without measurement gaps for L1 measurement;
	+ The max number of total SSB resources of serving cells and neighboring cells across all frequency layers of intra-frequency and inter-frequency without measurement gaps for L1 measurement;
	+ Maximum number of RRC configured candidate cells for intra-frequency L1-RSRP measurement;
	+ Maximum number of LTM CSI report configs, including aperiodic configs, periodic configs, and semi-persistent configs, respectively;
	+ Maximum number of RRC configured candidate cells for intra- and inter-frequency L1-RSRP measurement

Proposal 6: The SN can also request the MN for new maximum values of the number of L1 measurement resources/configurations (as listed in proposal 1) that the SN can configure for SCG LTM. And it’s up to the MN whether to accommodate the SN request.

Proposal 7: Regarding the capabilities across MCG and SCG per frequency layer, the MN indicates the maximum number of resources per frequency that the SN is allowed to configure. And the SN can request the MN for a new maximum value of the number that the SN can configure. I.e. similar to P1 and P2 above. The capabilities include:

* + The max number of neighbour cells UE can measure for L1-RSRP per frequency layer for intra-frequency or inter-frequency without measurement gaps;
	+ The max number of neighbour cells UE can measure for L1-RSRP per frequency layer for inter-frequency with measurement gaps;
	+ The max number of SSB resources UE can measure for L1-RSRP per frequency layer for intra-frequency or inter-frequency without measurement gaps;
	+ The max number of SSB resources UE can measure for L1-RSRP per frequency layer for inter-frequency with measurement gaps.

Proposal 8: Inter-node coordination is not supported for UE capability that defined as maximum number of resources configured in one slot, i.e. the max number of SSB resources for L1-RSRP measurement that UE can measure within a slot across candidate cells for intra- and inter-frequency without gap L1-RSRP measurement.

Proposal 9: For each coordinated capability above, the MN indicates a single value to the SN and vice versa. And the value is applicable to all BCs in the allowed BC list.

Besides, we also provide the corresponding TP for TS 37.340 and TS 38.331, and no comments is received. So, we think the corresponding TP is acceptable.

Proposal 10: RAN2 to adopt the TP in the Annex as baseline.

# 3. Conclusion

**Proposal 1: Clarify that the capability value of *ltm-FastProcessingConfig-r18* indicates the maximum number across all the supported bands, rather than the current band. Adopt the TP 1****in this paper.**

**Proposal 2: Add separate optional markers for the three components of the feature R4 39-7 (*ltm-FastUE-Processing*). Adopt the TP 2 in this paper.**

**Proposal 3: The signalling structure in option2 is not pursued. Keep the current signalling structure for the capabilities with per band pair per band combination granularity.**

**Proposal 4:** **RAN2 people ask internally to RAN4 to see whether the capabilities R4 39-4, 39-4a and 39-5 can be indicated independently, and come back on Thursday:**

* **If these capabilities can be indicated independently, adopt the TP 3 in this paper.**
* **If these capabilities are always coupled, no correction is needed.**

Proposal 5: In order to ensure that UE capabilities on L1 measurement are not exceeded, the MN indicates the maximum number of L1 measurement resources/configurations the SN is allowed to configure for SCG LTM, including:

* + The max number of frequency layers UE can measure for intra- and inter-frequency without measurement gaps L1-RSRP measurement;
	+ The max number of frequency layers UE can measure for inter-frequency L1-RSRP measurement with measurement gaps;
	+ The max number of total cells of serving cells and neighboring cells across all frequency layers of intra-frequency and inter-frequency without measurement gaps for L1 measurement;
	+ The max number of total SSB resources of serving cells and neighboring cells across all frequency layers of intra-frequency and inter-frequency without measurement gaps for L1 measurement;
	+ Maximum number of RRC configured candidate cells for intra-frequency L1-RSRP measurement;
	+ Maximum number of LTM CSI report configs, including aperiodic configs, periodic configs, and semi-persistent configs, respectively;
	+ Maximum number of RRC configured candidate cells for intra- and inter-frequency L1-RSRP measurement

Proposal 6: The SN can also request the MN for new maximum values of the number of L1 measurement resources/configurations (as listed in proposal 1) that the SN can configure for SCG LTM. And it’s up to the MN whether to accommodate the SN request.

Proposal 7: Regarding the capabilities across MCG and SCG per frequency layer, the MN indicates the maximum number of resources per frequency that the SN is allowed to configure. And the SN can request the MN for a new maximum value of the number that the SN can configure. I.e. similar to P1 and P2 above. The capabilities include:

* + The max number of neighbour cells UE can measure for L1-RSRP per frequency layer for intra-frequency or inter-frequency without measurement gaps;
	+ The max number of neighbour cells UE can measure for L1-RSRP per frequency layer for inter-frequency with measurement gaps;
	+ The max number of SSB resources UE can measure for L1-RSRP per frequency layer for intra-frequency or inter-frequency without measurement gaps;
	+ The max number of SSB resources UE can measure for L1-RSRP per frequency layer for inter-frequency with measurement gaps.

Proposal 8: Inter-node coordination is not supported for UE capability that defined as maximum number of resources configured in one slot, i.e. the max number of SSB resources for L1-RSRP measurement that UE can measure within a slot across candidate cells for intra- and inter-frequency without gap L1-RSRP measurement.

Proposal 9: For each coordinated capability above, the MN indicates a single value to the SN and vice versa. And the value is applicable to all BCs in the allowed BC list.

**Proposal 10: RAN2 to adopt the TP in the Annex as baseline.**

# 4. Reference

[1]. 3GPP TS 38.331 V18.2.0

[2]. R1-2403703 Updated RAN1 UE features list for Rel-18 NR after RAN1\_116bis

[3]. R4-2406680 Rel-18 RAN4 UE feature list for NR (version 4)

[4]. R2-2406355 Leftover LTM UE capability issues MediaTek Inc.

[5]. R2-2406418 Inter-node coordination on L1 measurement for LTM ZTE Corporation

Annex 1.1 - TP to TS 37.340

7.2 Measurements

Skip unrelated parts

For LTM operation, L1 measurements can be configured independently by the MN and by the SN. The MN indicates several maximum numbers of L1 measurement related configurations that the SN is allowed to configure, to ensure that UE capabilities are not exceeded, including:

* The max number of frequency layers UE can measure for intra- and inter-frequency without measurement gaps L1-RSRP measurement;
* The max number of frequency layers UE can measure for inter-frequency L1-RSRP measurement with measurement gaps;
* The max number of neighbour cells UE can measure for L1-RSRP per frequency layer for intra-frequency or inter-frequency without measurement gaps;
* The max number of neighbour cells UE can measure for L1-RSRP per frequency layer for inter-frequency with measurement gaps;
* The max number of total cells of serving cells and neighboring cells across all frequency layers of intra-frequency and inter-frequency without measurement gaps for L1 measurement;
* The max number of SSB resources UE can measure for L1-RSRP per frequency layer for intra-frequency or inter-frequency without measurement gaps;
* The max number of SSB resources UE can measure for L1-RSRP per frequency layer for inter-frequency with measurement gaps;
* The max number of total SSB resources of serving cells and neighboring cells across all frequency layers of intra-frequency and inter-frequency without measurement gaps for L1 measurement;
* The max number of RRC configured candidate cells for intra-frequency L1-RSRP measurement;
* The max number of LTM CSI report configs, including aperiodic configs, periodic configs, and semi-persistent configs, respectively;
* The max number of RRC configured candidate cells for intra- and inter-frequency L1-RSRP measurement.

The SN can also request the MN for new maximum values of the number of L1 measurement related configurations (as listed above) that it can configure, and it is up to the MN whether to accommodate the SN request, based on the capability coordination principles as described in 7.3. If the SN receives from the MN a new value for the maximum number of L1 measurement related configurations, is SN responsibility to ensure that its configured L1 measurement to comply with the new limit.

# Annex 1.2 - TP to TS 38.331

#### – *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 CG-Config-v1800-IEs OPTIONAL

}

CG-Config-v1800-IEs ::= SEQUENCE {

 candidateServingFreqRangeListNR-r18 CandidateServingFreqRangeListNR-r18 OPTIONAL,

 candidateServingFreqListNR-r16 CandidateServingFreqListNR-r16 OPTIONAL,

 idc-TDM-AssistanceConfig-r18 ENUMERATED {enabled} OPTIONAL,

 candidateCellInfoListSubsequentCPC-r18 CandidateCellInfoListCPC-r17 OPTIONAL,

 scpac-ReferenceConfigurationSCG-r18 ReferenceConfiguration-r18 OPTIONAL,

 subsequentCPAC-Information-r18 CandidateCellInfoListCPC-r17 OPTIONAL,

 successPSCell-Config-r18 SuccessPSCell-Config-r18 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

 ]],

 [[

 twoSRS-MultipanelScheme-r18 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

 ]],

 [[

 reservedResourceConfigNRDC-r17 ResourceConfigNRDC-r17 OPTIONAL

 ]],

 [[

 aggregatedBandwidthSN-r17 AggregatedBandwidthSN-r17 OPTIONAL

 ]],

 [[

 requestedMaxLTM-CandidateIdSCG-r18 INTEGER(0..maxNrofLTM-Configs-r18) OPTIONAL

 ]],

 [[

 requestedL1MeasConfigNRDC-r18 L1MeasConfigNRDC-r18 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

}

AggregatedBandwidthSN-r17 ::= SEQUENCE {

 aggBW-FDD-DL-r17 SupportedAggBandwidth-r17 OPTIONAL,

 aggBW-FDD-UL-r17 SupportedAggBandwidth-r17 OPTIONAL,

 aggBW-TDD-DL-r17 SupportedAggBandwidth-r17 OPTIONAL,

 aggBW-TDD-UL-r17 SupportedAggBandwidth-r17 OPTIONAL,

 aggBW-TotalDL-r17 SupportedAggBandwidth-r17 OPTIONAL,

 aggBW-TotalUL-r17 SupportedAggBandwidth-r17 OPTIONAL

}

-- TAG-CG-CONFIG-STOP

-- ASN1STOP

|  |
| --- |
| *CG-Config* field descriptions |
| ***aggregatedBandwidthSN***Used to indicate or request the maximum aggregated bandwidth at the SN side if the *supportedAggBW-FR1* was reported for the *requestedBC-MRDC.* This field is only used in NR-DC.- *aggBW-FDD-DL/UL-r17* indicates the aggregated bandwidth across FDD DL/UL CCs in SCG;- *aggBW-TDD-DL/UL-r17* indicates the aggregated bandwidth across TDD DL/UL CCs in SCG;- *aggBW-TotalDL/UL-r17* indicates the aggregated bandwidth across all DL/UL CCs in SCG. |
| ***candidateCellInfoListCPC***Contains information regarding candidate target cells for Conditional PSCell Change (CPC) or inter-SN subsequent CPAC that the source secondary gNB suggests the target secondary gNB to consider configuring for CPC or subsequent CPAC, and/or that the source secondary gNB prepares for intra-SN subsequent CPAC in MN format. This field is only used in SN initiated CPC and SN initiated subsequent CPAC. |
| ***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. |
| ***candidateCellInfoListSubsequentCPC***Contains information regarding candidate target cells for subsequent CPAC that candidate secondary gNB (or the serving secondary gNB in case of intra-SN subsequent CPAC in MN format) suggests the master gNB to consider configuring for subsequent CPAC. This field is only used in MN initiated and SN initiated subsequent CPAC. This field is only included in a *CG-Config* message which is contained within a *CG-CandidateList* message. |
| ***candidateServingFreqListNR, candidateServingFreqListEUTRA***Indicates frequencies of candidate serving cells for In-Device Co-existence Indication (see TS 36.331 [10]). |
| ***candidateServingFreqListNR-r16***indicates the candidate frequencies configured by SN for IDC. This field is only used in NR-DC. |
| ***candidateServingFreqRangeListNR***indicates the candidate frequency ranges configured by SN for IDC. This field is only used in NR-DC. |
| ***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. |
| ***idc-TDM-AssistanceConfig***Indicates if the IDC TDM reporting is enabled for the UE by SN. This field is only used in NR-DC. |
| ***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. |
| ***requestedL1MeasConfigNRDC***Used to request the maximum number of allowed L1 measurement configuration 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. |
| ***requestedMaxLTM-CandidateIdSCG***Used to request the maximum number of allowed LTM candidate configurations to configure. This field is only used in NR-DC. |
| ***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. $T\_{proc,SCG,}^{max} $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. |
| ***reservedResourceConfigNRDC***Used to request or indicate the maximum number of resources reserved for the SCG. This field is only used in NR-DC. |
| ***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 *appLayerMeasConfig* and/or *conditionalReconfiguration*, *ltm-Config*, 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. |
| ***scpac-ReferenceConfigurationSCG***Includes the reference configuration associated with the SCG for the candidate supporting subsequent CPAC. |
| ***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. $T\_{proc,SCG}^{max}, $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. |
| ***subsequentCPAC-Information***Contains information about handling of stored subsequent CPAC configurations for the UE that the target secondary gNB suggests the master gNB to consider configuring for normal PSCell addition or change. It includes information about updates of execution conditions for the subsequent CPAC configurations that are to be kept at the PSCell addition/change. |
| ***successPSCell-Config***Include the successful PSCell change or addition report configuration in case of SN initiated PSCell change or CPC. The *thresholdPercentageT304-SCG* is not configured in this message. |
| ***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-MultipanelScheme***Indicates whether the indicated serving cell is configured with multiple panel simultaneous uplink transmission schemes of multipanelSchemeSDM or multipanelSchemeSFN corresponding to two SRS resource sets configured in either *srs-ResourceSetToAddModList* or *srs-ResourceSetToAddModListDCI-0-2* with usage 'codebook' or 'noncodebook'. |
| ***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 CG-ConfigInfo-v1800-IEs OPTIONAL

}

CG-ConfigInfo-v1800-IEs ::= SEQUENCE {

 musim-GapConfigInfo-r18 MUSIM-GapConfig-r17 OPTIONAL,

 musim-CapRestrictionInfo-r18 SEQUENCE {

 musim-CapRestriction-r18 MUSIM-CapRestriction-r18 OPTIONAL,

 musim-CandidateBandList-r18 MUSIM-CandidateBandList-r18 OPTIONAL

 } OPTIONAL,

 scpac-ReferenceConfiguration-r18 ReferenceConfiguration-r18 OPTIONAL,

 subsequentCPAC-Candidates-r18 CandidateCellListCPC-r17 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

 ]],

 [[

 allowedAggregatedBandwidthSNList-r17 AllowedAggregatedBandwidthSNList-r17 OPTIONAL

 ]],

 [[

 maxNumberLTM-CandidatesSCG-r18 INTEGER(0..maxNrofLTM-Configs-r18) OPTIONAL

 ]],

 [[

allowedL1MeasConfigNRDC-r18 L1MeasConfigNRDC-r18 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

 ]],

 [[

 twoSRS-MultipanelScheme-r18 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

 ]],

 [[

 affectedCarrierFreqRangeCombList-r18 AffectedCarrierFreqRangeCombList-r18 OPTIONAL,

 affectedCarrierFreqCombList-r18 AffectedCarrierFreqCombList-r16 OPTIONAL,

 idc-TDM-Assistance-r18 IDC-TDM-Assistance-r18 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

}

AllowedAggregatedBandwidthSNList-r17 ::= SEQUENCE (SIZE (1..maxBandComb)) OF AllowedAggregatedBandwidth-r17

AllowedAggregatedBandwidth-r17 ::= SEQUENCE {

 bandCombinationIndex-r17 BandCombinationIndex,

 allowedAggBW-FDD-DL-r17 SupportedAggBandwidth-r17 OPTIONAL,

 allowedAggBW-FDD-UL-r17 SupportedAggBandwidth-r17 OPTIONAL,

 allowedAggBW-TDD-DL-r17 SupportedAggBandwidth-r17 OPTIONAL,

 allowedAggBW-TDD-UL-r17 SupportedAggBandwidth-r17 OPTIONAL,

 allowedAggBW-TotalDL-r17 SupportedAggBandwidth-r17 OPTIONAL,

 allowedAggBW-TotalUL-r17 SupportedAggBandwidth-r17 OPTIONAL

}

-- TAG-CG-CONFIG-INFO-STOP

-- ASN1STOP

|  |
| --- |
| *CG-ConfigInfo* field descriptions |
| ***affectedCarrierFreqCombList***This field is signalled upon MN not addressing IDC issue and contains the list of NR carrier frequency combinations reported by UE to MN for IDC problem caused by the NR-DC frequency combination. |
| ***affectedCarrierFreqRangeCombList***This field is signalled upon MN not addressing IDC issue and contains the list of NR carrier frequency range combinations reported by UE to MN for IDC problem caused by the NR-DC frequency combination. |
| ***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). |
| ***allowedAggregatedBandwidthSNList***A list of allowed maximum aggregated bandwidth at the SN side for the band combination included in the *allowedBC-ListMRDC.* This field is only used in NR-DC. |
| ***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. |
| ***allowedL1MeasConfigNRDC***Used to indicate the maximum number of allowed L1 measurement configuration for the SCG. The value is applicable to all BCs within the filed *allowedBC-ListMRDC*. This field is only used in NR-DC. |
| ***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***Used to indicate the maximum number of resources reserved for the SCG. This field is only used in 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, CPC or CHO with candidate SCG(s), the field *candidateCellInfoListMN* contains information regarding cells that the MN suggests the candidate target secondary node to consider configuring for MN initiated CPA, CPC, CHO with candidate SCG(s), or subsequent CPAC.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) or SN initiated inter-SN subsequent CPAC. |
| ***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. |
| ***idc-TDM-Assistance***This field is signalled upon MN not addressing IDC issue and contains IDC TDM assistance information reported by UE to MN for IDC problem. |
| ***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. |
| ***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]. |
| ***maxNumberLTM-CandidatesSCG***Indicates the maximum number of LTM candidate configurations that the SN is allowed to configure. If the field is absent the SN is not allowed to configure LTM candidate configurations. This field is only used in NR-DC. |
| ***maxNumberROHC-ContextSessionsSN***Indicates the maximum number of ROHC context sessions allowed to SN terminated bearer, excluding context sessions that leave all headers uncompressed. |
| ***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]). |
| ***musim-CapRestrictionInfo***Indicates the UE's preference on SCell(s) or PSCell to be released, serving cell(s) with restricted capability, band(s) or combination(s) of bands with restricted capability, or band(s) or band combination(s) to be avoided for UE temporary capabilities restriction purpose with the *musim-candidateBandList-r18* only for *musim-AffectedBandsList-r18* and *musim-AvoidedBandsList-r18*. All fields in *musim-CapRestriction-r18* can be sent from MN to SN, i.e., it is up to MN implementation to decide which field(s) need to be sent. |
| ***musim-GapConfigInfo***Indicates the MUSIM gap configuration configured by MN. |
| ***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. |
| ***scpac-ReferenceConfiguration***Includes the reference configuration associated with the SCG for the candidate supporting subsequent CPAC. |
| ***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 which may include *secondaryCellGroup,* *measConfig*, and *conditionalReconfiguration*. 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. |
| ***subsequentCPAC-Candidates***Includes the subsequent CPAC candidate PSCells that the UE has stored in MCG *VarConditionalReconfig*. |
| ***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'. |
| ***twoSRS-MultipanelScheme***Indicates whether the indicated serving cell is configured with multiple panel simultaneous uplink transmission schemes of multipanelSchemeSDM or multipanelSchemeSFN 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*. |

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| --- |
| *AllowedAggregatedBandwidth* field descriptions |
| ***AllowedAggregatedBandwidth***Indicates the allowed maximum aggregated bandwidth at the SN side.- *allowedAggBW-FDD-DL/UL-r17* indicates the allowed maximum aggregated bandwidth across FDD DL/UL CCs in SCG;- *allowedAggBW-TDD-DL/UL-r17* indicates the allowed maximum aggregated bandwidth across TDD DL/UL CCs in SCG;- *allowedAggBW-TotalDL/UL-r17* indicates the allowed maximum aggregated bandwidth across all DL/UL CCs in SCG. |
| ***bandCombinationIndex***This field indicates the position of a band combination in the *supportedBandCombinationList*. 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 *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 |

## 11.3 Inter-node RRC information element definitions

#### – *ResourceConfigNRDC*

The IE is used to indicate or request the maximum values that can be used by the SCG in NR-DC, with each value equal to or lower than the value of the corresponding field in the UE capability, as reported by the UE, unless specified otherwise.

*ResourceConfigNRDC* information element

-- 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

|  |
| --- |
| ***ResourceConfigNRDC* 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. Corresponds to the UE capability *maxNumberResAcrossCC-AcrossFR-r16* in *maxTotalResourcesForAcrossFreqRanges-r16*. |

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

#### – *L1MeasConfigNRDC*

The IE is used to indicate or request the maximum values that can be used by the SCG in NR-DC, with each value equal to or lower than the value of the corresponding field in the UE capability, as reported by the UE, unless specified otherwise.

*L1MeasConfigNRDC* information element

-- ASN1START

-- TAG-L1MEASCONFIGNRDC-START

ResourceConfigNRDC-r17 ::= SEQUENCE {

maxL1MeasNoGapSCG-r18 INTEGER(0..maxNrofL1MeasNoGap-r18) OPTIONAL,

maxL1MeasWithGapSCG-r18 INTEGER(0..maxNrofL1MeasWithGap-r18) OPTIONAL,

maxCells-L1MeasNoGapSCG-r18 INTEGER(0..maxNrofCells-L1MeasNoGap-r18) OPTIONAL,

maxCells-L1MeasWithGapSCG-r18 INTEGER(0..maxNrofCells-L1MeasWithGap-r18) OPTIONAL,

maxTotalCells-L1MeasNoGapSCG-r18 INTEGER(0..maxNrofTotalCells-L1MeasNoGap-r18) OPTIONAL,

maxSSBs-L1MeasNoGapSCG-r18 INTEGER(0..maxNrofSSBs-L1MeasNoGap-r18) OPTIONAL,

maxSSBs-L1MeasWithGapSCG-r18 INTEGER(0..maxNrofSSBs-L1MeasWithGap-r18) OPTIONAL,

maxTotalSSBs-L1MeasNoGapSCG-r18 INTEGER(0..maxNrofTotalSSBs-L1MeasNoGap-r18) OPTIONAL

maxCells-L1MeasIntraFreqSCG-r18 INTEGER(0..maxNrofSSBs-L1MeasIntraFreq-r18) OPTIONAL,

maxCells-L1MeasInterFreqSCG-r18 INTEGER(0..maxNrofSSBs-L1MeasInterFreq-r18) OPTIONAL,

maxReportConfigs-aperiodic-r18 INTEGER(0..maxNrofReportConfigs-aperiodic-r18) OPTIONAL,

maxReportConfigs-periodic-r18 INTEGER(0..maxNrofReportConfigs-periodic-r18) OPTIONAL,

maxReportConfigs-semi-persistent-r18 INTEGER(0..maxNrofReportConfigs-semi-persistent-r18) OPTIONAL

 ...

}

-- TAG-L1MEASCONFIGNRDC-STOP

-- ASN1STOP

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| --- |
| ***L1MeasConfigNRDC* field descriptions** |
| ***maxL1MeasNoGapSCG***Indicates the max number of frequency layers UE can measure for intra- and inter-frequency without measurement gaps L1-RSRP.  |
| ***maxL1MeasWithGapSCG***Indicates the max number of frequency layers UE can measure for inter-frequency L1-RSRP measurement with measurement gaps.  |
| ***maxCells-L1MeasNoGapSCG***Indicates the max number of neighbour cells UE can measure for L1-RSRP per frequency layer for intra-frequency or inter-frequency without measurement gaps. |
| ***maxCells-L1MeasWithGapSCG***Indicates the max number of neighbour cells UE can measure for L1-RSRP per frequency layer for inter-frequency with measurement gaps. |
| ***maxTotalCells-L1MeasNoGapSCG***Indicates the max number of total cells of serving cells and neighboring cells across all frequency layers of intra-frequency and inter-frequency without measurement gaps for L1 measurement. |
| ***maxSSBs-L1MeasNoGapSCG***Indicates the max number of SSB resources UE can measure for L1-RSRP per frequency layer for intra-frequency or inter-frequency without measurement gaps. |
| ***maxSSBs-L1MeasWithGapSCG***Indicates the max number of SSB resources UE can measure for L1-RSRP per frequency layer for inter-frequency with measurement gaps. |
| ***maxTotalSSBs-L1MeasNoGapSCG***Indicates the max number of total SSB resources of serving cells and neighboring cells across all frequency layers of intra-frequency and inter-frequency without measurement gaps for L1 measurement. |
| ***maxCells-L1MeasIntraFreqSCG***Indicates the max number of RRC configured candidate cells for intra-frequency L1-RSRP measurement. |
| ***maxCells-L1MeasInterFreqSCG***Indicates the max number of RRC configured candidate cells for intra- and inter-frequency L1-RSRP measurement. |
| ***maxReportConfigs-aperiodic***Indicates the max number of aperiodic LTM CSI report configs. |
| ***maxReportConfigs-periodic***Indicates the max number of periodic LTM CSI report configs. |
| ***maxReportConfigs-semi-persistent***Indicates the max number of semi-persistent LTM CSI report configs. |