**3GPP TSG-RAN WG2 Meeting #119 Electronic *R2-220***

**Elbonia, 17 – 26 August 2022**

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| --- |
| *CR-Form-v12.2* |
| **CHANGE REQUEST** |
|  |
|  | **38.331** | **CR** | **3276** | **rev** |  | **Current version:** | **17.1.0** |  |
|  |
| *For* [***HE******LP***](http://www.3gpp.org/3G_Specs/CRs.htm#_blank)*on using this form: comprehensive instructions can be found at* [*http://www.3gpp.org/Change-Requests*](http://www.3gpp.org/Change-Requests)*.* |
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| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| ***Proposed change affects:*** | UICC apps |  | ME | **X** | Radio Access Network | **X** | Core Network |  |

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|  |
| ***Title:***  | FR2-2 and CCA configuration |
|  |  |
| ***Source to WG:*** | Nokia, Nokia Shanghai Bell |
| ***Source to TSG:*** | R2 |
|  |  |
| ***Work item code:*** | NR\_ext\_to\_71GHz-Core |  | ***Date:*** | 2022-08-08 |
|  |  |  |  |  |
| ***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 canbe found in 3GPP [TR 21.900](http://www.3gpp.org/ftp/Specs/html-info/21900.htm). | *Use one of the following releases:Rel-8 (Release 8)Rel-9 (Release 9)Rel-10 (Release 10)Rel-11 (Release 11)…Rel-16 (Release 16)Rel-17 (Release 17)Rel-18 (Release 18)Rel-19 (Release 19)* |
|  |  |
| ***Reason for change:*** | RAN4 requests [R4-2211171](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_103-e/Docs/R4-2211171.zip) RAN1 to indicate whether and how UE gets information regarding channel access mode for neighour cells in IDLE/CONNECTED states in order for UE to know which requirements should be applied for neighbour cell measurements.1. UE should know for which neighobur cells which requirements apply i.e. UE should be given information regarding CCA used in neighbour cells
2. With the current specifications, the UE does not know the channel access mode of neighbor cells. Therefore, in both Idle/Inactive and Connected mode, the UE is not aware whether the SSB tranmissions from neighbor cells are subject to LBT or not. Under this condition, as pointed out by RAN4, the UE “may not know which requirements will apply” for neighbor or non-serving cell measurements.This problem can be solved by network providing the channel access mode information for the neighbor cells to the UE.
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|  |  |
| ***Summary of change:*** | 1. For RRC\_CONNECTED state UEs -Procedural text on handling a new neigbour cell list for where one indicates which access mode is applicable for which neighbour cell.For RRC\_CONNECTED state UEs - ASN.1 for adding new add/mod list of cells for which one can indicate *channelAccessMode2.*
2. Add channel access mode for neighbor cells in SIB3 and SIB4

**Impact analysis**I **Impacted 5G architecture options:**NR standalone, (NG)EN-DC, NE-DC, NR-DCImpacted functionality: FR2-2 measurements .**Inter-operability:** 1. If the network is implemented according to the CR and the UE is not NW there is no interoperability problem apart from NW could get biased measurement results for FR2-2 cells
2. If the UE is implemented according to the CR and the network is not there is no interoperability problem
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|  |  |
| ***Consequences if not approved:*** | UE does not know which measurement requirements are applied for neighbour cells in FR2-2 |
|  |  |
| ***Clauses affected:*** | 5.5.2.5, 6.3.1 |
|  |  |
|  | **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*

#### 5.5.2.5 Measurement object addition/modification

The UE shall:

1> for each *measObjectId* included in the received *measObjectToAddModList*:

2> if an entry with the matching *measObjectId* exists in the *measObjectList* within the *VarMeasConfig*, for this entry:

3> reconfigure the entry with the value received for this *measObject*, except for the fields *cellsToAddModList*, *excludedCellsToAddModList*, *allowedCellsToAddModList*, *cellsToRemoveList*, *excludedCellsToRemoveList*, *allowedCellsToRemoveList*, *tx-PoolMeasToRemoveList*, *tx-PoolMeasToAddModList*, *ssb-PositionQCL-CellsToRemoveList*, *ssb-PositionQCL-CellsToAddModList, cca-CellsToRemoveList*,and *cca-CellsToAddModList*;

3> if the received *measObject* includes the *cellsToRemoveList*:

4> for each *physCellId* included in the *cellsToRemoveList*:

5> remove the entry with the matching *physCellId* from the *cellsToAddModList*;

3> if the received *measObject* includes the *cellsToAddModList*:

4> for each *physCellId* value included in the *cellsToAddModList*:

5> if an entry with the matching *physCellId* exists in the *cellsToAddModList*:

6> replace the entry with the value received for this *physCellId*;

5> else:

6> add a new entry for the received *physCellId* to the *cellsToAddModList*;

3> if the received *measObject* includes the *excludedCellsToRemoveList*:

4> for each *pci-RangeIndex* included in the *excludedCellsToRemoveList*:

5> remove the entry with the matching *pci-RangeIndex* from the *excludedCellsToAddModList*;

NOTE 1: For each *pci-RangeIndex* included in the *excludedCellsToRemoveList* that concerns overlapping ranges of cells, a cell is removed from the exclude-list of cells only if all PCI ranges containing it are removed.

3> if the received *measObject* includes the *excludedCellsToAddModList*:

4> for each *pci-RangeIndex* included in the *excludedCellsToAddModList*:

5> if an entry with the matching *pci-RangeIndex* is included in the *excludedCellsToAddModList*:

6> replace the entry with the value received for this *pci-RangeIndex*;

5> else:

6> add a new entry for the received *pci-RangeIndex* to the *excludedCellsToAddModList*;

3> if the received *measObject* includes the *allowedCellsToRemoveList*:

4> for each *pci-RangeIndex* included in the *allowedCellsToRemoveList*:

5> remove the entry with the matching *pci-RangeIndex* from the *allowedCellsToAddModList*;

NOTE2: For each *pci-RangeIndex* included in the *allowedCellsToRemoveList* that concerns overlapping ranges of cells, a cell is removed from the allow-list of cells only if all PCI ranges containing it are removed.

3> if the received *measObject* includes the *allowedCellsToAddModList*:

4> for each *pci-RangeIndex* included in the *allowedCellsToAddModList*:

5> if an entry with the matching *pci-RangeIndex* is included in the *allowedCellsToAddModList*:

6> replace the entry with the value received for this *pci-RangeIndex*;

5> else:

6> add a new entry for the received *pci-RangeIndex* to the *allowedCellsToAddModList*

3> for each *measId* associated with this *measObjectId* in the *measIdList* within the *VarMeasConfig*, if any:

4> remove the measurement reporting entry for this *measId* from the *VarMeasReportList*, if included;

4> stop the periodical reporting timer or timer T321 or timer T322, whichever one is running, and reset the associated information (e.g. *timeToTrigger*) for this *measId*;

3> if the received *measObject* includes the *tx-PoolMeasToRemoveList*:

4> for each transmission resource pool indicated in *tx-PoolMeasToRemoveList*:

5> remove the entry with the matching identity of the transmission resource pool from the *tx-PoolMeasToAddModList*;

3> if the received *measObject* includes the *tx-PoolMeasToAddModList*:

4> for each transmission resource pool indicated in *tx-PoolMeasToAddModList*:

5> if an entry with the matchingidentity of the transmission resource poolexists in the *tx-PoolMeasToAddModList*:

6> replace the entry with the value received for this transmission resource pool;

5> else:

6> add a new entry for the received identity of the transmission resource pool to the *tx-PoolMeasToAddModList*;

3> if the received *measObject* includes the *ssb-PositionQCL-CellsToRemoveList*:

4> for each *physCellId* included in the *ssb-PositionQCL-CellsToRemoveList*:

5> remove the entry with the matching *physCellId* from the *ssb-PositionQCL-CellsToAddModList*;

3> if the received *measObject* includes the *ssb-PositionQCL-CellsToAddModList*:

4> for each *physCellId* included in the *ssb-PositionQCL-CellsToAddModList*:

5> if an entry with the matching *physCellId* exists in the *ssb-PositionQCL-CellsToAddModList*:

6> replace the entry with the value received for this *physCellId*;

5> else:

6> add a new entry for the received *physCellId* to the *ssb-PositionQCL-CellsToAddModList*;

3> if the received *measObject* includes the *cca-CellsToRemoveList*:

4> for each *physCellId* included in the *cca-CellsToRemoveList*:

5> remove the entry with the matching *physCellId* from the *cca-CellsToAddModList*;

3> if the received *measObject* includes the *cca-CellsToAddModList*:

4> for each *physCellId* included in the *cca-CellsToAddModList*:

5> if an entry with the matching *physCellId* exists in the *cca-CellsToAddModList*:

6> replace the entry with the value received for this *physCellId*;

5> else:

6> add a new entry for the received *physCellId* to the *cca-CellsToAddModList*;

2> else:

3> add a new entry for the received *measObject* to the *measObjectList* within *VarMeasConfig*.

*Next Modified Subclause*

6.3.1 System information blocks

*<<Skipped unchanged parts>>*

– *SIB3*

*SIB3* contains neighbouring cell related information relevant only for intra-frequency cell re-selection. The IE includes cells with specific re-selection parameters as well as exclude-listed cells.

***SIB3* information element**

-- ASN1START

-- TAG-SIB3-START

SIB3 ::= SEQUENCE {

 intraFreqNeighCellList IntraFreqNeighCellList OPTIONAL, -- Need R

 intraFreqExcludedCellList IntraFreqExcludedCellList OPTIONAL, -- Need R

 lateNonCriticalExtension OCTET STRING OPTIONAL,

 ...,

 [[

 intraFreqNeighCellList-v1610 IntraFreqNeighCellList-v1610 OPTIONAL, -- Need R

 intraFreqAllowedCellList-r16 IntraFreqAllowedCellList-r16 OPTIONAL, -- Cond SharedSpectrum2

 intraFreqCAG-CellList-r16 SEQUENCE (SIZE (1..maxPLMN)) OF IntraFreqCAG-CellListPerPLMN-r16 OPTIONAL -- Need R

 ]],

 [[

 intraFreqNeighHSDN-CellList-r17 IntraFreqNeighHSDN-CellList-r17 OPTIONAL, -- Need R

 intraFreqNeighCellList-v1710 IntraFreqNeighCellList-v1710 OPTIONAL -- Need R

 ]],

 [[

 channelAccessMode2-r17 ENUMERATED {enabled} OPTIONAL -- Need R

 ]]

}

IntraFreqNeighCellList ::= SEQUENCE (SIZE (1..maxCellIntra)) OF IntraFreqNeighCellInfo

IntraFreqNeighCellList-v1610::= SEQUENCE (SIZE (1..maxCellIntra)) OF IntraFreqNeighCellInfo-v1610

IntraFreqNeighCellList-v1710 ::= SEQUENCE (SIZE (1..maxCellIntra)) OF IntraFreqNeighCellInfo-v1710

IntraFreqNeighCellInfo ::= SEQUENCE {

 physCellId PhysCellId,

 q-OffsetCell Q-OffsetRange,

 q-RxLevMinOffsetCell INTEGER (1..8) OPTIONAL, -- Need R

 q-RxLevMinOffsetCellSUL INTEGER (1..8) OPTIONAL, -- Need R

 q-QualMinOffsetCell INTEGER (1..8) OPTIONAL, -- Need R

 ...

}

IntraFreqNeighCellInfo-v1610 ::= SEQUENCE {

 ssb-PositionQCL-r16 SSB-PositionQCL-Relation-r16 OPTIONAL -- Cond SharedSpectrum2

}

IntraFreqNeighCellInfo-v1710 ::= SEQUENCE {

 ssb-PositionQCL-r17 SSB-PositionQCL-Relation-r17 OPTIONAL -- Cond SharedSpectrum2

}

IntraFreqExcludedCellList ::= SEQUENCE (SIZE (1..maxCellExcluded)) OF PCI-Range

IntraFreqAllowedCellList-r16 ::= SEQUENCE (SIZE (1..maxCellAllowed)) OF PCI-Range

IntraFreqCAG-CellListPerPLMN-r16 ::= SEQUENCE {

 plmn-IdentityIndex-r16 INTEGER (1..maxPLMN),

 cag-CellList-r16 SEQUENCE (SIZE (1..maxCAG-Cell-r16)) OF PCI-Range

}

IntraFreqNeighHSDN-CellList-r17 ::= SEQUENCE (SIZE (1..maxCellIntra)) OF PCI-Range

-- TAG-SIB3-STOP

-- ASN1STOP

| ***SIB3* field descriptions** |
| --- |
| ***channelAccessMode2***If present ('enabled'), this field indicates that intra-frequency neighbor cells apply channel access mode procedures for operation with shared spectrum channel access in accordance with TS 37.213 [48], clause 4.4 for FR2-2. If absent, the neighbor cell does not apply any channel access procedure. |
| ***intraFreqAllowedCellList***List of allow-listed intra-frequency neighbouring cells, see TS 38.304 [20], clause 5.2.4. |
| ***intraFreqCAG-CellList***List of intra-frequency neighbouring CAG cells (as defined in TS 38.304 [20]) per PLMN. |
| ***intraFreqExcludedCellList***List of exclude-listed intra-frequency neighbouring cells. |
| ***intraFreqNeighCellList***List of intra-frequency neighbouring cells with specific cell re-selection parameters. If *intraFreqNeighCellList-v1610* is present, it shall contain the same number of entries, listed in the same order as in *intraFreqNeighCellList* (without suffix). |
| ***intraFreqNeighHSDN-CellList***List of intra-frequency neighbouring HSDN cells as specified in TS 38.304 [20]. |
| ***q-OffsetCell***Parameter "Qoffsets,n" in TS 38.304 [20]. |
| ***q-QualMinOffsetCell***Parameter "Qqualminoffsetcell" in TS 38.304 [20]. Actual value Qqualminoffsetcell = field value [dB]. |
| ***q-RxLevMinOffsetCell***Parameter "Qrxlevminoffsetcell" in TS 38.304 [20]. Actual value Qrxlevminoffsetcell = field value \* 2 [dB]. |
| ***q-RxLevMinOffsetCellSUL***Parameter "QrxlevminoffsetcellSUL" in TS 38.304 [20]. Actual value QrxlevminoffsetcellSUL = field value \* 2 [dB]. |
| ***ssb-PositionQCL***Indicates the QCL relation between SS/PBCH blocks for a specific intra-frequency neighbor cell as specified in TS 38.213 [13], clause 4.1. If provided, the cell specific value overwrites the value signalled by *ssb-PositionQCL-Common* in *SIB2* for the indicated cell. |

|  |  |
| --- | --- |
| **Conditional Presence** | **Explanation** |
| *SharedSpectrum2* | The field is optional present, Need R, if this intra-frequency or neighbor cell operates with shared spectrum channel access. Otherwise, it is absent, Need R. |

– *SIB4*

*SIB4* contains information relevant for inter-frequency cell re-selection (i.e. information about other NR frequencies and inter-frequency neighbouring cells relevant for cell re-selection), which can also be used for NR idle/inactive measurements. The IE includes cell re-selection parameters common for a frequency as well as cell specific re-selection parameters.

***SIB4* information element**

-- ASN1START

-- TAG-SIB4-START

SIB4 ::= SEQUENCE {

 interFreqCarrierFreqList InterFreqCarrierFreqList,

 lateNonCriticalExtension OCTET STRING OPTIONAL,

 ...,

 [[

 interFreqCarrierFreqList-v1610 InterFreqCarrierFreqList-v1610 OPTIONAL -- Need R

 ]],

 [[

 interFreqCarrierFreqList-v1700 InterFreqCarrierFreqList-v1700 OPTIONAL -- Need R

 ]],

 [[

 interFreqCarrierFreqList-v17xy InterFreqCarrierFreqList-v17xy OPTIONAL -- Need R

 ]]

}

InterFreqCarrierFreqList ::= SEQUENCE (SIZE (1..maxFreq)) OF InterFreqCarrierFreqInfo

InterFreqCarrierFreqList-v1610 ::= SEQUENCE (SIZE (1..maxFreq)) OF InterFreqCarrierFreqInfo-v1610

InterFreqCarrierFreqList-v1700 ::= SEQUENCE (SIZE (1..maxFreq)) OF InterFreqCarrierFreqInfo-v1700

InterFreqCarrierFreqList-v17xy ::= SEQUENCE (SIZE (1..maxFreq)) OF InterFreqCarrierFreqInfo-v17xy

InterFreqCarrierFreqInfo ::= SEQUENCE {

 dl-CarrierFreq ARFCN-ValueNR,

 frequencyBandList MultiFrequencyBandListNR-SIB OPTIONAL, -- Cond Mandatory

 frequencyBandListSUL MultiFrequencyBandListNR-SIB OPTIONAL, -- Need R

 nrofSS-BlocksToAverage INTEGER (2..maxNrofSS-BlocksToAverage) OPTIONAL, -- Need S

 absThreshSS-BlocksConsolidation ThresholdNR OPTIONAL, -- Need S

 smtc SSB-MTC OPTIONAL, -- Need S

 ssbSubcarrierSpacing SubcarrierSpacing,

 ssb-ToMeasure SSB-ToMeasure OPTIONAL, -- Need S

 deriveSSB-IndexFromCell BOOLEAN,

 ss-RSSI-Measurement SS-RSSI-Measurement OPTIONAL, -- Need R

 q-RxLevMin Q-RxLevMin,

 q-RxLevMinSUL Q-RxLevMin OPTIONAL, -- Need R

 q-QualMin Q-QualMin OPTIONAL, -- Need S

 p-Max P-Max OPTIONAL, -- Need S

 t-ReselectionNR T-Reselection,

 t-ReselectionNR-SF SpeedStateScaleFactors OPTIONAL, -- Need S

 threshX-HighP ReselectionThreshold,

 threshX-LowP ReselectionThreshold,

 threshX-Q SEQUENCE {

 threshX-HighQ ReselectionThresholdQ,

 threshX-LowQ ReselectionThresholdQ

 } OPTIONAL, -- Cond RSRQ

 cellReselectionPriority CellReselectionPriority OPTIONAL, -- Need R

 cellReselectionSubPriority CellReselectionSubPriority OPTIONAL, -- Need R

 q-OffsetFreq Q-OffsetRange DEFAULT dB0,

 interFreqNeighCellList InterFreqNeighCellList OPTIONAL, -- Need R

 interFreqExcludedCellList InterFreqExcludedCellList OPTIONAL, -- Need R

 ...

}

InterFreqCarrierFreqInfo-v1610 ::= SEQUENCE {

 interFreqNeighCellList-v1610 InterFreqNeighCellList-v1610 OPTIONAL, -- Need R

 smtc2-LP-r16 SSB-MTC2-LP-r16 OPTIONAL, -- Need R

 interFreqAllowedCellList-r16 InterFreqAllowedCellList-r16 OPTIONAL, -- Cond SharedSpectrum2

 ssb-PositionQCL-Common-r16 SSB-PositionQCL-Relation-r16 OPTIONAL, -- Cond SharedSpectrum

 interFreqCAG-CellList-r16 SEQUENCE (SIZE (1..maxPLMN)) OF InterFreqCAG-CellListPerPLMN-r16 OPTIONAL -- Need R

}

InterFreqCarrierFreqInfo-v1700 ::= SEQUENCE {

 interFreqNeighHSDN-CellList-r17 InterFreqNeighHSDN-CellList-r17 OPTIONAL, -- Need R

 highSpeedMeasInterFreq-r17 ENUMERATED {true} OPTIONAL, -- Need R

 redCapAccessAllowed-r17 ENUMERATED {true} OPTIONAL, -- Need R

 ssb-PositionQCL-Common-r17 SSB-PositionQCL-Relation-r17 OPTIONAL, -- Cond SharedSpectrum

 interFreqNeighCellList-v1710 InterFreqNeighCellList-v1710 OPTIONAL -- Cond SharedSpectrum2

}

InterFreqCarrierFreqInfo-v17xy ::= SEQUENCE {

 channelAccessMode2-r17 ENUMERATED {enabled} OPTIONAL -- Need R

}

InterFreqNeighHSDN-CellList-r17 ::= SEQUENCE (SIZE (1..maxCellInter)) OF PCI-Range

InterFreqNeighCellList ::= SEQUENCE (SIZE (1..maxCellInter)) OF InterFreqNeighCellInfo

InterFreqNeighCellList-v1610 ::= SEQUENCE (SIZE (1..maxCellInter)) OF InterFreqNeighCellInfo-v1610

InterFreqNeighCellList-v1710 ::= SEQUENCE (SIZE (1..maxCellInter)) OF InterFreqNeighCellInfo-v1710

InterFreqNeighCellInfo ::= SEQUENCE {

 physCellId PhysCellId,

 q-OffsetCell Q-OffsetRange,

 q-RxLevMinOffsetCell INTEGER (1..8) OPTIONAL, -- Need R

 q-RxLevMinOffsetCellSUL INTEGER (1..8) OPTIONAL, -- Need R

 q-QualMinOffsetCell INTEGER (1..8) OPTIONAL, -- Need R

 ...

}

InterFreqNeighCellInfo-v1610 ::= SEQUENCE {

 ssb-PositionQCL-r16 SSB-PositionQCL-Relation-r16 OPTIONAL -- Cond SharedSpectrum2

}

InterFreqNeighCellInfo-v1710 ::= SEQUENCE {

 ssb-PositionQCL-r17 SSB-PositionQCL-Relation-r17 OPTIONAL -- Cond SharedSpectrum2

}

InterFreqExcludedCellList ::= SEQUENCE (SIZE (1..maxCellExcluded)) OF PCI-Range

InterFreqAllowedCellList-r16 ::= SEQUENCE (SIZE (1..maxCellAllowed)) OF PCI-Range

InterFreqCAG-CellListPerPLMN-r16 ::= SEQUENCE {

 plmn-IdentityIndex-r16 INTEGER (1..maxPLMN),

 cag-CellList-r16 SEQUENCE (SIZE (1..maxCAG-Cell-r16)) OF PCI-Range

}

-- TAG-SIB4-STOP

-- ASN1STOP

| ***SIB4* field descriptions** |
| --- |
| ***absThreshSS-BlocksConsolidation***Threshold for consolidation of L1 measurements per RS index. If the field is absent, the UE uses the measurement quantity as specified in TS 38.304 [20]. |
| ***channelAccessMode2***If present ('enabled'), this field indicates that the neighbor cells on the inter-frequency apply channel access mode procedures for operation with shared spectrum channel access in accordance with TS 37.213 [48], clause 4.4 for FR2-2. If absent, the neighbor cell does not apply any channel access procedure. |
| ***deriveSSB-IndexFromCell***This field indicates whether the UE may use the timing of any detected cell on that frequency to derive the SSB index of all neighbour cells on that frequency. If this field is set to *true*, the UE assumes SFN and frame boundary alignment across cells on the neighbor frequency as specified in TS 38.133 [14]. |
| ***dl-CarrierFreq***This field indicates center frequency of the SS block of the neighbour cells, where the frequency corresponds to a GSCN value as specified in TS 38.101-1 [15]. |
| ***frequencyBandList***Indicates the list of frequency bands for which the NR cell reselection parameters apply. |
| ***highSpeedMeasInterFreq***If the field is set to *true* and UE supports high speed inter-frequency IDLE/INACTIVE measurements, the UE shall apply the enhanced inter-frequency RRM requirements on the inter-frequency carrier to support high speed up to 500 km/h in RRC\_IDLE/RRC\_INACTIVE as specified in TS 38.133 [14]. |
| ***interFreqAllowedCellList***List of allow-listed inter-frequency neighbouring cells, see TS 38.304 [20], clause 5.2.4. |
| ***interFreqCAG-CellList***List of inter-frequency neighbouring CAG cells (as defined in TS 38.304 [20] per PLMN. |
| ***interFreqCarrierFreqList***List of neighbouring carrier frequencies and frequency specific cell re-selection information. If *interFreqCarrierFreqList-v1610*, *interFreqCarrierFreqList-v1700* or *interFreqCarrierFreqList-v17xy* are present, they shall contain the same number of entries, listed in the same order as in *interFreqCarrierFreqList* (without suffix). |
| ***interFreqExcludedCellList***List of exclude-listed inter-frequency neighbouring cells. |
| ***interFreqNeighCellList***List of inter-frequency neighbouring cells with specific cell re-selection parameters. If *interFreqNeighCellList-v1610* is present, it shall contain the same number of entries, listed in the same order as in *interFreqNeighCellList* (without suffix). |
| ***interFreqNeighHSDN-CellList***List of inter-frequency neighbouring HSDN cells as specified in TS 38.304 [20]. |
| ***nrofSS-BlocksToAverage***Number of SS blocks to average for cell measurement derivation. If the field is absent, the UE uses the measurement quantity as specified in TS 38.304 [20]. |
| ***p-Max***Value in dBm applicable for the neighbouring NR cells on this carrier frequency. If absent the UE applies the maximum power according to TS 38.101-1 [15] in case of an FR1 cell or TS 38.101-2 [39] in case of an FR2 cell. In this release of the specification, if *p-Max* is present on a carrier frequency in FR2, the UE shall ignore the field and applies the maximum power according to TS 38.101-2 [39]. This field is ignored by IAB-MT. The IAB-MT applies output power and emissions requirements, as specified in TS 38.174 [63]. |
| ***q-OffsetCell***Parameter "Qoffsets,n" in TS 38.304 [20]. |
| ***q-OffsetFreq***Parameter "Qoffsetfrequency" in TS 38.304 [20]. |
| ***q-QualMin***Parameter "Qqualmin" in TS 38.304 [20]. If the field is absent, the UE applies the (default) value of negative infinity for Qqualmin. |
| ***q-QualMinOffsetCell***Parameter "Qqualminoffsetcell" in TS 38.304 [20]. Actual value Qqualminoffsetcell = field value [dB]. |
| ***q-RxLevMin***Parameter "Qrxlevmin" in TS 38.304 [20]. |
| ***q-RxLevMinOffsetCell***Parameter "Qrxlevminoffsetcell" in TS 38.304 [20]. Actual value Qrxlevminoffsetcell = field value \* 2 [dB]. |
| ***q-RxLevMinOffsetCellSUL***Parameter "QrxlevminoffsetcellSUL" in TS 38.304 [20]. Actual value QrxlevminoffsetcellSUL = field value \* 2 [dB]. |
| ***q-RxLevMinSUL***Parameter "Qrxlevmin" in TS 38.304 [20]. |
| ***redCapAccessAllowed***Indicates whether RedCap UEs are allowed to access the frequency. |
| ***smtc***Measurement timing configuration for inter-frequency measurement. If this field is absent, the UE assumes that SSB periodicity is 5 ms in this frequency. |
| ***smtc2-LP***Measurement timing configuration for inter-frequency neighbour cells with a Long Periodicity (LP) indicated by periodicity in *smtc2-LP*. The timing offset and duration are equal to the offset and duration indicated in *smtc* in *InterFreqCarrierFreqInfo*. The periodicity in *smtc2-LP* can only be set to a value strictly larger than the periodicity in *smtc* in *InterFreqCarrierFreqInfo* (e.g. if *smtc* indicates sf20 the Long Periodicity can only be set to sf40, sf80 or sf160, if *smtc* indicates sf160, *smtc2-LP* cannot be configured). The *pci-List*, if present, includes the physical cell identities of the inter-frequency neighbour cells with Long Periodicity. If *smtc2-LP* is absent, the UE assumes that there are no inter-frequency neighbour cells with a Long Periodicity. |
| ***ssb-PositionQCL***Indicates the QCL relation between SS/PBCH blocks for a specific neighbor cell as specified in TS 38.213 [13], clause 4.1. If provided, the cell specific value overwrites the common value signalled by *ssb-PositionQCL-Common* in *SIB4* for the indicated cell. |
| ***ssb-PositionQCL-Common***Indicates the QCL relation between SS/PBCH blocks for inter-frequency neighbor cells as specified in TS 38.213 [13], clause 4.1. |
| ***ssb-ToMeasure***The set of SS blocks to be measured within the SMTC measurement duration (see TS 38.215 [9]). When the field is absent the UE measures on all SS-blocks. |
| ***ssbSubcarrierSpacing***Subcarrier spacing of SSB.Only the following values are applicable depending on the used frequency:FR1: 15 or 30 kHzFR2-1: 120 or 240 kHzFR2-2: 120, 480, or 960 kHz |
| ***threshX-HighP***Parameter "ThreshX, HighP" in TS 38.304 [20]. |
| ***threshX-HighQ***Parameter "ThreshX, HighQ" in TS 38.304 [20]. |
| ***threshX-LowP***Parameter "ThreshX, LowP" in TS 38.304 [20]. |
| ***threshX-LowQ***Parameter "ThreshX, LowQ" in TS 38.304 [20]. |
| ***t-ReselectionNR***Parameter "TreselectionNR" in TS 38.304 [20]. |
| ***t-ReselectionNR-SF***Parameter "Speed dependent ScalingFactor for TreselectionNR" in TS 38.304 [20]. If the field is absent, the UE behaviour is specified in TS 38.304 [20]. |

|  |  |
| --- | --- |
| **Conditional Presence** | **Explanation** |
| *Mandatory* | The field is mandatory present in SIB4. |
| *RSRQ* | The field is mandatory present if *threshServingLowQ* is present in *SIB2*; otherwise it is absent. |
| *SharedSpectrum* | This field is mandatory present if this inter-frequency operates with shared spectrum channel access. Otherwise, it is absent, Need R. |
| *SharedSpectrum2* | The field is optional present, Need R, if this inter-frequency or neighbor cell operates with shared spectrum channel access. Otherwise, it is absent, Need R. |

#### *<<Skipped unchanged parts>>*

*– MeasObjectNR*

The IE *MeasObjectNR* specifies information applicable for SS/PBCH block(s) intra/inter-frequency measurements and/or CSI-RS intra/inter-frequency measurements.

***MeasObjectNR* information element**

-- ASN1START

-- TAG-MEASOBJECTNR-START

MeasObjectNR ::= SEQUENCE {

 ssbFrequency ARFCN-ValueNR OPTIONAL, -- Cond SSBorAssociatedSSB

 ssbSubcarrierSpacing SubcarrierSpacing OPTIONAL, -- Cond SSBorAssociatedSSB

 smtc1 SSB-MTC OPTIONAL, -- Cond SSBorAssociatedSSB

 smtc2 SSB-MTC2 OPTIONAL, -- Cond IntraFreqConnected

 refFreqCSI-RS ARFCN-ValueNR OPTIONAL, -- Cond CSI-RS

 referenceSignalConfig ReferenceSignalConfig,

 absThreshSS-BlocksConsolidation ThresholdNR OPTIONAL, -- Need R

 absThreshCSI-RS-Consolidation ThresholdNR OPTIONAL, -- Need R

 nrofSS-BlocksToAverage INTEGER (2..maxNrofSS-BlocksToAverage) OPTIONAL, -- Need R

 nrofCSI-RS-ResourcesToAverage INTEGER (2..maxNrofCSI-RS-ResourcesToAverage) OPTIONAL, -- Need R

 quantityConfigIndex INTEGER (1..maxNrofQuantityConfig),

 offsetMO Q-OffsetRangeList,

 cellsToRemoveList PCI-List OPTIONAL, -- Need N

 cellsToAddModList CellsToAddModList OPTIONAL, -- Need N

 excludedCellsToRemoveList PCI-RangeIndexList OPTIONAL, -- Need N

 excludedCellsToAddModList SEQUENCE (SIZE (1..maxNrofPCI-Ranges)) OF PCI-RangeElement OPTIONAL, -- Need N

 allowedCellsToRemoveList PCI-RangeIndexList OPTIONAL, -- Need N

 allowedCellsToAddModList SEQUENCE (SIZE (1..maxNrofPCI-Ranges)) OF PCI-RangeElement OPTIONAL, -- Need N

 ...,

 [[

 freqBandIndicatorNR FreqBandIndicatorNR OPTIONAL, -- Need R

 measCycleSCell ENUMERATED {sf160, sf256, sf320, sf512, sf640, sf1024, sf1280} OPTIONAL -- Need R

 ]],

 [[

 smtc3list-r16 SSB-MTC3List-r16 OPTIONAL, -- Need R

 rmtc-Config-r16 SetupRelease {RMTC-Config-r16} OPTIONAL, -- Need M

 t312-r16 SetupRelease { T312-r16 } OPTIONAL -- Need M

 ]],

 [[

 associatedMeasGapSSB-r17 MeasGapId-r17 OPTIONAL, -- Need R

 associatedMeasGapCSIRS-r17 MeasGapId-r17 OPTIONAL, -- Need R

 smtc4list-r17 SSB-MTC4List-r17 OPTIONAL, -- Need R

 measCyclePSCell-r17 ENUMERATED {ms160, ms256, ms320, ms512, ms640, ms1024, ms1280, spare1}

 OPTIONAL, -- Need R

 cellsToAddModListExt-v1710 CellsToAddModListExt-v1710 OPTIONAL -- Need N

 ]]

}

SSB-MTC3List-r16::= SEQUENCE (SIZE(1..4)) OF SSB-MTC3-r16

SSB-MTC4List-r17::= SEQUENCE (SIZE(1..3)) OF SSB-MTC4-r17

T312-r16 ::= ENUMERATED { ms0, ms50, ms100, ms200, ms300, ms400, ms500, ms1000}

ReferenceSignalConfig::= SEQUENCE {

 ssb-ConfigMobility SSB-ConfigMobility OPTIONAL, -- Need M

 csi-rs-ResourceConfigMobility SetupRelease { CSI-RS-ResourceConfigMobility } OPTIONAL -- Need M

}

SSB-ConfigMobility::= SEQUENCE {

 ssb-ToMeasure SetupRelease { SSB-ToMeasure } OPTIONAL, -- Need M

 deriveSSB-IndexFromCell BOOLEAN,

 ss-RSSI-Measurement SS-RSSI-Measurement OPTIONAL, -- Need M

 ...,

 [[

 ssb-PositionQCL-Common-r16 SSB-PositionQCL-Relation-r16 OPTIONAL, -- Cond SharedSpectrum

 ssb-PositionQCL-CellsToAddModList-r16 SSB-PositionQCL-CellsToAddModList-r16 OPTIONAL, -- Need N

 ssb-PositionQCL-CellsToRemoveList-r16 PCI-List OPTIONAL -- Need N

 ]],

 [[

 deriveSSB-IndexFromCellInter-r17 ServCellIndex OPTIONAL, -- Need R

 ssb-PositionQCL-Common-r17 SSB-PositionQCL-Relation-r17 OPTIONAL, -- Cond SharedSpectrum2

 ssb-PositionQCL-Cells-r17 SetupRelease {SSB-PositionQCL-CellList-r17} OPTIONAL -- Need M

 ]],

 [[

 cca-CellsToAddModList-r17 CCA-CellsToAddModList-r17 OPTIONAL, -- Need N

 cca-CellsToRemoveList-r17 PCI-List OPTIONAL -- Need N

 ]]

}

Q-OffsetRangeList ::= SEQUENCE {

 rsrpOffsetSSB Q-OffsetRange DEFAULT dB0,

 rsrqOffsetSSB Q-OffsetRange DEFAULT dB0,

 sinrOffsetSSB Q-OffsetRange DEFAULT dB0,

 rsrpOffsetCSI-RS Q-OffsetRange DEFAULT dB0,

 rsrqOffsetCSI-RS Q-OffsetRange DEFAULT dB0,

 sinrOffsetCSI-RS Q-OffsetRange DEFAULT dB0

}

ThresholdNR ::= SEQUENCE{

 thresholdRSRP RSRP-Range OPTIONAL, -- Need R

 thresholdRSRQ RSRQ-Range OPTIONAL, -- Need R

 thresholdSINR SINR-Range OPTIONAL -- Need R

}

CellsToAddModList ::= SEQUENCE (SIZE (1..maxNrofCellMeas)) OF CellsToAddMod

CellsToAddModListExt-v1710 ::= SEQUENCE (SIZE (1..maxNrofCellMeas)) OF CellsToAddModExt-v1710

CellsToAddMod ::= SEQUENCE {

 physCellId PhysCellId,

 cellIndividualOffset Q-OffsetRangeList

}

CellsToAddModExt-v1710 ::= SEQUENCE {

 ntn-PolarizationDL-r17 ENUMERATED {rhcp,lhcp,linear} OPTIONAL, -- Need R

 ntn-PolarizationUL-r17 ENUMERATED {rhcp,lhcp,linear} OPTIONAL -- Need R

}

RMTC-Config-r16 ::= SEQUENCE {

 rmtc-Periodicity-r16 ENUMERATED {ms40, ms80, ms160, ms320, ms640},

 rmtc-SubframeOffset-r16 INTEGER(0..639) OPTIONAL, -- Need M

 measDurationSymbols-r16 ENUMERATED {sym1, sym14or12, sym28or24, sym42or36, sym70or60},

 rmtc-Frequency-r16 ARFCN-ValueNR,

 ref-SCS-CP-r16 ENUMERATED {kHz15, kHz30, kHz60-NCP, kHz60-ECP},

 ...,

 [[

 rmtc-Bandwidth-r17 ENUMERATED {mhz100, mhz400, mhz800, mhz1600, mhz2000} OPTIONAL, -- Need R

 measDurationSymbols-v1700 ENUMERATED {sym140, sym560, sym1120} OPTIONAL, -- Need R

 ref-SCS-CP-v1700 ENUMERATED {kHz120, kHz480, kHz960} OPTIONAL, -- Need R

 tci-StateInfo-r17 SEQUENCE {

 tci-StateId TCI-StateId,

 ref-ServCellId ServCellIndex OPTIONAL -- Need R

 } OPTIONAL -- Need R

 ]]

}

SSB-PositionQCL-CellsToAddModList-r16 ::= SEQUENCE (SIZE (1..maxNrofCellMeas)) OF SSB-PositionQCL-CellsToAddMod-r16

SSB-PositionQCL-CellsToAddMod-r16 ::= SEQUENCE {

 physCellId-r16 PhysCellId,

 ssb-PositionQCL-r16 SSB-PositionQCL-Relation-r16

}

CCA-CellsToAddModList-r17 ::= SEQUENCE (SIZE (1..maxNrofCellMeas)) OF CCA-CellsToAddMod-r17

CCA-CellsToAddMod-r17 ::= SEQUENCE {

 physCellId-r17 PhysCellId,

 channelAccessMode2-r17 ENUMERATED {enabled}

}

SSB-PositionQCL-CellList-r17 ::= SEQUENCE (SIZE (1..maxNrofCellMeas)) OF SSB-PositionQCL-Cell-r17

SSB-PositionQCL-Cell-r17 ::= SEQUENCE {

 physCellId-r17 PhysCellId,

 ssb-PositionQCL-r17 SSB-PositionQCL-Relation-r17

}

-- TAG-MEASOBJECTNR-STOP

-- ASN1STOP

|  |
| --- |
| ***CCA-CellsToAddMod* field descriptions** |
| ***channelAccessMode2***This field indicates that a specific neighbor cell applies channel access mode procedures for operation with shared spectrum channel access in accordance with TS 37.213 [48], clause 4.4 for FR2-2. |
| ***physCellId***Physical cell identity of a cell in the cell list. |

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| --- |
| ***CellsToAddMod* field descriptions** |
| ***cellIndividualOffset***Cell individual offsets applicable to a specific cell. |
| ***physCellId***Physical cell identity of a cell in the cell list. |

|  |
| --- |
| ***MeasObjectNR* field descriptions** |
| ***absThreshCSI-RS-Consolidation***Absolute threshold for the consolidation of measurement results per CSI-RS resource(s) from L1 filter(s). The field is used for the derivation of cell measurement results as described in 5.5.3.3 and the reporting of beam measurement information per CSI-RS resource as described in 5.5.5.2. |
| ***absThreshSS-BlocksConsolidation***Absolute threshold for the consolidation of measurement results per SS/PBCH block(s) from L1 filter(s). The field is used for the derivation of cell measurement results as described in 5.5.3.3 and the reporting of beam measurement information per SS/PBCH block index as described in 5.5.5.2. |
| ***allowedCellsToAddModList***List of cells to add/modify in the allow-list of cells. It applies only to SSB resources. |
| ***allowedCellsToRemoveList***List of cells to remove from the allow-list of cells. |
| ***associatedMeasGapSSB***Indicates the associated measurement gap for SSB measuring identified by *ssb-ConfigMobility* in this measurement object. When multiple *MeasObjectNR* with the same SSB frequency are configured, the network configures the same measurement gap ID in this field for each *MeasObjectNR*. If this field is absent, the associated measurement gap is the gap configured via *gapFR1*, *gapFR2*, or *gapUE*. |
| ***associatedMeasGapCSIRS***Indicates the associated measurement gap for CSI-RS measuring identified by *csi-rs-ResourceConfigMobility* in this measurement object. If this field is absent, the associated measurement gap is the gap configured via *gapFR1*, *gapFR2*, or *gapUE*. |
| ***cellsToAddModList***List of cells to add/modify in the cell list. |
| ***cellsToRemoveList***List of cells to remove from the cell list.  |
| ***excludedCellsToAddModList***List of cells to add/modify in the exclude-list of cells. It applies only to SSB resources. |
| ***excludedCellsToRemoveList***List of cells to remove from the exclude-list of cells. |
| ***freqBandIndicatorNR***The frequency band in which the SSB and/or CSI-RS indicated in this *MeasObjectNR* are located and according to which the UE shall perform the RRM measurements. This field is always provided when the network configures measurements with this *MeasObjectNR*. |
| ***measCyclePSCell***The parameter is used only when the PSCell is configured on the frequency indicated by the *measObjectNR* and the SCG is deactivated, see TS 38.133 [14]. The field may also be configured when the PSCell is not configured on that frequency. Value ms*160* corresponds to 160 ms, value *ms256* corresponds to 256 ms and so on. |
| ***measCycleSCell***The parameter is used only when an SCell is configured on the frequency indicated by the measObjectNR and is in deactivated state, see TS 38.133 [14]. gNB configures the parameter whenever an SCell is configured on the frequency indicated by the *measObjectNR*, but the field may also be signalled when an SCell is not configured. Value *sf160* corresponds to 160 sub-frames, value *sf256* corresponds to 256 sub-frames and so on. |
| ***nrofCSInrofCSI-RS-ResourcesToAverage***Indicates the maximum number of measurement results per beam based on CSI-RS resources to be averaged. The same value applies for each detected cell associated with this *MeasObjectNR*. |
| ***nrofSS-BlocksToAverage***Indicates the maximum number of measurement results per beam based on SS/PBCH blocks to be averaged. The same value applies for each detected cell associated with this *MeasObject*. |
| ***ntn-PolarizationDL***If present, this parameter indicates polarization information for downlink transmission on service link: including Right hand, Left hand circular polarizations (RHCP, LHCP) and Linear polarization. |
| ***ntn-PolarizationUL***If present, this parameter indicates polarization information for uplink transmission on service link. If not present and *ntnPolarizationDL* is present, UE assumes the same polarization for UL and DL. |
| ***offsetMO***Offset values applicable to all measured cells with reference signal(s) indicated in this *MeasObjectNR*. |
| ***quantityConfigIndex***Indicates the n-*th* element of *quantityConfigNR-List* provided in *MeasConfig*. |
| ***referenceSignalConfig***RS configuration for SS/PBCH block and CSI-RS. |
| ***refFreqCSI-RS***Point A which is used for mapping of CSI-RS to physical resources according to TS 38.211 [16] clause 7.4.1.5.3. |
| ***smtc1***Primary measurement timing configuration. (see clause 5.5.2.10). |
| ***smtc2***Secondary measurement timing configuration for SS corresponding to this *MeasObjectNR* with PCI listed in *pci-List*. For these SS, the periodicity is indicated by *periodicity* in *smtc2* and the timing offset is equal to the offset indicated in *periodicityAndOffset* modulo *periodicity*. *periodicity* in smtc2 can only be set to a value strictly shorter than the periodicity indicated by *periodicityAndOffset* in *smtc1* (e.g. if *periodicityAndOffset* indicates *sf10*, *periodicity* can only be set of *sf5*, if *periodicityAndOffset* indicates *sf5*, *smtc2* cannot be configured). |
| ***smtc3list***Measurement timing configuration list for SS corresponding to IAB-MT. This is used for the IAB-node's discovery of other IAB-nodes and the IAB-Donor-DUs. |
| ***smtc4list***Measurement timing configuration list for NTN deployments. |
| ***ssbFrequency***Indicates the frequency of the SS associated to this *MeasObjectNR*. For operation with shared spectrum channel access, this field is a k\*30 kHz shift from the sync raster where k = 0,1,2, and so on if the *reportType* within the corresponding *ReportConfigNR* is set to reportCGI (see TS 38.211 [16], clause 7.4.3.1). Frequencies are considered to be on the sync raster if they are also identifiable with a GSCN value (see TS 38.101-1 [15]). |
| ***ssb-PositionQCL-Common***Indicates the QCL relationship between SS/PBCH blocks for all measured cells as specified in TS 38.213 [13], clause 4.1. |
| ***ssbSubcarrierSpacing***Subcarrier spacing of SSB.Only the following values are applicable depending on the used frequency:FR1: 15 or 30 kHzFR2-1: 120 or 240 kHzFR2-2: 120, 480, or 960 kHz |
| ***t312***The value of timer T312. Value ms0 represents 0 ms, ms50 represents 50 ms and so on. |

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| ***RMTC-Config* field descriptions** |
| ***measDurationSymbols***Number of consecutive symbols for which the Physical Layer reports samples of RSSI (see TS 38.215 [9], clause 5.1.21). Value *sym1* corresponds to one symbol, *sym14or12* corresponds to 14 symbols of the reference numerology for NCP and 12 symbols for ECP, and so on.If *measDurationSymbols-v1700* is signalled, the UE ignores *measDurationSymbols-r16*. |
| ***ref-SCS-CP***Indicates a reference subcarrier spacing and cyclic prefix to be used for RSSI measurements (see TS 38.215 [9]). Value kHz15 corresponds to 15kHz, kHz30 corresponds to 30 kHz, value kHz60-NCP corresponds to 60 kHz using normal cyclic prefix (NCP), and kHz60-ECP corresponds to 60 kHz using extended cyclic prefix (ECP).If *ref-SCS-CP-v1700* is signalled, the UE ignores *ref-SCS-CP-r16*. |
| ***rmtc-Bandwidth***Indicates the bandwidth for the RSSI measurement (see TS 38. 215 [9], clause 5.1.21). |
| ***rmtc-Frequency***Indicates the center frequency of the measured bandwidth for a frequency which operates with shared spectrum channel access (see TS 38. 215 [9], clause 5.1.21). |
| ***rmtc-Periodicity***Indicates the RSSI measurement timing configuration (RMTC) periodicity (see TS 38.215 [9], clause 5.1.21). |
| ***rmtc-SubframeOffset***Indicates the RSSI measurement timing configuration (RMTC) subframe offset for this frequency (see TS 38.215 [9], clause 5.1.21). For inter-frequency measurements, this field is optional present and if it is not configured, the UE chooses a random value as *rmtc-SubframeOffset* for *measDurationSymbols* which shall be selected to be between 0 and the configured *rmtc-Periodicity* with equal probability. |
| ***servCellId***Indicates the reference serving cell index for the TCI state. |
| ***tci-StateId***Indicates the TCI state to be used for RSSI measurements. This field is only applicable for shared spectrum channel access in FR2-2. |

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| ***ReferenceSignalConfig* field descriptions** |
| ***csi-rs-ResourceConfigMobility***CSI-RS resources to be used for CSI-RS based RRM measurements. |
| ***ssb-ConfigMobility***SSB configuration for mobility (nominal SSBs, timing configuration). |

|  |
| --- |
| ***SSB-ConfigMobility* field descriptions** |
| ***deriveSSB-IndexFromCell***If this field is set to *true*, UE assumes SFN and frame boundary alignment across cells on the same frequency carrier as specified in TS 38.133 [14]. Hence, if the UE is configured with a serving cell for which (*absoluteFrequencySSB*, *subcarrierSpacing*) in *ServingCellConfigCommon* is equal to (*ssbFrequency*, *ssbSubcarrierSpacing*) in this *MeasObjectNR*, this field indicates whether the UE can utilize the timing of this serving cell to derive the index of SS block transmitted by neighbour cell. Otherwise, this field indicates whether the UE may use the timing of any detected cell on that target frequency to derive the SSB index of all neighbour cells on that frequency. |
| ***deriveSSB-IndexFromCellInter***If this field is present, UE assumes SFN and frame boundary alignment between the reference serving cell indicated by *ServCellIndex* and all neighbour cells in this *MeasObjectNR* as specified in TS 38.133 [14]. This field also indicates that the UE can utilize the timing of the reference serving cell indicated by *ServCellIndex* to derive the index of SS block transmitted by all inter-frequency neighbour cells on the frequency indicated by the *MeasObjectNR*. When this field is included, the network should set *deriveSSB-IndexFromCell* to *true*. |
| ***ssb-ToMeasure***The set of SS blocks to be measured within the SMTC measurement duration. The first/leftmost bit corresponds to SS/PBCH block index 0, the second bit corresponds to SS/PBCH block index 1, and so on. Value 0 in the bitmap indicates that the corresponding SS/PBCH block is not to be measured while value 1 indicates that the corresponding SS/PBCH block is to be measured (see TS 38.215 [9]). When the field is not configured the UE measures on all SS blocks. Regardless of the value of this field, SS/PBCH blocks outside of the applicable *smtc* are not to be measured. See TS 38.215 [9] clause 5.1.1. |

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| ***SSB-PositionQCL-CellsToAddMod* field descriptions** |
| ***physCellId***Physical cell identity of a cell in the cell list. |
| ***ssb-PositionQCL***Indicates the QCL relation between SS/PBCH blocks for a specific cell as specified in TS 38.213 [13], clause 4.1. If provided, the cell specific value overwrites the value signalled by *ssb-PositionQCL-Common*. |

|  |  |
| --- | --- |
| **Conditional Presence** | **Explanation** |
| *CSI-RS* | This field is mandatory present if *csi-rs-ResourceConfigMobility* is configured, otherwise, it is absent. |
| *SSBorAssociatedSSB* | This field is mandatory present if *ssb-ConfigMobility* is configured or *associatedSSB* is configured in at least one cell. Otherwise, it is absent, Need R. |
| *IntraFreqConnected* | This field is optionally present, Need R if the UE is configured with a serving cell for which (absoluteFrequencySSB, subcarrierSpacing) in ServingCellConfigCommon is equal to (*ssbFrequency*, *ssbSubcarrierSpacing*) in this *MeasObjectNR*, otherwise, it is absent. |
| *SharedSpectrum* | This field is mandatory present if this *MeasObject* is for a frequency which operates with shared spectrum channel access in FR1. Otherwise, it is absent, Need R. |
| *SharedSpectrum2* | This field is optionally present if this *MeasObject* is for a frequency which operates with shared spectrum channel access in FR2-2. Otherwise, it is absent, Need R. |

*End of Changes*