**3GPP TSG-RAN WG2 Meeting #111 Electronic *R2-200XXXX***

**17 – 28 August 2020**

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| *CR-Form-v12.0* |
| **CHANGE REQUEST** |
|  |
|  | **38.331** | **CR** |  | **rev** |  | **Current version:** | **16.1.0** |  |
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| *For* [***HE******LP***](http://www.3gpp.org/3G_Specs/CRs.htm#_blank)*on using this form: comprehensive instructions can be found at* [*http://www.3gpp.org/Change-Requests*](http://www.3gpp.org/Change-Requests)*.* |
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| ***Proposed change affects:*** | UICC apps |  | ME | **X** | Radio Access Network |  | Core Network |  |

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| ***Title:***  | Corrections for NPNs |
|  |  |
| ***Source to WG:*** | Nokia, Nokia Shanghai Bell, Samsung |
| ***Source to TSG:*** | R2 |
|  |  |
| ***Work item code:*** | NG\_RAN\_PRN-Core, NR\_unlic-Core |  | ***Date:*** | 2020-08 |
|  |  |  |  |  |
| ***Category:*** | **F** |  | ***Release:*** | 16 |
|  | *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-12 (Release 12)**Rel-13 (Release 13)Rel-14 (Release 14)Rel-15 (Release 15)Rel-16 (Release 16)* |
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| ***Reason for change:*** | This CR contains the agreed NPN related corrections from RAN2#111-e. |
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| ***Summary of change:*** | 1. R2-2008016: Changes in the CR are endorsed
2. Update the name of IEs for indicating CAG-cell list per PLMN in SIB3 and SIB4 in a same manner.
3. R2-200
4. A
5. R2-200
6. A
7. R2-200.
8. A.
9. R2-200.
10. A.
11. R2-200.
12. A.
13. R2-200.
14. A.

**Impact analysis**Impacted functionality:.Inter-operability:  |
|  |  |
| ***Consequences if not approved:*** | The specification of NPN feature remains unclear and contains errors. |
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| ***Clauses affected:*** | 6.3.1 |
|  |  |
|  | **Y** | **N** |  |  |
| ***Other specs*** |  |  |  Other core specifications  | TS/TR ... CR ...  |
| ***affected:*** |  |  |  Test specifications | TS/TR ... CR ...  |
| ***(show related CRs)*** |  |  |  O&M Specifications | TS/TR ... CR ...  |
|  |  |
| ***Other comments:*** |  |
|  |  |
| ***This CR's revision history:*** |  |

*First Modified Subclause*

*Next change*

*Next change*

*Next change*

*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 blacklisted cells.

***SIB3* information element**

-- ASN1START

-- TAG-SIB3-START

SIB3 ::= SEQUENCE {

 intraFreqNeighCellList IntraFreqNeighCellList OPTIONAL, -- Need R

 intraFreqBlackCellList IntraFreqBlackCellList OPTIONAL, -- Need R

 lateNonCriticalExtension OCTET STRING OPTIONAL,

 ...,

 [[

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

 intraFreqWhiteCellList-r16 IntraFreqWhiteCellList-r16 OPTIONAL, -- Cond SharedSpectrum2

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

 ]]

}

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

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

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

}

IntraFreqBlackCellList ::= SEQUENCE (SIZE (1..maxCellBlack)) OF PCI-Range

IntraFreqWhiteCellList-r16 ::= SEQUENCE (SIZE (1..maxCellWhite)) 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

}

-- TAG-SIB3-STOP

-- ASN1STOP

| ***SIB3* field descriptions** |
| --- |
| ***intraFreqBlackCellList***List of blacklisted intra-frequency neighbouring cells. |
| ***intraFreqCAG-CellList***List of intra-frequency neighbouring CAG cells (as defined in TS 38.304 [20]) per PLMN. |
| ***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). |
| ***intraFreqWhiteCellList***List of whitelisted intra-frequency neighbouring cells, see TS 38.304 [20], clause 5.2.4. |
| ***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 relationship 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. |

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| **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. |

*Next change*

*SIB4*

*SIB4* contains information relevant only for inter-frequency cell re-selection i.e. information about other NR frequencies and inter-frequency neighbouring cells relevant for cell re-selection. 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 ::= SEQUENCE (SIZE (1..maxFreq)) OF InterFreqCarrierFreqInfo

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

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,

 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

 interFreqBlackCellList InterFreqBlackCellList OPTIONAL, -- Need R

 ...

}

InterFreqCarrierFreqInfo-v1610 ::= SEQUENCE {

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

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

 interFreqWhiteCellList-r16 InterFreqWhiteCellList-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

}

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

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

InterFreqNeighCellInfo ::= SEQUENCE {

 physCellId PhysCellId,

 q-OffsetCell Q-OffsetRange,

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

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

 ...

}

InterFreqNeighCellInfo-v1610 ::= SEQUENCE {

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

}

InterFreqBlackCellList ::= SEQUENCE (SIZE (1..maxCellBlack)) OF PCI-Range

InterFreqWhiteCellList-r16 ::= SEQUENCE (SIZE (1..maxCellWhite)) 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]. |
| ***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. |
| ***interFreqBlackCellList***List of blacklisted inter-frequency neighbouring cells. |
| ***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 *iinterFreqCarrierFreqList-v1610* is present, it shall contain the same number of entries, listed in the same order as in *interFreqCarrierFreqList* (without suffix). |
| ***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). |
| ***interFreqWhiteCellList***List of whitelisted inter-frequency neighbouring cells, see TS 38.304 [20], clause 5.2.4. |
| ***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]. |
| ***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]. |
| ***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-r16***Measurement timing configuration for inter-frequency neighbour cells with a Long Periodicity (LP) indicated by periodicity in *smtc2-LP-r16*. The timing offset and duration are equal to the offset and duration indicated in *smtc* in *InterFreqCarrierFreqInfo*. The periodicity in *smtc2-LP-r16* 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-r16* 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-r16* is absent, the UE assumes that there are no inter-frequency neighbour cells with a Long Periodicity. |
| ***ssb-PositionQCL***Indicates the QCL relationship 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 relationship 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 values 15 kHz or 30 kHz (FR1), and 120 kHz or 240 kHz (FR2) are applicable. |
| ***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]. |

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| **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. |

*End of Changes*