**3GPP TSG-RAN WG4 Meeting #102-e *R4-2206627***

**Electronic Meeting, February 21 – March 3, 2022**

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| *CR-Form-v12.1* | | | | | | | | |
| **CHANGE REQUEST** | | | | | | | | |
|  | | | | | | | | |
|  | **38.101-1** | **CR** | **<CR#>** | **rev** | **-** | **Current version:** | **17.4.0** |  |
|  | | | | | | | | |
| *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 |  | Core Network |  |

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| ***Title:*** | Big CR for TS 38.101-1 Maintenance Part-2 (Rel-17) | | | | | | | | | |
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| ***Source to WG:*** | MCC, vivo | | | | | | | | | |
| ***Source to TSG:*** | R4 | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Work item code:*** | NR\_unlic-Core,  NR\_newRAT-Core,  NR\_CADC\_R16\_3BDL\_2BUL,  5G\_V2X\_NRSL-Core,  NR\_RF\_FR1-Core | | | | |  | ***Date:*** | | | 2022-03-07 |
|  |  | | | |  | |  | | |  |
| ***Category:*** | **F** |  | | | | | ***Release:*** | | | Rel-17 |
|  | *Use one of the following categories:* ***F*** *(correction)* ***A*** *(mirror corresponding to a change in an earlier release)* ***B*** *(addition of feature),* ***C*** *(functional modification of feature)* ***D*** *(editorial modification)*  Detailed explanations of the above categories can be found in 3GPP [TR 21.900](http://www.3gpp.org/ftp/Specs/html-info/21900.htm). | | | | | | | | *Use one of the following releases: Rel-8 (Release 8) Rel-9 (Release 9) Rel-10 (Release 10) Rel-11 (Release 11) … Rel-15 (Release 15) Rel-16 (Release 16) Rel-17 (Release 17) Rel-18 (Release 18)* | |
|  |  | | | | | | | | | |
| ***Reason for change:*** | | This big CRs merge the mutile endorsed draf CRs. The reason for change in each endorsed draft CR is copied below.  R4-2203614 Correction to n46 channel raster Rohde & Schwarz  For band n46 the first allowed ARFCN is specified as 743333, however this ARFCN corresponds to 5149.995 MHz, which is below the lower frequency (5150 MHz) of the band. The lowest ARFCN should be increased by 1 to be inside the frequency range of the band. Also the ARFCN range in the UE specification 38.101-1 is not aligned with the ARFCN range in 38.104.  R4-2204603 Correction to the note on the use of operating bands for shared spectrum access Ericsson  Correct the note on the use of Band n96 and apply the corrected note also for n46.  Some Administrations outside the US also allow operation of equipment compliant with the FCC rules of Rel-16.  Requirements for any new NS value specified in Rel-17 can be supported by a Rel-16 UE by release independence. This can be done without indication in the *modifiedMPRbehavior* for Rel-16 devices.  The note applies for all bands designated for shared-spectrum access including n46 (widely allocated but the full band is not available in all countries).  R4-2204200 n1 and n65 coexistence fix CR Cat-A rel 17 Qualcomm Incorporated  Conflict of NS and general emission requirements for larger channel BWs.  R4-2204209 n65 AMPR discrepancies rel 16 CR Cat-A rel 17 Qualcomm Incorporated  Not enough AMPR exists to meet severe B34 protection for CIM3 and CIM5 distortion  R4-2204738 Draft CR to TS38.101-1: Corrections on REFSEN for CA ZTE Corporation  This is mirror CR to R4-2206573, the corrections are highlighted in yellow on top of the endorsed draft CR R4-2202274 in last meeting.  R4-2205185 Draft CR for 38.101-1 updating note in MSD tables (Rel-17) Huawei, HiSilicon  The transmit power is limited to min(+20 dBm, PCMAX\_L,f,c) for the REFSENS MSD due to dual uplink for 2DL/2UL configurations. However this limitation is missing for 3DL/2UL configurations.  R4-2205187 Draft CR for 38.101-1 updating references in V2X test cases (Rel-17) Huawei, HiSilicon  In V2X test cases, the requirements for con-current operation usually refer back to NR and V2X non-cocurrent requirements. In quite a few places, the reference is self-pointing which might cause confusion.  R4-2205298 Draft CR for 38.101-1 to correct configured transmit power for V2X(R17) Huawei, HiSilicon  Based on the endorsed R4-2119497, None of the SL bands define ΔTC, that is removed from pcmax formula  R4-2206093 Corrections on carrier leakage requirement Qualcomm Incoporated  The text in the beginning of section 6.4A.2.2 is a hanging paragraph.  The carrier leakage description is moved to carrier leakage clause and clause is created.  The existing sentence:  For intra-band non-contiguous CA, the carrier leakage requirement is defined with applicable frequencies dependent on parameter txDirectCurrentLocation-r16 in UplinkTxDirectCurrentTwoCarrierList IE indicated in active uplink carrier(s).  The sentence above is sufficient. The sentence below refers to additional DC location, it is not clear what is “additional DC location reporting” it is better to refer to secondPA-TxDirectCurrent-r16 which is a repeating the UplinkTxDirectCurrentTwoCarrierInfo-r16. And this second or additional is not a capability so UE either just reports it or does not report it.  For band combinations with supporting additional DC location reporting for intra-band CA, the applicable LO leakage frequency depend on the txDirectCurrentLocation-r16 indicated in the additional reporting IE  Sentence below belongs to the requirement for the exception. Normally part of the in-band emissions requirement. Carrier leakage is present regardless of RBs are allocated or not.  , and are those that are enclosed either in the RB containing the carrier leakage frequency, or in the two RBs immediately adjacent to the carrier leakage frequency but excluding any allocated RB.  The sentence below repeats what is said in the first sentence.  Otherwise, The applicable frequencies for this limit depend on the parameter txDirectCurrentLocation-r16 in UplinkTxDirectCurrentTwoCarrierList IE.The actual requirement for carrier leakage is missing. Added reference to intra-band contiguous tables.  In this sentence, the UL CC synchronization is not a UE requirement and regardless of synchoirnization or not, the 1LO case will have the LO in between the CC. The sentence is needed for the case when LO is in the gap but IQ image lands on CC.  When signalling for dualPA-Architecture IE is absent, carrier leakage or I/Q image may land inside the gap spectrum between 2 UL CCs when UL CCs are synchronized with frequencies in the gap.  In-band emission requirements, dB values, are not defined. Added a reference to the values in intra-band contiguous.  In clauses 6.5A.2.2.2, 6.5A.3.1, 6.5A.2.4.1.2 the reference to carrier leakage exception is removed since it does not present any requirement. The sentence indicating that there maybe a carrier leakage in the gap needs to put in to the new clause 6.4A.2.2.3 since in soime cases the carrier leakage may need to be recognised even if the exception is not granted.  Text to refer one or two RBs for carrier leakage are removed since it relates to the actual exception and its width which is already in IBE section.  R4-2204331 draft CR for n74 related CA co-existence requirements for TS 38.101-1 KDDI, NTT DoCoMo, Softbank  In RAN4 # 101, It was added some condition and NOTEs related n74 in the UE co-existence table in TS38.101-1(R4-2119873). This draft CR is intend to reflect these additon to CAs related to n74. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Summary of change:*** | | The summary of change in each each endorsed draft CR is copied below.  R4-2203614 Correction to n46 channel raster Rohde & Schwarz  Update lowest ARFCN from 743333 to 743334  R4-2204603 Correction to the note on the use of operating bands for shared spectrum access Ericsson  Clause 5.2: NOTE 14 in Table 5.2-1 modified to “This band is applicable only in countries/regions designating this band for shared-spectrum access use subject to country-specific conditions.” This footnote also applies to Band n46.  R4-2204200 n1 and n65 coexistence fix CR Cat-A rel 17 Qualcomm Incorporated  Mirror CR  Resolving n1 NS\_48/49 and UE-UE coexistence B34 emission requirement for larger BW > 20M.   1. Add new row in 38.101-1 UE-UE coexistence table for B34 only and add a new note (XX) to state that requirement is applicable for channel BWs <= 20MHz and for power class 3 only. AMPR will apply for channel BW > 20MHz. 2. Edit note 27 for power class 3 (B39/B33 proptection), so general requirement only applies to power class 3 and channel BW up to 20MHz. AMPR will apply for channel BW > 20MHz.   Resolving n65 NS\_51 and UE-UE coexistence emission requirements  NS\_51 exists for B34 protection against 50MHz channel BW, so note 43 must be modified in general UE-UE coexistence table that “requirements are applicable for channel BWs up to 20MHz”  R4-2204209 n65 AMPR discrepancies rel 16 CR Cat-A rel 17 Qualcomm Incorporated  Mirror CR  Modify A5 AMPR boundary to cover 30KHz and 60KHz SCS and not just 15KHz SCS for CIM5 coverage.  Modify NS\_51 A1 AMPR 15dB to 17dB to provide margin for CIM3 = -60dBc. LTE has 17dB backoff. NR 20MHz BW for NS\_24 for same impairment has 18dB backoff. Measurement margin is insufficient for 15dB backoff.  Editorial change to correct A5 to A6 in table 6.2.3.28-2 header.  R4-2204738 Draft CR to TS38.101-1: Corrections on REFSEN for CA ZTE Corporation  Adding the descriptions for the REFSEN requirements for CA including intra-band CA and inter-band CA, i.e. considering both ΔRIBNC and ΔRIBNC.  R4-2205185 Draft CR for 38.101-1 updating note in MSD tables (Rel-17) Huawei, HiSilicon  Adding the transmit power limitation to 3DL/2UL configurations.  R4-2205187 Draft CR for 38.101-1 updating references in V2X test cases (Rel-17) Huawei, HiSilicon  Updating the references to clarify the requirements for V2X con-current operation.  R4-2205298 Draft CR for 38.101-1 to correct configured transmit power for V2X(R17) Huawei, HiSilicon  TC,c is replaced by TIB,c in the pcmax formula.  R4-2206093 Corrections on carrier leakage requirement Qualcomm Incoporated  6.4A.2.2.0 General created to correct hanging paragraph  Carrier leakage clause 6.4A.2.2.3 is created for non-contiguous CA and text moved there. The text is corrected to remove repeats and ambiguous references.  The missing dB requirements for non-contiguos CA carrier leakage are refeerred to contiguos CA clause 6.4A.2.1.2.  Carrier leakage sentence is removed from SEM, Spurious emissions and ACLR and moved to new carrier leakage clause 6.4A.2.2.3.  Text to refer one or two RBs for carrier leakage are removed since it relates to the actual exception and its width.  R4-2204331 draft CR for n74 related CA co-existence requirements for TS 38.101-1 KDDI, NTT DoCoMo, Softbank  Modify/ add correponding NOTE and related specifications in UE co-existence table | | | | | | | | |
|  | |  | | | | | | | | |
| ***Consequences if not approved:*** | | The consequences if not approved for each endorsed draft CR are coppied below.  R4-2203614 Correction to n46 channel raster Rohde & Schwarz  Incorrect ARFCN remains in the spec.  R4-2204603 Correction to the note on the use of operating bands for shared spectrum access Ericsson  The informative NOTE 14 not correct.  R4-2204200 n1 and n65 coexistence fix CR Cat-A rel 17 Qualcomm Incorporated  UE cannot meet general UE-UE emission requirements  R4-2204209 n65 AMPR discrepancies rel 16 CR Cat-A rel 17 Qualcomm Incorporated  UE cannot  R4-2204738 Draft CR to TS38.101-1: Corrections on REFSEN for CA ZTE Corporation  Incorrect REFSEN for CA.  R4-2205185 Draft CR for 38.101-1 updating note in MSD tables (Rel-17) Huawei, HiSilicon  The REFSENS MSD expectation would be different with unbalanced transmit power.  R4-2205187 Draft CR for 38.101-1 updating references in V2X test cases (Rel-17) Huawei, HiSilicon  The requirements for V2X con-current operation are not clear.  R4-2205298 Draft CR for 38.101-1 to correct configured transmit power for V2X(R17) Huawei, HiSilicon  TC,c is still included in the pcmax formula for NR V2X.  R4-2206093 Corrections on carrier leakage requirement Qualcomm Incoporated  Requirements are unclear   1. If exception is granted to SEM, Spurious, ACLR or not since carrierl leakage is mentioned in the corresponding clauses 2. The text to describe 2CC DC location use andf RAN4 requirements is unclear   R4-2204331 draft CR for n74 related CA co-existence requirements for TS 38.101-1 KDDI, NTT DoCoMo, Softbank  Coexistence conditions are not reflected correctly in TS38.101-1.. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Clauses affected:*** | | R4-2203614 Correction to n46 channel raster Rohde & Schwarz  5.4.2.3  R4-2204603 Correction to the note on the use of operating bands for shared spectrum access Ericsson  5.2  R4-2204200 n1 and n65 coexistence fix CR Cat-A rel 17 Qualcomm Incorporated  6.5.3.2  R4-2204209 n65 AMPR discrepancies rel 16 CR Cat-A rel 17 Qualcomm Incorporated  6.2.3.15, 6.2.3.38  R4-2204738 Draft CR to TS38.101-1: Corrections on REFSEN for CA ZTE Corporation  7.3A.2  R4-2205185 Draft CR for 38.101-1 updating note in MSD tables (Rel-17) Huawei, HiSilicon  7.3A.5  R4-2205187 Draft CR for 38.101-1 updating references in V2X test cases (Rel-17) Huawei, HiSilicon  6.2E.1.2, 6.2E.2.2, 6.2E.2.3, 6.2E.3.1, 6.2E.3.4, 6.3E.1.2, 6.3E.2.1, 6.3E.2.2, 6.3E.3.2, 6.3E.3.3, 6.3E.3.4, 6.3E.4.3, 6.4E.1.2, 6.4E.2.6, 6.5E.1.2, 6.5E.2.1, 6.5E.2.2.2, 6.5E.2.3.1, 6.5E.2.4.2, 6.5E.3.3, 6.5E.3.4.2, 6.5E.4.2, 7.3E.2, 7.4E.2, 7.5E.2, 7.6E.2.2, 7.6E.3.2, 7.7E.1, 7.7E.2, 7.8E.2  R4-2205298 Draft CR for 38.101-1 to correct configured transmit power for V2X(R17) Huawei, HiSilicon  6.2E.4.1  R4-2206093 Corrections on carrier leakage requirement Qualcomm Incoporated  6.4A.2.2, 6.4A.2.2.0, 6.4A.2.2.2, 6.5A.2.2.2, 6.5A.2.4.1.2, 6.5A.3.1  R4-2205300 Draft CR for 38.101-3 to add MOP for band combination related to band 3C(R17) Huawei, HiSilicon  6.2B.1.3  R4-2205312 Draft CR for 38.101-3 to delete the MSD frequency test points for DC\_1A\_n5A(R17) Huawei, HiSilicon  7.3B.2.3.5.1  R4-2204331 draft CR for n74 related CA co-existence requirements for TS 38.101-1 KDDI, NTT DoCoMo, Softbank  6.5A.3.2.3 | | | | | | | | |
|  | |  | | | | | | | | |
|  | | **Y** | **N** |  | | | |  | | |
| ***Other specs*** | | **X** |  | Other core specifications | | | | TS/TR 38.104 CR R4-2203615 | | |
| ***affected:*** | | **X** |  | Test specifications | | | | TS 38.521-1 | | |
| ***(show related CRs)*** | |  | **X** | O&M Specifications | | | | TS/TR ... CR ... | | |
|  | |  | | | | | | | | |
| ***Other comments:*** | |  | | | | | | | | |
|  | |  | | | | | | | | |
| ***This CR's revision history:*** | |  | | | | | | | | |

## ***<Start of change>***

## 3.2 Symbols

For the purposes of the present document, the following symbols apply:

ΔFGlobal Granularity of the global frequency raster

ΔFRaster Band dependent channel raster granularity

ΔfOOB Δ Frequency of Out Of Band emission

ΔFTX-RX Maximum deviation to the Tx-Rx carrier center frequency separation for asymmetric uplink/downlink channel bandwidth operation

∆MPRc Allowed Maximum Power Reduction relaxation for serving cell *c*

ΔPPowerClass Adjustment to maximum output power for a given power class

RB The starting frequency offset between the allocated RB and the measured non-allocated RB

ΔRIB,c Allowed reference sensitivity relaxation due to support for inter-band CA operation, for serving cell *c*

ΔRIBC Allowed reference sensitivity relaxation due to support for intra-band contiguous CA operation

ΔRIBNC Allowed reference sensitivity relaxation due to support for intra-band non-contiguous CA operation

ΔRIB,4R Reference sensitivity adjustment due to support for 4 antenna ports

ΔShift Channel raster offset

TC Allowed operating band edge transmission power relaxation

TC,*c*Allowed operating band edge transmission power relaxation for serving cell *c*

ΔTIB,c Allowed maximum configured output power relaxation due to support for inter-band CA operation, inter-band NR-DC operation and due to support for SUL operations, for serving cell *c*

BWChannel Channel bandwidth

BWChannel,block Sub-block bandwidth, expressed in MHz. BWChannel,block= Fedge,block,high- Fedge,block,low

BWChannel\_CA Aggregated channel bandwidth, expressed in MHz

BWChannel,max Maximum channel bandwidth supported among all bands in a release

BWGB max( BWGB,Channel(*k*) )

BWGB,Channel(k) Minimum guard band defined in clause 5.3A.1 of carrier *k*

BWDL Channel bandwidth for DL

BWUL Channel bandwidth for UL

BWinterferer Bandwidth of the interferer

Ceil(x) Rounding upwards; ceil(x) is the smallest integer such that ceil(x) ≥ x

Floor(x) Rounding downwards; floor(x) is the greatest integer such that floor(x) ≤ x

FC *RF reference frequency* on the channel raster, given in table 5.4.2.2-1

FC,block, high Fc of the highest transmitted/received carrier in a *sub-block*

FC,block, low Fc of the lowest transmitted/received carrier in a *sub-block*

FC,low The Fc of the lowest carrier, expressed in MHz

FC,high The Fc of the highest carrier, expressed in MHz

FDL\_low The lowest frequency of the downlink *operating band*

FDL\_high The highest frequency of the downlink *operating band*

FUL\_low The lowest frequency of the uplink *operating band*

FUL\_high The highest frequency of the uplink *operating band*

Fedge,block,low The lower *sub-block* edge, where Fedge,block,low = FC,block,low - Foffset, low.

Fedge,block,high The upper *sub-block* edge, where Fedge,block,high = FC,block,high + Foffset, high.

Fedge , low The *lower edge* of *aggregated channel bandwidth*, expressed in MHz. Fedge,low = FC,low - Foffset,low.

Fedge, high The *higher edge* of *aggregated channel bandwidth*, expressed in MHz. Fedge,high = FC,high + Foffset,high.

FInterferer (offset) Frequency offset of the interferer (between the center frequency of the interferer and the carrier frequency of the carrier measured)

FInterferer Frequency of the interferer

FIoffset Frequency offset of the interferer (between the center frequency of the interferer and the closest edge of the carrier measured)

Foffset Frequency offset from FC\_high to the *higher edge* or FC\_low to the *lower edge.*

Foffset,high Frequency offset from FC,high to the upper *UE RF Bandwidth edge*, or from FC,block, high to the upper sub-block edge

Foffset,low Frequency offset from FC,low to the lower *UE RF Bandwidth edge*, or from FC,block, low to the lower sub-block edge

FOOB The boundary between the NR out of band emission and spurious emission domains

FREF RF reference frequency

FREF-Offs Offset used for calculating FREF

FREF, shift RF reference frequency for Supplementary Uplink (SUL) bands, the uplink of all FDD bands, and TDD bands

Fuw (offset) The frequency separation of the center frequency of the carrier closest to the interferer and the center frequency of the interferer

GBChannel Minimum guard band defined in clause 5.3.3

LCRB Transmission bandwidth which represents the length of a contiguous resource block allocation expressed in units of resources blocks

Max() The largest of given numbers

Min() The smallest of given numbers

 Physical resource block number

NRACLR NR ACLR

NRB Transmission bandwidth configuration, expressed in units of resource blocks

NRB\_agg The number of the aggregated RBs within the fully allocated aggregated channel bandwidth

for carrier 1 to j, where *μ* is defined in TS 38.211 [6]

NRB,c The transmission bandwidth configuration of component carrier c, expressed in units of resource blocks

for carrier j, where *μ* is defined in TS 38.211 [6]

NRB,largest BW The largest transmission bandwidth configuration of the component carriers in the bandwidth combination, expressed in units of resource blocks

NRB,low The transmission bandwidth configurations according to Table 5.3.2-1 for the lowest assigned component carrier in clause 5.3A.1

NRB,high The transmission bandwidth configurations according to Table 5.3.2-1 for the highest assigned component carrier in clause 5.3A.1

NREF NR Absolute Radio Frequency Channel Number (NR-ARFCN)

NREF-Offs Offset used for calculating NREF

PCMAX The configured maximum UE output power

PCMAX, *c* The configured maximum UE output power for serving cell *c*

PCMAX, *f*, *c* The configured maximum UE output power for carrier *f* of serving cell *c* in each slot

PEMAX Maximum allowed UE output power signalled by higher layers

PEMAX, *c* Maximum allowed UE output power signalled by higher layers for serving cell *c*

PInterferer Modulated mean power of the interferer

Plargest BW Power of the largest transmission bandwidth configuration of the component carriers in the bandwidth combination

PPowerClass The nominal UE power (i.e., no tolerance)

P-MPR*c* Power Management Maximum Power Reduction for serving cell *c*

PRB The transmitted power per allocated RB, measured in dBm

PUMAX The measured configured maximum UE output power

Puw Power of an unwanted DL signal

Pw Power of a wanted DL signal

RBstart The lowest RB index of transmitted resource blocks

RBstart\_CA The lowest RB index of transmitted resource blocks for intra-band contiguous CA

SCSc SCS for the component carrier c

SCSlargest BW SCS for the largest transmission bandwidth configuration of the component carriers in the bandwidth combination

SCSlow SCS for the lowest assigned component carrier in clause 5.3A.1

SCShigh SCS for the highest assigned component carrier in clause 5.3A.1

*tp* Transient Period value signalled by the UE

*tpstart* Start position of transient period relative to the symbol boundary

T(PCMAX, *f*, *c*) Tolerance for applicable values of PCMAX, *f*, *c* for configured maximum UE output power for carrier *f* of serving cell *c*

TL,c Absolute value of the lower tolerance for the applicable *operating band* as specified in clause 6.2.1

SSREF SS block reference frequency position

UTRAACLR UTRA ACLR

## ***<Next change>***

## 5.2 Operating bands

NR is designed to operate in the FR1 operating bands defined in Table 5.2-1.

Table 5.2-1: NR operating bands in FR1

|  |  |  |  |
| --- | --- | --- | --- |
| NR operating band | Uplink (UL) *operating band* BS receive / UE transmit  FUL\_low  – FUL\_high | Downlink (DL) *operating band* BS transmit / UE receive  FDL\_low – FDL\_high | Duplex Mode |
| n1 | 1920 MHz – 1980 MHz | 2110 MHz – 2170 MHz | FDD |
| n2 | 1850 MHz – 1910 MHz | 1930 MHz – 1990 MHz | FDD |
| n3 | 1710 MHz – 1785 MHz | 1805 MHz – 1880 MHz | FDD |
| n5 | 824 MHz – 849 MHz | 869 MHz – 894 MHz | FDD |
| n7 | 2500 MHz – 2570 MHz | 2620 MHz – 2690 MHz | FDD |
| n8 | 880 MHz – 915 MHz | 925 MHz – 960 MHz | FDD |
| n12 | 699 MHz – 716 MHz | 729 MHz – 746 MHz | FDD |
| n13 | 777 MHz – 787 MHz | 746 MHz – 756 MHz | FDD |
| n14 | 788 MHz – 798 MHz | 758 MHz – 768 MHz | FDD |
| n18 | 815 MHz – 830 MHz | 860 MHz – 875 MHz | FDD |
| n20 | 832 MHz – 862 MHz | 791 MHz – 821 MHz | FDD |
| n2416 | 1626.5 MHz – 1660.5 MHz | 1525 MHz – 1559 MHz | FDD |
| n25 | 1850 MHz – 1915 MHz | 1930 MHz – 1995 MHz | FDD |
| n26 | 814 MHz – 849 MHz | 859 MHz – 894 MHz | FDD |
| n28 | 703 MHz – 748 MHz | 758 MHz – 803 MHz | FDD |
| n29 | N/A | 717 MHz – 728 MHz | SDL |
| n303 | 2305 MHz – 2315 MHz | 2350 MHz – 2360 MHz | FDD |
| n34 | 2010 MHz – 2025 MHz | 2010 MHz – 2025 MHz | TDD |
| n3810 | 2570 MHz – 2620 MHz | 2570 MHz – 2620 MHz | TDD |
| n39 | 1880 MHz – 1920 MHz | 1880 MHz – 1920 MHz | TDD |
| n40 | 2300 MHz – 2400 MHz | 2300 MHz – 2400 MHz | TDD |
| n41 | 2496 MHz – 2690 MHz | 2496 MHz – 2690 MHz | TDD |
| n46 | 5150 MHz – 5925 MHz | 5150 MHz – 5925 MHz | TDD13 |
| n4711 | 5855 MHz – 5925 MHz | 5855 MHz – 5925 MHz | TDD |
| n48 | 3550 MHz – 3700 MHz | 3550 MHz – 3700 MHz | TDD |
| n50 | 1432 MHz – 1517 MHz | 1432 MHz – 1517 MHz | TDD1 |
| n51 | 1427 MHz – 1432 MHz | 1427 MHz – 1432 MHz | TDD |
| n53 | 2483.5 MHz – 2495 MHz | 2483.5 MHz – 2495 MHz | TDD |
| n65 | 1920 MHz – 2010 MHz | 2110 MHz – 2200 MHz | FDD4 |
| n66 | 1710 MHz – 1780 MHz | 2110 MHz – 2200 MHz | FDD |
| n67 | N/A | 738 MHz – 758 MHz | SDL |
| n70 | 1695 MHz – 1710 MHz | 1995 MHz – 2020 MHz | FDD |
| n71 | 663 MHz – 698 MHz | 617 MHz – 652 MHz | FDD |
| n74 | 1427 MHz – 1470 MHz | 1475 MHz – 1518 MHz | FDD |
| n75 | N/A | 1432 MHz – 1517 MHz | SDL |
| n76 | N/A | 1427 MHz – 1432 MHz | SDL |
| n7712 | 3300 MHz – 4200 MHz | 3300 MHz – 4200 MHz | TDD |
| n78 | 3300 MHz – 3800 MHz | 3300 MHz – 3800 MHz | TDD |
| n79 | 4400 MHz – 5000 MHz | 4400 MHz – 5000 MHz | TDD |
| n80 | 1710 MHz – 1785 MHz | N/A | SUL |
| n81 | 880 MHz – 915 MHz | N/A | SUL |
| n82 | 832 MHz – 862 MHz | N/A | SUL |
| n83 | 703 MHz – 748 MHz | N/A | SUL |
| n84 | 1920 MHz – 1980 MHz | N/A | SUL |
| n85 | 698 MHz – 716 MHz | 728 MHz – 746 MHz | FDD |
| n86 | 1710 MHz – 1780 MHz | N/A | SUL |
| n89 | 824 MHz – 849 MHz | N/A | SUL |
| n90 | 2496 MHz – 2690 MHz | 2496 MHz – 2690 MHz | TDD5 |
| n91 | 832 MHz – 862 MHz | 1427 MHz – 1432 MHz | FDD9 |
| n92 | 832 MHz – 862 MHz | 1432 MHz – 1517 MHz | FDD9 |
| n93 | 880 MHz – 915 MHz | 1427 MHz – 1432 MHz | FDD9 |
| n94 | 880 MHz – 915 MHz | 1432 MHz – 1517 MHz | FDD9 |
| n958 | 2010 MHz – 2025 MHz | N/A | SUL |
| n9614 | 5925 MHz – 7125 MHz | 5925 MHz – 7125 MHz | TDD13 |
| n9715 | 2300 MHz – 2400 MHz | N/A | SUL |
| n9815 | 1880 MHz – 1920 MHz | N/A | SUL |
| n9916 | 1626.5 MHz – 1660.5 MHz | N/A | SUL |
| NOTE 1: UE that complies with the NR Band n50 minimum requirements in this specification shall also comply with the NR Band n51 minimum requirements.  NOTE 2: UE that complies with the NR Band n75 minimum requirements in this specification shall also comply with the NR Band n76 minimum requirements.  NOTE 3: Uplink transmission is not allowed at this band for UE with external vehicle-mounted antennas.  NOTE 4: A UE that complies with the NR Band n65 minimum requirements in this specification shall also comply with the NR Band n1 minimum requirements.  NOTE 5: Unless otherwise stated, the applicability of requirements for Band n90 is in accordance with that for Band n41; a UE supporting Band n90 shall meet the requirements for Band n41. A UE supporting Band n90 shall also support band n41.  NOTE 6: A UE that supports NR Band n66 shall receive in the entire DL operating band.  NOTE 7: A UE that supports NR Band n66 and CA operation in any CA band shall also comply with the minimum requirements specified for the DL CA configurations CA\_n66B and CA\_n66(2A) in the current version of the specification.  NOTE 8: This band is applicable in China only.  NOTE 9: Variable duplex operation does not enable dynamic variable duplex configuration by the network, and is used such that DL and UL frequency ranges are supported independently in any valid frequency range for the band.  NOTE 10: When this band is used for V2X SL service, the band is exclusively used for NR V2X in particular regions.  NOTE 11: This band is unlicensed band used for V2X service. There is no expected network deployment in this band.  NOTE 12: In the USA this band is restricted to 3450 – 3550 MHz and 3700 – 3980 MHz  NOTE 13: This band is restricted to operation with shared spectrum channel access as defined in 37.213.  NOTE 14: This band is applicable only in countries/regions designating this band for shared-spectrum access use subject to country-specific conditions.  NOTE 15: The requirements for this band are applicable only where no other NR or E-UTRA TDD operating band(s) are used within the frequency range of this band in the same geographical area. For scenarios where other NR or E-UTRA TDD operating band(s) are used within the frequency range of this band in the same geographical area, special co-existence requirements may apply that are not covered by the 3GPP specifications.  NOTE 16: DL operation in this band is restricted to 1526 – 1536 MHz and UL operation is restricted to 1627.5 – 1637.5 MHz and 1646.5 – 1656.5 MHz. | | | |

## 5.2A Operating bands for CA

## ***<Next change>***

#### 5.4.2.3 Channel raster entries for each operating band

The RF channel positions on the channel raster in each NR operating band are given through the applicable NR-ARFCN in Table 5.4.2.3‑1, using the channel raster to resource element mapping in clause 5.4.2.2.

For NR operating bands with 100 kHz channel raster, ΔFRaster = 20 × ΔFGlobal. In this case every 20th NR-ARFCN within the operating band are applicable for the channel raster within the operating band and the step size for the channel raster in Table 5.4.2.3‑1 is given as <20>.

For NR operating bands with 15 kHz channel raster below 3GHz, ΔFRaster = *I* × ΔFGlobal, where *I ϵ {3,6}*. Every *Ith* NR‑ARFCN within the operating band are applicable for the channel raster within the operating band and the step size for the channel raster in Table 5.4.2.3‑1 is given as < *I* >.

For NR operating bands with 15 kHz channel raster above 3GHz, ΔFRaster = *I* × ΔFGlobal, where *I ϵ {1,2}.* Every *Ith* NR‑ARFCN within the operating band are applicable for the channel raster within the operating band and the step size for the channel raster in table 5.4.2.3-1 is given as <*I*>.

In frequency bands with two or more ΔFRaster, the higher ΔFRaster: For 15 kHz and 30 kHz channel raster applies to channels using only the SCS that is equal to or larger than the higher ΔFRaster and SSB SCS is equal to the higher ∆FRaster.

Table 5.4.2.3-1: Applicable NR-ARFCN per operating band

|  |  |  |  |
| --- | --- | --- | --- |
| NR operating band | ΔFRaster  (kHz) | Uplink  Range of NREF  (First – <Step size> – Last) | Downlink  Range of NREF  (First – <Step size> – Last) |
| n1 | 100 | 384000 – <20> – 396000 | 422000 – <20> – 434000 |
| n2 | 100 | 370000 – <20> – 382000 | 386000 – <20> – 398000 |
| n3 | 100 | 342000 – <20> – 357000 | 361000 – <20> – 376000 |
| n5 | 100 | 164800 – <20> – 169800 | 173800 – <20> – 178800 |
| n7 | 100 | 500000 – <20> – 514000 | 524000 – <20> – 538000 |
| n8 | 100 | 176000 – <20> – 183000 | 185000 – <20> – 192000 |
| n12 | 100 | 139800 – <20> – 143200 | 145800 – <20> – 149200 |
| n13 | 100 | 155400 – <20> – 157400 | 149200 – <20> – 151200 |
| n14 | 100 | 157600 – <20> – 159600 | 151600 – <20> – 153600 |
| n18 | 100 | 163000 – <20> – 166000 | 172000 – <20> – 175000 |
| n20 | 100 | 166400 – <20> – 172400 | 158200 – <20> – 164200 |
| n24 | 100 | 325300 – <20> – 332100 | 305000 – <20> – 311800 |
| n25 | 100 | 370000 – <20> – 383000 | 386000 – <20> – 399000 |
| n26 | 100 | 162800 – <20> – 169800 | 171800 – <20> – 178800 |
| n28 | 100 | 140600 – <20> – 149600 | 151600 – <20> – 160600 |
| n29 | 100 | N/A | 143400 – <20> – 145600 |
| n30 | 100 | 461000 – <20> – 463000 | 470000 – <20> – 472000 |
| n34 | 100 | 402000 – <20> – 405000 | 402000 – <20> – 405000 |
| n38 | 100 | 514000 – <20> – 524000 | 514000 – <20> – 524000 |
| n39 | 100 | 376000 – <20> – 384000 | 376000 – <20> – 384000 |
| n40 | 100 | 460000 – <20> – 480000 | 460000 – <20> – 480000 |
| n41 | 15 | 499200 – <3> – 537999 | 499200 – <3> – 537999 |
|  | 30 | 499200 – <6> – 537996 | 499200 – <6> – 537996 |
| n462 | 15 | 743334 – <1> – 795000 | 743333 – <1> – 795000 |
| n47 | 15 | 790334 – <1> – 795000 | 790334 – <1> – 795000 |
| n48 | 15 | 636667 – <1> – 646666 | 636667 – <1> – 646666 |
|  | 30 | 636668 – <2> – 646666 | 636668 – <2> – 646666 |
| n50 | 100 | 286400 – <20> – 303400 | 286400 – <20> – 303400 |
| n51 | 100 | 285400 – <20> – 286400 | 285400 – <20> – 286400 |
| n53 | 100 | 496700 – <20> – 499000 | 496700 – <20> – 499000 |
| n65 | 100 | 384000 – <20> – 402000 | 422000 – <20> – 440000 |
| n66 | 100 | 342000 – <20> – 356000 | 422000 – <20> – 440000 |
| n67 | 100 | N/A | 147600 – <20> – 151600 |
| n70 | 100 | 339000 – <20> – 342000 | 399000 – <20> – 404000 |
| n71 | 100 | 132600 – <20> – 139600 | 123400 – <20> – 130400 |
| n74 | 100 | 285400 – <20> – 294000 | 295000 – <20> – 303600 |
| n75 | 100 | N/A | 286400 – <20> – 303400 |
| n76 | 100 | N/A | 285400 – <20> – 286400 |
| n77 | 15 | 620000 – <1> – 680000 | 620000 – <1> – 680000 |
|  | 30 | 620000 – <2> – 680000 | 620000 – <2> – 680000 |
| n78 | 15 | 620000 – <1> – 653333 | 620000 – <1> – 653333 |
|  | 30 | 620000 – <2> – 653332 | 620000 – <2> – 653332 |
| n79 | 15 | 693334 – <1> – 733333 | 693334 – <1> – 733333 |
|  | 30 | 693334 – <2> – 733332 | 693334 – <2> – 733332 |
| n80 | 100 | 342000 – <20> – 357000 | N/A |
| n81 | 100 | 176000 – <20> – 183000 | N/A |
| n82 | 100 | 166400 – <20> – 172400 | N/A |
| n83 | 100 | 140600 – <20> –149600 | N/A |
| n84 | 100 | 384000 – <20> – 396000 | N/A |
| n85 | 100 | 139600 – <20> – 143200 | 145600 – <20> – 149200 |
| n86 | 100 | 342000 – <20> – 356000 | N/A |
| n89 | 100 | 164800 – <20> – 169800 | N/A |
| n90 | 15 | 499200 – <3> – 537999 | 499200 – <3> – 537999 |
|  | 30 | 499200 – <6> – 537996 | 499200 – <6> – 537996 |
|  | 100 | 499200 – <20> – 538000 | 499200 – <20> – 538000 |
| n91 | 100 | 166400 – <20> – 172400 | 285400 – <20> – 286400 |
| n92 | 100 | 166400 – <20> – 172400 | 286400 – <20> – 303400 |
| n93 | 100 | 176000 – <20> – 183000 | 285400 – <20> – 286400 |
| n94 | 100 | 176000 – <20> – 183000 | 286400 – <20> – 303400 |
| n95 | 100 | 402000 – <20> – 405000 | N/A |
| n963 | 15 | 795000 – <1> – 875000 | 795000 – <1> – 875000 |
| n97 | 100 | 460000 – <20> – 480000 | N/A |
| n98 | 100 | 376000 – <20> – 384000 | N/A |
| n99 | 100 | 325300 – <20> – 332100 | N/A |
| NOTE 1: The channel numbers that designate carrier frequencies so close to the operating band edges that the carrier extends beyond the operating band edge shall not be used.  NOTE 2: The following NREF are allowed for operation in Band n46: see Table 5.4.2.3-2.  NOTE 3: The following NREF are allowed for operation in Band n96: see Table 5.4.2.3-3. | | | |

Table 5.4.2.3-2: Allowed NREF (NR-ARFCN) for operation in Band n46

|  |  |
| --- | --- |
| Channel Bandwidth | Allowed NREF |
| 10 MHz | 782000, 788668 |
| 20 MHz | 744000, 745332, 746668, 748000, 749332, 750668, 752000, 753332, 754668, 756000, 765332, 766668, 768000, 769332, 770668, 772000, 773332, 774668, 776000, 777332, 778668, 780000, 781332, 783000, 784332, 785668, 787000, 788332, 789668, 791000, 792332, 793668 |
| 40 MHz | 744668, 746000, 748668, 751332, 754000, 755332, 766000, 767332, 770000, 772668, 775332, 778000, 780668, 783668, 786332, 787668, 790332, 793000 |
| 60 MHz | 745332, 746668, 748000, 752000, 753332, 754668, 766668, 768000, 769332, 773332, 774668, 778668, 780000, 784332, 785668, 791000, 792332 |
| 80 MHz | 746000, 747332, 752668, 754000, 767332, 768668, 774000, 779332, 785000, 791668 |
| NOTE: 10 MHz channel bandwidth shall only apply in certain regions where the absence of non 3GPP technologies can be guaranteed on a long-term basis in this version of specification. | |

Table 5.4.2.3-3: Allowed NREF (NR-ARFCN) for operation in Band n96

|  |  |
| --- | --- |
| Channel Bandwidth | Allowed NREF |
| 20 MHz | 797000, 798332, 799668, 801000, 802332, 803668, 805000, 806332, 807668, 809000, 810332, 811668, 813000, 814332,  815668, 817000, 818332, 819668, 821000, 822332, 823668, 825000, 826332, 827668, 829000, 830332, 831668, 833000, 834332, 835668, 837000, 838332, 839668, 841000, 842332, 843668, 845000, 846332, 847668, 849000, 850332, 851668, 853000, 854332, 855668, 857000, 858332, 859668, 861000, 862332, 863668, 865000, 866332, 867668, 869000, 870332, 871668, 873000, 874332 |
| 40 MHz | 797668, 800332, 803000, 805668, 808332, 811000, 813668, 816332, 819000, 821668, 824332, 827000, 829668, 832332, 835000, 837668, 840332, 843000, 845668, 848332, 851000, 853668, 856332, 859000, 861668, 864332, 867000, 869668,  872332 |
| 60 MHz | 798332, 799668, 803668, 805000, 809000, 810332, 814332, 815668, 819668, 821000, 825000, 826332, 830332, 831668, 835668, 837000, 841000, 842332, 846332, 847668, 851668, 853000, 857000, 858332, 862332, 863668, 867668, 869000, 873000 |
| 80 MHz | 799000, 804332, 809668, 815000, 820332, 825668, 831000, 836332, 841668, 847000, 852332, 857668, 863000, 868332 |

## ***<Next change>***

#### 6.2.3.15 A-MPR for NS\_24

Table 6.2.3.15-1: A-MPR for NS\_24

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Channel Bandwidth, MHz | Carrier Centre Frequency, Fc, MHz | Region A | | | Region B | | | Region C | | |
|  |  | RBend\*12\*SCS  MHz | LCRB\*12\*SCS  MHz | A-MPR | RBend\*12\*SCS  MHz | LCRB\*12\*SCS  MHz | A-MPR | RBend\*12\*SCS  MHz | LCRB\*12\*SCS  MHz | A-MPR |
| 5MHz | Fc=1992.5 |  | >3.24 | A7 |  |  |  |  |  |  |
| 5MHz | Fc=1997.5 |  | >3.24 | A4 |  |  |  |  |  |  |
| 5MHz | Fc=2002.5 |  | >1.98 | A1 | >3.6 | >1.08 ≤1.98 | A2 | ≤3.6 | ≤1.98 | A3 |
|  |  |  |  |  |  | ≤1.08 | A6 |  |  |  |
| 10MHz | Fc=1985 | >5.4 |  | A4 |  |  |  |  |  |  |
| 10MHz | Fc=1995 |  | >4.32 | A1 | >7.38 | >1.08 ≤4.32 | A2 | ≤7.38 | ≤4.32 | A3 |
|  |  |  |  |  |  | ≤1.08 | A6 |  |  |  |
| 10MHz | Fc=2000 | ≥5.76 |  | A5 | <3.06 |  | A5 | ≥3.06  <5.76 | >1.44 | A6 |
| 15MHz | Fc=1987.5 |  | >6.84 | A1 | >11.34 | >1.08 ≤6.84 | A2 | ≤11.34 | ≤6.84 | A3 |
|  |  |  |  |  |  | ≤1.08 | A6 |  |  |  |
| 15MHz | Fc=1997.5 | ≥8.64 |  | A5 | <3.78 |  | A5 | ≥3.78  <8.64 | >1.44 | A6 |
| 20MHz | Fc=1990 | >13.32 |  | A5 | <4.68 |  | A5 | ≥4.68  ≤13.32 | >2.16 | A6 |
| 20MHz | Fc=1995 | ≥11.5212.42 |  | A5 | <5.58 |  | A5 | ≥5.58  <11.52 | >1.44 | A6 |
| NOTE 1: The A-MPR values are listed in Table 6.2.3.15-2.  NOTE 2: For any undefined region, MPR applies | | | | | | | | | | |

Table 6.2.3.15-2: A-MPR for modulation and waveform type

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Modulation/Waveform | A1 | A2 | A3 | A4 | A5 | A6 | A7 |
|  | Outer/Inner | Outer/Inner | Outer/Inner | Outer | Outer/Inner | Outer/Inner | Outer |
| DFT-s-OFDM PI/2 BPSK | ≤ 11 | ≤ 5 | ≤ 4 | ≤ 8.5 | ≤ 18 | ≤ 10 | ≤ 3.5 |
| DFT-s-OFDM QPSK | ≤ 11 | ≤ 5 | ≤ 4 | ≤ 8.5 | ≤ 18 | ≤ 10 | ≤ 3.5 |
| DFT-s-OFDM 16 QAM | ≤ 11 | ≤ 5 | ≤ 4 | ≤ 8.5 | ≤ 18 | ≤ 10 | ≤ 3.5 |
| DFT-s-OFDM 64 QAM | ≤ 11 | ≤ 5 | ≤ 4 | ≤ 8.5 | ≤ 19 | ≤ 10 | ≤ 3.5 |
| DFT-s-OFDM 256 QAM | ≤ 11 | ≤ 5 |  | ≤ 8.5 | ≤ 20 | ≤ 10 |  |
| CP-OFDM QPSK | ≤ 13 | ≤ 6.5 | ≤ 4 | ≤ 8.5 | ≤ 19 | ≤ 12 | ≤ 5.5 |
| CP-OFDM 16 QAM | ≤ 13 | ≤ 6.5 | ≤ 4 | ≤ 8.5 | ≤ 19 | ≤ 12 | ≤ 5.5 |
| CP-OFDM 64 QAM | ≤ 13 | ≤ 6.5 | ≤ 4 | ≤ 8.5 | ≤ 19 | ≤ 12 | ≤ 5.5 |
| CP-OFDM 256 QAM | ≤ 13 | ≤ 6.5 |  | ≤ 8.5 | ≤ 20 | ≤ 12 |  |
| NOTE 1: The backoff applied is max(MPR, A-MPR) where MPR is defined in Table 6.2.2-1  NOTE 2: Outer and inner allocations are defined in clause 6.2.2 | | | | | | | |

## ***<Next change>***

#### 6.2.3.28 A-MPR for NS\_51

Table 6.2.3.28-1: A-MPR regions for NS\_51

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Channel Bandwidth, MHz | Carrier Center Frequency, Fc, MHz | Regions | | A-MPR |
| RBend\*12\*SCS  MHz | LCRB\*12\*SCS  MHz |
| 50 MHz | Fc ≤ 1945 | ≤ 4.5 | > 0 | A7 |
| >4.5, < 32.4 | ≥ max(0, 12\*SCS\*RBend - 14.4) | A4 |
| < 32.4 | < max(0, 12\*SCS\*RBend - 14.4) | A5 |
| ≥ 32.4 | > 0 | A6 |
| 50 MHz | 1945 < Fc ≤ 1980 | < 27 | ≥ max(0, 12\*SCS\*RBend - 14.4) | A1 |
| < 27 | < max(0, 12\*SCS\*RBend - 14.4) | A2 |
| ≥ 27 | > 0 | A3 |

Table 6.2.3.28-2: A-MPR for NS\_51

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Modulation/Waveform | | A1 | A2 | A3 | A4 | A5 | A6 | A7 |
| Outer/Inner | Outer/Inner | Outer/Inner | Outer/Inner | Outer/Inner | Outer/Inner | Outer/Inner |
| DFT-s-OFDM | PI/2 BPSK | 17 | 12.5 | 22 | 7 | 4.5 | 16 | 14 |
| QPSK | 17 | 12.5 | 22 | 7 | 4.5 | 16 | 14 |
| 16 QAM | 17 | 12.5 | 22 | 7 | 4.5 | 16 | 14 |
| 64 QAM | 17 | 12.5 | 22 | 7 | 4.5 | 16 | 14 |
| 256 QAM | 17 | 12.5 | 22 | 7 | 4.5 | 16 | 14 |
| CP-OFDM | QPSK | 17 | 12.5 | 22 | 8.5 | 4.5 | 17 | 14 |
| 16 QAM | 17 | 12.5 | 22 | 8.5 | 4.5 | 17 | 14 |
| 64 QAM | 17 | 12.5 | 22 | 8.5 | 4.5 | 17 | 14 |
| 256 QAM | 17 | 12.5 | 22 | 8.5 | 4.5 | 17 | 14 |

## ***<Next change>***

## 6.2E Transmitter power for V2X

### 6.2E.1 UE maximum output power for V2X

#### 6.2E.1.1 General

When NR V2X UE is configured for NR V2X sidelink transmissions non-concurrent with NR uplink transmissions for NR V2X operating bands specified in Table 5.2E.1-1, the allowed NR V2X UE maximum output power is specified in Table 6.2.1-1 in clause 6.2.1.

When a UE is configured for NR V2X sidelink transmissions in NR Band n47, the V2X UE shall meet the following additional requirements for transmission within the frequency ranges 5855-5925 MHz:

- The maximum mean power spectral density shall be restricted to 23 dBm/MHz EIRP when the network signaling value NS\_33 is indicated.

where the network signaling values are specified in clause 6.2E.3.

NOTE: The PSD limit in EIRP shall be converted to conducted requirement depend on the supported post antenna connector gain Gpost connector declared by the UE following the principle described in annex I in [11].

For NR V2X UE supporting SL MIMO, the maximum output power requirements in Table 6.2E.1.1-1 shall be met with the SL MIMO configurations specified in Table 6.2D.1-2. The maximum output power is defined as the sum of the maximum output power from each UE antenna connector. The period of measurement shall be at least one sub frame (1 ms).

Table 6.2E.1.1-1: NR V2X UE Power Class for SL-MIMO

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| NR band | Class 1 (dBm) | Tolerance (dB) | Class 2 (dBm) | Tolerance (dB) | Class 3 (dBm) | Tolerance (dB) | Class 4 (dBm) | Tolerance (dB) |
| n38 |  |  |  |  | 23 | +2/-3 |  |  |
| n47 |  |  | 26 | +2/-3 | 23 | +2/-3 |  |  |

If the UE transmits on one antenna connector at a time, the requirements in Table 6.2.1-1 shall apply to the active antenna connector.

#### 6.2E.1.2 UE maximum output power for V2X con-current operation

For the inter-band con-current NR V2X operation, the maximum output power is specified in Table 6.2E.1.2-1. The period of measurement shall be at least one sub frame (1ms).

Table 6.2E.1.2-1: NR V2X UE Power Class for inter-band con-current combination (two bands)

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| NR V2X con-current operating band Configuration | Class 1 (dBm) | Tolerance (dB) | Class 2 (dBm) | Tolerance  (dB) | Class 3 (dBm) | Tolerance (dB) | Class 4 (dBm) | Tolerance (dB) |
| V2X\_n39A-n47A |  |  |  |  | 23 | +2/-32 |  |  |
| V2X\_n40A-n47A |  |  |  |  | 23 | +2/-32 |  |  |
| V2X\_n41A-n47A |  |  |  |  | 23 | +2/-32 |  |  |
| V2X\_n71A-n47A |  |  |  |  | 23 | +2/-34 |  |  |
| V2X\_n78A-n47A |  |  |  |  | 23 | +2/-32 |  |  |
| V2X\_n79A-n47A |  |  |  |  | 23 | +2/-32 |  |  |
| NOTE 1: The con-current band combinations are used for NR V2X Service.  NOTE 2: PPowerClass is the maximum UE power specified without taking into account the tolerance  NOTE 3: For inter-band con-current aggregation the maximum power requirement apply to the total transmitted power over all component carriers (per UE).  NOTE 4: 4 refers to the transmission bandwidths (Figure 5.6-1) confined within FUL\_low and FUL\_low + 4 MHz or FUL\_high – 4 MHz and FUL\_high, the maximum output power requirement is relaxed by reducing the lower tolerance limit by 1.5 dB | | | | | | | | |

### 6.2E.2 UE maximum output power reduction for V2X

#### 6.2E.2.1 General

When UE is configured for NR V2X sidelink transmissions non-concurrent with NR uplink transmissions for NR V2X operating bands specified in Table 5.2E.1-1, this clause specifies the allowed Maximum Power Reduction (MPR) power for V2X physical channels and signals due to PSCCH/PSSCH, PSFCH and S-SSB transmission.

#### 6.2E.2.2 MPR for V2X UE

For contiguous allocation of PSCCH and PSSCH simultaneous transmission, the allowed MPR for the maximum output power for NR V2X physical channels PSCCH and PSSCH shall be as specified in Table 6.2E.2.2-1 for Power class 3 NR V2X UE and Table 6.2E.2.2-1a for power class 2 NR V2X UE.

Table 6.2E.2.2-1: Maximum Power Reduction (MPR) for power class 3 NR V2X

|  |  |  |  |
| --- | --- | --- | --- |
| Modulation | | Channel bandwidth/MPR (dB) | |
|  | | Outer RB allocations | Inner RB allocations |
| CP-OFDM | QPSK | ≤ 4.5 | ≤ 2.5 |
|  | 16QAM | ≤ 4.5 | ≤ 2.5 |
|  | 64 QAM | ≤ 4.5 | |
|  | 256 QAM | ≤ 7.0 | |

Table 6.2E.2.2-1a: Maximum Power Reduction (MPR) for power class 2 NR V2X

|  |  |  |  |
| --- | --- | --- | --- |
| Modulation | | Channel bandwidth/MPR (dB) | |
|  | | Outer RB allocations | Inner RB allocations |
|  | QPSK | ≤ 5.5 | ≤ 2.5 |
| CP-OFDM | 16QAM |  |  |
|  | 64 QAM | ≤ 6 | ≤ 4.5 |
|  | 256 QAM | ≤ 7.0 | |

Where the following parameters are defined to specify valid RB allocation ranges for Outer and Inner RB allocations:

NRB is the maximum number of RBs for a given Channel bandwidth and sub-carrier spacing defined in Table 5.3.2-1.

RBStart,Low = max(1, floor(LCRB/2))

where max() indicates the largest value of all arguments and floor(x) is the greatest integer less than or equal to x.

RBStart,High = NRB – RBStart,Low – LCRB

The RB allocation is an Inner RB allocation if the following conditions are met

RBStart,Low ≤ RBStart ≤ RBStart,High,and

LCRB ≤ ceil(NRB/2)

where ceil(x) is the smallest integer greater than or equal to x.

The RB allocation is an Outer RB allocation for all other allocations which are not an Inner RB allocation.

For PSFCH with single RB transmission for PC3 NR V2X UE, the required MPR is defined as follow

MPR\_PSFCH = 3.5 dB

For contiguous and non-contiguous allocation for simultaneous PSFCH transmission for PC3 and PC2 NR V2X UE, the required MPR are specified as follow

MPR\_PSFCH = CEIL {MA\_PSFCH, 0.5}

Where MA\_PSFCH for power class 3 is defined as follows

MA\_PSFCH = 7.5 ; 0.00< NGap/NRB ≤ 0.55

= 12.0 ; 0.55< NGap/NRB ≤1.0

Where MA\_PSFCH for power class 2 is defined as follows

MA\_PSFCH = 8.5 ; 0.00 ≤ NGap/NRB < 0.4

= 10.0 ; 0.4 ≤ NGap/NRB < 0.55

= 14.0 ; 0.55 ≤ NGap/NRB ≤ 1.0

Where,

NGap is the gap RB amount between RBstart and RBend for contiguous and non-contiguous allocation simultaneous PSFCH transmission. (NGap = RBend - RBstart)

CEIL{MA, 0.5} means rounding upwards to closest 0.5dB.

The allowed MPR for the maximum output power for NR V2X physical channels on S-SSB transmission shall be specified in Table 6.2E.2.2-2 for power class 3 and power class 2.

Table 6.2E.2.2-2: Maximum Power Reduction (MPR) for S-SSB transmission for power class 3 and power class 2 NR V2X

|  |  |  |
| --- | --- | --- |
| Channel | MPRS-SSB (dB) | |
|  | Outer RB allocations | Inner RB allocations |
| S-SSB | ≤ 6.0 | ≤ 2.5 |

For NR V2X UE with two transmit antenna connectors, the allowed Maximum Power Reduction (MPR) values specified in current clause shall apply to the maximum output power specified in Table 6.2E.1.1-1. The requirements shall be met with SL MIMO configurations defined in Table 6.2D.1-2. For UE supporting SL MIMO, the maximum output power is defined as the sum of the maximum output power from each UE antenna connector.

For the UE maximum output power modified by MPR, the power limits specified in clause 6.2E.4 apply.

#### 6.2E.2.3 MPR for V2X con-current operation

For the inter-band con-current NR V2X operation, the allowed maximum power reduction (MPR) for the maximum output power shall be applied per each component carrier. The MPR requirements in clause 6.2.2 apply for NR Uu operation in licensed band, and the MPR requirements in in clause 6.2E.2.2 apply for NR sidelink operation in licensed band or Band n47.

### 6.2E.3 UE additional maximum output power reduction for V2X

#### 6.2E.3.1 General

For the applied maximum output power reduction is obtained by taking the maximum value of MPR requirements specified in clause 6.2E.2 and A-MPR requirements specified in current clause.

Additional emission requirements can be indicated by the network or pre-configured radio parameters. Each additional emission requirement is associated with a unique network signalling (NS) value indicated in RRC signalling by an NR frequency band number of the applicable operating band and an associated value in the field [*additionalSpectrumEmission*]*.* Throughout this specification, the notion of indication or signalling of an NS value refers to the corresponding indication of an NR V2X frequency band number of the applicable operating band, the IE field [*freqBandIndicatorNR*] and an associated value of [*additionalSpectrumEmission*]in the relevant RRC information elements [7]*.*

To meet the additional requirements, additional maximum power reduction (A-MPR) is allowed for the maximum output power as specified in Table 6.2.1-1. Unless stated otherwise, the total reduction to UE maximum output power is max(MPR, A-MPR) where MPR is defined in clause 6.2E.2. Outer and inner allocation notation used in clause 6.2E.3.2 is defined in clause 6.2E.2. In absence of modulation and waveform types the A-MPR applies to all modulation and waveform types.

Table 6.2E.3.1-1: Additional Maximum Power Reduction (A-MPR) for PC3 NR V2X

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Network Signalling value | Requirements (clause) | NR Band | Channel bandwidth (MHz) | Resources Blocks (*N*RB) | A-MPR (dB) |
| NS\_01 |  | Table 5.2E.1-1 | 10, 20, 30, 40 | Table 5.3.2-1 | N/A |
| NS\_33 | 6.5E.2.3.1 (A-SEM)  6.5E.3.4 (A-SE) | n47 | 10 | Clause 6.2E.3.2 | |
| NS\_52 | 6.5E.2.3.2 (A-SEM) | n47 | 40 | Clause 6.2E.3.3 | |

Table 6.2E.3.1-2: Mapping of network signaling label

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| NR V2X operating bands | Value of additionalSpectrumEmission | | | | | | | | |
|  | **0** | **1** | **2** | **3** | **4** | **5** | **6** | **7** |
| n38 | NS\_01 |  |  |  |  |  |  |  |
| n47 | NS\_01 | NS\_33 | NS\_52 |  |  |  |  |  |
| NOTE: [*additionalSpectrumEmission*] corresponds to an information element of the same name defined in clause 6.3.2 of TS 38.331 [7]. | | | | | | | | | |

For UE with two transmit antenna connectors, the A-MPR values specified in clause 6.2E.3.2 and 6.2E.3.3 shall apply to the maximum output power specified in Table 6.2E.1.1-1. The requirements shall be met with the SL MIMO configurations specified in Table 6.2D.1-2. For UE supporting SL MIMO, the maximum output power is defined as the sum of the maximum output power from each UE antenna connector. Unless stated otherwise, an A-MPR of 0 dB shall be used.

For the UE maximum output power modified by A-MPR, the power limits specified in clause 6.2E.4 apply.

#### 6.2E.3.2 A-MPR for V2X UE by NS\_33

When NS\_33 is indicated by the network or pre-configured radio parameters for NR V2X UE, the additional maximum output power reduction specified as

A-MPR = CEIL {MA, 0.5}

Where MA is defined as follows

MA = A-MPRBase + Gpost connector\* A-MPRStep

CEIL{MA, 0.5} means rounding upwards to closest 0.5dB.

A-MPRBase and A-MPRStep are specified in Tables 6.2E.3-1, 6.2E.3-2 is allowed when network signalling value is provided*.* A-MPRBase is the default A-MPR value when no Gpost connector is declared. The supported post antenna connector gain Gpost connector is declared by the UE following the principle described in annex I in [11]. The A-MPRstep is the increase in A-MPR allowance to allow UE to meet tighter conducted A-SE and A-SEM requirements with higher value of declared Gpost connector.

For the contiguous PSSCH and PSCCH transmission when NS\_33 is indicated by the network or pre-configured radio parameters for NR V2X UE, the NR UE allow the follow A-MPR requirements specified in Table 6.2E.3.2-1 and 6.2E.3.2-2 for power class 3. And A-MPR requirements specified in Table 6.2E.3.2-2a and 6.2E.3.2-2b for power class 2 are allowed for NR V2X UE.

Table 6.2E.3.2-1: PC3 A-MPR for PSSCH/PSCCH by NS\_33 (at Fc =5860MHz)

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Carrier frequency [MHz] | Resources Blocks (*L*CRB) | Start Resource  Block | A-MPRBase (dB) | | |
|  |  |  | QPSK/16QAM | 64QAM | 256QAM |
| 5860 | ≥ 10 and ≤ 15 | 0 | ≤ 24 | | |
|  |  | ≥ 1 and ≤ 3 | ≤19 | | |
|  | ≥ 10 and ≤ 15 | ≥ 26 and ≤ 38 | ≤6 | | |
|  | ≥ 10 and ≤ 15 | ≥38 | ≤ 6 | | |
|  | ≥ 10 and ≤ 20 | ≥ 12 and ≤ 14 | ≤11 | | |
|  |  | ≥ 15 and ≤ 19 | ≤9.5 | | |
|  |  | ≥ 20 and ≤ 25 | ≤8.0 | | |
|  | > 15 and < 25 | ≥ 25 | ≤ 8 | | |
|  | ≥ 10 and < 40 | ≥ 4 and ≤7 | ≤ 16 | | |
|  |  | ≥ 8 and ≤ 11 | ≤ 13.5 | | |
|  | ≥ 20 and < 40 | ≥ 0 and ≤ 3 | ≤ 22 | | |
|  | ≥ 25 and < 40 | ≥ 16 and ≤ 21 | ≤ 9.5 | | |
|  |  | ≥ 22 and ≤ 27 | ≤ 8.0 | | |
|  | ≥ 24 and ≤ 40 | ≥ 12 and ≤ 15 | ≤ 12 | | |
|  | 40 and 45 | 0 and 1 | ≤ 19 | | |
|  |  | ≥ 2 and ≤ 5 | ≤ 16 | | |
|  |  | ≥ 6 and ≤ 11 | ≤ 13.5 | | |
|  | >45 | ≥ 0 | ≤ 16 | | |
| NOTE 1: A-MPRstep =1.2 dB is applied for RBstart 0 and 1 and A-MPRstep =0.7 dB is applied for all other RBstart  NOTE 2: Applicable for Channel Bandwidth = 10 MHz | | | | | |

Table 6.2E.3.2-2: PC3 A-MPR for PSSCH/PSCCH by NS\_33 (at other carrier frequency)

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Carrier frequency [MHz] | RB allocations | A-MPRBase (dB) | | | | A-MPRstep (dB) |
|  |  | QPSK | 16QAM | 64QAM | 256QAM |
| 5870, 5880, 5890, 5900, 5910, 5920 | Inner | ≤ 3.0 | | ≤ 5.0 | ≤ 6.0 | 0.5 |
|  | Outer | ≤ 4.5 | |  |  |  |
| NOTE 1: Inner and Outer RB allocations are defined in clause 6.2E.2.2  NOTE 2: Applicable for Channel Bandwidth = 10 MHz | | | | | | |

Table 6.2E.3.2-2a: PC2 A-MPR for PSCCH/PSSCH by NS\_33 (at Fc=5860MHz)

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Carrier frequency [MHz] | Resource Block (LCRB) | Start Resource Block | A-MPR(dB) | | |
| QPSK/16QAM | 64QAM | 256QAM |
| 5860 | ≥ 10 and ≤ 15 | 0 and 1 | ≤ 24 | | |
| 2 and 3 | ≤ 22 | | |
| 4 | ≤ 20 | | |
| ≥ 10 and ≤ 25 | ≥ 5 and ≤ 7 | ≤ 17.5 | | |
| ≥ 10 and ≤ 30 | 10 | ≤ 16 | | |
| ≥ 10 | 8 and 9 | ≤ 16 | | |
| ≥ 11 and ≤ 14 | ≤ 14.5 | | |
| ≥ 15 and ≤ 19 | ≤ 13 | | |
| ≥ 20 and ≤ 24 | ≤ 11.5 | | |
| ≥ 25 and ≤ 29 | ≤ 10 | | |
| ≥ 30 | ≤ 8.5 | | |
| ≥ 20 and ≤ 24 | 1 | ≤ 22 | | |
| ≥ 20 and ≤ 30 | 0 | ≤ 22 | | |
| 2 and 3 | ≤ 20 | | |
| 4 | ≤ 17.5 | | |
| ≥ 25 and ≤ 40 | 1 | ≤ 20 | | |
| ≥ 30 | ≥ 5 and ≤ 7 | ≤ 16 | | |
| ≥ 36 | 0 | ≤ 20 | | |
| ≥ 2 and ≤ 4 | ≤ 17.5 | | |
| 10 | ≤ 14.5 | | |
| ≥ 45 | 1 | ≤ 17.5 | | |
| NOTE 1: A-MPRstep =1.2 dB is applied for RBstart 0 and 1 and A-MPRstep =0.7 dB is applied for all other RBstart  NOTE 2: Applicable for Channel Bandwidth = 10 MHz | | | | | |

Table 6.2E.3.2-2b: PC2 A-MPR for PSSCH/PSCCH by NS\_33 (at other carrier frequency)

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Carrier frequency [MHz] | RB allocations | A-MPR (dB) | | | |
| QPSK | 16QAM | 64QAM | 256QAM |
| 5870,5910,5920 | outer | ≤ 8.5 | | | ≤ 8.5 |
| inner | ≤ 6.0 | | |
| 5880,5890,5900 | outer | ≤ 6.0 | | | ≤ 6.5 |
| inner | ≤ 3.5 | | ≤ 4.5 |
| NOTE 1: Inner and Outer RB allocations are defined in clause 6.2E.2.1  NOTE 2: Applicable for Channel Bandwidth = 10 MHz | | | | | |

For the simultaneous PSFCH transmission when NS\_33 is indicated by the network or pre-configured radio parameters for NR V2X UE, the NR UE allow the follow A-MPR requirements specified in Table 6.2E.3.2-3 for power class 3 and in Table 6.2E.3.2-3a for power class 2.

Table 6.2E.3.2-3: PC3 A-MPR for simultaneous PSFCH by NS\_33

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Channel Bandwidth  [MHz] | Center Frequency  [MHz] | RB allocation | A-MPRBase (dB) | | | A-MPRstep (dB) |
|  |  |  | 0 ≤ NGap / NRB < 0.15 | 0.15≤ NGap / NRB < 0.3 | 0.3≤ NGap / NRB ≤ 1 |  |
| 10 | 5860 | NRB =1 | 19.0 | | | 1.0 |
|  | NRB > 1 | 22.0 | | |  |
|  | 5870, 5880, 5890, 5900, 5910, 5920 | NRB =1 | 5 | | | 0.8 |
| NRB > 1 | 14 | 7 | 18.5 |  |
| Note 1: NGap is the gap RB amount between RBstart and RBend for contiguous and non-contiguous allocation simultaneous PSFCH transmission. (NGap = RBend - RBstart) | | | | | | |

Table 6.2E.3.2-3a: PC2 A-MPR for simultaneous PSFCH by NS\_33

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Channel Bandwidth  [MHz] | Center Frequency  [MHz] | RB allocation | A-MPRBase (dB) | | | A-MPRstep (dB) |
|  |  |  | 0 ≤ NGap / NRB < 0.2 | 0.2≤ NGap / NRB < 0.4 | 0.4≤ NGap / NRB ≤ 1 |  |
| 10 | 5860 | NRB =1 | 25.0 | | | 1.0 |
|  | NRB > 1 | 22.0 | | |  |
|  | 5870, 5880, 5890, 5900, 5910, 5920 | NRB =1 | 5 | | | 0.8 |
| NRB > 1 | 16.5 | 12 | 20 |  |
| Note 1: NGap is the gap RB amount between RBstart and RBend for contiguous and non-contiguous allocation simultaneous PSFCH transmission. (NGap = RBend - RBstart) | | | | | | |

For the S-SSB transmission when NS\_33 is indicated by the network or pre-configured radio parameters for NR V2X UE, the NR UE allow the follow A-MPR requirements specified in Table 6.2E.3.2-4 for power class 3 and in Table 6.2E.3.2-5 for power class 2.

Table 6.2E.3.2-4: PC3 A-MPR for S-SSB transmission by NS\_33

|  |  |  |  |
| --- | --- | --- | --- |
| Carrier Frequency (MHz) | RBStart \* 12\*SCS  [MHz] | A-MPRBase (dB) | AMPRStep (dB) |
| 5860 | ≤1.0 | ≤ 25 | 0.6 |
|  | >1.0 and ≤2.0 | ≤ 19 |  |
|  | >2.0 and ≤3.24 | ≤ 12 |  |
|  | >3.24 and ≤3.6 | ≤ 10 |  |
|  | >3.6 | ≤ 9 |  |
| 5870, 5880, 5890, 5900, 5910, 5920 | ≤1.0 | ≤ 7.0 | 0.85 |
|  | >1.0 and ≤1.6 | ≤ 6.5 |  |
|  | >1.6 and ≤2.6 | ≤ 5.8 |  |
|  | >2.6 and ≤3.24 | ≤ 4.5 |  |
|  | >3.24 and ≤4.32 | ≤ 5.5 |  |
|  | >4.32 | ≤ 6.5 |  |

Table 6.2E.3.2-5: PC3 A-MPR for S-SSB transmission by NS\_33

|  |  |  |  |
| --- | --- | --- | --- |
| Carrier Frequency (MHz) | RBStart \* 12\*SCS  [MHz] | A-MPRBase (dB) | AMPRStep (dB) |
| 5860 | ≤1.0 | ≤ 25 | 0.6 |
|  | >1.0 and ≤2.0 | ≤ 19 |  |
|  | >2.0 and ≤3.24 | ≤ 12 |  |
|  | >3.24 and ≤3.6 | ≤ 10 |  |
|  | >3.6 | ≤ 14 |  |
| 5870, 5880, 5890, 5900, 5910, 5920 | ≤1.0 | ≤ 7.0 | 0.85 |
|  | >1.0 and ≤1.6 | ≤ 6.5 |  |
|  | >1.6 and ≤2.6 | ≤ 5.8 |  |
|  | >2.6 and ≤3.24 | ≤ 4.5 |  |
|  | >3.24 and ≤4.32 | ≤ 5.5 |  |
|  | >4.32 | ≤ 6.5 |  |

#### 6.2E.3.3 A-MPR for Power class 3 V2X UE by NS\_52

When NS\_52 is indicated by the network or pre-configured radio parameters for NR V2X UE, the additional maximum output power reduction specified as

A-MPR = CEIL {MA, 0.5}

Where MA is defined as follows

MA = A-MPR

CEIL{MA, 0.5} means rounding upwards to closest 0.5dB.

For the contiguous PSSCH and PSCCH transmission when NS\_52 is indicated by the network or pre-configured radio parameters for NR V2X UE, the NR UE allow the follow A-MPR requirements.

Table 6.2E.3.3-1: A-MPR for PSSCH/PSCCH by NS\_52

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Carrier frequency(MHz) | Modulation | A-MPR(dB) | | |
|  |  | Region 1 | Region 2 | Region 3 |
| 5885 | QPSK | ≤ 15 | ≤ 8.0 | ≤ 5.5 |
|  | 16QAM |  | ≤ 8.0 | ≤ 5.5 |
|  | 64QAM |  | ≤ 8.5 | ≤ 5.5 |
|  | 256QAM |  | ≤ 8.5 | ≤ 6.0 |
| Note1: Void. | | | | |

Where the following parameters are defined to specify valid RB allocation ranges for Region1, Region2 and Region3 according to RB allocations:

Table 6.2E.3.3-1a: A-MPR Region definitions for PSSCH/PSCCH by NS\_52

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Channel Bandwidth, MHz | Carrier frequency (MHz) | A-MPR parameters for region definitions | | A-MPR |
|  |  | RBstart or RBend | LCRB |  |
| 40 | 5885 | **RBstart** ≤ floor(NRB\*0.2) or **RBend** ≥ NRB - floor(NRB\*0.2) | **LCRB** ≤floor(NRB\*0.2) | Region 1 |
|  |  | The RB allocation is in Region 2 allocation for all other allocations which are not a Region1 or Region3 allocation. | | Region 2 |
|  |  | floor(NRB /3.5) ≤ **RBstart** ≤ NRB –floor(NRB /3.5) – LCRB | **LCRB** ≤ceil(NRB/3.5) | Region 3 |

NRB is the maximum number of RBs for a given Channel bandwidth and sub-carrier spacing defined in Table 5.3.2-1 [3].

For the simultaneous PSFCH transmission when NS\_52 is indicated by the network or pre-configured radio parameters for NR V2X UE, the NR UE allow the follow A-MPR requirements

Table 6.2E.3.3-2: A-MPR for simultaneous PSFCH by NS\_52

|  |  |  |
| --- | --- | --- |
| Channel Bandwidth [MHz] | Carrier frequency [MHz] | A-MPR (dB) |
| 40 MHz | 5885 | 23.5 |

For the S-SSB transmission when NS\_52 is indicated by the network or pre-configured radio parameters for NR V2X UE, the NR UE allow the follow A-MPR requirements

Table 6.2E.3.2-3: A-MPR for S-SSB transmission by NS\_52

|  |  |  |
| --- | --- | --- |
| Carrier Frequency [MHz] | RBStart \* 12\*SCS  [MHz] | A-MPR (dB) |
| 5885 | ≤ 7 | ≤ 16 |
|  | > 7 and ≤ 12 | ≤ 10.5 |
|  | > 12 and ≤ 19 | ≤ 4.0 |
|  | > 19 and ≤ 25 | ≤ 10.5 |
|  | > 25 | ≤ 16 |

#### 6.2E.3.4 A-MPR for V2X con-current operation

For the inter-band con-current NR V2X operation, the allowed additional maximum power reduction (A-MPR) for the maximum output power shall be applied per each component carrier. The A-MPR requirements in clause 6.2.3 apply for NR Uu operation in licensed band, and the A-MPR requirements in clause 6.2E.3.2 and 6.2E.3.3 apply for NR sidelink operation in Band n47.

### 6.2E.4 Configured transmitted power for V2X

#### 6.2E.4.1 General

The NR V2X UE is allowed to set its configured maximum output power PCMAX,f,*c* for carrier f of serving cell *c* in each slot. The configured maximum output power PCMAX,f,*c* is set within the following bounds:

PCMAX\_L,f,c ≤ PCMAX,f,*c* ≤ PCMAX\_H,f,*c* with

PCMAX\_L,f, *c* = MIN {PEMAX,*c*, PPowerClass, V2X – MAX(MAX(MPR*c* , A-MPR*c*) + TIB,*c* , P-MPR*c*), PRegulatory,c }

PCMAX\_H,f, *c* = MIN {PEMAX,*c*, PPowerClass, PRegulatory }

where

- PCMAX,f,*c* is configured for PSSCH\PSCCH, S-SSB and PSFCH, respectively;

- For the total transmitted power PCMAX,PSSCH/PSCCH , PEMAX,c is the value given by IE *sl-maxTxPower*, defined by TS 38.331, when the UE is not associated with a serving cell on the NR V2X carrier .

- PPowerClass,V2X is the maximum UE power specified in Table 6.2E.1.1-1 without taking into account the tolerance specified in the Table 6.2E.1.1-1;

- MPR*c* and A-MPR*c* for serving cell *c* are specified in clause 6.2E.2 and clause 6.2E.3 for PSSCH\PSCCH, S-SSB and PSFCH, respectively;

-- TIB,c and P-MPR*c* are specified in clause 6.2.4

- PRegulatory,c= 10 - Gpost connector dBm the V2X UE is within the protected zone [12] of CEN DSRC tolling system and operating in Band n47; PRegulatory,c= 33 - Gpost connector dBm otherwise.

The maximum output power P*CMAX,PSSCH* and P*CMAX,PSCCH* are derived from PCMAX,c based on 0dB PSD offset between PSSCH and PSCCH.

For the measured configured maximum output power PUMAX,*c* for NR V2X sidelink transmissions non-concurrent with NR uplink transmissions, the same requirement as in clause 6.2.4 shall be applied.

For NR V2X UE supporting SL MIMO, the transmitted power is configured per each UE.

For NR V2X UE with two transmit antenna connectors, the tolerance is specified in Table 6.2E.4.1-1. The requirements shall be met with SL MIMO configurations specified in Table 6.2D.1-2.

If the UE transmits on two antenna connectors at the same time, the tolerance is specified in Table 6.2E.4.1-1.

Table 6.2E.4.1-1: PCMAX,*c* tolerance schemes for MIMO

|  |  |  |
| --- | --- | --- |
| PCMAX,*c*(dBm) | Tolerance TLOW(PCMAX\_L,*c*) (dB) | Tolerance THIGH(PCMAX\_H,*c*) (dB) |
| PCMAX,*c* = 26 | 3.0 | 2.0 |
| 23 ≤ PCMAX,*c* < 26 | 3.0 | 2.0 |
| 22 ≤ PCMAX,*c* < 23 | 5.0 | 2.0 |
| 21 ≤ PCMAX,*c* < 22 | 5.0 | 3.0 |
| 20 ≤ PCMAX,*c* < 21 | 6.0 | 4.0 |
| 16 ≤ PCMAX,*c* < 20 | 5.0 | |
| 11 ≤ PCMAX,*c* < 16 | 6.0 | |
| -40 ≤ PCMAX,*c* < 11 | 7.0 | |

#### 6.2E.4.2 Configured transmitted power for V2X con-current operation

When a UE is configured for simultaneous NR V2X sidelink and NR uplink transmissions for inter-band con-current operation, the UE is allowed to set its configured maximum output power PCMAX,*c*,*NR*and PCMAX,*c*,*V2X*for the configured NR uplink carrier and the configured NR V2X carrier, respectively, and its total configured maximum output power PCMAX,c.

The configured maximum output power PCMAX *c*,*NR(p)* in slot *p* for the configured NR uplink carrier shall be set within the bounds:

PCMAX\_L,*c,NR* (*p*) ≤ PCMAX,*c,NR* (*p*) ≤ PCMAX\_H,*c,NR* (*p*)

where PCMAX\_L,*c,NR* andPCMAX\_H,*c,NR* are the limit as specified in clause 6.2E.4.1.

The configured maximum output power PCMAX *c*,*V2X (q)* in slot *q* for the configured NR V2X carrier shall be set within the bounds:

PCMAX,*c,V2X* (*q*) ≤ PCMAX\_H,*c,V2X* (*q*)

where PCMAX\_H,*c,V2X* is the limit as specified in clause 6.2E.4.

The total UE configured maximum output power PCMAX (*p,q*) in a slot *p* of NR uplink carrier and a slot *q* of NR V2X sidelink that overlap in time shall be set within the following bounds for synchronous and asynchronous operation unless stated otherwise:

PCMAX\_L (*p,q*) ≤ PCMAX (*p,q*) ≤ PCMAX\_H (*p,q*)

with

PCMAX\_L (*p,q*) = PCMAX\_L,*c,NR* (*p*)

PCMAX\_H (*p,q*) = 10 log10 [pCMAX\_H,*c,NR*(*p*) + pCMAX\_H,*c,V2X*(*q*)]

where pCMAX\_H*,c,V2X* and pCMAX\_H,*c,NR*are the limits PCMAX\_H,*c,V2X* (*q*) and PCMAX\_H,*c,NR* (*p*) expressed in linear scale.

The measured total maximum output power PUMAX over both the NR uplink and NR V2X carriers is

PUMAX = 10 log10 [pUMAX,*c,NR* + pUMAX,*c,V2X*],

where pUMAX,*c,NR*  denotes the measured output power of serving cell *c* for the configured NR uplink carrier, and pUMAX,*c,V2X* denotes the measured output power for the configured NR V2X carrier expressed in linear scale.

When a UE is configured for synchronous V2X sidelink and uplink transmissions,

PCMAX\_L(*p, q*)  – TLOW (PCMAX\_L(*p, q*)) ≤ PUMAX  ≤ PCMAX\_H(*p, q*) + THIGH (PCMAX\_H(*p, q*))

where PCMAX\_L (*p,q*) and PCMAX\_H (*p,q*) are the limits for the pair (*p,q*) and with the tolerances TLOW(PCMAX) and THIGH(PCMAX) for applicable values of PCMAX specified in Table 6.2E.4.1-1.. PCMAX\_L may be modified for any overlapping portion of slots *(p, q)* and *(p +1, q+1).*

## ***<Next change>***

## 6.3E Output power dynamics for V2X

### 6.3E.1 Minimum output power for V2X

#### 6.3E.1.1 General

When UE is configured for NR V2X sidelink transmissions non-concurrent with NR uplink transmissions for NR V2X operating bands in Table 5.2E.1-1, the minimum output power is specified in Table 6.3E.1.1-1. The minimum output power is defined as the mean power in at least one sub-frame 1 ms.

Table 6.3E.1.1-1: Minimum output power

|  |  |  |
| --- | --- | --- |
| Channel bandwidth  (MHz) | Minimum output power  (dBm) | Measurement bandwidth  (MHz) |
| 10 | -30 | 9.375 |
| 20 | -30 | 19.095 |
| 30 | -28.2 | 28.815 |
| 40 | -27 | 38.895 |

For NR V2X UE with two transmit antenna connectors, the minimum output power is defined as the sum of the mean power at each transmit connector in one sub-frame (1 ms). The minimum output power shall not exceed the values specified for single carrier.

If the UE transmits on one antenna connector at a time, the requirements specified for single carrier shall apply to the active antenna connector.

#### 6.3E.1.2 Minimum output power for V2X con-current operation

For the inter-band con-current NR V2X operation, the requirements specified in clause 6.3.1 shall apply for the uplink in licensed band and the requirements specified in clause 6.3E.1.1 shall apply for the sidelink in licensed band or Band n47.

### 6.3E.2 Transmit OFF power for V2X

#### 6.3E.2.1 General

When UE is configured for NR V2X sidelink transmissions non-concurrent with NR uplink transmissions for NR V2X operating bands in Table 5.2E.1-1, the requirements specified in current clause apply.

Table 6.3E.2.1-1: Transmit OFF power

|  |  |  |
| --- | --- | --- |
| Channel bandwidth  (MHz) | Transmit OFF power  (dBm) | Measurement bandwidth  (MHz) |
| 10 | -50 | 9.375 |
| 20 | -50 | 19.095 |
| 30 | -50 | 28.815 |
| 40 | -50 | 38.895 |

For NR V2X UE supporting SL MIMO, the transmit OFF power at each transmit antenna connector shall not exceed the values specified in Table 6.3E.2.1-1 for single carrier. Transmit off power is defined as the mean power in at least one sub-frame 1 ms.

#### 6.3E.2.2 Transmit OFF power for V2X con-current operation

For the inter-band con-current NR V2X operation, the requirements specified in clause 6.3.2 shall apply for the uplink in licensed band and the requirements specified in clause 6.3E.2.1 shall apply for the sidelink in licensed band or Band n47.

### 6.3E.3 Transmit ON/OFF time mask for V2X

#### 6.3E.3.1 General

For NR V2X UE, additional requirements on ON/OFF time masks for V2X physical channels and signals are specified in this clause.

#### 6.3E.3.2 General time mask

The General ON/OFF time mask defines the observation period between the Transmit OFF and ON power and between Transmit ON and OFF power for PSCCH, and PSSCH transmissions in a slot wherein the last symbol is punctured to create a guard period.



Figure 6.3E.3.2-1: General PSCCH/PSSCH time mask for NR V2X UE

For NR V2X UE supporting SL MIMO, the ON/OFF time mask requirements apply at each transmit antenna connector.

For UE with two transmit antenna connectors, the general ON/OFF time mask requirements specified in current subclause apply to each transmit antenna connector. The requirements shall be met with the SL MIMO configurations described in subclause 6.2D.1.

If the UE transmits on one antenna connector at a time, the general ON/OFF time mask requirements apply to the active antenna connector.

#### 6.3E.3.3 S-SSB time mask

The S-PSS/S-SSS/PSBCH time mask for NR V2X UE defines the observation period between transmit OFF and ON S-PSS power and between transmit ON PSBCH and OFF power in a slot wherein the last symbol is punctured to create a guard period.

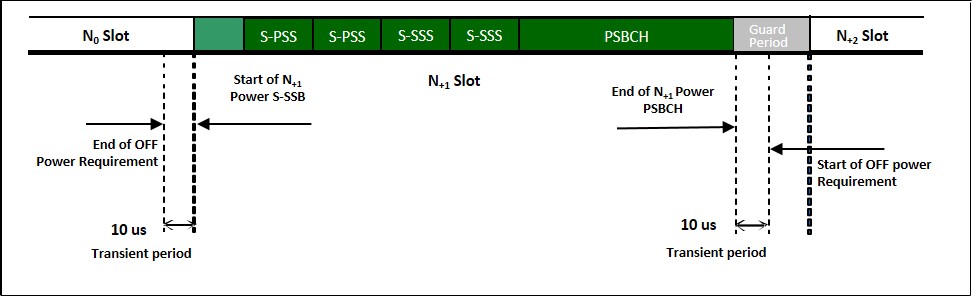


Figure 6.3E.3.3-1: S-SSB time mask for NR V2X UE

For NR V2X UE supporting SL MIMO, the ON/OFF time mask requirements apply at each transmit antenna connector.

For UE with two transmit antenna connectors, the S-SSB ON/OFF time mask requirements specified in current subclause apply to each transmit antenna connector. The requirements shall be met with the SL MIMO configurations described in subclause 6.2D.1.

If the UE transmits on one antenna connector at a time, the S-SSB ON/OFF time mask requirements apply to the active antenna connector.

#### 6.3E.3.4 Transmit ON/OFF time mask for V2X con-current operation

For the inter-band con-current NR V2X operation, the requirements specified in clause 6.3.3 shall apply for the uplink in licensed band and the requirements specified in clause 6.3E.3.2 and 6.3E.3.3 shall apply for the sidelink in licensed band or Band n47.

### 6.3E.4 Power control for V2X

#### 6.3E.4.1 General

When UE is configured for NR V2X sidelink transmissions non-concurrent with NR uplink transmissions for NR V2X operating bands in Table 5.2E.1-1, the following requirements are applied for NR V2X sidelink transmission.

For NR V2X UE supporting SL MIMO, the power control tolerance for single carrier shall apply to the sum of output power at each transmit antenna connector.

If the UE transmits on one antenna connector at a time, the requirements for single carrier shall apply to the active antenna connector.

#### 6.3E.4.2 Absolute power tolerance

The requirements in clause 6.3.4.2 shall apply for NR V2X transmission.

#### 6.3E.4.3 Power control for V2X con-current operation

For the inter-band con-current NR V2X operation, the requirements specified in clause 6.3.4 shall apply for the uplink in licensed band and the requirements specified in clause 6.3E.4.1 and 6.3E.4.2 shall apply for the sidelink in licensed band or Band n47.

## ***<Next change>***

#### 6.4A.2.2 Transmit modulation quality for intra-band non-contiguous CA

##### 6.4A.2.2.0 General

For intra-band non-contiguous carrier aggregation, the requirements in subclauses 6.4A.2.2.1, 6.4A.2.2.2 applies.

The requirements in this clause apply with PCC and SCC in the UL configured and activated: PCC with PRB allocation and SCC without PRB allocation and without CSI reporting and SRS configured.

In case the parameter 3300 or 3301 is reported from UE via *txDirectCurrentLocation-r16* IE (as defined in TS 38.331 [13]), carrier leakage measurement requirement in subclause 6.4A.2.2.2 shall be waived, and the RF correction with regard to the carrier leakage and IQ image shall be omitted during the calculation of transmit modulation quality.

#### 6.4A.2.2.1 Error Vector Magnitude

For the intra-band non-contiguous carrier aggregation, the Error Vector Magnitude requirement should be defined for each component carrier. Requirements only apply with PRB allocation in one of the component carriers. Similar transmitter impairment removal procedures are applied for CA waveform before EVM calculation as is specified for non-CA waveform in sub-section 6.4.2.1.

When a single component carrier is configured Table 6.4.2.1-1 apply.

The EVM requirements are according to Table 6.4A.2.2.1-1 if CA is configured in uplink with the parameters defined in Table 6.4.2.1-2.

Table 6.4A.2.2.1-1: Minimum requirements for Error Vector Magnitude

|  |  |  |
| --- | --- | --- |
| Parameter | Unit | Average EVM Level per CC |
| Pi/2-BPSK | % | 30 |
| QPSK | % | 17.5 |
| 16 QAM | % | 12.5 |
| 64 QAM | % | 8 |
| 256 QAM | % | 3.5 |

#### 6.4A.2.2.2 In-band emissions

For intra-band non-contiguous carrier aggregation the requirements for in-band emissions are defined for each component carrier. Requirements defined in clause 6.4A.2.1.2 only apply with PRB allocation in one of the component carriers.

When signalling for dualPA-Architecture IE is absent, carrier leakage or I/Q image may land inside the gap spectrum between 2 UL CCs.

For intra-band non-contiguous CA, the IQ image requirement is defined with the applicable frequencies based on symmetry with respect to the carrier leakage frequency, but excluding any allocated RBs.

##### 6.4A.2.2.3 Carrier leakage

For intra-band non-contiguous CA, if UE indicates *uplinkTxDC-TwoCarrierReport-r16*, the carrier leakage requirement is defined with applicable frequencies dependent on parameter *txDirectCurrentLocation-r16* in *UplinkTxDirectCurrentTwoCarrierList* IE indicated in activated uplink carrier(s), otherwise, the carrier leakage requirement is defined with applicable frequencies dependent on parameter *txDirectCurrentLocation* in *UplinkTxDirectCurrent* IE.

The relative carrier leakage power is a power ratio of the additive sinusoid waveform and the modulated waveform. The relative carrier leakage power shall not exceed the values specified in Table 6.4A.2.4.3-1. Carrier leakage frequencies are those that are enclosed either in the RB containing the carrier leakage frequency, or in the two RBs immediately adjacent to the carrier leakage frequency but excluding any allocated RB.

#### 6.4A.2.3 Transmit modulation quality for inter-band CA

For inter-band carrier aggregation with one uplink carrier assigned to one NR band, the transmit modulation quality requirements in subclause 6.4.2 apply.

For inter-band carrier aggregation with two contiguous carriers assigned to one NR band, the transmit modulation quality requirements in subclause 6.4A.2.1 apply for those carriers.

For inter-band carrier aggregation with two uplink non-contiguous carrier assigned to one NR band, the transmit modulation quality requirements in subclause 6.4A.2.2 apply for those carriers.

For inter-band carrier aggregation with uplink assigned to two NR bands, the transmit modulation quality requirements shall apply on each component carrier as defined in clause 6.4.2 with all component carriers active: PCC with PRB allocation and SCC without PRB allocation and without CSI reporting and SRS configured.

For combinations of intra-band and inter-band carrier aggregation with three uplink component carriers (up to two contiguously aggregated carriers per operating band), the transmit modulation quality requirements specified in subclause 6.4.2 apply for the NR band supporting one component carrier, and for the NR band supporting two contiguous component carriers the requirements specified in subclause 6.4A.2.1 apply.

#### 6.4A.2.4 Void

## ***<Next change>***

## 6.4E Transmit signal quality for V2X

### 6.4E.1 Frequency error for V2X

#### 6.4E.1.1 General

The UE modulated carrier frequency for NR V2X sidelink transmissions in Table 5.2E.1-1, shall be accurate to within ±0.1 PPM observed over a period of 1 ms compared to the absolute frequency in case of using GNSS synchronization source. The same requirements applied over a period of 1 ms compared to the carrier frequency received from the gNB or V2X synchronization reference UE in case of using the gNB or V2X synchronization reference UE sidelink synchronization signals.

For NR V2X UE supporting SL MIMO, the UE modulated carrier frequency at each transmit antenna connector shall be accurate to within ±0.1 PPM observed over a period of 0.5 ms in case of using GNSS synchronization source. The same requirements apply over a period of 0.5 ms compared to the relative frequency in case of using the NR gNode B or V2X synchronization reference UE sidelink synchronization signals.

If the UE transmits on one antenna connector at a time, the requirements for single carrier shall apply to the active antenna connector.

#### 6.4E.1.2 Frequency error for V2X con-current operation

For the inter-band con-current NR V2X operation, the requirements specified in clause 6.4.1 shall apply for the uplink in licensed band and the requirements specified in clause 6.4E.1.1 shall apply for the sidelink in licensed band or Band n47.

### 6.4E.2 Transmit modulation quality for V2X

#### 6.4E.2.1 General

The transmit modulation quality requirements in this clause apply to V2X sidelink transmissions.

For NR V2X UE supporting SL MIMO, the transmit modulation quality requirements for single carrier shall apply to each transmit antenna connector.

If V2X UE transmits on one antenna connector at a time, the requirements specified for single carrier apply to the active antenna connector.

#### 6.4E.2.2 Error Vector Magnitude for V2X

For V2X sidelink physical channels PSCCH and PSSCH, the Error Vector Magnitude requirements shall be as specified for PUSCH in Table 6.4.2.1-1 except pi/2-BPSK for NR V2X operating bands in Table 5.2E.1-1. When sidelink transmissions are shortened due to transmission gap of one symbol at the end of the slot, the EVM measurement interval is reduced by one symbol, accordingly.

#### 6.4E.2.3 Carrier leakage for V2X

Carrier leakage of NR V2X sidelink transmission, the requirements for NR PUSCH in Table 6.4.2.2-1 shall be applied.

#### 6.4E.2.4 In-band emissions for V2X

For V2X sidelink physical channels PSCCH, PSSCH and PSBCH, the In-band emissions requirements shall be as specified for PUSCH in subclause 6.4.2.3 for the corresponding modulation and transmission bandwidth. When V2X transmissions are shortened due to transmission gap of one symbol at the end of the subframe, the In-band emissions measurement interval is reduced by one symbol, accordingly.

#### 6.4E.2.5 EVM equalizer spectrum flatness for V2X

For V2X sidelink physical channels PSCCH, PSSCH and PSBCH, the EVM equalizer spectrum flatness requirements shall be as specified for PUSCH in clause 6.4.2.4 for the corresponding modulation and transmission bandwidth.

#### 6.4E.2.6 Transmit modulation quality for V2X con-current operation

For the inter-band con-current NR V2X operation, the requirements specified in clause 6.4.2 shall apply for the uplink in licensed band and the requirements specified in clause 6.4E.2.1 through 6.4E.2.5 shall apply for the sidelink in licensed band or Band n47.

## ***<Next change>***

#### 6.5.3.2 Spurious emissions for UE co-existence

This clause specifies the requirements for NR bands for coexistence with protected bands.

Table 6.5.3.2-1: Requirements for spurious emissions for UE co-existence

| NR Band | Spurious emission for UE co-existence | | | | | | |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | Protected band | Frequency range (MHz) | | | Maximum Level (dBm) | MBW (MHz) | NOTE |
| n1, n84 | E-UTRA Band 1, 5, 7, 8, 11, 18, 19, 20, 21, 22, 26, 27, 28, 31, 32, 38, 40, 41, 42, 43, 44, 45, 50, 51, 52, 65, 67, 68, 69, 72, 73, 74, 75, 76,  NR Band n78, n79 | FDL\_low | - | FDL\_high | -50 | 1 |  |
|  | NR Band n77 | FDL\_low | - | FDL\_high | -50 | 1 | 2 |
|  | E-UTRA Band 3, | FDL\_low | - | FDL\_high | -50 | 1 | 15 |
|  | E-UTRA Band 34 | FDL\_low | - | FDL\_high | -50 | 1 | 15, XX |
|  | Frequency range | 1880 | - | 1895 | -40 | 1 | 15, 27 |
|  | Frequency range | 1895 | - | 1915 | -15.5 | 5 | 15, 26, 27 |
|  | Frequency range | 1915 | - | 1920 | +1.6 | 5 | 15, 26, 27 |
| n2 | E-UTRA Band 4, 5, 12, 13, 14, 17, 24, 26, 27, 28, 29, 30, 41, 42, 48, 50, 51, 53, 66, 70, 71, 74, 85 | FDL\_low | - | FDL\_high | -50 | 1 |  |
|  | E-UTRA Band 2, 25 | FDL\_low | - | FDL\_high | -50 | 1 | 15 |
|  | E-UTRA Band 43,  NR Band n77 | FDL\_low | - | FDL\_high | -50 | 1 | 2 |
| n3, n80 | E-UTRA Band 1, 5, 7, 8, 20, 26, 27, 28, 31, 32, 33, 34, 38, 39, 40, 41, 43, 44, 45, 50, 51, 65, 67, 68, 69, 72, 73,74, 75, 76.  NR Band n79 | FDL\_low | - | FDL\_high | -50 | 1 |  |
|  | E-UTRA Band 3 | FDL\_low | - | FDL\_high | -50 | 1 | 15 |
|  | E-UTRA Band 11, 18, 19, 21 | FDL\_low | - | FDL\_high | -50 | 1 |  |
|  | E-UTRA Band 22, 42, 52,  NR Band n77, n78 | FDL\_low | - | FDL\_high | -50 | 1 | 2 |
|  | Frequency range | 1884.5 | - | 1915.7 | -41 | 0.3 | 8 |
| n5, n89 | E-UTRA Band 1, 2, 3, 4, 5, 7, 8, 12, 13, 14, 17, 18, 19, 24, 25, 26, 28, 29, 30, 31, 34, 38, 40, 42, 43, 45, 48, 50, 51, 65, 66, 70, 71, 73, 74, 85  NR Band n79 | FDL\_low | - | FDL\_high | -50 | 1 |  |
|  | E-UTRA Band 41, 52, 53  NR Band n77, n78 | FDL\_low | - | FDL\_high | -50 | 1 | 2 |
|  | E-UTRA Band 11, 21 | FDL\_low | - | FDL\_high | -50 | 1 |  |
|  | Frequency range | 1884.5 | - | 1915.7 | -41 | 0.3 | 8 |
| n7 | E-UTRA Band 1, 2, 3, 4, 5, 7, 8, 12, 13, 14, 17, 20, 22, 26, 27, 28, 29, 30, 31, 32, 33, 34, 40, 42, 43, 50, 51, 52, 65, 66, 67, 68, 72, 74, 75, 76, 85,  NR Band n77, n78 | FDL\_low | - | FDL\_high | -50 | 1 |  |
|  | Frequency range | 2570 | - | 2575 | +1.6 | 5 | 15, 21, 26 |
|  | Frequency range | 2575 | - | 2595 | -15.5 | 5 | 15, 21, 26 |
|  | Frequency range | 2595 | - | 2620 | -40 | 1 | 15, 21 |
| n8, n81 | E-UTRA Band 1, 20, 28, 31, 32, 33, 34, 38, 39, 40, 45, 50, 51, 65, 67, 68, 69, 72, 73, 74, 75, 76 | FDL\_low | - | FDL\_high | -50 | 1 |  |
|  | E-UTRA band 3, 7, 22, 41, 42, 43, 52,  NR Band n77, n78, n79 | FDL\_low | - | FDL\_high | -50 | 1 | 2 |
|  | E-UTRA 8 | FDL\_low | - | FDL\_high | -50 | 1 | 15 |
|  | E-UTRA Band 11, 21 | FDL\_low | - | FDL\_high | -50 | 1 |  |
|  | Frequency range | 1884.5 | - | 1915.7 | -41 | 0.3 | 8 |
| n12 | E-UTRA Band 2, 5, 13, 14, 17, 24, 25, 26, 27, 30, 41, 50, 53, 70, 71, 74 | FDL\_low | - | FDL\_high | -50 | 1 |  |
|  | E-UTRA Band 4, 48, 51, 66  NR Band n77 | FDL\_low | - | FDL\_high | -50 | 1 | 2 |
|  | E-UTRA Band 12, 85 | FDL\_low | - | FDL\_high | -50 | 1 | 15 |
| n13 | E-UTRA Band 2, 4, 5,12, 13, 17, 25, 26, 27, 29, 41, 48, 50, 51, 53, 66, 70, 71, 74, 85 | FDL\_low | - | FDL\_high | -50 | 1 |  |
|  | E-UTRA Band 14 | FDL\_low | - | FDL\_high | -50 | 1 | 15 |
|  | E-UTRA Band 24, 30  NR Band n77 | FDL\_low | - | FDL\_high | -50 | 1 | 2 |
|  | Frequency range | 769 | - | 775 | -35 | 0.00625 | 15 |
|  | Frequency range | 799 | - | 805 | -35 | 0.00625 | 11, 15 |
| n14 | E-UTRA Band 2, 4, 5, 12, 13, 14, 17, 23, 24, 25, 26, 27, 29, 30, 41, 48, 53, 66, 70, 71, 85 | FDL\_low | - | FDL\_high | -50 | 1 |  |
|  | NR Band n77 | FDL\_low | - | FDL\_high | -50 | 1 | 2 |
|  | Frequency range | 769 | - | 775 | -35 | 0.00625 | 12, 15 |
|  | Frequency range | 799 | - | 805 | -35 | 0.00625 | 11, 12, 15 |
| n18 | E-UTRA Band 1, 3, 11, 21, 34, 40, 42, 65  NR Band n79 | FDL\_low | - | FDL\_high | -50 | 1 |  |
|  | NR Band n77, n78 | FDL\_low | - | FDL\_high | -50 | 1 | 2 |
|  | Frequency range | 758 | - | 799 | -50 | 1 |  |
|  | Frequency range | 799 | - | 803 | -40 | 1 |  |
|  | Frequency range | 860 | - | 890 | -40 | 1 |  |
|  | Frequency range | 945 | - | 960 | -50 | 1 |  |
|  | Frequency range | 1884.5 | - | 1915.7 | -41 | 0.3 | 8 |
|  | Frequency range | 2545 | - | 2575 | -50 | 1 |  |
|  | Frequency range | 2595 | - | 2645 | -50 | 1 |  |
| n20, n82 | E-UTRA Band 1, 3, 7, 8, 22, 31, 32, 33, 34, 40, 43, 50, 51, 65, 67, 68, 72, 74, 75, 76 | FDL\_low | - | FDL\_high | -50 | 1 |  |
|  | E-UTRA Band 20 | FDL\_low | - | FDL\_high | -50 | 1 | 15 |
|  | E-UTRA Band 38, 42, 52, 69,  NR Band n77, n78 | FDL\_low | - | FDL\_high | -50 | 1 | 2 |
|  | Frequency range | 758 | - | 788 | -50 | 1 |  |
| n24, n99 | E-UTRA Band 2, 4, 5, 10, 12, 13, 14, 17, 24, 25, 26, 29, 30, 41, 48, 66, 70, 71, 85 | FDL\_low | - | FDL\_high | -50 | 1 |  |
|  | NR Band n77 | FDL\_low | - | FDL\_high | -50 | 1 | 2 |
| n25 | E-UTRA Band 4, 5, 12, 13, 14, 17, 24, 26, 27, 28, 29, 30, 41, 42, 48, 53, 66, 70, 71, 85 | FDL\_low | - | FDL\_high | -50 | 1 |  |
|  | E-UTRA Band 2 | FDL\_low | - | FDL\_high | -50 | 1 | 15 |
|  | E-UTRA Band 25 | FDL\_low | - | FDL\_high | -50 | 1 | 15 |
|  | E-UTRA Band 43,  NR Band n77 | FDL\_low | - | FDL\_high | -50 | 1 | 2 |
| n26 | E-UTRA Band 1, 2, 3, 4, 5, 11, 12, 13, 14, 17, 18,19, 21, 24, 25, 26, 29, 30, 31, 34, 39, 40, 42, 43, 48, 50, 51, 65, 66, 70, 71, 73,74, 85 | FDL\_low | - | FDL\_high | -50 | 1 |  |
|  | E-UTRA Band 41, 53  NR Band n77, n78, n79 | FDL\_low | - | FDL\_high | -50 | 1 | 2 |
|  | Frequency range | 703 | - | 799 | -50 | 1 |  |
|  | Frequency range | 799 | - | 803 | -40 | 1 | 15 |
|  | Frequency range | 945 | - | 960 | -50 | 1 |  |
|  | Frequency range | 1884.5 | - | 1915.7 | -41 | 0.3 | 8 |
| n28, n83 | E-UTRA Band 1, 4, 22, 32, 42, 43, 50, 51, 65, 66, 73, 74, 75, 76,  NR Band n77, n78 | FDL\_low | - | FDL\_high | -50 | 1 | 2 |
|  | E-UTRA Band 1 | FDL\_low | - | FDL\_high | -50 | 1 | 19, 25 |
|  | E-UTRA Band 2, 3, 5, 7, 8, 18, 19, 20, 25, 26, 27, 31, 34, 38, 39, 40, 41, 52, 72,  NR Band n79 | FDL\_low | - | FDL\_high | -50 | 1 |  |
|  | E-UTRA Band 11, 21 | FDL\_low | - | FDL\_high | -50 | 1 | 19, 24 |
|  | Frequency range | 470 | - | 694 | -42 | 8 | 15, 35 |
|  | Frequency range | 470 | - | 710 | -26.2 | 6 | 34 |
|  | Frequency range | 662 | - | 694 | -26.2 | 6 | 15 |
|  | Frequency range | 758 | - | 773 | -32 | 1 | 15 |
|  | Frequency range | 773 | - | 803 | -50 | 1 |  |
|  | Frequency range | 1884.5 | - | 1915.7 | -41 | 0.3 | 8, 19 |
| n30 | E-UTRA Band 2, 4, 5, 7, 12, 13, 14, 17, 24, 25, 26, 27, 29, 30, 38, 41, 48, 53, 66, 70, 71, 85,  NR Band n77 | FDL\_low | - | FDL\_high | -50 | 1 |  |
| n34 | E-UTRA Band 1, 3, 7, 8, 11, 18, 19, 20, 21, 22, 26, 28, 31, 32, 33, 38,39, 40, 41, 42, 43, 44, 45, 50, 51, 52, 65, 67, 69, 72, 74, 75, 76,  NR Band n78, n79 | FDL\_low | - | FDL\_high | -50 | 1 | 5 |
|  | NR Band n77 | FDL\_low | - | FDL\_high | -50 | 1 | 2 |
|  | Frequency range | 1884.5 | - | 1915.7 | -41 | 0.3 | 8 |
| n38 | E-UTRA Band 1, 2, 3, 4, 5, 8, 12, 13, 14, 17, 20, 22, 27, 28, 29, 30, 31, 32, 33, 34, 40, 42, 43, 50, 51, 52, 65, 66, 67, 68, 72, 74, 75, 76, 85 | FDL\_low | - | FDL\_high | -50 | 1 |  |
|  | NR Band n77, n78, n79 | FDL\_low | - | FDL\_high | -50 | 1 |  |
|  | Frequency range | 2620 | - | 2645 | -15.5 | 5 | 15, 22, 26 |
|  | Frequency range | 2645 | - | 2690 | -40 | 1 | 15, 22 |
| n39, n98 | E-UTRA Band 1, 8, 22, 26, 28, 34, 40, 41, 42, 44, 45, 50, 51, 52, 74,  NR Band n79 | FDL\_low | - | FDL\_high | -50 | 1 |  |
|  | NR Band n77, n78 | FDL\_low | - | FDL\_high | -50 | 1 | 2 |
|  | Frequency range | 1805 | - | 1855 | -40 | 1 | 33 |
|  | Frequency range | 1855 | - | 1880 | -15.5 | 5 | 15, 26, 33 |
| n40, n97 | E-UTRA Band 1, 3, 5, 7, 8, 11, 18, 19, 20, 21, 22, 26, 27, 28, 31, 32, 33, 34, 38, 39, 41, 42, 43, 44, 45, 50, 51, 52, 65, 67, 68, 69, 72, 74, 75, 76,  NR Band n77, n78 | FDL\_low | - | FDL\_high | -50 | 1 | 44 |
|  | NR Band n79 | FDL\_low | - | FDL\_high | -50 | 1 | 2 |
|  | Frequency range | 1884.5 | - | 1915.7 | -41 | 0.3 | 8 |
| n41 | E-UTRA Band 1, 2, 3, 4, 5, 8, 12, 13, 14, 17, 24, 25, 26, 27, 28, 29, 30, 34, 39, 42, 44, 45, 48, 50, 51, 52, 65, 66, 70, 71, 73, 74, 85,  NR Band n77, n78 | FDL\_low | - | FDL\_high | -50 | 1 |  |
|  | E-UTRA Band 40 | FDL\_low | - | FDL\_high | -40 | 1 |  |
|  | NR Band n79 | FDL\_low | - | FDL\_high | -50 | 1 | 2 |
|  | E-UTRA Band 11, 18, 19, 21 | FDL\_low | - | FDL\_high | -50 | 1 |  |
|  | Frequency range | 1884.5 |  | 1915.7 | -41 | 0.3 | 8 |
| n47 | E-UTRA Band 1, 3, 5, 7, 8, 22, 26, 28, 34, 39, 40, 41, 42, 44, 45, 65, 68, 72, 73 | FDL\_low | - | FDL\_high | -50 | 1 |  |
|  | NR Band n71, n77, n78, n79 | FDL\_low | - | FDL\_high | -50 | 1 |  |
| n48 | E-UTRA Band 2, 4, 5, 12, 13, 14, 17, 24, 25, 26, 29, 30, 41, 50, 51, 66, 70, 71, 74, 85 | FDL\_low | - | FDL\_high | -50 | 1 |  |
| n50 | E-UTRA Band 1, 2, 3, 4, 5, 7, 8, 12, 13, 17, 20, 26, 28, 29, 31, 34, 38, 39, 40, 41, 42, 43, 48, 65, 66, 67, 68 | FDL\_low | - | FDL\_high | -50 | 1 |  |
| n51 | E-UTRA Band 1, 2, 3, 4, 5, 7, 8, 12, 13, 17, 20, 26, 28, 29, 31, 34, 38, 39, 40, 41, 42, 43, 48, 52, 65, 66, 67, 68, 85 | FDL\_low | - | FDL\_high | -50 | 1 |  |
| n53 | E-UTRA Band 2, 4, 5, 12, 13, 14, 17, 24, 25, 26, 29, 30, 48, 66, 70, 71, 85,  NR Band n77 | FDL\_low | - | FDL\_high | -50 | 1 |  |
| n65 | E-UTRA Band 1, 3, 5, 7, 8, 11, 18, 19, 20, 21, 22, 26, 27, 28, 31, 32, 38, 40, 41, 42, 43, 50, 51, 65, 68, 69, 72, 74, 75, 76,  NR Band n78, n79 | FDL\_low | - | FDL\_high | -50 | 1 |  |
|  | NR Band n77 | FDL\_low | - | FDL\_high | -50 | 1 | 2 |
|  | E-UTRA Band 34 | FDL\_low | - | FDL\_high | -50 | 1 | 43 |
|  | Frequency range | 1900 | - | 1915 | -15.5 | 5 | 15, 26, 27 |
|  | Frequency range | 1915 | - | 1920 | +1.6 | 5 | 15, 26, 27 |
| n66, n86 | E-UTRA Band 2, 4, 5, 7, 12, 13, 14, 17, 25, 26, 27, 28, 29, 30, 38, 41, 43, 50, 51, 53, 66, 70, 71, 74, 85 | FDL\_low | - | FDL\_high | -50 | 1 |  |
|  | E-UTRA Band 42, 48,  NR Band n77 | FDL\_low | - | FDL\_high | -50 | 1 | 2 |
| n70 | E-UTRA Band 2, 4, 5, 12, 13, 14, 17, 24, 25, 26, 29, 30, 41, 47, 48, 66, 70, 71, 85 | FDL\_low | - | FDL\_high | -50 | 1 |  |
|  | NR Band n77 | FDL\_low | - | FDL\_high | -50 | 1 | 2 |
| n71 | E-UTRA Band 4, 5, 12, 13, 14, 17, 24, 26, 30, 48, 53, 66, 85 | FDL\_low | - | FDL\_high | -50 | 1 |  |
|  | E-UTRA Band 2, 25, 41, 70,  NR Band n77 | FDL\_low | - | FDL\_high | -50 | 1 | 2 |
|  | E-UTRA Band 29 | FDL\_low | - | FDL\_high | -38 | 1 | 15 |
|  | E-UTRA Band 71 | FDL\_low | - | FDL\_high | -50 | 1 | 15 |
| n74 | E-UTRA Band 1, 2, 3, 4, 5, 7, 8, 12, 13, 17, 18, 19, 20, 26, 28, 29, 31, 34, 38, 39, 40, 41, 42, 43, 48, 52, 65, 66, 67, 68, 85  NR Band n77, n78 | FDL\_low | - | FDL\_high | -50 | 1 |  |
|  | NR Band n79 | FDL\_low | - | FDL\_high | -50 | 1 | 2 |
|  | Frequency range | 1884.5 | - | 1915.7 | -41 | 0.3 | 8 |
|  | Frequency range | 1400 | - | 1427 | -32 | 27 | 15, 41 |
|  | Frequency range | 1475 | - | 1488 | -28 | 1 | 15, 42 |
|  | Frequency range | 1475 | - | 1488 | -50 | 1 | 15, 45 |
|  | Frequency range | 1475.9 | - | 1510.9 | -35 | 1 | 15, 46 |
|  | Frequency range | 1488 | - | 1518 | -50 | 1 | 15 |
| n77 | E-UTRA Band 1, 2, 3, 4, 5, 7, 8, 11, 12, 13, 14, 17, 18, 19, 20, 21, 24, 25, 26, 27, 28, 29, 30, 34, 39, 40, 41, 53, 65, 66, 70, 71, 74, 85 | FDL\_low | - | FDL\_high | -50 | 1 |  |
|  | Frequency range | 1884.5 | - | 1915.7 | -41 | 0.3 | 8 |
| n78 | E-UTRA Band 1, 3, 5, 7, 8, 11, 18, 19, 20, 21, 26, 28, 34, 39, 40, 41, 65 | FDL\_low | - | FDL\_high | -50 | 1 |  |
|  | Frequency range | 1884.5 | - | 1915.7 | -41 | 0.3 | 8 |
| n79 | E-UTRA Band 1, 3, 5, 8, 11, 18, 19, 21, 28, 34, 39, 40, 41, 42, 65, 74 | FDL\_low | - | FDL\_high | -50 | 1 |  |
|  | Frequency range | 1884.5 | - | 1915.7 | -41 | 0.3 | 8 |
| n85 | E-UTRA Band 2, 5, 13, 14, 17, 24, 25, 26, 27, 30, 41, 53, 70, 71, 74 | FDL\_low | - | FDL\_high | -50 | 1 |  |
|  | E-UTRA Band 4, 48, 50, 51, 66  NR Band n77, n78 | FDL\_low | - | FDL\_high | -50 | 1 | 2 |
|  | E-UTRA Band 12, 85 | FDL\_low | - | FDL\_high | -50 | 1 | 15 |
| n95 | E-UTRA Band 1, 3 , 5, 8, 28, 39, 40, 41  NR Band n78, n79 | FDL\_low | - | FDL\_high | -50 | 1 | 5 |
|  | NR Band n77 | FDL\_low | - | FDL\_high | -50 | 1 | 2 |
|  | Frequency range | 1884.5 | - | 1915.7 | -41 | 0.3 | 8 |
| NOTE 1: FDL\_low and FDL\_high refer to each frequency band specified in Table 5.2-1 in TS 38.101-1 or Table 5.5-1 in TS 36.101  NOTE 2: As exceptions, measurements with a level up to the applicable requirements defined in Table 6.5.3.1-2 are permitted for each assigned NR carrier used in the measurement due to 2nd, 3rd, 4th or 5th harmonic spurious emissions. Due to spreading of the harmonic emission the exception is also allowed for the first 1 MHz frequency range immediately outside the harmonic emission on both sides of the harmonic emission. This results in an overall exception interval centred at the harmonic emission of (2 MHz + N x LCRB x RBsize kHz), where N is 2, 3, 4, 5 for the 2nd, 3rd, 4th or 5th harmonic respectively. The exception is allowed if the measurement bandwidth (MBW) totally or partially overlaps the overall exception interval.  NOTE 3: 15 kHz SCS is assumed when RB is mentioned in the note when channel bandwidth is less than or equal to 50 MHz, lowest SCS is assumed when channel bandwidth is larger than 50 MHz. The transmission bandwidth in terms of RB position and range is not limited to 15 kHz SCS and shall scale with SCS accordingly.  NOTE 4: Void  NOTE 5: For non-synchronised TDD operation to meet these requirements some restriction will be needed for either the operating band or protected band  NOTE 6: N/A  NOTE 7: Void  NOTE 8: Applicable when co-existence with PHS system operating in 1884.5 - 1915.7 MHz.  NOTE 9: Void  NOTE 10: Void  NOTE 11: Void  NOTE 12: The emissions measurement shall be sufficiently power averaged to ensure a standard deviation < 0.5 dB  NOTE 13: Void  NOTE 14: Void  NOTE 15: These requirements also apply for the frequency ranges that are less than FOOB (MHz) in Table 6.5.3.1-1 from the edge of the channel bandwidth.  NOTE 16: Void  NOTE 17: Void  NOTE 18: Void  NOTE 19: Applicable when the assigned NR carrier is confined within 718 MHz and 748 MHz and when the channel bandwidth used is 5 or 10 MHz.  NOTE 20: Void  NOTE 21: This requirement is applicable for any channel bandwidths up to 20MHz within the range 2500 - 2570 MHz with the following restriction: for carriers of 15 MHz bandwidth when carrier centre frequency is within the range 2560.5 - 2562.5 MHz and for carriers of 20 MHz bandwidth when carrier centre frequency is within the range 2552 - 2560 MHz the requirement is applicable only for an uplink transmission bandwidth less than or equal to 54 RB.  NOTE 22: This requirement is applicable for power class 3 UE for any channel bandwidths up to 20 MHz. For channel bandwidth within the range 2570 - 2615 MHz with the following restriction: for carriers of 15 MHz bandwidth when the carrier centre frequency is within the range 2605.5 - 2607.5 MHz and for carriers of 20 MHz bandwidth when the carrier centre frequency is within the range 2597 - 2605 MHz the requirement is applicable only for an uplink transmission bandwidth less than or equal to 54 RB. . For carriers overlapping the frequency range 2615 - 2620 MHz the requirement applies with the maximum output power configured to +19 dBm in the IE P-Max.  NOTE 23: Void  NOTE 24: As exceptions, measurements with a level up to the applicable requirement of -38 dBm/MHz is permitted for each assigned NR carrier used in the measurement due to 2nd harmonic spurious emissions. An exception is allowed if there is at least one individual RB within the transmission bandwidth (see Figure 5.3.1-1) for which the 2nd harmonic totally or partially overlaps the measurement bandwidth (MBW).  NOTE 25: As exceptions, measurements with a level up to the applicable requirement of -36 dBm/MHz is permitted for each assigned NR carrier used in the measurement due to 3rd harmonic spurious emissions. An exception is allowed if there is at least one individual RB within the transmission bandwidth (see Figure 5.3.1-1) for which the 3rd harmonic totally or partially overlaps the measurement bandwidth (MBW).  NOTE 26: For these adjacent bands, the emission limit could imply risk of harmful interference to UE(s) operating in the protected operating band.  NOTE 27: This requirement is applicable for channel bandwidths up to 20 MHz within the range 1920 - 1980 MHz with the following restriction: for carriers of 15 MHz bandwidth when the carrier centre frequency is within the range 1927.5 - 1929.5 MHz and for carriers of 20 MHz bandwidth when the carrier centre frequency is within the range 1930 - 1938 MHz the requirement is applicable only for an uplink transmission bandwidth less than or equal to 54 RB.  NOTE 28: Void  NOTE 29: Void  NOTE 30: Void  NOTE 31: Void  NOTE 32: Void  NOTE 33: This requirement is only applicable for carriers with bandwidth up to 20MHz and confined within 1885-1920 MHz (requirement for carriers with at least 1RB confined within 1880 - 1885 MHz is not specified). This requirement applies for an uplink transmission bandwidth less than or equal to 54 RB for carriers of 15 MHz bandwidth when carrier center frequency is within the range 1892.5 - 1894.5 MHz and for carriers of 20 MHz bandwidth when carrier center frequency is within the range 1895 - 1903 MHz. The above restriction is applicable to only power class 3 UEs.  NOTE 34: This requirement is applicable for 5 and 10 MHz NR channel bandwidth allocated within 718-728 MHz. For carriers of 10 MHz bandwidth, this requirement applies for an uplink transmission bandwidth less than or equal to 30 RB with RBstart > 1 and RBstart < 48.  NOTE 35: This requirement is applicable in the case of a 10 MHz NR carrier confined within 703 MHz and 733 MHz, otherwise the requirement of -25 dBm with a measurement bandwidth of 8 MHz applies.  NOTE 36: Void  NOTE 37: Void  NOTE 38: Void  NOTE 39: Void  NOTE 40: Void  NOTE 41: Applicable for cases and when the lower edge of the assigned NR UL channel bandwidth frequency is greater than or equal to 1427 MHz + the channel BW assigned for 5 and 10 MHz bandwidth, and when the lower edge of the assigned NR UL channel bandwidth frequency is greater than or equal to 1440 MHz for 15 and 20 MHz bandwidth. This requirement shall be verified with UE transmission power of 15 dBm.  NOTE 42: Applicable when upper edge of the assigned NR UL channel bandwidth frequency is more than 1460 MHz and less than or equal to 1470 MHz for 5 MHz bandwidth, and when the upper edge of the assigned NR UL channel bandwidth frequency is more than 1460 MHz and less than or equal to 1465 MHzfor 10 MHz bandwidth.  NOTE 43: This requirement is applicable for NR channel bandwidths up to 20MHz allocated within 1920-1980 MHz.  NOTE 44: As exceptions, for 90 and 100 MHz channel bandwidth, -40 dBm/MHz is applicable in the frequency range of 2496 – 2505 MHz.  NOTE 45: Applicable when upper edge of the assigned NR UL channel bandwidth frequency is equal to or less than 1460 MHz.  NOTE 46: Applicable for 5 MHz bandwidth and when the NR carrier is within 1447.9 – 1462.9 MHz.  NOTE\_XX This requirement is applicable for power class 3 and channel bandwidths up to 20MHz | | | | | | | |

NOTE: To simplify Table 6.5.3.2-1, E-UTRA band numbers are listed for bands which are specified only for E-UTRA operation or both E-UTRA and NR operation. NR band numbers are listed for bands which are specified only for NR operation.

< end of changes >

## ***<Next change>***

##### 6.5A.2.2.2 Spectrum emission mask for intra-band non-contiguous CA

For intra-band non-contiguous carrier aggregation the spectrum emission mask requirement is defined as a composite spectrum emissions mask. Composite spectrum emission mask applies to frequencies up to ΔfOOB starting from the edges of the sub-blocks. Composite spectrum emission mask is defined as follows

a) Composite spectrum emission mask is a combination of individual sub-block spectrum emissions masks

b) In case the sub-block consist of one component carrier the sub-lock general spectrum emission mask is defined in subclause 6.5.2.1

c) If for some frequency sub-block spectrum emission masks overlap then spectrum emission mask allowing higher power spectral density applies for that frequency

d) If for some frequency a sub-block spectrum emission mask overlaps with the sub-block bandwidth of another sub-block, then the emission mask does not apply for that frequency.

## ***<Next change>***

6.5A.2.4.1.2 NR ACLR for intra-band non-contiguous CA

For intra-band non-contiguous carrier aggregation, CA Adjacent Channel Leakage power Ratio(CAACLR) is the ratio of the sum of the filtered mean power centred on each assigned channel frequency to the filtered mean power centred on an adjacent NR channel frequency at nominal channel spacing. In case the gap bandwidth Wgap between 2 uplink CCs is smaller than maximum of the 2 uplink channel bandwidths then no CAACLR requirement is set for the gap. Each assigned NR channel power and adjacent NR channel power are measured with rectangular filters with measurement bandwidths specified in Table 6.5.2.4.1-1. If the measured adjacent channel power is greater than –50dBm then the ACLR shall be higher than the value specified in Table 6.5A.2.4.1.2-1.

Table 6.5A.2.4.1.2-1: General requirements for intra-band non-contiguous CA ACLR

|  |  |
| --- | --- |
|  | ACLR / Measurement bandwidth |
| CA ACLR | 30 dB |
| CA Measurement bandwidth for each sub block  (NOTE 1) | MBWACLR |
| Adjacent channel centre frequency offset (in MHz) | + BWChannel  /  - BWChannel |
| NOTE 1: MBWACLR is the single-channel ACLR measurement bandwidths specified in 6.5.2.4.1. | |

6.5A.2.4.1.3 NR ACLR for Inter-band CA

## ***<Next change>***

### 6.5A.3 Spurious emission for CA

#### 6.5A.3.1 General spurious emissions

For inter-band carrier aggregation with uplink assigned to two NR bands, the spurious emission requirement Table 6.5.3.1-2 apply for the frequency ranges that are more than FOOB as defined in Table 6.5.3.1-1 away from edges of the assigned channel bandwidth on a component carrier. If for some frequency a spurious emission requirement of individual component carrier overlaps with the spectrum emission mask or channel bandwidth of another component carrier then it does not apply.

NOTE: For inter-band carrier aggregation with uplink assigned to two NR bands the requirements in Table 6.5.3.1-2 could be verified by measuring spurious emissions at the specific frequencies where second and third order intermodulation products generated by the two transmitted carriers can occur; in that case, the requirements for remaining applicable frequencies in Table 6.5.3.1-2 would be considered to be verified by the measurements verifying the one uplink inter-band CA spurious emission requirement.

For intra-band contiguous carrier aggregation the spurious emission limits apply for the frequency ranges that are more than FOOB (MHz) in Table 6.5A.3.1-1 from the edge of the aggregated channel bandwidth. For frequencies ΔfOOB greater than FOOB as specified in Table 6.5A.3.1-1 the spurious emission requirements in Table 6.5.3.1-2 are applicable. For power class 2 intra-band contiguous carrier aggregation, the spurious emissions is measured as the sum from both UE transmit antenna connectors when UE indicates support for *dualPA-Architecture* IE.

Table 6.5A.3.1-1: Boundary between out of band and spurious emission domain for intra-band contiguous carrier aggregation

|  |  |
| --- | --- |
| Aggregated Channel bandwidth | OOB boundary FOOB (MHz) |
| BWChannel\_CA | BWChannel\_CA + 5 |

For intra-band non-contiguous carrier aggregation transmission the spurious emission requirement is defined as a composite spurious emission requirement. Composite spurious emission requirement applies to frequency ranges that are more than FOOB away from the edges of each carrier in the gap and out of the gap. Composite spurious emission requirement is defined as follows

a) Composite spurious emission requirement is a combination of individual sub-block spurious emission requirements

b) In case the sub-block consist of one component carrier the sub-lock spurious emission requirement and FOOB are defined in subclause 6.5.3.1

c) If for some frequency an individual sub-block spurious emission requirement overlaps with the general spectrum emission mask or the sub-block bandwidth of another sub-block then it does not apply

For combinations of intra-band and inter-band carrier aggregation with three uplink component carriers (up to two contiguously aggregated carriers per operating band), the spurious emission requirement is defined as follows. For the NR band supporting one component carrier the requirements in Table 6.5.3.1-2 apply for frequency ranges that are more than FOOB (MHz) from the edges of assigned channel bandwidth as defined in Table 6.5.3.1-1. For the NR band supporting two contiguous component carriers the requirements in Table 6.5.3.1-2 apply for frequency ranges that are more than FOOB (MHz) from the edges of assigned aggregated channel bandwidth as defined in Table 6.5A.3.1-1. If for some frequency a spurious emission requirement of a single component carrier or two contiguous component carriers overlap with the spurious emission requirement or channel bandwidth of another component carrier or two contiguously aggregated carriers then it does not apply.

## ***<Next change>***

6.5A.3.2.3 Spurious emissions for UE co-existence for Inter-band CA

For inter-band carrier aggregation with two contiguous carriers assigned to one NR band, the requirements in subclause 6.5A.3.2.1 apply for that band.

For inter-band carrier aggregation with the uplink assigned to two NR bands, the requirements in Table 6.5A.3.2.3-1 apply on each component carrier with all component carriers are active.

NOTE: For inter-band carrier aggregation with uplink assigned to two NR bands the requirements in Table 6.5A.3.2.3-1 could be verified by measuring spurious emissions at the specific frequencies where second and third order intermodulation products generated by the two transmitted carriers can occur; in that case, the requirements for remaining applicable frequencies in Table 6.5A.3.2.3-1 would be considered to be verified by the measurements verifying the one uplink inter-band CA UE to UE co-existence requirements.

**Table 6.5A.3.2.3-1: Requirements for uplink inter-band carrier aggregation (two bands)**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **NR CA combination** | **Spurious emission** | | | | | | |
|  | **Protected Band** | **Frequency range (MHz)** | | | **Maximum Level (dBm)** | **MBW (MHz)** | **NOTE** |
| CA\_n1-n3 | E-UTRA Band 1, 5, 7, 8, 11, 18, 19, 20, 21, 26, 27, 28, 31, 32, 38, 40, 41, 43, 44, 50, 51, 65, 67, 68, 69, 72, 73, 74, 75, 76  NR Band n79 | FDL\_low | - | FDL\_high | -50 | 1 |  |
|  | E-UTRA band 3, 34 | FDL\_low | - | FDL\_high | -50 | 1 | 4 |
|  | E-UTRA band 22, 42, 52  NR Band n77, n78 | FDL\_low | - | FDL\_high | -50 | 1 | 2 |
|  | Frequency range | 1880 | - | 1895 | -40 | 1 | 4,6 |
|  | Frequency range | 1895 | - | 1915 | -15.5 | 5 | 4, 6, 7 |
|  | Frequency range | 1915 | - | 1920 | +1.6 | 5 | 4, 6, 7 |
| CA\_n1-n5 | E-UTRA Band 1, 5, 7, 8, 11, 18, 19, 21, 22, 26, 28, 31, 38, 40, 42, 43, 50, 51, 65, 73, 74 | FDL\_low | - | FDL\_high | -50 | 1 |  |
|  | E-UTRA band 3,34 | FDL\_low | - | FDL\_high | -50 | 1 | 5 |
|  | E-UTRA band 41, 52  NR Band n77, n78, n79 | FDL\_low | - | FDL\_high | -50 | 1 | 2 |
| CA\_n1-n7 | E-UTRA Band 1, 5, 7, 8, 20, 22, 26, 27, 28, 31,32, 40, 42, 43, 50, 51, 52, 65, 67, 68, 72, 74, 75, 76  NR Band n78, n79 | FDL\_low | - | FDL\_high | -50 | 1 |  |
|  | band n77 | FDL\_low | - | FDL\_high | -50 | 1 | 2 |
|  | band 3, 34 | FDL\_low | - | FDL\_high | -50 | 1 | 4 |
|  | Frequency range | 1880 |  | 1895 | -40 | 1 | 4, 6 |
|  | Frequency range | 1895 |  | 1915 | -15.5 | 5 | 4. 7, 6 |
|  | Frequency range | 1915 |  | 1920 | +1.6 | 5 | 4. 7, 6 |
|  | Frequency range | 2570 | - | 2575 | +1.6 | 5 | 4, 7, 18 |
|  | Frequency range | 2575 | - | 2595 | -15.5 | 5 | 4, 7, 18 |
|  | Frequency range | 2595 | - | 2620 | -40 | 1 | 4, 18 |
| CA\_n1-n8 | E-UTRA Band 20, 28, 31, 32, 38, 40, 45, 50, 51, 65, 67, 68, 69, 72, 73, 74, 75, 76 | FDL\_low | - | FDL\_high | -50 | 1 |  |
|  | E-UTRA Band 3, 7, 22, 41, 42, 43  NR Band n77, n78, n79 | FDL\_low | - | FDL\_high | -50 | 1 | 2 |
|  | E-UTRA Band 1, 8, 34 | FDL\_low | - | FDL\_high | -50 | 1 | 4 |
|  | E-UTRA Band 11, 21 | FDL\_low | - | FDL\_high | -50 | 1 | 5 |
|  | Frequency range | 1880 | - | 1895 | -40 | 1 | 4, 6 |
|  | Frequency range | 1895 | - | 1915 | -15.5 | 5 | 4, 6, 7 |
|  | Frequency range | 1915 | - | 1920 | +1.6 | 5 | 4, 6, 7 |
| CA\_n1-n18 | E-UTRA Band 1, 11, 21, 42, 65  NR Band n79 | FDL\_low | - | FDL\_high | -50 | 1 |  |
|  | E-UTRA Band 3, 34 | FDL\_low | - | FDL\_high | -50 | 1 | 4 |
|  | NR Band n77, n78 | FDL\_low | - | FDL\_high | -50 | 1 | 2 |
|  | Frequency range | 758 | - | 799 | -50 | 1 |  |
|  | Frequency range | 799 | - | 803 | -40 | 1 | 4 |
|  | Frequency range | 860 | - | 890 | -40 | 1 |  |
|  | Frequency range | 945 | - | 960 | -50 | 1 |  |
|  | Frequency range | 2545 | - | 2575 | -50 | 1 |  |
|  | Frequency range | 2595 | - | 2645 | -50 | 1 |  |
| CA\_n1-n28 | E-UTRA Band 5, 7, 8, 18, 19, 20, 26, 27, 31, 38, 40, 41, 72, 73  NR band n79 | FDL\_low | - | FDL\_high | -50 | 1 |  |
|  | E-UTRA Band 1, 22, 32, 42, 43, 50, 51, 52, 65, 74, 75, 76  NR band n77, n78 | FDL\_low | - | FDL\_high | -50 | 1 | 2 |
|  | E-UTRA Band 3, 34 | FDL\_low | - | FDL\_high | -50 | 1 | 4 |
|  | E-UTRA Band 11, 21 | FDL\_low | - | FDL\_high | -50 | 1 | 11, 12 |
|  | E-UTRA Band 1, 65 | FDL\_low | - | FDL\_high | -50 | 1 | 11, 15 |
|  | Frequency range | 470 | - | 694 | -42 | 8 | 4, 14 |
|  | Frequency range | 470 | - | 710 | -26.2 | 6 | 15 |
|  | Frequency range | 758 | - | 773 | -30 | 1 | 4 |
|  | Frequency range | 773 | - | 803 | -50 | 1 |  |
|  | Frequency range | 662 | - | 694 | -26.2 | 6 | 4 |
|  | Frequency range | 1880 | - | 1895 | -40 | 1 | 4, 6 |
|  | Frequency range | 1895 | - | 1915 | -15.5 | 5 | 4, 6, 7 |
|  | Frequency range | 1915 | - | 1920 | +1.6 | 5 | 4, 6, 7 |
| CA\_n1-n40 | E-UTRA Band 1, 5, 7, 8, 11, 18, 19, 20, 21, 22, 26, 27, 28, 31, 32, 38, 41, 42, 43, 44, 45, 50, 51, 52, 65, 67, 68, 69, 72, 73, 74, 75, 76  NR band n78 | FDL\_low | - | FDL\_high | -50 | 1 |  |
|  | Band 3, 34 | FDL\_low | - | FDL\_high | -50 | 1 | 4 |
|  | NR band n77, n79 | FDL\_low | - | FDL\_high | -50 | 1 | 2 |
|  | Frequency range | 1880 |  | 1895 | -40 | 1 | 4, 14 |
|  | Frequency range | 1895 |  | 1915 | -15.5 | 5 | 4, 7, 14 |
|  | Frequency range | 1915 |  | 1920 | +1.6 | 5 | 4, 7, 14 |
|  | Frequency range | 1884.5 | - | 1915.7 | -41 | 0.3 | 3 |
| CA\_n1-n41 | E-UTRA Band 1, 3, 5, 8, 11, 18, 19, 21, 26, 27, 28, 42, 44, 45, 50, 51, 52, 65, 73, 74  NR Band n78 | FDL\_low | - | FDL\_high | -50 | 1 |  |
|  | E-UTRA band 34 | FDL\_low | - | FDL\_high | -50 | 1 | 4 |
|  | E-UTRA Band 40 | FDL\_low | - | FDL\_high | -40 | 1 |  |
|  | NR Band n77, n79 | FDL\_low | - | FDL\_high | -50 | 1 | 2 |
|  | Frequency range | 1880 | - | 1895 | -40 | 1 | 4,6 |
|  | Frequency range | 1895 | - | 1915 | -15.5 | 5 | 4, 6, 7 |
|  | Frequency range | 1915 | - | 1920 | +1.6 | 5 | 4, 6, 7 |
| CA\_n1-n74 | E-UTRA Band 1, 5, 7, 8, 18, 19, 20, 26, 28, 31, 38, 40, 41, 42, 43, 52, 65, 67, 68  NR Band n78 | FDL\_low | - | FDL\_high | -50 | 1 |  |
|  | NR Band n77, n79 | FDL\_low | - | FDL\_high | -50 | 1 | 2 |
| E-UTRA Band 3, 34 | FDL\_low | - | FDL\_high | -50 | 1 | 4 |
| Frequency range | 1880 | - | 1895 | -40 | 1 | 4, 6 |
| Frequency range | 1895 | - | 1915 | -15.5 | 5 | 4, 6, 7 |
| Frequency range | 1915 | - | 1920 | +1.6 | 5 | 4, 6, 7 |
| Frequency range | 1884.5 | - | 1915.7 | -41 | 0.3 | 3 |
| Frequency range | 1400 | - | 1427 | -32 | 27 | 4, 20 |
| Frequency range | 1475 | - | 1488 | -28 | 1 | 4, 21 |
| Frequency range | 1475 | - | 1488 | -50 | 1 | 4, 22 |
| Frequency range | 1488 | - | 1510.9 | -35 | 1 | 4, 23 |
| Frequency range | 1488 | - | 1518 | -50 | 1 | 4 |
| CA\_n1-n77 | E-UTRA Band 1, 5, 7, 8, 11, 18, 19, 20, 21, 26, 27, 28, 40, 41, 65, 74 | FDL\_low | - | FDL\_high | -50 | 1 |  |
|  | E-UTRA Band 3, 34 | FDL\_low | - | FDL\_high | -50 | 1 | 4 |
|  | Frequency range | 1880 | - | 1895 | -40 | 1 | 4, 6 |
|  | Frequency range | 1895 | - | 1915 | -15.5 | 5 | 4, 6, 7 |
|  | Frequency range | 1915 | - | 1920 | +1.6 | 5 | 4, 6, 7 |
| CA\_n1-n78 | E-UTRA Band 1, 3, 5, 7, 8, 11, 18, 19, 20, 21, 26, 28, 34, 40, 41, 65, 74 | FDL\_low | - | FDL\_high | -50 | 1 |  |
|  | Frequency range | 1880 | - | 1895 | -40 | 1 | 4, 6 |
|  | Frequency range | 1895 | - | 1915 | -15.5 | 5 | 4, 6, 7 |
|  | Frequency range | 1915 | - | 1920 | +1.6 | 5 | 4, 6, 7 |
| CA\_n1-n79 | E-UTRA Band 1, 3, 5, 7, 8, 11, 18, 19, 21, 26, 28, 34, 40, 41, 42, 65, 74 | FDL\_low | - | FDL\_high | -50 | 1 |  |
|  | Frequency range | 1880 | - | 1895 | -40 | 1 | 4, 6 |
|  | Frequency range | 1895 | - | 1915 | -15.5 | 5 | 4, 6, 7 |
|  | Frequency range | 1915 | - | 1920 | +1.6 | 5 | 4, 6, 7 |
| CA\_n2-n5 | E-UTRA Band 2, 4, 5, 12, 13, 14, 17, 25, 26, 28, 29, 30, 42, 48, 50, 51 66, 70, 71, 74, 85, | FDL\_low | - | FDL\_high | -50 | 1 |  |
|  | E-UTRA Band 41, 43, 53  NR Band n77 | FDL\_low | - | FDL\_high | -50 | 1 | 2 |
| CA\_n2-n7 | E-UTRA Band 2, 5, 7, 10, 12, 13, 14, 17, 26, 27, 28, 29, 30, 42, 50, 51, 66, 74, 85 | FDL\_low | - | FDL\_high | -50 | 1 |  |
|  | E-UTRA Band 43 | FDL\_low | - | FDL\_high | -50 | 1 | 2 |
|  | Frequency range | 2570 | - | 2575 | 1.6 | 5 | 4, 7, 18 |
|  | Frequency range | 2575 | - | 2595 | -15.5 | 5 | 4, 7, 18 |
|  | Frequency range | 2595 | - | 2620 | -40 | 1 | 4, 18 |
| CA\_n2-n12 | E-UTRA Band 5, 13, 14, 17, 24, 26, 27, 30, 41, 50, 53, 71, 74 | FDL\_low | - | FDL\_high | -50 | 1 |  |
|  | E-UTRA Band 12, 25, 85 | FDL\_low | - | FDL\_high | -50 | 1 | 3 |
|  | E-UTRA Band 2 | FDL\_low | - | FDL\_high | -50 | 1 | 4 |
|  | E-UTRA Band 4, 10, 51, 66, 70 | FDL\_low | - | FDL\_high | -50 | 1 | 2 |
| CA\_n2-n14 | E-UTRA Band 4, 5, 10, 12, 13, 14, 17, 24, 26, 27, 29, 30, 41, 48, 53, 66, 70, 71, 85 | FDL\_low | - | FDL\_high | -50 | 1 |  |
|  | E-UTRA band 2, 25 | FDL\_low | - | FDL\_high | -50 | 1 | 2 |
|  | Frequency range | 769 | - | 775 | -35 | 0.00625 | 4 |
|  | Frequency range | 799 | - | 805 | -35 | 0.00625 | 4 |
| CA\_n2-n30 | E-UTRA Band 4, 5, 12, 13, 14, 17, 24, 26, 27, 28, 29, 41, 42, 48, 50, 51, 53, 66, 70, 71, 74, 85  NR band n30 | FDL\_low | - | FDL\_high | -50 | 1 |  |
|  | E-UTRA Band 25 | FDL\_low | - | FDL\_high | -50 | 1 | 4 |
|  | NR Band n2 | FDL\_low | - | FDL\_high | -50 | 1 | 4 |
|  | E-UTRA Band 43,  NR Band n77 | FDL\_low | - | FDL\_high | -50 | 1 | 2 |
| CA\_n2-n48 | E-UTRA Band 4, 5, 12, 13, 14, 17, 24, 25, 26, 29, 30, 41, 50, 51, 53, 66, 70, 71, 74, 85 | FDL\_low | - | FDL\_high | -50 | 1 |  |
| CA\_n2-n66 | E-UTRA Band 4, 5, 10, 12, 13, 14, 17, 24, 26, 27, 28, 29, 30, 41, 50, 51, 66, 70, 71, 74, 85 | FDL\_low | - | FDL\_high | -50 | 1 |  |
|  | E-UTRA Band 2, 25 | FDL\_low | - | FDL\_high | -50 | 1 | 4 |
|  | E-UTRA Band 42, 48,  NR Band n77 | FDL\_low | - | FDL\_high | -50 | 1 | 2 |
| CA\_n2-n77 | E-UTRA Band 4, 5, 12, 13, 14, 17, 26, 29, 30, 41, 65, 66, 70, 71 | FDL\_low | - | FDL\_high | -50 | 1 |  |
|  | E-UTRA Band 2, 25 | FDL\_low | - | FDL\_high | -50 | 1 | 2 |
| CA\_n2-n78 | E-UTRA Band 5, 7, 12, 13，26, 28, 41, 66 | FDL\_low | - | FDL\_high | -50 | 1 |  |
|  | E-UTRA Band 2, 25 | FDL\_low | - | FDL\_high | -50 | 1 | 4 |
| CA\_n3-n5 | E-UTRA Band 1, 5, 7, 8, 11, 18, 19, 21, 26, 28, 31, 38, 40, 43, 50, 51, 65, 73, 74  NR Band n79 | FDL\_low | - | FDL\_high | -50 | 1 |  |
|  | E-UTRA band 3,34 | FDL\_low | - | FDL\_high | -50 | 1 | 5 |
|  | E-UTRA Band 22, 42, 52  Band n77, n78 | FDL\_low | - | FDL\_high | -50 | 1 | 2 |
| CA\_n3-n7 | E-UTRA Band 1, 5, 7, 8, 20, 26, 27, 28, 31, 32, 33, 34, 40, 43, 44, 50, 51, 65, 67, 72, 74, 75, 76 | FDL\_low | - | FDL\_high | -50 | 1 |  |
|  | E-UTRA band 3 | FDL\_low | - | FDL\_high | -50 | 1 | 4 |
|  | E-UTRA band 22, 42, 52  NR-band n77, n78 | FDL\_low | - | FDL\_high | -50 | 1 | 2 |
|  | Frequency range | 2570 | - | 2575 | +1.6 | 5 | 4, 7, 18 |
|  | Frequency range | 2575 | - | 2595 | -15.5 | 5 | 4, 7, 18 |
|  | Frequency range | 2595 | - | 2620 | -40 | 1 | 4, 18 |
| CA\_n3-n8 | E-UTRA Band 1, 11, 20, 21, 28, 31, 32, 33, 34, 38, 39, 40, 44, 50, 51, 65, 67, 72, 73, 74, 75, 76 | FDL\_low | - | FDL\_high | -50 | 1 |  |
|  | E-UTRA band 3, 8 | FDL\_low | - | FDL\_high | -50 | 1 | 2, 4 |
|  | E-UTRA band 7, 22, 41, 42, 43, 52  NR Band n77, n78, n79 | FDL\_low | - | FDL\_high | -50 | 1 | 2 |
|  | Frequency range | 1884.5 | - | 1915.7 | -41 | 0.3 | 3 |
| CA\_n3-n18 | E-UTRA Band 1, 3, 11, 21, 28, 34, 40, 65  NR Band n79 | FDL\_low | - | FDL\_high | -50 | 1 |  |
|  | NR Band n77, n78 | FDL\_low | - | FDL\_high | -50 | 1 | 2 |
|  | Frequency range | 945 | - | 960 | -50 | 1 |  |
|  | Frequency range | 1884.5 | - | 1915.7 | -41 | 0.3 | 3 |
|  | Frequency range | 2545 | - | 2575 | -50 | 1 |  |
|  | Frequency range | 2595 | - | 2645 | -50 | 1 |  |
| CA\_n3-n34 | E-UTRA Band 1, 7, 8, 11, 18, 19, 20, 21, 26, 28, 31, 32, 33, 38, 39, 40, 41, 43, 44, 45, 50, 51, 65, 67, 69,72, 73, 74, 75, 76 | FDL\_low | - | FDL\_high | -50 | 1 |  |
|  | E-UTRA Band 22, 42, 52  NR Band n78, n79 | FDL\_low | - | FDL\_high | -50 | 1 | 2 |
|  | E-UTRA Band 3 | FDL\_low | - | FDL\_high | -50 | 1 | 15 |
|  | Frequency range | 1884.5 | - | 1915.7 | -41 | 0.3 | 3 |
| CA\_n3-n38 | E-UTRA Band 1, 5, 8, 20, 27, 28, 31, 32, 33, 34, 40, 43, 50, 51, 65, 67, 68, 72, 74, 75, 76 | FDL\_low | - | FDL\_high | -50 | 1 |  |
|  | E-UTRA band 3 | FDL\_low | - | FDL\_high | -50 | 1 | 15 |
|  | E-UTRA band 22, 42, 52 | FDL\_low | - | FDL\_high | -50 | 1 | 2 |
|  | Frequency range | 2620 | - | 2645 | -15.5 | 5 | 15, 22, 26 |
|  | Frequency range | 2645 | - | 2690 | -40 | 1 | 15, 22 |
| CA\_n3-n28 | E-UTRA Band 5, 7, 8, 18, 19, 20, 26, 27, 31 38, 40, 41, 72 | FDL\_low | - | FDL\_high | -50 | 1 |  |
|  | E-UTRA Band 32, 42, 43, 50, 51, 74, 75, 76  NR band n77, n78, n79 | FDL\_low | - | FDL\_high | -50 | 1 | 2 |
|  | E-UTRA Band 3, 34 | FDL\_low | - | FDL\_high | -50 | 1 | 4 |
|  | E-UTRA Band 11, 21 | FDL\_low | - | FDL\_high | -50 | 1 | 11, 12 |
|  | E-UTRA Band 1, 65 | FDL\_low | - | FDL\_high | -50 | 1 | 11, 15 |
|  | Frequency range | 470 | - | 694 | -42 | 8 | 4, 14 |
|  | Frequency range | 470 | - | 710 | -26.2 | 6 | 15 |
|  | Frequency range | 758 | - | 773 | -30 | 1 | 4 |
|  | Frequency range | 773 | - | 803 | -50 | 1 |  |
|  | Frequency range | 662 | - | 694 | -26.2 | 6 | 4 |
|  | Frequency range | 1880 | - | 1895 | -40 | 1 | 4, 6 |
|  | Frequency range | 1895 | - | 1915 | -15.5 | 5 | 4, 6, 7 |
|  | Frequency range | 1915 | - | 1920 | +1.6 | 5 | 4, 6, 7 |
|  | Frequency range | 1839.9 | - | 1879.9 | -50 | 1 | 4 |
|  | Frequency range | 1884.5 | - | 1915.7 | -41 | 0.3 | 3, 11 |
| CA\_n3-n40 | E-UTRA Band 1, 5, 7, 8, 11, 18, 19, 20, 21, 26, 27, 28, 31, 32, 33, 34, 38, 39, 41, 43, 44. 45, 50, 51, 65, 67, 68, 69, 72, 73, 74, 75, 76 | FDL\_low | - | FDL\_high | -50 | 1 |  |
|  | E-UTRA Band 3 | FDL\_low | - | FDL\_high | -50 | 1 | 4 |
|  | UTRA Band 22, 42, 52  NR Band n77, n78, n79 | FDL\_low | - | FDL\_high | -50 | 1 | 2 |
|  | Frequency range | 1884.5 | - | 1915.7 | -41 | 0.3 | 3 |
| CA\_n3-n41 | E-UTRA Band 1, 5, 8, 11, 18, 19, 20, 21, 26, 27, 28, 34, 39, 44, 45, 50, 51, 65, 73, 74 | FDL\_low | - | FDL\_high | -50 | 1 |  |
|  | E-UTRA Band 40 | FDL\_low | - | FDL\_high | -40 | 1 |  |
|  | E-UTRA Band 3 | FDL\_low | - | FDL\_high | -50 | 1 | 4 |
|  | E-UTRA Band 42,  NR Band n77, n78, n79 | FDL\_low | - | FDL\_high | -50 | 1 | 2 |
|  | Frequency range | 1884.5 | - | 1915.7 | -41 | 0.3 | 3 |
| CA\_n3-n74 | E-UTRA Band 1, 5, 7, 8, 18, 19, 20, 26, 28, 31, 34, 38, 39, 40, 41, 43, 65, 67, 68 | FDL\_low | - | FDL\_high | -50 | 1 |  |
|  | E-UTRA Band 3 | FDL\_low | - | FDL\_high | -50 | 1 | 4 |
| E-UTRA Band 42, 52  NR Band n77, n78, n79 | FDL\_low | - | FDL\_high | -50 | 1 | 2 |
| Frequency range | 1884.5 | - | 1915.7 | -41 | 0.3 | 3 |
| Frequency range | 1400 | - | 1427 | -32 | 27 | 4, 20 |
| Frequency range | 1475 | - | 1488 | -28 | 1 | 4, 21 |
| Frequency range | 1475 | - | 1488 | -50 | 1 | 4, 22 |
| Frequency range | 1488 | - | 1510.9 | -35 | 1 | 4, 23 |
| Frequency range | 1488 | - | 1518 | -50 | 1 | 4 |
| CA\_n3-n77 | E-UTRA Band 1, 3, 5, 7, 8, 11, 18, 19, 20, 21, 26, 28, 34, 39, 40, 41, 65, 74 | FDL\_low | - | FDL\_high | -50 | 1 |  |
|  | Frequency range | 1884.5 | - | 1915.7 | -41 | 0.3 | 3 |
| CA\_n3-n78 | E-UTRA Band 1, 3, 5, 7, 8, 11, 18, 19, 20, 21, 26, 28, 34, 39, 40, 41, 65, 74 | FDL\_low | - | FDL\_high | -50 | 1 |  |
|  | Frequency range | 1884.5 | - | 1915.7 | -41 | 0.3 | 3 |
| CA\_n3-n79 | E-UTRA Band 1, 3, 5, 8, 11, 18, 19, 21, 28, 34, 39, 40, 41, 65, 74 | FDL\_low | - | FDL\_high | -50 | 1 |  |
|  | E-UTRA Band 42 | FDL\_low | - | FDL\_high | -50 | 1 | 2 |
|  | Frequency range | 1884.5 | - | 1915.7 | -41 | 0.3 | 3 |
| CA\_n5-n7 | E-UTRA Band 1, 2, 3, 4, 5, 8, 12, 13, 14, 17, 28, 29, 30, 31, 34, 40, 42, 43, 65, 66, 71, 85  NR Band n7 | FDL\_low | - | FDL\_high | -50 | 1 |  |
|  | E-UTRA Band 52  NR Band n77, n78 | FDL\_low | - | FDL\_high | -50 | 1 | 2 |
|  | E-UTRA band 26 | 859 | - | 869 | -27 | 1 |  |
|  | Frequency range | 2570 | - | 2575 | +1.6 | 5 | 4, 7, 18 |
|  | Frequency range | 2575 | - | 2595 | -15.5 | 5 | 4, 7, 18 |
|  | Frequency range | 2595 | - | 2620 | -40 | 1 | 4, 13 |
| CA\_n5-n12 | E-UTRA Band 2, 5, 13, 14, 17, 24, 25, 26, 30, 42, 43 50, 71, 74 | FDL\_low | - | FDL\_high | -50 | 1 |  |
|  | E-UTRA Band 4, 10, 41, 42, 48, 51, 66, 70  NR Band n77 | FDL\_low | - | FDL\_high | -50 | 1 | 2 |
|  | E-UTRA Band 12, 85 | FDL\_low | - | FDL\_high | -50 | 1 | 4 |
| CA\_n5-n14 | E-UTRA Band 2, 4, 5, 10, 12, 13, 14, 17, 24, 25, 26, 29, 30, 48, 66, 70, 71, 85 | FDL\_low | - | FDL\_high | -50 | 1 |  |
|  | E-UTRA band 41, 53 | FDL\_low | - | FDL\_high | -50 | 1 | 2 |
| CA\_n5-n25 | E-UTRA Band 4, 5, 10, 12, 13, 14, 17, 24, 26, 28, 29, 30, 42, 48, 50, 51, 53, 66, 70, 71,74, 85 | FDL\_low | - | FDL\_high | -50 | 1 |  |
|  | E-UTRA Band 41, 43, n77 | FDL\_low | - | FDL\_high | -50 | 1 | 2 |
|  | E-UTRA Band 2, 25 | FDL\_low | - | FDL\_high | -50 | 1 | 4 |
| CA\_n5-n30 | E-UTRA Band 2, 4, 7, 12, 13, 14, 17, 24, 25, 26, 29, 38, 48, 66, 70, 71, 85  NR band n5, 30 | FDL\_low | - | FDL\_high | -50 | 1 |  |
|  | E-UTRA Band 41, 53  NR Band n77 | FDL\_low | - | FDL\_high | -50 | 1 | 2 |
| CA\_n5An48 | E-UTRA Band 2, 4, 5, 12, 13, 14, 17, 24, 25, 26, 29, 30, 65, 66, 70, 71, 73 | FDL\_low | - | FDL\_high | -50 | 1 |  |
|  | E-UTRA Band 41 | FDL\_low | - | FDL\_high | -50 | 1 | 2 |
|  | E-UTRA Band 11, 21 | FDL\_low | - | FDL\_high | -50 | 1 |  |
|  | Frequency range | 1884.5 | - | 1915.7 | -41 | 0.3 | 8 |
| CA\_n5-n66 | E-UTRA Band 1, 2, 3, 4, 5, 6, 7, 8, 12, 13, 14, 17, 24, 25, 28, 29, 30, 34, 38, 40, 43, 45, 50, 51, 65, 66, 70, 71, 85 | FDL\_low | - | FDL\_high | -50 | 1 |  |
|  | E-UTRA Band 26 | 859 | - | 869 | -27 | 1 |  |
|  | E-UTRA Band 41, 42, 48, 52 | FDL\_low | - | FDL\_high | -50 | 1 | 2 |
|  | NR Band n77, n78 | FDL\_low | - | FDL\_high | -50 | 1 | 2 |
|  | Frequency range | 1884.5 | - | 1915.7 | -41 | 0.3 | 3 |
| CA\_n5-n77 | E-UTRA Band 1, 2, 3, 4, 8, 11, 12, 13, 14, 17, 18, 19, 21, 25, 26, 28, 29, 30, 34, 40, 65, 66, 70, 71, 74 | FDL\_low | - | FDL\_high | -50 | 1 |  |
|  | E-UTRA Band 41 | FDL\_low | - | FDL\_high | -50 | 1 | 2 |
|  | Frequency range | 1884.5 | - | 1915.7 | -41 | 0.3 | 3 |
| CA\_n5-n78 | E-UTRA Band 1, 2, 3, 4, 5, 7, 8, 11, 12, 13, 14, 17, 18, 19, 21, 24, 25, 26, 28, 29, 30, 31, 34, 38, 40, 45, 65, 66, 70, 74 | FDL\_low | - | FDL\_high | -50 | 1 |  |
|  | Frequency range | 945 | - | 960 | -50 | 1 |  |
|  | Frequency range | 1884.5 | - | 1915.7 | -41 | 0.3 | 3 |
|  | Frequency range | 2545 | - | 2575 | -50 | 1 | 2 |
|  | Frequency range | 2595 | - | 2645 | -50 | 1 |  |
|  | E-UTRA Band 41 | FDL\_low | - | FDL\_high | -50 | 1 | 7, 2 |
| CA\_n5-n79 | E-UTRA Band 1, 2, 3, 4, 5, 7, 8, 11, 12, 13, 14, 17, 18, 19, 21, 24, 25, 26, 28, 29, 30, 31, 34, 38, 40, 42, 43, 45, 48, 50, 51, 65, 66, 70, 71, 73, 74, 85 | FDL\_low | - | FDL\_high |  |  |  |
|  | E-UTRA Band 41, 52 | FDL\_low | - | FDL\_high | -50 | 1 | 2 |
|  | Frequency range | 1884.5 | - | 1915.7 | -41 | 0.3 | 3 |
| CA\_n7-n25 | E-UTRA Band 4, 5, 7, 12, 13, 14 17, 26, 27, 28, 29, 30, 42, 66, 85 | FDL\_low | - | FDL\_high | -50 | 1 |  |
|  | NR Band n78 | FDL\_low | - | FDL\_high | -50 | 1 | 2 |
|  | E-UTRA Band 43 | FDL\_low | - | FDL\_high | -50 | 1 | 2 |
|  | E-UTRA Band 2, 25 | FDL\_low | - | FDL\_high | -50 | 1 | 4 |
|  | Frequency range | 2570 | - | 2575 | 1.6 | 5 | 4, 7, 18 |
|  | Frequency range | 2575 | - | 2595 | -15.5 | 5 | 4, 7, 18 |
|  | Frequency range | 2595 | - | 2620 | -40 | 1 | 4, 18 |
| CA\_n7-n28 | E-UTRA Band 2, 3, 5, 7, 8, 20, 26, 27, 31, 34, 40 72 | FDL\_low | - | FDL\_high | -50 | 1 |  |
|  | E-UTRA Band 1, 4, 42, 43, 50, 51, 65, 66, 74, 75, 76  NR band n78 | FDL\_low | - | FDL\_high | -50 | 1 | 2 |
|  | E-UTRA Band n1 | FDL\_low | - | FDL\_high | -50 | 1 | 11, 12 |
|  | Frequency range | 758 | - | 773 | -32 | 1 | 4 |
|  | Frequency range | 773 | - | 803 | -50 | 1 |  |
|  | Frequency range | 2570 | - | 2575 | +1.6 | 5 | 4, 7, 18 |
|  | Frequency range | 2575 | - | 2595 | -15.5 | 5 | 4, 7, 18 |
|  | Frequency range | 2595 | - | 2620 | -40 | 1 | 4, 18 |
| CA\_n7-n66 | E-UTRA Band 2, 4, 5, 7, 12, 13, 14, 17, 26, 27, 28, 29, 30, 43, 66, 71, 85 | FDL\_low | - | FDL\_high | -50 | 1 |  |
|  | E-UTRA Band 42 | FDL\_low | - | FDL\_high | -50 | 1 | 2 |
|  | Frequency range | 2570 | - | 2575 | +1.6 | 5 | 4, 7, 18 |
|  | Frequency range | 2575 | - | 2595 | -15.5 | 5 | 4, 7, 18 |
|  | Frequency range | 2595 | - | 2620 | -40 | 1 | 4, 18 |
| CA\_n7-n77 | E-UTRA Band 1, 2, 3, 4, 5, 7, 8, 11, 18, 19, 20, 21, 26, 27, 28, 31, 32, 33, 34, 40, 50, 51, 65, 66, 67, 68, 72, 74, 75, 76 | FDL\_low | - | FDL\_high | -50 | 1 |  |
|  | Frequency range | 2570 | - | 2575 | +1.6 | 5 | 4, 6, 7 |
|  | Frequency range | 2575 | - | 2595 | -15.5 | 5 | 4, 6, 7 |
|  | Frequency range | 2595 | - | 2620 | -40 | 1 | 4, 6 |
| CA\_n7-n78 | E-UTRA Band 1, 2, 3, 4, 5, 7, 8, 11, 18, 19, 20, 21, 26, 27, 28, 31, 32, 33, 34, 40, 50, 51, 65, 66, 67, 68, 72, 74, 75, 76 | FDL\_low | - | FDL\_high | -50 | 1 |  |
|  | Frequency range | 2570 | - | 2575 | +1.6 | 5 | 4, 7, 18 |
|  | Frequency range | 2575 | - | 2595 | -15.5 | 5 | 4, 7, 18 |
|  | Frequency range | 2595 | - | 2620 | -40 | 1 | 4, 18 |
| CA\_n8-n34 | E-UTRA Band 1, 20, 28, 31, 32, 33, 38, 39, 40, 45, 50, 51, 65, 67, 69,72, 73, 74, 75, 76 | FDL\_low | - | FDL\_high | -50 | 1 |  |
|  | E-UTRA Band 3, 7, 22, 41, 42, 43, 52  NR Band n78, n79 | FDL\_low | - | FDL\_high | -50 | 1 | 2 |
|  | E-UTRA Band 8 | FDL\_low | - | FDL\_high | -50 | 1 | 4 |
|  | E-UTRA Band 11, 21 | FDL\_low | - | FDL\_high | -50 | 1 |  |
|  | Frequency range | 1884.5 | - | 1915.7 | -41 | 0.3 | 3 |
| CA\_n8-n39 | E-UTRA Band 1, 34, 40, 50, 51, 74 | FDL\_low | - | FDL\_high | -50 | 1 |  |
|  | E-UTRA Band 22, 41, 42  NR Band n77, n78, n79 | FDL\_low | - | FDL\_high | -50 | 1 | 2 |
|  | E-UTRA Band 8 | FDL\_low | - | FDL\_high | -50 | 1 | 4 |
| CA\_n8-n40 | E-UTRA Bands 1, 5, 11, 18, 19, 20, 21, 26, 28, 31, 32, 33, 34, 38, 39, 45, 50, 51, 65, 67, 68, 69, 72, 73, 74, 75, 76 | FDL\_low | - | FDL\_high | -50 | 1 |  |
|  | E-UTRA Bands 3, 7, 22, 41, 42, 43, 52  NR Bands n77, n78, n79 | FDL\_low | - | FDL\_high | -50 | 1 | 2 |
|  | E-UTRA Band 8 | FDL\_low | - | FDL\_high | -50 | 1 | 4 |
|  | Frequency range | 1884.5 | - | 1915.7 | -41 | 0.3 | 3 |
| CA\_n8-n41 | E-UTRA Band 1, 11, 12, 28, 34, 39, 45, 50, 51, 65, 73,74 | FDL\_low | - | FDL\_high | -50 | 1 |  |
|  | E-UTRA Band 40 | FDL\_low | - | FDL\_high | -40 | 1 |  |
|  | E-UTRA band 3, 42, 52  NR band n77, n78, n79 | FDL\_low | - | FDL\_high | -50 | 1 | 2 |
|  | Frequency range | 1884.5 | - | 1915.7 | -41 | 0.3 | 3 |
| CA\_n8-n78 | E-UTRA Band 1, 8, 11, 20, 21, 28, 34, 39, 40, 65, 74 | FDL\_low | - | FDL\_high | -50 | 1 |  |
|  | E-UTRA Band 3, 7, 41 | FDL\_low | - | FDL\_high | -50 | 1 | 2 |
|  | Frequency range | 1884.5 | - | 1915.7 | -41 | 0.3 | 3 |
| CA\_n8-n79 | E-UTRA Band 1, 8, 11, 21, 28, 34, 39, 40, 65, 74 | FDL\_low | - | FDL\_high | -50 | 1 |  |
|  | E-UTRA Band 3, 41, 42 | FDL\_low | - | FDL\_high | -50 | 1 | 2 |
|  | Frequency range | 1884.5 | - | 1915.7 | -41 | 0.3 | 3 |
| CA\_n12-n30 | E-UTRA Band 2, 5, 13, 14, 17, 24, 25, 26, 27, 30, 41, 53, 71 | FDL\_low | - | FDL\_high | -50 | 1 |  |
|  | E-UTRA Band 4, 48, 66, 70,  NR Band n77 | FDL\_low | - | FDL\_high | -50 | 1 | 2 |
|  | E-UTRA Band 12, 85 | FDL\_low | - | FDL\_high | -50 | 1 | 4 |
| CA\_n12-n66 | E-UTRA Band 2, 5, 13, 14, 17, 25, 26, 27, 30, 41, 53, 71, 74 | FDL\_low | - | FDL\_high | -50 | 1 |  |
|  | E-UTRA Band 4, 48, 50, 51, 66, 70  NR Band n77 | FDL\_low | - | FDL\_high | -50 | 1 | 2 |
|  | E-UTRA Band 12, 85 | FDL\_low | - | FDL\_high | -50 | 1 | 4 |
| CA\_n12-n77 | E-UTRA Band 2, 5, 13, 14, 17, 24, 25, 26, 27, 30, 41, 53, 71, 74 | FDL\_low | - | FDL\_high | -50 | 1 |  |
|  | E-UTRA Band 4, 50, 51, 66, 70, | FDL\_low | - | FDL\_high | -50 | 1 | 2 |
|  | E-UTRA Band 12, 85 | FDL\_low | - | FDL\_high | -50 | 1 | 4 |
| CA\_n13-n25 | E-UTRA Band 4, 5,12,13,17, 26, 29, 41, 48, 66, 70, 71 | FDL\_low | - | FDL\_high | -50 | 1 |  |
|  | E-UTRA Band 2,14, 25 | FDL\_low | - | FDL\_high | -50 | 1 | 4 |
|  | E-UTRA Band 30 | FDL\_low | - | FDL\_high | -50 | 1 | 2 |
|  | Frequency range | 769 | - | 775 | -35 | 0.00625 | 4 |
|  | Frequency range | 799 | - | 805 | -35 | 0.00625 | 4 |
| CA\_n13-n66 | Bands 2, 4, 5, 7, 12, 13, 17, 25, 26, 27, 29, 41, 53, 66, 70, 71, 85 | FDL\_low | - | FDL\_high | -50 | 1 |  |
|  | E-UTRA Band 14 | FDL\_low | - | FDL\_high | -50 | 1 | 4 |
|  | E-UTRA Band 24, 30, 46, 48, | FDL\_low | - | FDL\_high | -50 | 1 | 2 |
|  | NR Band n77 | 769 | - | 775 | -35 | 0.00625 | 4 |
|  | Frequency range | 799 | - | 805 | -35 | 0.00625 | 4 |
| CA\_n13-n77 | E-UTRA Band 2, 5, 7, 12, 13, 25, 26, 41, 66 | FDL\_low | - | FDL\_high | -50 | 1 |  |
|  | Frequency range | 769 | - | 775 | -35 | 0.00625 | 4 |
|  | Frequency range | 799 | - | 805 | -35 | 0.00625 | 4 |
| CA\_n14-n30 | E-UTRA Band 2, 4, 5,12, 13, 14, 17, 24, 25, 26, 27, 29, 30, 41, 48, 53, 66, 70, 71, 85 | FDL\_low | - | FDL\_high | -50 | 1 |  |
|  | NR Band n77 | FDL\_low | - | FDL\_high | -50 | 1 | 2 |
|  | Frequency range | 769 | - | 775 | -35 | 0.00625 | 4 |
|  | Frequency range | 799 | - | 805 | -35 | 0.00625 | 4 |
| CA\_n14-n66 | E-UTRA Band 2, 4, 5, 10, 12, 13, 14, 17, 24, 25, 26, 27, 29, 30, 41, 53, 66, 70, 71, 85 | FDL\_low | - | FDL\_high | -50 | 1 |  |
|  | E-UTRA band 48 | FDL\_low | - | FDL\_high | -50 | 1 | 2 |
|  | Frequency range | 769 | - | 775 | -35 | 0.00625 | 4 |
|  | Frequency range | 799 | - | 805 | -35 | 0.00625 | 4 |
| CA\_n14-n77 | E-UTRA Band 2, 4, 5, 12, 13, 14, 17, 23, 24, 25, 26, 27, 29, 30, 41, 53, 66, 70, 71, 85 | FDL\_low | - | FDL\_high | -50 | 1 |  |
|  | Frequency range | 769 | - | 775 | -35 | 0.00625 | 4, 20 |
|  | Frequency range | 799 | - | 805 | -35 | 0.00625 | 4, 20 |
| CA\_n18-n28 | E-UTRA Band 11, 21 | FDL\_low | - | FDL\_high | -50 | 1 | 11, 12 |
|  | E-UTRA Band 1 | FDL\_low | - | FDL\_high | -50 | 1 | 2,11, 15 |
|  | E-UTRA Band 42, 65  NR Band n77, n78 | FDL\_low | - | FDL\_high | -50 | 1 | 2 |
|  | E-UTRA Band 3, 34  NR Band n79 | FDL\_low | - | FDL\_high | -50 | 1 |  |
|  | Frequency range | 470 | - | 694 | -42 | 8 | 4, 14 |
|  | Frequency range | 470 | - | 710 | -26.2 | 6 | 13 |
|  | Frequency range | 662 | - | 694 | -26.2 | 6 | 4 |
|  | Frequency range | 758 | - | 799 | -50 | 1 |  |
|  | Frequency range | 799 | - | 803 | -40 | 1 | 4 |
|  | Frequency range | 860 | - | 890 | -40 | 1 |  |
|  | Frequency range | 945 | - | 960 | -50 | 1 | 4 |
|  | Frequency range | 1884.5 | - | 1915.7 | -41 | 0.3 | 3 |
|  | Frequency range | 2545 | - | 2575 | -50 | 1 |  |
|  | Frequency range | 2595 | - | 2645 | -50 | 1 |  |
| CA\_n18-n41 | E-UTRA Band 1, 3, 34, 42, 65 | FDL\_low | - | FDL\_high | -50 | 1 |  |
|  | E-UTRA Band 2, 25 | FDL\_low | - | FDL\_high | -50 | 1 | 4 |
|  | E-UTRA Band 11, 21 | FDL\_low | - | FDL\_high | -50 | 1 |  |
|  | E-UTRA Band 40 | FDL\_low | - | FDL\_high | -40 | 1 |  |
|  | NR Band n77, n78, n79 | FDL\_low | - | FDL\_high | -50 | 1 | 2 |
|  | Frequency range | 758 | - | 799 | -50 | 1 |  |
|  | Frequency range | 799 | - | 803 | -40 | 1 |  |
|  | Frequency range | 860 | - | 890 | -40 | 1 |  |
|  | Frequency range | 945 | - | 960 | -50 | 1 |  |
|  | Frequency range | 1884.5 | - | 1915.7 | -41 | 0.3 | 3 |
| CA\_n18-n74 | E-UTRA Band 1, 3, 34, 42, 65 | FDL\_low | - | FDL\_high | -50 | 1 |  |
|  | NR Band n77, n78, n79 | FDL\_low | - | FDL\_high | -50 | 1 | 2 |
| Frequency range | 758 | - | 799 | -50 | 1 |  |
| Frequency range | 799 | - | 803 | -40 | 1 |  |
| Frequency range | 860 | - | 890 | -40 | 1 |  |
| Frequency range | 945 | - | 960 | -50 | 1 |  |
| Frequency range | 1400 | - | 1427 | -32 | 27 | 4, 20 |
| Frequency range | 1475 | - | 1488 | -28 | 1 | 4, 21 |
| Frequency range | 1475 | - | 1488 | -50 | 1 | 4, 22 |
| Frequency range | 1488 | - | 1510.9 | -35 | 1 | 4, 23 |
| Frequency range | 1488 | - | 1518 | -50 | 1 | 4 |
| Frequency range | 1884.5 | - | 1915.7 | -41 | 0.3 | 3 |
| Frequency range | 2545 | - | 2575 | -50 | 1 |  |
| Frequency range | 2595 | - | 2645 | -50 | 1 |  |
| CA\_n18-n77 | E-UTRA Band 1, 3, 11, 21, 34, 65, 74 | FDL\_low | - | FDL\_high | -50 | 1 |  |
|  | Frequency range | 758 | - | 799 | -50 | 1 |  |
|  | Frequency range | 799 | - | 803 | -40 | 1 |  |
|  | Frequency range | 860 | - | 890 | -40 | 1 |  |
|  | Frequency range | 945 | - | 960 | -50 | 1 |  |
|  | Frequency range | 1884.5 | - | 1915.7 | -41 | 0.3 | 3 |
|  | Frequency range | 2545 | - | 2575 | -50 | 1 |  |
|  | Frequency range | 2595 | - | 2645 | -50 | 1 |  |
| CA\_n18-n78 | E-UTRA Band 1, 3, 11, 21, 34, 65, | FDL\_low | - | FDL\_high | -50 | 1 |  |
|  | Frequency range | 758 | - | 799 | -50 | 1 |  |
|  | Frequency range | 799 | - | 803 | -40 | 1 |  |
|  | Frequency range | 860 | - | 890 | -40 | 1 |  |
|  | Frequency range | 945 | - | 960 | -50 | 1 |  |
|  | Frequency range | 1884.5 | - | 1915.7 | -41 | 0.3 | 3 |
|  | Frequency range | 2545 | - | 2575 | -50 | 1 |  |
|  | Frequency range | 2595 | - | 2645 | -50 | 1 |  |
| CA\_n20-n28 | E-UTRA Band 3, 7, 28, 31, 34 | FDL\_low | - | FDL\_high | -50 | 1 |  |
|  | E-UTRA Band 1, 22, 32, 38, 42, 43, 65, 75, 76  NR Band n78 | FDL\_low | - | FDL\_high | -50 | 1 | 2 |
| CA\_n20-n78 | E-UTRA Band 1, 3, 7, 8, 34, 40, 65 | FDL\_low | - | FDL\_high | -50 | 1 |  |
|  | E-UTRA Band 20 | FDL\_low | - | FDL\_high | -50 | 1 | 4 |
|  | E-UTRA Band 38, 69 | FDL\_low | - | FDL\_high | -50 | 1 | 2 |
| CA\_n24-n41 | E-UTRA Band 2, 4, 5, 10, 12, 13, 14, 17, 25, 26, 29, 30, 48, 66, 70, 71, 85 | FDL\_low | - | FDL\_high | -50 | 1 |  |
|  | NR Band n77 | FDL\_low | - | FDL\_high | -50 | 1 | 2 |
| CA\_n24-n48 | E-UTRA Band 2, 4, 5, 10, 12, 13, 14, 17, 25, 26, 29, 30, 41, 66, 70, 71, 85 | FDL\_low | - | FDL\_high | -50 | 1 |  |
| CA\_n24-n77 | E-UTRA Band 2, 4, 5, 10, 12, 13, 14, 17, 25, 26, 29, 30, 41, 66, 70, 71, 85 | FDL\_low | - | FDL\_high | -50 | 1 |  |
| CA\_n25-n41 | E-UTRA Band 4, 5, 12, 13 , 14, 17, 24, 26, 27, 28, 29, 30, 42, 48, 66, 70, 71,85 | FDL\_low | - | FDL\_high | -50 | 1 |  |
|  | E-UTRA Band 2, 25 | FDL\_low | - | FDL\_high | -50 | 1 | 4 |
|  | NR Band n77 | FDL\_low | - | FDL\_high | -50 | 1 | 2 |
| CA\_n25-n48 | E-UTRA Band 2, 4, 5, 10, 12, 13, 14, 17, 24, 25, 26, 29, 30, , 50, 51, 53, 66, 70, 71, 85 | FDL\_low | - | FDL\_high | -50 | 1 |  |
|  | E-UTRA Band 41, NR band n79 | FDL\_low | - | FDL\_high | -50 | 1 | 2 |
| CA\_n25-n66 | E-UTRA Band 4, 5, 7, 12, 13, 14, 17, 24, 26, 27, 28, 29, 30, 38, 41, 50, 51, 53, 66, 70, 71, 74, 85 | FDL\_low | - | FDL\_high | -50 | 1 |  |
|  | E-UTRA Band 42, 43, 48,  NR Band n77 | FDL\_low | - | FDL\_high | -50 | 1 | 2 |
|  | E-UTRA Band 2, 25 | FDL\_low | - | FDL\_high | -50 | 1 | 4 |
| CA\_n25-n71 | E-UTRA Band 4, 5, 12, 13, 14, 17, 24, 26, 30, 48, 53, 66, 85 | FDL\_low | - | FDL\_high | -50 | 1 |  |
|  | E-UTRA Band 41, 70 | FDL\_low | - | FDL\_high | -50 | 1 | 2 |
|  | NR Band n71 | FDL\_low | - | FDL\_high | -50 | 1 | 4 |
|  | E-UTRA Band 29 | FDL\_low | - | FDL\_high | -38 | 1 | 4 |
| CA\_n25-n77 | E-UTRA Band 4, 5, 12, 13, 14, 17, 26, 29, 30, 41, 65, 66, 70, 71 | FDL\_low | - | FDL\_high | -50 | 1 |  |
|  | E-UTRA Band 2, 25 | FDL\_low | - | FDL\_high | -50 | 1 | 2 |
| CA\_n25-n78 | E-UTRA Band 5, 7, 12, 13, 25, 26, 28, 41，66 | FDL\_low | - | FDL\_high | -50 | 1 |  |
|  | E-UTRA Band 2, 25 | FDL\_low | - | FDL\_high | -50 | 1 | 4 |
| CA\_n26-n66 | E-UTRA Band 2, 4, 5, 10, 12, 13, 14, 17, 24, 25, 26, 29, 30, 43, 47, 50, 51, 66, 70, 71, 74, 85 | FDL\_low | - | FDL\_high | -50 | 1 |  |
|  | E-UTRA Band 41, 42, 48, 53  NR band 77 | FDL\_low | - | FDL\_high | -50 | 1 | 2 |
|  | Frequency range | 1884.5 | - | 1915.7 | -41 | 0.3 | 3 |
| CA\_n26-n70 | E-UTRA Band 2, 5, 10, 12, 13, 14, 17, 24, 25, 29, 30, 48, 66, 70, 71, 85 | FDL\_low | - | FDL\_high | -50 | 1 |  |
|  | E-UTRA Band 41, 53 | FDL\_low | - | FDL\_high | -50 | 1 | 2 |
|  | Frequency range | 1884.5 | - | 1915.7 | -41 | 0.3 | 3 |
| CA\_n28-n40 | E-UTRA Band 1, 3, 5, 7, 8, 18, 19, 20, 26, 27, 28, 31, 34, 38, 41, 72 | FDL\_low | - | FDL\_high | -50 | 1 |  |
|  | E-UTRA Band 11, 21, 22, 32, 42, 43, 50, 51, 52, 65, 73, 74, 75, 76  NR band n77, n78, n79 | FDL\_low | - | FDL\_high | -50 | 1 | 2 |
|  | Frequency range | 1884.5 | - | 1915.7 | -41 | 0.3 | 3 |
| CA\_n28-n41 | E-UTRA Band 2, 3, 5, 8, 25, 26, 27, 34 | FDL\_low | - | FDL\_high | -50 | 1 |  |
|  | E-UTRA Band 4, 42, 50, 51, 52, 65, 66, 73, 74  NR Band n77, n78, n79 | FDL\_low | - | FDL\_high | -50 | 1 | 2 |
|  | E-UTRA Band 18, 19 | FDL\_low | - | FDL\_high | -50 | 1 | 11 |
|  | E-UTRA Band 1 | FDL\_low | - | FDL\_high | -50 | 1 | 11, 15 |
|  | E-UTRA Band 11, 21 | FDL\_low | - | FDL\_high | -50 | 1 | 11, 12 |
|  | E-UTRA Band 40 | FDL\_low | - | FDL\_high | -40 | 1 |  |
|  | Frequency range | 470 | - | 694 | -42 | 8 | 4, 14 |
|  | Frequency range | 470 | - | 710 | -26.2 | 6 | 13 |
|  | Frequency range | 662 | - | 694 | -26.2 | 6 | 4 |
|  | Frequency range | 758 | - | 773 | -32 | 1 | 4 |
|  | Frequency range | 773 | - | 803 | -50 | 1 |  |
|  | Frequency range | 1884.5 | - | 1915.7 | -41 | 0.3 | 3, 11 |
| CA\_n28-n46 | E-UTRA Band 4, 22, 32, 42, 43, 50, 51, 65, 66, 73, 74, 75, 76  NR Band n77, n78 | FDL\_low | - | FDL\_high | -50 | 1 | 2 |
|  | E-UTRA Band 1 | FDL\_low | - | FDL\_high | -50 | 1 | 19, 25 |
|  | E-UTRA Band 2, 3, 5, 7, 8, 18, 19, 20, 25, 26, 27, 31, 34, 38, 40, 41, 52, 72, 87, 88  NR Band n79 | FDL\_low | - | FDL\_high | -50 | 1 |  |
|  | E-UTRA Band 11, 21 | FDL\_low | - | FDL\_high | -50 | 1 | 19, 24 |
|  | Frequency range | 470 | - | 694 | -42 | 8 | 15, 35 |
|  | Frequency range | 470 | - | 710 | -26.2 | 6 | 34 |
|  | Frequency range | 662 | - | 694 | -26.2 | 6 | 15 |
|  | Frequency range | 758 | - | 773 | -32 | 1 | 15 |
|  | Frequency range | 773 | - | 803 | -50 | 1 |  |
|  | Frequency range | 1884.5 | - | 1915.7 | -41 | 0.3 | 8, 19 |
| CA\_n28-n50 | E-UTRA Band 2, 3, 5, 7, 8, 18, 19, 25, 26, 27, 31, 34, 38, 39, 40, 41, 72 | FDL\_low | - | FDL\_high | -50 | 1 |  |
|  | E-UTRA Band 4, 22, 42, 43, 48, 52, 65, 66, 73  NR Band n77, n78, n79 | FDL\_low | - | FDL\_high | -50 | 1 | 2 |
|  | E-UTRA Band 1 | FDL\_low | - | FDL\_high | -50 | 1 | 2, 10, 11 |
|  | Frequency range | 470 | - | 694 | -42 | 8 | 4, 14 |
|  | Frequency range | 470 | - | 710 | -26.2 | 6 | 13 |
|  | Frequency range | 662 | - | 694 | -26.2 | 6 | 4 |
|  | Frequency range | 758 | - | 773 | -32 | 1 | 4 |
|  | Frequency range | 773 | - | 803 | -50 | 1 |  |
|  | Frequency range | 1884.5 | - | 1915.7 | -41 | 0.3 | 3, 11 |
| CA\_n28-n77 | E-UTRA Band 3, 5, 7, 8, 18, 19, 20, 26, 34, 39, 40, 41 | FDL\_low | - | FDL\_high | -50 | 1 |  |
|  | E-UTRA Band 65, 74 | FDL\_low | - | FDL\_high | -50 | 1 |  |
|  | E-UTRA Band 1 | FDL\_low | - | FDL\_high | -50 | 1 | 11, 15 |
|  | E-UTRA Band 11, 21 | FDL\_low | - | FDL\_high | -50 | 1 | 11, 12 |
|  | Frequency range | 758 | - | 773 | -32 | 1 |  |
|  | Frequency range | 773 | - | 803 | -50 | 1 |  |
|  | Frequency range | 1884.5 | - | 1915.7 | -41 | 0.3 | 3, 11 |
| CA\_n28-n74 | E-UTRA Band 2, 3, 5, 7, 8, 18, 19, 20, 26, 31, 34, 38, 39, 40, 41 | FDL\_low | - | FDL\_high | -50 | 1 |  |
|  | E-UTRA Band 1 | FDL\_low | - | FDL\_high | -50 | 1 | 2, 11, 15 |
| E-UTRA Band 4, 42, 43, 52, 65, 66  NR Band n77, n78, n79 | FDL\_low | - | FDL\_high | -50 | 1 | 2 |
| Frequency range | 470 | - | 694 | -42 | 8 | 4, 14 |
| Frequency range | 470 | - | 710 | -26.2 | 6 | 13 |
| Frequency range | 662 | - | 694 | -26.2 | 6 | 4 |
| Frequency range | 758 | - | 773 | -32 | 1 | 4 |
| Frequency range | 773 | - | 803 | -50 | 1 |  |
| Frequency range | 1884.5 | - | 1915.7 | -41 | 0.3 | 3, 11 |
| Frequency range | 1400 | - | 1427 | -32 | 27 | 4, 20, 2 |
| Frequency range | 1475 | - | 1488 | -28 | 1 | 4, 21, 2 |
| Frequency range | 1475 | - | 1488 | -50 | 1 | 4, 22 |
| Frequency range | 1488 | - | 1510.9 | -35 | 1 | 4, 23 |
| Frequency range | 1488 | - | 1518 | -50 | 1 | 4, 2 |
| CA\_n28-n78 | E-UTRA Band 3, 5, 7, 8, 18, 19, 20, 26, 34, 39, 40, 41 | FDL\_low | - | FDL\_high | -50 | 1 |  |
|  | E-UTRA Band 65 | FDL\_low | - | FDL\_high | -50 | 1 | 2 |
|  | E-UTRA Band 1 | FDL\_low | - | FDL\_high | -50 | 1 | 11, 15 |
|  | E-UTRA Band 11, 21 | FDL\_low | - | FDL\_high | -50 | 1 | 11, 12 |
|  | Frequency range | 758 | - | 773 | -32 | 1 |  |
|  | Frequency range | 773 | - | 803 | -50 | 1 |  |
|  | Frequency range | 1884.5 | - | 1915.7 | -41 | 0.3 | 3, 11 |
| CA\_n28-n79 | E-UTRA Band 3, 5, 8, 18, 19, 34, 39, 40, 41, | FDL\_low | - | FDL\_high | -50 | 1 |  |
|  | E-UTRA Band 1, 42, 65, 74 | FDL\_low | - | FDL\_high | -50 | 1 | 2 |
|  | E-UTRA Band 11, 21 | FDL\_low | - | FDL\_high | -50 | 1 | 10 |
|  | Frequency range | 470 | - | 694 | -42 | 8 | 4, 14 |
|  | Frequency range | 470 | - | 710 | -26.2 | 6 | 13 |
|  | Frequency range | 662 | - | 694 | -26.2 | 6 | 4 |
|  | Frequency range | 758 | - | 773 | -32 | 1 | 4 |
|  | Frequency range | 773 | - | 803 | -50 | 1 |  |
|  | Frequency range | 1884.5 | - | 1915.7 | -41 | 0.3 | 3, 10, 11 |
| CA\_n30-n66 | E-UTRA Band 2, 4, 5, 12, 13, 14, 17, 24, 25, 26, 27, 29, 38, 41, 70, 71  NR band n30, n66 | FDL\_low | - | FDL\_high | -50 | 1 |  |
|  | E-UTRA Band 48,  NR Band n77 | FDL\_low | - | FDL\_high | -50 | 1 | 2 |
| CA\_n30-n77 | E-UTRA Band 2, 4, 5, 7, 12, 13, 14, 17, 24, 25, 26, 27, 29, 30, 38, 41, 53, 66, 70, 71, 85 | FDL\_low | - | FDL\_high | -50 | 1 |  |
| CA\_n34-n40 | E-UTRA Band 1, 3, 7, 8, 20, 22, 26, 28, 31, 32, 33, 38, 39, 41, 42, 43, 44, 45, 50, 51, 65, 67, 69, 72, 73, 74, 75, 76  NR band n78 | FDL\_low | - | FDL\_high | -50 | 1 |  |
|  | NR band n79 | FDL\_low | - | FDL\_high | -50 | 1 | 2 |
|  | Frequency range | 1884.5 | - | 1915.7 | -41 | 0.3 | 8 |
| CA\_n34-n79 | E-UTRA Band 1, 3, 8, 11, 18, 19, 21, 28, 39, 40, 41, 42, 65, 74 | FDL\_low | - | FDL\_high | -50 | 1 |  |
|  | Frequency range | 1884.5 | - | 1915.7 | -41 | 0.3 | 8 |
| CA\_n38-n66 | E-UTRA Band 2, 4, 5, 12, 13, 14, 17, 25, 27, 28, 29, 30, 43, 50, 51, 66, 74, 85 | FDL\_low | - | FDL\_high | -50 | 1 |  |
|  | E-UTRA Band 42 | FDL\_low | - | FDL\_high | -50 | 1 | 2 |
|  | Frequency range | 2620 | - | 2645 | -15.5 | 5 | 5, 7, 19 |
|  | Frequency range | 2645 | - | 2690 | -40 | 1 | 5, 19, |
| CA\_n38-n78 | E-UTRA Band 1, 3, 5, 8, 20, 28, 34, 40, 65, | FDL\_low | - | FDL\_high | -50 | 1 |  |
|  | Frequency range | 2620 | - | 2645 | -15.5 | 5 | 15, 22, 26 |
|  | Frequency range | 2645 | - | 2690 | -40 | 1 | 15, 22 |
| CA\_n39-n40 | E-UTRA Band 1, 8, 22, 26, 28, 34, 41, 42, 44, 45, 50, 51, 52, 73, 74 | FDL\_low | - | FDL\_high | -50 | 1 |  |
|  | NR Band n77, n78, n79 | FDL\_low | - | FDL\_high | -50 | 1 | 2 |
|  | Frequency range | 1805 |  | 1855 | -40 | 1 | 8 |
|  | Frequency range | 1855 |  | 1880 | -15.5 | 5 | 4, 7, 8 |
| CA\_n39-n41 | E-UTRA Band 1, 8, 26, 28, 34, 42, 44, 45, 50, 51, 74 | FDL\_low | - | FDL\_high | -50 | 1 |  |
|  | E-UTRA Band 40 | FDL\_low | - | FDL\_high | -40 | 1 |  |
|  | NR Band n77, n78, n79 | FDL\_low | - | FDL\_high | -50 | 1 | 2 |
|  | Frequency range | 1805 | - | 1855 | -40 | 1 | 4 |
|  | Frequency range | 1855 | - | 1880 | -15.5 | 5 | 4, 7, 8 |
| CA\_n39-n79 | E-UTRA Band 1, 8, 28, 34, 40, 41, 44, 45 | FDL\_low | - | FDL\_high | -50 | 1 |  |
|  | NR Band n78 | FDL\_low | - | FDL\_high | -50 | 1 | 2 |
|  | Frequency range | 1805 | - | 1855 | -40 | 1 | 4, 8 |
|  | Frequency range | 1855 | - | 1880 | -15.5 | 5 | 4, 7, 8 |
| CA\_n40-n41 | E-UTRA Band 1, 3, 5, 8, 11, 18, 19, 21, 26, 27, 28, 34, 39, 42, 44, 45, 50, 51, 65, 73, 74,  NR Band n77, n78 | FDL\_low | - | FDL\_high | -50 | 1 |  |
|  | NR Band n79 | FDL\_low | - | FDL\_high | -50 | 1 | 2 |
|  | Frequency range | 1884.5 | - | 1915.7 | -41 | 0.3 | 3 |
| CA\_n40-n78 | UTRA Band 1, 3, 5, 7, 8, 11, 18, 19, 20, 21, 26, 27, 28, 31, 32, 33, 34, 38, 39, 41, 44, 45, 50, 51, 65, 67, 68, 69, 72, 73, 74, 75, 76 | FDL\_low | - | FDL\_high | -50 | 1 |  |
|  | NR Band n79 | FDL\_low | - | FDL\_high | -50 | 1 | 2 |
|  | Frequency range | 1884.5 | - | 1915.7 | -41 | 0.3 | 3 |
| CA\_n40-n79 | E-UTRA Band 1, 3, 5, 8, 11, 18, 19, 21, 26, 28, 34, 39, 41, 42, 65, 74,  NR band n78 | FDL\_low | - | FDL\_high | -50 | 1 |  |
|  | Frequency range | 1884.5 | - | 1915.7 | -41 | 0.3 | 3 |
| CA\_n41-n50 | E-UTRA Band 1, 2, 3, 4, 5, 8, 12, 13 , 14, 17, 20, 25, 26, 27, 28, 29, 30, 31, 34, 39, 42, 43, 44, 48, 52, 65, 66, 67, 68, 70, 71, 73, 85  NR Band n77, n78 | FDL\_low | - | FDL\_high | -50 | 1 |  |
|  | E-UTRA Band 40 | FDL\_low | - | FDL\_high | -40 | 1 |  |
|  | NR Band n79 | FDL\_low | - | FDL\_high | -50 | 1 | 2 |
| CA\_n41-n66 | E-UTRA Band 2, 4, 5, 12, 13, 14, 17, 24, 25, 26, 27, 28, 29, 30, 50, 51, 66, 70, 71, 74, 85 | FDL\_low | - | FDL\_high | -50 | 1 |  |
|  | E-UTRA Band 42, 48 | FDL\_low | - | FDL\_high | -50 | 1 | 2 |
| CA\_n41-n71 | E-UTRA Band 4, 5, 12, 13, 14, 17, 24, 26, 30, 48, 66, 85 | FDL\_low | - | FDL\_high | -50 | 1 |  |
|  | E-UTRA Band 2, 25, 70 | FDL\_low | - | FDL\_high | -50 | 1 | 2 |
|  | NR Band n71 | FDL\_low | - | FDL\_high | -50 | 1 | 4 |
|  | E-UTRA Band 29 | FDL\_low | - | FDL\_high | -38 | 1 | 4 |
| CA\_n41-n74 | E-UTRA Band 1, 2, 3, 4, 5, 8, 12, 13, 17, 18, 19, 26, 28, 29, 34, 39, 42, 48, 52, 65, 66, 85  NR Band n77, n78 | FDL\_low | - | FDL\_high | -50 | 1 |  |
|  | NR Band n79 | FDL\_low | - | FDL\_high | -50 | 1 | 2 |
| E-UTRA Band 40 | FDL\_low | - | FDL\_high | -40 | 1 |  |
| Frequency range | 1884.5 |  | 1915.7 | -41 | 0.3 | 3 |
| Frequency range | 1400 | - | 1427 | -32 | 27 | 4, 20 |
| Frequency range | 1475 | - | 1488 | -28 | 1 | 4, 21 |
| Frequency range | 1475 | - | 1488 | -50 | 1 | 4, 22 |
| Frequency range | 1488 | - | 1510.9 | -35 | 1 | 4, 23 |
| Frequency range | 1488 | - | 1518 | -50 | 1 | 4 |
| CA\_n41-n77 | E-UTRA Band 1, 2, 3, 4, 5, 8, 10, 11, 12, 13, 14, 17, 18, 19, 20, 21, 24, 25, 26, 27, 28, 29, 30, 34, 39, 44, 45, 50, 51, 53, 65, 66, 70, 71, 73, 74, 85 | FDL\_low | - | FDL\_high | -50 | 1 |  |
|  | E-UTRA Band 40 | FDL\_low | - | FDL\_high | -40 | 1 |  |
|  | Frequency range | 1884.5 |  | 1915.7 | -41 | 0.3 | 3 |
| CA\_n41-n78 | E-UTRA Band 1, 3, 5, 8, 11, 18, 19, 21, 26, 28, 34, 39, 65, 74 | FDL\_low | - | FDL\_high | -50 | 1 |  |
|  | E-UTRA Band 40 | FDL\_low | - | FDL\_high | -40 | 1 |  |
|  | Frequency range | 1884.5 |  | 1915.7 | -41 | 0.3 | 3 |
| CA\_n41-n79 | E-UTRA Band 1, 3, 5, 8, 11, 18, 19, 21, 28, 34, 42, 44, 45, 65 | FDL\_low | - | FDL\_high | -50 | 1 |  |
|  | E-UTRA Band 40 | FDL\_low | - | FDL\_high | -40 | 1 |  |
|  | Frequency range | 1884.5 | - | 1915.7 | -41 | 0.3 | 3 |
| CA\_n46-n78 | E-UTRA Band 1, 3, 5, 7, 8, 11, 18, 19, 20, 21, 26, 28, 34, 39, 40, 41, 65 | FDL\_low | - | FDL\_high | -50 | 1 |  |
|  | Frequency range | 1884.5 | - | 1915.7 | -41 | 0.3 | 8 |
| CA\_n48-n66 | E-UTRA Band 2, 4, 5, 7, 12, 13, 14, 17, 24, 25, 26, 27, 29, 30, 41, 50, 51, 66, 70, 71, 74, 85 | FDL\_low | - | FDL\_high | -50 | 1 |  |
| CA\_n48-n70 | E-UTRA Band 2, 4, 5, 12, 13, 14, 17, 24, 25, 26, 29, 30, 66, 70, 71, 85 | FDL\_low | - | FDL\_high | -50 | 1 |  |
|  | E-UTRA Band 41 | FDL\_low | - | FDL\_high | -50 | 1 | 2 |
| CA\_n48\_n71 | E-UTRA Band 4, 5, 12, 13, 14, 17, 24, 26, 30, 50, 51, 53, 66, 74, 85 | FDL\_low | - | FDL\_high | -50 | 1 |  |
|  | E-UTRA Band 2, 25, 41, 70 | FDL\_low | - | FDL\_high | -50 | 1 | 2 |
|  | E-UTRA Band 29 | FDL\_low | - | FDL\_high | -38 | 1 | 15 |
|  | E-UTRA Band 71 | FDL\_low | - | FDL\_high | -50 | 1 | 15 |
| CA\_n50-n78 | E-UTRA Band 1, 2, 3, 4, 5, 7, 8, 12, 13, 17, 20, 25, 26, 27, 28, 29, 31, 33, 34, 38, 39, 40, 41, 44, 65, 66, 67, 68, 69, 72, 73, 85 | FDL\_low | - | FDL\_high | -50 | 1 |  |
|  | NR Band n79 | FDL\_low | - | FDL\_high | -50 | 1 | 2 |
| CA\_n66-n71 | E-UTRA Band 4, 5, 12, 13, 14, 17, 26, 27, 30, 43, 50, 51, 53, 66, 74, 85 | FDL\_low | - | FDL\_high | -50 | 1 |  |
|  | E-UTRA Band 2, 25, 41, 42, 48, 70  NR Band n77 | FDL\_low | - | FDL\_high | -50 | 1 | 2 |
|  | E-UTRA Band 29 | FDL\_low | - | FDL\_high | -38 | 1 | 4 |
|  | E-UTRA Band 71 | FDL\_low | - | FDL\_high | -50 | 1 | 4 |
| CA\_n66-n77 | E-UTRA Band 2, 4, 5, 12, 13, 14, 17, 26, 29, 30, 41, 65, 66, 70, 71 | FDL\_low | - | FDL\_high | -50 | 1 |  |
| CA\_n66-n78 | E-UTRA Band 2, 4, 5, 7, 12, 13, 14, 17, 29, 26, 28, 41, 66, 71 | FDL\_low | - | FDL\_high | -50 | 1 |  |
| CA\_n70-n71 | E-UTRA Band 4, 5, 12, 13, 14, 17, 26, 27, 30, 48, 66, 74, 85 | FDL\_low | - | FDL\_high | -50 | 1 |  |
|  | E-UTRA Band 2, 7, 25, 41, 70,  NR Band n77 | FDL\_low | - | FDL\_high | -50 | 1 | 2 |
|  | E-UTRA Band 29 | FDL\_low | - | FDL\_high | -38 | 1 | 4 |
|  | E-UTRA Band 71 | FDL\_low | - | FDL\_high | -38 | 1 | 4 |
| CA\_n71-n77 | E-UTRA Band 1, 3, 4, 5, 7, 8, 10, 11, 12, 13, 14, 17, 18, 19, 20, 21, 24, 26, 27, 28, 29, 30, 34, 39, 40, 44, 45, 50, 51, 53, 65, 66, 71, 73, 74, 85, | FDL\_low | - | FDL\_high | -50 | 1 |  |
|  | Frequency range | 1884.5 |  | 1915.7 | -41 | 0.3 | 3 |
|  | E-UTRA Band 2, 25, 41, 70 | FDL\_low | - | FDL\_high | -50 | 1 | 2 |
|  | E-UTRA Band 29 | FDL\_low | - | FDL\_high | -38 | 1 | 4 |
|  | E-UTRA Band 71 | FDL\_low | - | FDL\_high | -50 | 1 | 4 |
| CA\_n71-n78 | E-UTRA Band 5, 26 | FDL\_low | - | FDL\_high | -50 | 1 |  |
|  | E-UTRA Band 41 | FDL\_low | - | FDL\_high | -50 | 1 | 2 |
| CA\_n74-n77 | E-UTRA Band 1, 2, 3, 4, 5, 7, 8, 12, 13, 17, 18, 19, 20, 26, 28, 29, 34, 39, 40, 41, 65, 66,85 | FDL\_low | - | FDL\_high | -50 | 1 |  |
|  | Frequency range | 1884.5 | - | 1915.7 | -41 | 0.3 | 3 |
| Frequency range | 1400 | - | 1427 | -32 | 27 | 4, 20 |
| Frequency range | 1475 | - | 1488 | -28 | 1 | 4, 21 |
| Frequency range | 1475 | - | 1488 | -50 | 1 | 4, 22 |
| Frequency range | 1488 | - | 1510.9 | -35 | 1 | 4, 23 |
| Frequency range | 1488 | - | 1518 | -50 | 1 | 4 |
| CA\_n74-n78 | E-UTRA Band 1, 3, 5, 7, 8, 18, 19, 20, 26, 28, 34, 39, 40, 41, 65, | FDL\_low | - | FDL\_high | -50 | 1 |  |
|  | Frequency range | 1884.5 | - | 1915.7 | -41 | 0.3 | 3 |
| Frequency range | 1400 | - | 1427 | -32 | 27 | 4, 20 |
| Frequency range | 1475 | - | 1488 | -28 | 1 | 4, 21 |
| Frequency range | 1475 | - | 1488 | -50 | 1 | 4, 22 |
| Frequency range | 1488 | - | 1510.9 | -35 | 1 | 4, 23 |
| Frequency range | 1488 | - | 1518 | -50 | 1 | 4 |
| CA\_n77-n79 | E-UTRA Band 1, 3, 5, 8, 11, 18, 19, 21, 28, 34, 40, 41, 65, 74 | FDL\_low | - | FDL\_high | -50 | 1 |  |
|  | Frequency range | 1884.5 | - | 1915.7 | -41 | 0.3 | 3 |
| CA\_n78-n79 | E-UTRA Band 1, 3, 5, 8, 11, 18, 19, 21, 28, 34, 40, 41, 65, 74 | FDL\_low | - | FDL\_high | -50 | 1 |  |
|  | Frequency range | 1884.5 | - | 1915.7 | -41 | 0.3 | 3 |
| CA\_n78-n92 | E-UTRA Band 1, 3, 7, 8, 34, 40, 65 | FDL\_low | - | FDL\_high | -50 | 1 |  |
|  | E-UTRA Band 20 | FDL\_low | - | FDL\_high | -50 | 1 | 4 |
|  | E-UTRA Band 38, 69 | FDL\_low | - | FDL\_high | -50 | 1 | 2 |

## ***<Next change>***

## 6.5E Output RF spectrum emissions for V2X

### 6.5E.1 Occupied bandwidth for V2X

#### 6.5E.1.1 General

When UE is configured for NR V2X sidelink transmissions non-concurrent with NR uplink transmissions for NR V2X operating bands specified in Table 5.2E.1-1, the requirements in clause 6.5.1 shall apply for NR V2X sidelink transmission.

For NR V2X UE with two transmit antenna connectors, the occupied bandwidth at each transmitter antenna shall be less than the channel bandwidth specified in Table 6.5.1-1. The requirements shall be met with SL MIMO configurations described in clause 6.2D.1.

If V2X UE transmits on one antenna connector at a time, the requirements specified for single carrier shall apply to the active antenna connector.

#### 6.5E.1.2 Occupied bandwidth for V2X con-current operation

For the inter-band con-current NR V2X operation, the requirements specified in clause 6.5.1 shall apply for the uplink in licensed band and the requirements specified in clause 6.5E.1.1 shall apply for the sidelink in licensed band or Band n47.

### 6.5E.2 Out of band emission for V2X

#### 6.5E.2.1 General

When UE is configured for NR V2X sidelink transmissions non-concurrent with NR uplink transmissions for NR V2X operating bands specified in Table 5.2E.1-1, the requirements in clause 6.5E.2.2.1, 6.5E.2.3 and 6.5E.2.4.1 apply for NR V2X sidelink transmission.

For NR V2X UE with two transmit antenna connectors, the requirements specified for single carrier shall apply to each transmit antenna connector. The requirements shall be met with SL MIMO configurations described in clause 6.2D.1.

#### 6.5E.2.2 Spectrum emission mask

##### 6.5E.2.2.1 General

For NR V2X UE, the existing NR general spectrum emission mask in subclause 6.5.2.2 applies for all supporting NR V2X channel bandwidths. The spectrum emission mask of the UE applies to frequencies (ΔfOOB) starting from the ± edge of the assigned NR channel bandwidth. For frequencies greater than (ΔfOOB), the power of any UE emission shall not exceed the levels specified in Table 6.5.2.2-1 for the specified channel bandwidth for NR V2X operating bands in Table 5.2E.1-1.

##### 6.5E.2.2.2 Spectrum emission mask for V2X con-current operation

For the inter-band con-current NR V2X operation, the general/additional SEM requirements specified in clause 6.5.2 shall apply for the uplink in licensed band and the general/additional SEM requirements specified in clause 6.5E.2.2.1 shall apply for the sidelink in licensed band or Band n47.

#### 6.5E.2.3 Additional Spectrum emission mask

##### 6.5E.2.3.1 Requirements for network signalling value "NS\_33"

The additional spectrum mask in Table 6.5E.2.3.1-1 applies for NR V2X UE within 5 855 MHz to 5 950 MHz according to ETSI EN 302 571. Additional spectrum emission requirements are signalled by the network to indicate that the UE shall meet an additional requirement for a specific deployment scenario as part of the cell handover/broadcast message.

When "NS\_33" is indicated in the cell or pre-configured radio parameters, the power of any V2X UE emission shall not exceed the levels specified in Table 6.5E.2.3.1-1.

Table 6.5E.2.3.1-1: Additional spectrum mask requirements for 10MHz channel bandwidth

|  |  |  |
| --- | --- | --- |
| Spectrum emission limit (dBm EIRP)/ Channel bandwidth | | |
| ΔfOOB  (MHz) | 10 MHz | Measurement bandwidth |
| ± 0-0.5 | [] | 100 kHz |
| ± 0.5-5 | [] | 100 kHz |
| ± 5-10 | [] | 100 kHz |

NOTE 1: As a general rule, the resolution bandwidth of the measuring equipment should be equal to the measurement bandwidth. However, to improve measurement accuracy, sensitivity and efficiency, the resolution bandwidth may be smaller than the measurement bandwidth. When the resolution bandwidth is smaller than the measurement bandwidth, the result should be integrated over the measurement bandwidth in order to obtain the equivalent noise bandwidth of the measurement bandwidth.

NOTE 2: Additional SEM for NR V2X overrides any other requirements in frequency range 5855-5950MHz.

NOTE 3: The EIRP requirement is converted to conducted requirement depend on the supported post antenna connector gain Gpost connector declared by the UE following the principle described in annex I in [11].

##### 6.5E.2.3.2 Requirements for network signalling value "NS\_52"

The additional spectrum mask in Table 6.5E.2.3.2-1 applies for NR V2X UE within 5 765 MHz to 6 005 MHz according to FCC regulation. Additional spectrum emission requirements are signalled by the network to indicate that the UE shall meet an additional requirement for a specific deployment scenario as part of the cell handover/broadcast message.

When "NS\_52" is indicated in the cell or pre-configured radio parameters, the power of any V2X UE emission shall not exceed the levels specified in Table 6.5E.2.3.2-1.

Table 6.5E.2.3.2-1: Additional spectrum mask requirements for 40MHz channel bandwidth (fc = 5885MHz)

|  |  |  |
| --- | --- | --- |
| ΔfOOB (MHz) | Emission Limit (dBm) | Measurement Bandwidth |
| ±0-2 | -32 | 100kHz |
| ±2-10 | -36 | 100kHz |
| ±10-20 | -38 | 100kHz |
| ±20-40 | -43 | 100kHz |
| ±40-100 | -50 | 100kHz |

NOTE: The ASE requirements for NS\_52 will not be verified until the corresponding regulation release a formal rule for C-V2X emission limits.

#### 6.5E.2.4 Adjacent channel leakage ratio

##### 6.5E.2.4.1 General

Adjacent Channel Leakage power Ratio (ACLR) is the ratio of the filtered mean power centred on the assigned channel frequency to the filtered mean power centred on an adjacent channel frequency.

For NR V2X UE, the existing ACLR requirement for NR uplink transmission in clause 6.5.2.4 are applied for NR V2X UE for NR V2X operating bands in 5.2E.1-1.

For NR V2X UE with two transmit antenna connectors, the requirements specified for single carrier shall apply to each transmit antenna connector. The requirements shall be met with SL MIMO configurations described in clause 6.2D.1.

If V2X UE transmits on one antenna connector at a time, the requirements specified for single carrier shall apply to the active antenna connector.

##### 6.5E.2.4.2 ACLR for V2X con-current operation

For the inter-band con-current NR V2X operation, the ACLR requirement specified in clause 6.5.2.4 shall apply for the uplink in licensed band and the ACLR requirement specified in clause 6.5E.2.4.1 shall apply for the sidelink in licensed band or Band n47.

### 6.5E.3 Spurious emissions for V2X

#### 6.5E.3.1 General spurious emissions

When UE is configured for NR V2X sidelink transmissions non-concurrent with NR uplink transmissions for NR V2X operating bands specified in Table 5.2E.1-1, the general spurious emission requirements in clause 6.5.3.1 shall apply for NR V2X sidelink transmission.

For NR V2X UE with two transmit antenna connectors, the requirements specified for single carrier shall apply to each transmit antenna connector. The requirements shall be met with the SL MIMO configurations described in clause 6.2D.1.

#### 6.5E.3.2 Spurious emissions for UE co-existence

When UE is configured for NR V2X sidelink transmissions non-concurrent with NR uplink transmissions for NR V2X operating bands specified in Table 5.2E.1-1, the requirements in clause 6.5.3.2 shall apply for NR V2X sidelink transmission.

For NR V2X UE with two transmit antenna connectors, the requirements specified for single carrier shall apply to each transmit antenna connector. The requirements shall be met with the SL MIMO configurations described in clause 6.2D.1.

#### 6.5E.3.3 Spurious emissions for UE co-existence for V2X con-current operation

For the inter-band con-current NR V2X operation, the UE-coexistence requirements in Table 6.5E.3.3.1-1 apply for the corresponding inter-band con-current operation with transmission assigned to both uplink in licensed band and sidelink in Band n47.

Table 6.5E.3.3.1-1: Requirements for inter-band con-current V2X operation

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| V2X | Spurious emission | | | | | | |
| con-current operating band configuration | Protected band | Frequency range (MHz) | | | Maximum Level (dBm) | MBW (MHz) | NOTE |
| V2X\_n39A-n47A | E-UTRA Band 1, 8, 22, 26, 28, 34, 40, 41, 42, 44, 45  NR Band n79 | FDL\_low | - | FDL\_high | -50 | 1 |  |
|  | NR Band n77, n78 | FDL\_low | - | FDL\_high | -50 | 1 | 1 |
|  | Frequency range | 5925 | - | 5950 | -30 | 1 | 3, 4 |
|  | Frequency range | 5815 | - | 5855 | -30 | 1 | 3 |
| V2X\_n40A-n47A | E-UTRA Band 1, 3, 5, 7, 8, 22, 26, 28, 34, 39, 42, 44, 45, 68, 72  NR Band n77, n78 | FDL\_low | - | FDL\_high | -50 | 1 |  |
|  | NR Band n79 | FDL\_low | - | FDL\_high | -50 | 1 | 1 |
|  | Frequency range | 5925 | - | 5950 | -30 | 1 | 3, 4 |
|  | Frequency range | 5815 | - | 5855 | -30 | 1 | 3 |
|  | E-UTRA Band 1, 3, 5, 8, 26, 28, 34, 39, 42, 44, 45, 65, 73  NR Band n77, n78 | FDL\_low | - | FDL\_high | -50 | 1 |  |
|  | NR Band n79 | FDL\_low | - | FDL\_high | -50 | 1 | 1 |
|  | Frequency range | 5925 | - | 5950 | -30 | 1 | 3, 4 |
|  | Frequency range | 5815 | - | 5855 | -30 | 1 | 3 |
| V2X\_n71A-n47A | E-UTRA Band 4, 5, 12, 13, 14, 17, 24, 26, 30, 48, 66, 85 | FDL\_low | - | FDL\_high | -50 | 1 |  |
|  | E-UTRA Band 2, 25, 41, 70 | FDL\_low | - | FDL\_high | -50 | 1 | 1 |
|  | E-UTRA Band 29 | FDL\_low | - | FDL\_high | -38 | 1 | 2 |
|  | NR Band n71 | FDL\_low | - | FDL\_high | -50 | 1 |  |
|  | Frequency range | 5925 | - | 5950 | -30 | 1 | 3, 4 |
|  | Frequency range | 5815 | - | 5855 | -30 | 1 | 3 |
| V2X\_n78A-n47A | E-UTRA Band 1, 3, 5, 7, 8, 26 28, 34, 39, 40, 41, 65 | FDL\_low | - | FDL\_high | -50 | 1 |  |
|  | Frequency range | 5925 | - | 5950 | -30 | 1 | 3, 4 |
|  | Frequency range | 5815 | - | 5855 | -30 | 1 | 3 |
| V2X\_n79A-n47A | E-UTRA Band 1, 3, 5, 8, 28, 34, 39, 40, 41, 42, 65 | FDL\_low | - | FDL\_high | -50 | 1 |  |
| NOTE 1: As exceptions, measurements with a level up to the applicable requirements defined in Table 6.6.3.1-2 are permitted for each assigned E-UTRA carrier used in the measurement due to 2nd, 3rd, 4th or 5th harmonic spurious emissions. In case the exceptions are allowed due to spreading of the harmonic emission the exception is also allowed for the first 1 MHz frequency range immediately outside the harmonic emission on both sides of the harmonic emission. This results in an overall exception interval centred at the harmonic emission of (2MHz + N x LCRB x 180kHz), where N is 2, 3 or 4 for the 2nd, 3rd or 4th harmonic respectively. The exception is allowed if the measurement bandwidth (MBW) totally or partially overlaps the overall exception interval.  NOTE 2: These requirements also apply for the frequency ranges that are less than FOOB (MHz) in Table 6.6.3.1-1 and Table 6.6.3.1A-1 from the edge of the aggregated channel bandwidth.  NOTE 3: Applicable when NS\_33 is configured by the pre-configured radio parameters for power class 3 V2X UE.  NOTE 4: In the frequency range x-5950MHz, SE requirement of -30dBm/MHz should be applied; where x = max (5925, fc + 15), where fc is the channel centre frequency. | | | | | | | |

#### 6.5E.3.4 Additional spurious emissions requirements for V2X

##### 6.5E.3.4.1 General

This clause specifies additional spurious emission requirements for V2X operation

##### 6.5E.3.4.2 Requirements for network signalling value "NS\_33"

Table 6.5E.3.4.2-1: Additional requirements for "NS\_33"

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Protected band | | Frequency range (MHz) | | | Maximum Level (EIRP2) | MBW (MHz) | NOTE |
| Frequency range | 5925 | | - | 5950 | -30 | 1 | 1 |
| Frequency range | 5815 | | - | 5855 | -30 | 1 | 3 |
| NOTE 1: In the frequency range x-5950MHz, SE requirement of -30dBm/MHz should be applied; where x = max (5925, fc + 15), where fc is the channel centre frequency.  NOTE 2: The EIRP requirement is converted to conducted requirement depend on the supported post antenna connector gain Gpost connector declared by the UE following the principle described in annex I in [11].  NOTE 3: Resolution BW is 10% of the measurement BW and the result should be integrated to achieve the measurement bandwidth. The sweep time shall be set larger than (symbol length)\*(number of points in sweep) to improve the measurement accuracy. | | | | | | | |

When "NS\_33" is configured from pre-configured radio parameters or the cell, and the indication from upper layers has indicated that the UE is within the protection zone of CEN DSRC devices or HDR DSRC devices, the power of any NR V2X UE emission shall fulfil either one of the two sets of conditions.

Table 6.5E.3.4.2-2: Requirements for spurious emissions to protect CEN DSRC for V2X UE

|  |  |  |
| --- | --- | --- |
|  | Maximum Transmission Power (dBm EIRP1) | Emission Limit in Frequency Range 5795-5815 (dBm/MHz EIRP1) |
| Condition 1 | 10 | -65 |
| Condition 2 | 10 | -45 |
| NOTE 1: The EIRP requirement is converted to conducted requirement depend on the supported post antenna connector gain Gpost connector declared by the UE following the principle described in annex I in [11]. | | |

##### 6.5E.3.4.3 Void

### 6.5E.4 Transmit intermodulation

#### 6.5E.4.1 General

When UE is configured for NR V2X sidelink transmissions non-concurrent with NR uplink transmissions for NR V2X operating bands specified in Table 5.2E.1-1, the requirements in clause 6.5.4 apply for NR V2X sidelink transmission.

For NR V2X UE with two transmit antenna connectors, the requirements specified for single carrier shall apply to each transmit antenna connector. The requirements shall be met with the SL MIMO configurations described in clause 6.2D.1.

#### 6.5E.4.2 Transmit intermodulation for V2X con-current operation

For the inter-band con-current NR V2X operation, the requirements specified in clause 6.5.4 shall apply for the uplink in licensed band and the requirements specified in clause 6.5E.4.1 shall apply for the sidelink in licensed band or Band n47.

## ***<Next change>***

## 7.3A Reference sensitivity for CA

### 7.3A.1 General

The reference sensitivity power level REFSENS is the minimum mean power applied to each one of the UE antenna ports for all UE categories, at which the throughput shall meet or exceed the requirements for the specified reference measurement channel.

### 7.3A.2 Reference sensitivity power level for CA

#### 7.3A.2.1 Reference sensitivity power level for Intra-band contiguous CA

For intra-band contiguous carrier aggregation, the throughput of each component carrier shall be ≥ 95 % of the maximum throughput of the reference measurement channels as specified in Annexes A.2.2.2, A.3.2, and A.3.3 (with one sided dynamic OCNG Pattern OP.1 FDD/TDD for the DL-signal as described in Annex A.5.1.1/A.5.2.1) with parameters specified in Table 7.3.2-1, Table 7.3.2-2, and Table 7.3.2-3.

For UE(s) supporting one uplink carrier, the uplink configuration of the PCC shall be in accordance with Table 7.3.2-3 and the downlink PCC carrier center frequency shall be configured closer to uplink operating band than any of the downlink SCC center frequency.

For aggregation of two or more downlink FDD carriers with two uplink carriers, the reference sensitivity is defined only for the specific uplink and downlink test points which are specified in Table 7.3A.2.1-1 and the reference sensitivity power level increased by ΔRIBC. The requirements apply with all downlink carriers active. Unless given by Table 7.3.2-4, the reference sensitivity requirements shall be verified with the network signaling value NS\_01 (Table 6.2.3.1-1) configured.

Table 7.3A.2.1-1: Intra-band contiguous CA uplink configuration for reference sensitivity

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| CA configuration | SCS  (PCC/SCC)  (kHz) | Aggregated channel bandwidth (PCC+SCC) | UL PCC allocation  (LCRB) | UL SCC allocation  (LCRB) | PCC ΔRIBC (dB) | SCC ΔRIBC (dB) | Duplex mode |
| CA\_n5B | 15/15 | 10MHz + 10MHz | 10 (RBstart = 0) | 10 (RBstart = 42) | 30.8 | 26.1 | FDD |
| CA\_n7B | 15/15 | 10MHz + 40MHz | 9 (RBstart = 26) | 36 (RBstart = 180) | 34 | 25 | FDD |
| NOTE 1: All combinations of channel bandwidths defined in Table 5.5A.1-1.  NOTE 2: The carrier centre frequency of SCC in the UL operating band is configured closer to the DL operating band.  NOTE 3: The transmitted power over both PCC and SCC shall be set to PUMAX as defined in subclause 6.2A.4.  NOTE 4: The PCC allocation is same as Transmission bandwidth configuration NRB as defined in Table 5.3.2-1. | | | | | | | |

#### 7.3A.2.3 Reference sensitivity power level for Inter-band CA

For inter-band carrier aggregation with one component carrier per operating band and the uplink assigned to one NR band the throughput shall be ≥ 95 % of the maximum throughput of the reference measurement channels as specified in Annexes A.2.2.2, A.3.2, and A.3.3 (with one sided dynamic OCNG Pattern OP.1 FDD/TDD for the DL-signal as described in Annex A.5.1.1/A.5.2.1 with parameters specified in Table 7.3.2-1, Table 7.3.2-2 and Table 7.3.2-3 modified in accordance with clause 7.3A.3.2. The reference sensitivity is defined to be met with all downlink component carriers active and one of the uplink carriers active. Exceptions to reference sensitivity are allowed in accordance with clause 7.3A.4.

For the combination of intra-band and inter-band carrier aggregation, the intra-band CA relaxation, ΔRIBC and ΔRIBNC, are also applied according to the clause 7.3A.2.1 and 7.3A.2.2.

## ***<Next change>***

Table 7.3A.5-2: 3DL/2UL interband Reference sensitivity QPSK PREFSENS and uplink/downlink configurations

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Band / Channel bandwidth / NRB / Duplex mode | | | | | | | | Source of IMD |
| NR CA band combination | NR band | UL Fc  (MHz) | UL/DL BW  (MHz) | UL  CLRB | DL Fc (MHz) | MSD  (dB) | Duplex mode |  |
| CA\_n1-n3-n28 | n1 | 1975 | 5 | 25 | 2165 | N/A | FDD | N/A |
|  | n28 | 710.5 | 5 | 25 | 765.5 | N/A | FDD | N/A |
|  | n3 | 1723.5 | 5 | 25 | 1818.5 | 4.0 | FDD | IMD5 |
|  | n3 | 1780 | 5 | 25 | 1875 | N/A | FDD | N/A |
|  | n28 | 710.5 | 5 | 25 | 765.5 | N/A | FDD | N/A |
|  | n1 | 1949 | 5 | 25 | 2139 | 11.0 | FDD | IMD4 |
| CA\_n1-n3-n41 | n1 | 1977.5 | 5 | 25 | 2167.5 | N/A | FDD | N/A |
|  | n3 | 1712.5 | 5 | 25 | 1807.5 | N/A | FDD | N/A |
|  | n41 | 2507.5 | 10 | 25 | 2507.5 | 5.0 | TDD | IMD5 |
| CA\_n1-n3-n77 | n1 | 1950 | 5 | 25 | 2140 | N/A | FDD | N/A |
|  | n3 | 1750 | 5 | 25 | 1845 | N/A | FDD | N/A |
|  | n77 | 3700 | 10 | 50 | 3700 | 28.4 | TDD | IMD22 |
|  | n1 | 1950 | 5 | 25 | 2140 | N/A | FDD | N/A |
|  | n3 | 1712.5 | 5 | 25 | 1807.5 | 31.5 | FDD | IMD21,2 |
|  | n77 | 3757.5 | 10 | 50 | 3757.5 | N/A | TDD | N/A |
|  | n1 | 1950 | 5 | 25 | 2140 | 31.0 | FDD | IMD21 |
|  | n3 | 1775 | 5 | 25 | 1870 | N/A | FDD | N/A |
|  | n77 | 3915 | 10 | 50 | 3915 | N/A | TDD | N/A |
| CA\_n1-n3-n78 | n1 | 1950 | 5 | 25 | 2140 | N/A | FDD | N/A |
|  | n3 | 1750 | 5 | 25 | 1845 | N/A |  | N/A |
|  | n78 | 3700 | 10 | 52 | 3700 | 28.4 | TDD | IMD2 |
|  | n1 | 1950 | 5 | 25 | 2140 | N/A | FDD | N/A |
|  | n3 | 1770 | 5 | 25 | 1865 | N/A |  | N/A |
|  | n78 | 3360 | 10 | 52 | 3360 | 11.2 | TDD | IMD4 |
|  | n1 | 1950 | 5 | 25 | 2140 | N/A | FDD | N/A |
|  | n3 | 1735 | 5 | 25 | 1830 | 27.9 |  | IMD2 |
|  | n78 | 3780 | 10 | 52 | 3780 | N/A | TDD | N/A |
| CA\_n1-n5-n7 | n1 | 1968 | 5 | 25 | 2158 | N/A | FDD | N/A |
|  | n7 | 2512 | 10 | 50 | 2632 | N/A | FDD | N/A |
|  | n5 | 835 | 5 | 25 | 880 | 1.0 | FDD | IMD5 |
| CA\_n1-n5-n78 | n1 | 1932 | 5 | 25 | 2122 | 18.1 | FDD | IMD3 |
|  | n5 | 829 | 5 | 25 | 874 | N/A | FDD | N/A |
|  | n78 | 3780 | 10 | 50 | 3780 | N/A | TDD | N/A |
|  | n1 | 1975 | 5 | 25 | 2165 | N/A | FDD | N/A |
|  | n5 | 840 | 5 | 25 | 885 | 3.1 | FDD | IMD5 |
|  | n78 | 3405 | 10 | 50 | 3405 | N/A | TDD | N/A |
|  | n1 | 1950 | 5 | 25 | 2140 | N/A | FDD | N/A |
|  | n5 | 830 | 5 | 25 | 875 | N/A | FDD | N/A |
|  | n78 | 3610 | 10 | 50 | 3610 | 15.7 | TDD | IMD3 |
| CA\_n1-n7-n28 | n1 | 1935 | 5 | 25 | 2125 | N/A | FDD | N/A |
|  | n7 | 2533 | 10 | 50 | 2653 | 30.0 | FDD | IMD2 |
|  | n28 | 718 | 5 | 25 | 773 | N/A | FDD | N/A |
|  | n1 | 1935 | 5 | 25 | 2125 | N/A | FDD | N/A |
|  | n7 | 2510 | 10 | 50 | 2630 | N/A | FDD | N/A |
|  | n28 | 730 | 10 | 50 | 785 | 4.5 | FDD | IMD5 |
| CA\_n1-n7-n78 | n1 | 1977.5 | 5 | 25 | 2167.5 | N/A | FDD | N/A |
|  | n7 | 2507.5 | 5 | 25 | 2627.5 | 9.1 | FDD | IMD4 |
|  | n78 | 3305 | 10 | 50 | 3305 | N/A | TDD | N/A |
|  | n1 | 1950 | 5 | 25 | 2140 | 8.7 | FDD | IMD4 |
|  | n7 | 2510 | 10 | 50 | 2630 | N/A | FDD | N/A |
|  | n78 | 3580 | 10 | 50 | 3580 | N/A | TDD | N/A |
|  | n1 | 1970 | 5 | 25 | 2160 | N/A | FDD | N/A |
|  | n7 | 2520 | 5 | 25 | 2640 | N/A | FDD | N/A |
|  | n78 | 3390 | 10 | 50 | 3390 | 10.1 | TDD | IMD4 |
| CA\_n1-n28-n78 | n1 | 1960 | 5 | 25 | 2150 | 15.7 | FDD | IMD3 |
|  | n28 | 740 | 5 | 25 | 795 | N/A | FDD | N/A |
|  | n78 | 3630 | 10 | 50 | 3630 | N/A | TDD | N/A |
|  | n1 | 1970 | 5 | 25 | 2160 | N/A | FDD | N/A |
|  | n28 | 739 | 5 | 25 | 794 | 4.2 | FDD | IMD5 |
|  | n78 | 3352 | 10 | 50 | 3352 | N/A | TDD | N/A |
|  | n1 | 1950 | 5 | 25 | 2140 | N/A | FDD | N/A |
|  | n28 | 733 | 5 | 25 | 788 | N/A | FDD | N/A |
|  | n78 | 3416 | 10 | 50 | 3416 | 15.7 | TDD | IMD3 |
| CA\_n1-n40-n78 | n1 | 1930 | 5 | 25 | 2120 | N/A | FDD | N/A |
|  | n40 | 2310 | 5 | 25 | 2310 | N/A | TDD | N/A |
|  | n78 | 3480 | 10 | 50 | 3480 | 9.8 | TDD | IMD41 |
|  | n1 | 1930 | 5 | 25 | 2120 | N/A | FDD | N/A |
|  | n40 | 2340 | 5 | 25 | 2340 | 10.6 | TDD | IMD4 |
|  | n78 | 3450 | 10 | 50 | 3450 | N/A | TDD | N/A |
|  | n1 | 1950 | 5 | 25 | 2140 | 9.1 | FDD | IMD4 |
|  | n40 | 2380 | 5 | 25 | 2380 | N/A | TDD | N/A |
|  | n78 | 3450 | 10 | 50 | 3450 | N/A | TDD | N/A |
| CA\_n1-n77-n79 | n1 | 1950 | 5 | 25 | 2140 | 6.0 | FDD | IMD31,2 |
|  | n77 | 3400 | 10 | 50 | 3400 | N/A | TDD | N/A |
|  | n79 | 4660 | 40 | 216 | 4660 | N/A | TDD | N/A |
| CA\_n1-n78-n79 | n1 | 1950 | 5 | 25 | 2140 | N/A | FDD | N/A |
|  | n78 | 3410 | 10 | 50 | 3410 | N/A | TDD | N/A |
|  | n79 | 4870 | 40 | 216 | 4870 | 15.9 | TDD | IMD31,3 |
|  | n1 | 1950 | 5 | 25 | 2140 | N/A | FDD | N/A |
|  | n78 | 3490 | 10 | 50 | 3490 | 4.6 | TDD | IMD53 |
|  | n79 | 4670 | 40 | 216 | 4670 | N/A | TDD | N/A |
|  | n1 | 1950 | 5 | 25 | 2140 | 15.6 | FDD | IMD31,2 |
|  | n78 | 3400 | 10 | 50 | 3400 | N/A | TDD | N/A |
|  | n79 | 4660 | 40 | 216 | 4660 | N/A | TDD | N/A |
| CA\_n2-n5-n30 | n2 | 1870 | 5 | 25 | 1959 | N/A | FDD | N/A |
|  | n5 | 835 | 5 | 25 | 880 | 9.7 | FDD | IMD4 |
|  | n30 | 2310 | 10 | 50 | 2355 | N/A | FDD | N/A |
| CA\_n2-n5-n66 | n2 | 1900 | 5 | 25 | 1980 | N/A | FDD | N/A |
|  | n5 | 830 | 5 | 25 | 875 | N/A | FDD | N/A |
|  | n66 | 1740 | 5 | 25 | 2140 | 7.2 | FDD | IMD4 |
| CA\_n2-n5-n77 | n2 | 1907.5 | 5 | 25 | 1987.5 | N/A | FDD | N/A |
|  | n5 | 842.5 | 5 | 25 | 887.5 | 3.8 | FDD | IMD55 |
|  | n77 | 3305 | 5 | 25 | 3305 | N/A | TDD | N/A |
|  | n2 | 1907 | 5 | 25 | 1987 | 16.5 | FDD | IMD35 |
|  | n5 | 846.5 | 5 | 25 | 891.5 | N/A | FDD | N/A |
|  | n77 | 3680 | 5 | 25 | 3680 | N/A | TDD | N/A |
|  | n2 | 1880 | 5 | 25 | 1960 | N/A | FDD | N/A |
|  | n5 | 830 | 5 | 25 | 875 | N/A | FDD | N/A |
|  | n77 | 3540 | 10 | 50 | 3540 | 16.0 | TDD | IMD31 |
| CA\_n2-n12-n775 | n2 | 1880 | 5 | 25 | 1960 | 16.5 | FDD | IMD32 |
|  | n12 | 707.5 | 5 | 25 | 737.5 | N/A | FDD | N/A |
|  | n77 | 3375 | 10 | 50 | 3375 | N/A | TDD | N/A |
|  | n2 | 1900 | 5 | 25 | 1980 | N/A | FDD | N/A |
|  | n12 | 707.5 | 5 | 25 | 737.5 | N/A | FDD | N/A |
|  | n77 | 3315 | 10 | 50 | 3315 | 16.0 | TDD | IMD31,2 |
| CA\_n2-n14-n66 | n2 | 1874 | 5 | 25 | 1954 | N/A | FDD | N/A |
|  | n14 | 793 | 5 | 25 | 763 | N/A | FDD | N/A |
|  | n66 | 1762 | 5 | 25 | 2162 | 7.6 | FDD | IMD4 |
|  | n2 | 1874 | 5 | 25 | 1954 | 7.2 | FDD | IMD4 |
|  | n14 | 793 | 5 | 25 | 763 | N/A | FDD | N/A |
|  | n66 | 1770 | 5 | 25 | 2170 | N/A | FDD | N/A |
| CA\_n2-n14-n77 | n2 | 1874 | 5 | 25 | 1954 | 16.5 | FDD | IMD3 |
|  | n14 | 793 | 5 | 25 | 763 | N/A | FDD | N/A |
|  | n77 | 3540 | 10 | 50 | 3540 | N/A | TDD | N/A |
|  | n2 | 1880 | 5 | 25 | 1960 | N/A | FDD | N/A |
|  | n14 | 793 | 5 | 25 | 763 | N/A | FDD | N/A |
|  | n77 | 3466 | 10 | 50 | 3466 | 16.0 | TDD | IMD31 |
| CA\_n2-n30-n77 | n2 | 1906 | 5 | 25 | 1986 | 8.6 | FDD | IMD45 |
|  | n30 | 2312 | 5 | 25 | 2357 | N/A | FDD | N/A |
|  | n77 | 3305 | 10 | 50 | 3305 | N/A | TDD | N/A |
|  | n2 | 1905 | 5 | 25 | 1985 | N/A | FDD | N/A |
|  | n30 | 2309 | 5 | 25 | 2354 | 10.6 | FDD | IMD45 |
|  | n77 | 3361 | 10 | 50 | 3361 | N/A | TDD | N/A |
|  | n2 | 1860 | 5 | 25 | 1940 | N/A | FDD | N/A |
|  | n30 | 2309 | 5 | 25 | 2354 | 3.4 | FDD | IMD5 |
|  | n77 | 3967 | 10 | 50 | 3967 | N/A | TDD | N/A |
|  | n2 | 1870 | 5 | 25 | 1950 | N/A | FDD | N/A |
|  | n30 | 2310 | 5 | 25 | 2355 | N/A | FDD | N/A |
|  | n77 | 4180 | 10 | 50 | 4180 | 29.4 | TDD | IMD22,5 |
| CA\_n2-n66-n77 | n2 | 1880 | 5 | 25 | 1960 | N/A | FDD | N/A |
|  | n66 | 1740 | 5 | 25 | 2140 | N/A | FDD | N/A |
|  | n77 | 3620 | 10 | 50 | 3620 | 29.4 | TDD | IMD25 |
|  | n2 | 1880 | 5 | 25 | 1960 | N/A | FDD | N/A |
|  | n66 | 1740 | 5 | 25 | 2140 | N/A | FDD | N/A |
|  | n77 | 3900 | 10 | 50 | 3900 | 8.9 | TDD | IMD4 |
|  | n2 | 1855 | 5 | 25 | 1935 | N/A | FDD | N/A |
|  | n66 | 1715 | 5 | 25 | 2115 | 29.2 | FDD | IMD2 |
|  | n77 | 3970 | 10 | 50 | 3970 | N/A | TDD | N/A |
|  | n2 | 1880 | 5 | 25 | 1960 | N/A | FDD | N/A |
|  | n66 | 1740 | 5 | 25 | 2140 | 10.4 | FDD | IMD4 |
|  | n77 | 3500 | 10 | 50 | 3500 | N/A | TDD | N/A |
|  | n2 | 1885 | 5 | 25 | 1965 | N/A | FDD | N/A |
|  | n66 | 1775 | 5 | 25 | 2175 | 4.0 | FDD | IMD5 |
|  | n77 | 3915 | 10 | 50 | 3915 | N/A | TDD | N/A |
|  | n2 | 1880 | 5 | 25 | 1960 | 32.1 | FDD | IMD2 |
|  | n66 | 1760 | 5 | 25 | 2160 | N/A | FDD | N/A |
|  | n77 | 3720 | 10 | 50 | 3720 | N/A | TDD | N/A |
|  | n2 | 1880 | 5 | 25 | 1960 | 9.1 | FDD | IMD45 |
|  | n66 | 1770 | 5 | 25 | 2170 | N/A | FDD | N/A |
|  | n77 | 3350 | 10 | 50 | 3350 | N/A | TDD | N/A |
|  | n2 | 1880 | 5 | 25 | 1960 | 2.1 | FDD | IMD55 |
|  | n66 | 1760 | 5 | 25 | 2160 | N/A | FDD | N/A |
|  | n77 | 3620 | 10 | 50 | 3620 | N/A | TDD | N/A |
| CA\_n3-n5-n7 | n3 | 1780 | 5 | 25 | 1875 | N/A | FDD | N/A |
|  | n5 | 845 | 5 | 25 | 890 | N/A | FDD | N/A |
|  | n7 | 2505 | 10 | 50 | 2625 | 30.0 | FDD | IMD24 |
|  | n3 | 1720 | 5 | 25 | 1815 | N/A | FDD | N/A |
|  | n5 | 835 | 5 | 25 | 880 | 19.0 | FDD | IMD3 |
|  | n7 | 2560 | 10 | 50 | 2680 | N/A | FDD | N/A |
| CA\_n3-n5-n78 | n3 | 1730 | 5 | 25 | 1825 | N/A | FDD | N/A |
|  | n5 | 839 | 5 | 25 | 884 | N/A | FDD | N/A |
|  | n78 | 3408 | 10 | 50 | 3408 | 16.1 | TDD | IMD3 |
|  | n3 | 1730 | 5 | 25 | 1825 | N/A | FDD | N/A |
|  | n5 | 839 | 5 | 25 | 884 | N/A | FDD | N/A |
|  | n78 | 3512 | 10 | 50 | 3512 | 4.5 | TDD | IMD5 |
|  | n3 | 1767 | 5 | 25 | 1862 | 15.7 | FDD | IMD3 |
|  | n5 | 839 | 5 | 25 | 884 | N/A | FDD | N/A |
|  | n78 | 3540 | 10 | 50 | 3540 | N/A | TDD | N/A |
| CA\_n3-n7-n28 | n3 | 1747 | 5 | 25 | 1842 | N/A | FDD | N/A |
|  | n7 | 2543 | 5 | 25 | 2663 | N/A | FDD | N/A |
|  | n28 | 741 | 5 | 25 | 796 | 20.0 | FDD | IMD2 |
|  | n3 | 1712.5 | 5 | 25 | 1807.5 | N/A | FDD | N/A |
|  | n7 | 2562 | 5 | 25 | 2682 | 17.0 | FDD | IMD3 |
|  | n28 | 743 | 5 | 25 | 798 | N/A | FDD | N/A |
|  | n3 | 1737.5 | 5 | 25 | 1832.5 | 16.5 | FDD | IMD2 |
|  | n7 | 2543 | 5 | 25 | 2663 | N/A | FDD | N/A |
|  | n28 | 710.5 | 5 | 25 | 765.5 | N/A | FDD | N/A |
| CA\_n3-n7-n78 | n3 | 1725 | 5 | 25 | 1820 | 17.6 | FDD | IMD3 |
|  | n7 | 2565 | 5 | 25 | 2685 | N/A | FDD | N/A |
|  | n78 | 3310 | 10 | 50 | 3310 | N/A | TDD | N/A |
|  | n3 | 1725 | 5 | 25 | 1820 | 8.6 | FDD | IMD4 |
|  | n7 | 2565 | 5 | 25 | 2685 | N/A | FDD | N/A |
|  | n78 | 3475 | 10 | 50 | 3475 | N/A | TDD | N/A |
|  | n3 | 1730 | 5 | 25 | 1825 | N/A | FDD | N/A |
|  | n7 | 2560 | 5 | 25 | 2680 | N/A | FDD | N/A |
|  | n78 | 3390 | 10 | 50 | 3390 | 16.1 | TDD | IMD3 |
| CA\_n3-n8-n78 | n3 | 1730 | 5 | 25 | 1825 | N/A | FDD | N/A |
|  | n8 | 910 | 5 | 25 | 955 | N/A | FDD | N/A |
|  | n78 | 3550 | 10 | 50 | 3550 | 16.1 | TDD | IMD3 |
|  | n3 | 1730 | 5 | 25 | 1825 | N/A | FDD | N/A |
|  | n8 | 910 | 5 | 25 | 955 | N/A | FDD | N/A |
|  | n78 | 3370 | 10 | 50 | 3370 | 4.5 | TDD | IMD5 |
|  | n3 | 1725 | 5 | 25 | 1820 | 15.7 | FDD | IMD3 |
|  | n8 | 910 | 5 | 25 | 955 | N/A | FDD | N/A |
|  | n78 | 3640 | 10 | 50 | 3640 | N/A | TDD | N/A |
| CA\_n3-n18-n41 | n18 | 820 | 5 | 25 | 865 | N/A | FDD | N/A |
|  | n3 | 1720 | 5 | 25 | 1815 | N/A | FDD | N/A |
|  | n41 | 2540 | 10 | 50 | 2540 | [N/A]1 | TDD | IMD2 |
|  | n18 | 820 | 5 | 25 | 865 | N/A | FDD | N/A |
|  | n3 | 1725 | 5 | 25 | 1820 | N/A | FDD | N/A |
|  | n41 | 2630 | 10 | 50 | 2630 | 16.0 | TDD | IMD3 |
|  | n18 | 820 | 5 | 25 | 865 | 28.9 | FDD | IMD2 |
|  | n3 | 1765 | 5 | 25 | 1860 | N/A | FDD | N/A |
|  | n41 | 2630 | 10 | 50 | 2630 | N/A | TDD | N/A |
|  | n18 | 830 | 5 | 25 | 875 | [19.0] | FDD | IMD3 |
|  | n3 | 1725 | 5 | 25 | 1820 | N/A | FDD | N/A |
|  | n41 | 2670 | 5 | 25 | 2670 | N/A | TDD | N/A |
|  | n3 | 1755 | 5 | 25 | 1850 | 28.8 | FDD | IMD2 |
|  | n41 | 2670 | 10 | 50 | 2670 | N/A | TDD | N/A |
|  | n18 | 820 | 5 | 25 | 865 | N/A | FDD | N/A |
| CA\_n3-n28-n41 | n3 | 1715 | 5 | 25 | 1810 | N/A | FDD | N/A |
|  | n28 | 743 | 5 | 25 | 798 | N/A | FDD | N/A |
|  | n41 | 2518 | 5 | 25 | 2518 | 27.4 | TDD | IMD2 |
|  | n3 | 1715 | 5 | 25 | 1810 | N/A | FDD | N/A |
|  | n28 | 743 | 5 | 25 | 798 | N/A | FDD | N/A |
|  | n41 | 2687 | 5 | 25 | 2687 | 15.9 | TDD | IMD3 |
| CA\_n3-n28-n77 | n3 | 1720 | 5 | 25 | 1815 | N/A | FDD | N/A |
|  | n28 | 733 | 5 | 25 | 788 | N/A | FDD | N/A |
|  | n77 | 4173 | 10 | 50 | 4173 | 15.9 | TDD | IMD3 |
|  | n28 | 735 | 5 | 25 | 790 | N/A | FDD | N/A |
|  | n77 | 3320 | 10 | 50 | 3320 | N/A | TDD | N/A |
|  | n3 | 1755 | 5 | 25 | 1850 | 17.0 | FDD | IMD3 |
|  | n3 | 1712.5 | 5 | 25 | 1807.5 | N/A | FDD | N/A |
|  | n77 | 4195 | 10 | 50 | 4195 | N/A | TDD | N/A |
|  | n28 | 715 | 5 | 25 | 770 | 15.3 | FDD | IMD3 |
| CA\_n3-n28-n78 | n28 | 735 | 5 | 25 | 790 | N/A | FDD | N/A |
|  | n78 | 3320 | 10 | 50 | 3320 | N/A | TDD | IMD3 |
|  | n3 | 1755 | 5 | 25 | 1850 | 17.3 | FDD | N/A |
|  | n3 | 1750 | 5 | 25 | 1845 | N/A | FDD | N/A |
|  | n28 | 743 | 5 | 25 | 798 | N/A | FDD | N/A |
|  | n78 | 3764 | 10 | 50 | 3764 | 4.5 | TDD | IMD5 |
| CA\_n3-n28-n79 | n3 | 1770 | 5 | 25 | 1865 | N/A | N/A | n3 |
|  | n28 | 725 | 5 | 25 | 780 | N/A | N/A | n28 |
|  | n79 | 4585 | 40 | 216 | 4585 | 9.4 | IMD41| | n79 |
|  | n3 | 1770 | 5 | 25 | 1865 | N/A | N/A | n3 |
|  | n79 | 4530 | 40 | 216 | 4530 | N/A | N/A | n79 |
|  | n28 | 725 | 5 | 25 | 780 | 10.3 | IMD4 | n28 |
|  | n28 | 725 | 5 | 25 | 780 | N/A | N/A | n28 |
|  | n79 | 4770 | 40 | 216 | 4770 | N/A | N/A | n79 |
|  | n3 | 1775 | 5 | 25 | 1870 | 5.7 | IMD5 | n3 |
| CA\_n3-40-n41 | n3 | 1747.5 | 5 | 25 | 1842.5 | 1.0 | FDD | IMD5 |
|  | n40 | 2347.5 | 5 | 25 | 2347.5 | N/A | TDD | N/A |
|  | n41 | 2600 | 10 | 50 | 2600 | N/A | TDD | N/A |
| CA\_n3-n41-n77 | n3 | 1720 | 5 | 25 | 1815 | N/A | FDD | N/A |
|  | n77 | 3900 | 10 | 50 | 3900 | N/A | TDD | N/A |
|  | n41 | 2640 | 5 | 25 | 2640 | 5.3 | TDD | IMD5 |
|  | n41 | 2620 | 5 | 25 | 2620 | N/A | TDD | N/A |
|  | n77 | 3400 | 10 | 50 | 3400 | N/A | TDD | N/A |
|  | n3 | 1745 | 5 | 25 | 1840 | 16.4 | FDD | IMD3 |
|  | n41 | 2580 | 5 | 25 | 2580 | N/A | TDD | N/A |
|  | n3 | 1720 | 5 | 25 | 1815 | N/A | FDD | N/A |
|  | n77 | 3440 | 10 | 50 | 3440 | 16.8 | TDD | IMD31 |
| CA\_n3-n41-n78 | n3 | 1730 | 5 | 25 | 1825 | N/A | FDD | N/A |
|  | n41 | 2560 | 10 | 50 | 2560 | N/A | TDD | N/A |
|  | n78 | 3390 | 10 | 50 | 3390 | 16.4 | TDD | IMD3 |
|  | n3 | 1745 | 5 | 25 | 1840 | 16.4 | TDD | IMD3 |
|  | n41 | 2620 | 5 | 25 | 2620 | N/A | FDD | N/A |
|  | n78 | 3400 | 10 | 50 | 3400 | N/A | TDD | N/A |
| CA\_n3-n77-n79 | n77 | 3350 | 10 | 50 | 3350 | N/A | FDD | N/A |
|  | n79 | 4840 | 40 | 216 | 4840 | N/A | TDD | N/A |
|  | n3 | 1765 | 5 | 25 | 1860 | 15.7 | TDD | IMD31, 2  |2\*fBn77-fBn79| |
| CA\_n5-n7-n78 | n5 | 834 | 5 | 25 | 879 | 30.2 | FDD | IMD2 |
|  | n7 | 2550 | 5 | 25 | 2670 | N/A | FDD | N/A |
|  | n78 | 3429 | 10 | 50 | 3429 | N/A | TDD | N/A |
|  | n5 | 830 | 5 | 25 | 875 | 3.3 | FDD | IMD5 |
|  | n7 | 2525 | 5 | 25 | 2645 | N/A | FDD | N/A |
|  | n78 | 3350 | 10 | 50 | 3350 | N/A | TDD | N/A |
|  | n5 | 844 | 5 | 25 | 889 | N/A | FDD | N/A |
|  | n7 | 2525 | 5 | 25 | 2645 | 30.1 | FDD | IMD2 |
|  | n78 | 3489 | 10 | 50 | 3489 | N/A | TDD | N/A |
|  | n5 | 835 | 5 | 25 | 880 | N/A | FDD | N/A |
|  | n7 | 2540 | 5 | 25 | 2660 | N/A | FDD | N/A |
|  | n78 | 3375 | 10 | 50 | 3375 | 29.7 | TDD | IMD2 |
|  | n5 | 835 | 5 | 25 | 880 | N/A | FDD | N/A |
|  | n7 | 2550 | 5 | 25 | 2670 | N/A | FDD | N/A |
|  | n78 | 3430 | 10 | 50 | 3430 | 9.7 | TDD | IMD4 |
| CA\_n5-n12-n77 | n5 | 835 | 5 | 25 | 880 | 3.9 | FDD | IMD5 |
|  | n12 | 707.5 | 5 | 25 | 737.5 | N/A | FDD | N/A |
|  | n77 | 3710 | 10 | 50 | 3710 | N/A | TDD | N/A |
|  | n5 | 835 | 5 | 25 | 880 | N/A | FDD | N/A |
|  | n12 | 710 | 5 | 25 | 740 | 4.4 | FDD | IMD55 |
|  | n77 | 4080 | 10 | 50 | 4080 | N/A | TDD | N/A |
|  | n5 | 830 | 5 | 25 | 875 | N/A | FDD | N/A |
|  | n12 | 707.5 | 5 | 25 | 737.5 | N/A | FDD | N/A |
|  | n77 | 3905 | 10 | 50 | 3905 | 4.4 | TDD | IMD5 |
| CA\_n5-n14-n775 | n5 | 835 | 5 | 25 | 880 | 3.9 | FDD | IMD5 |
|  | n14 | 793 | 5 | 25 | 763 | N/A | FDD | N/A |
|  | n77 | 4052 | 10 | 50 | 4052 | N/A | TDD | N/A |
|  | n5 | 846.5 | 5 | 25 | 891.5 | N/A | FDD | N/A |
|  | n14 | 795.5 | 5 | 25 | 765.5 | 11.6 | FDD | IMD41 |
|  | n77 | 3305 | 10 | 50 | 3305 | N/A | TDD | N/A |
|  | n5 | 840 | 5 | 25 | 885 | N/A | FDD | N/A |
|  | n14 | 793 | 5 | 25 | 763 | N/A | FDD | N/A |
|  | n77 | 3313 | 10 | 50 | 3313 | 10.3 | TDD | IMD41 |
| CA\_n5-n25-n66 | n5 | 834 | 5 | 25 | 879 | N/A | FDD | N/A |
|  | n25 | 1900 | 5 | 25 | 1980 | N/A | FDD | N/A |
|  | n66 | 1712 | 5 | 25 | 2132 | 7.2 | FDD | IMD4 |
| CA\_n5-n25-n77 | n5 | 830 | 5 | 25 | 875 | N/A | FDD | N/A |
|  | n25 | 1880 | 5 | 25 | 1960 | N/A | FDD | N/A |
|  | n77 | 3540 | 10 | 50 | 3540 | 16.0 | TDD | IMD3 |
|  | n5 | 844 | 5 | 25 | 889 | 3.8 | FDD | IMD55 |
|  | n25 | 1907 | 5 | 25 | 1987 | N/A | FDD | N/A |
|  | n77 | 3305 | 10 | 50 | 3305 | N/A | TDD | N/A |
|  | n5 | 846.5 | 5 | 25 | 891.5 | N/A | FDD | N/A |
|  | n25 | 1907 | 5 | 25 | 1987 | 16.5 | FDD | IMD3 |
|  | n77 | 3680 | 10 | 25 | 3680 | N/A | TDD | N/A |
| CA\_n5-n25-n78 | n5 | 830 | 5 | 25 | 875 | N/A | FDD | N/A |
|  | n25 | 1900 | 5 | 25 | 1980 | N/A | FDD | N/A |
|  | n78 | 3560 | 10 | 50 | 3560 | 16.1 | TDD | IMD3 |
| CA\_n5-n29-n77 | n5 | 845 | 5 | 25 | 890 | N/A | FDD | N/A |
|  | n29 | N/A | 5 | N/A | 720 | 4.4 | SDL | IMD57 |
|  | n77 | 4100 | 10 | 50 | 4100 | N/A | TDD | N/A |
| CA\_n5-n30-n66 | n5 | 830 | 5 | 25 | 875 | N/A | FDD | N/A |
|  | n30 | 2307.5 | 5 | 25 | 2352.5 | N/A | FDD | N/A |
|  | n66 | 1725 | 5 | 25 | 2125 | 4 | FDD | IMD5 |
| CA\_n5-n30-n77 | n5 | 835 | 5 | 25 | 880 | 15.2 | FDD | IMD31 |
|  | n30 | 2310 | 5 | 25 | 2355 | N/A | FDD | N/A |
|  | n77 | 3740 | 10 | 50 | 3740 | N/A | TDD | N/A |
|  | n5 | 835 | 5 | 25 | 880 | N/A | FDD | N/A |
|  | n30 | 2310 | 5 | 25 | 2355 | 13.2 | FDD | IMD35 |
|  | n77 | 4025 | 10 | 50 | 4025 | N/A | TDD | N/A |
|  | n5 | 840 | 5 | 25 | 885 | N/A | FDD | N/A |
|  | n30 | 2310 | 5 | 25 | 2355 | N/A | FDD | N/A |
|  | n77 | 3780 | 10 | 50 | 3780 | 16.1 | TDD | IMD3 |
| CA\_n5-n66-n77 | n5 | 845 | 5 | 25 | 890 | N/A | FDD | N/A |
|  | n66 | 1775 | 5 | 25 | 2175 | N/A | FDD | N/A |
|  | n77 | 3465 | 10 | 50 | 3465 | 16.1 | TDD | IMD3 |
|  | n5 | 826.5 | 5 | 25 | 871.5 | N/A | FDD | N/A |
|  | n66 | 1712.5 | 5 | 25 | 2112.5 | N/A | FDD | N/A |
|  | n77 | 4192 | 10 | 50 | 4192 | 8.2 | TDD | IMD45 |
|  | n5 | 835 | 5 | 25 | 880 | N/A | FDD | N/A |
|  | n66 | 1735 | 5 | 25 | 2135 | N/A | FDD | N/A |
|  | n77 | 3535 | 10 | 50 | 3535 | 3.3 | TDD | IMD5 |
|  | n5 | 826.5 | 5 | 25 | 871.5 | N/A | FDD | N/A |
|  | n66 | 1742 | 5 | 25 | 2142 | 13.2 | FDD | IMD3 |
|  | n77 | 3795 | 10 | 50 | 3795 | N/A | TDD | N/A |
| CA\_n5-n66-n78 | n5 | 830 | 5 | 25 | 875 | N/A | FDD | N/A |
|  | n66 | 1720 | 5 | 25 | 2120 | N/A | FDD | N/A |
|  | n78 | 3380 | 10 | 50 | 3380 | 16.1 | TDD | IMD3 |
| CA\_n5-n66-n78 | n5 | 830 | 5 | 25 | 875 | N/A | FDD | N/A |
|  | n66 | 1720 | 5 | 25 | 2120 | 13.2 | FDD | IMD3 |
|  | n78 | 3780 | 10 | 50 | 3780 | N/A | TDD | N/A |
| CA\_n7-n25-n77 | n7 | 2520 | 5 | 25 | 2640 | 5.3 | FDD | IMD5 |
|  | n25 | 1870 | 5 | 25 | 1950 | N/A | FDD | N/A |
|  | n77 | 4125 | 10 | 50 | 4125 | N/A | TDD | N/A |
|  | n7 | 2550 | 5 | 25 | 2670 | N/A | FDD | N/A |
|  | n25 | 1870 | 5 | 25 | 1950 | 8.6 | FDD | IMD4 |
|  | n77 | 3525 | 10 | 50 | 3525 | N/A | TDD | N/A |
|  | n7 | 2520 | 5 | 25 | 2640 | N/A | FDD | N/A |
|  | n25 | 1905 | 5 | 25 | 1985 | N/A | FDD | N/A |
|  | n77 | 3750 | 10 | 50 | 3750 | 4.5 | TDD | IMD5 |
| CA\_n7-n25-n78 | n7 | 2550 | 5 | 25 | 2670 | N/A | FDD | N/A |
|  | n25 | 1870 | 5 | 25 | 1950 | 8.6 | FDD | IMD4 |
|  | n78 | 3525 | 10 | 50 | 3525 | N/A | TDD | N/A |
|  | n7 | 2520 | 5 | 25 | 2640 | N/A | FDD | N/A |
|  | n25 | 1905 | 5 | 25 | 1985 | N/A | FDD | N/A |
|  | n78 | 3750 | 10 | 50 | 3750 | 4.5 | TDD | IMD5 |
| CA\_n7-n28-n78 | n7 | 2567.5 | 5 | 25 | 2687.5 | N/A | FDD | N/A |
|  | n28 | 727.5 | 5 | 25 | 782.5 | 28.8 | FDD | IMD2 |
|  | n78 | 3350 | 10 | 50 | 3350 | N/A | TDD | N/A |
|  | n7 | 2567.5 | 5 | 25 | 2687.5 | N/A | FDD | N/A |
|  | n28 | 727.5 | 5 | 25 | 782.5 | 3.0 | FDD | IMD5 |
|  | n78 | 3460 | 10 | 50 | 3460 | N/A | TDD | N/A |
|  | n7 | 2530 | 5 | 25 | 2650 | 30.5 | FDD | IMD2 |
|  | n28 | 740 | 5 | 25 | 795 | N/A | FDD | N/A |
|  | n78 | 3390 | 10 | 50 | 3390 | N/A | TDD | N/A |
|  | n7 | 2565 | 5 | 25 | 2685 | N/A | FDD | N/A |
|  | n28 | 745 | 5 | 25 | 800 | N/A | FDD | N/A |
|  | n78 | 3310 | 10 | 50 | 3310 | 29.7 | TDD | IMD2 |
|  | n7 | 2550 | 5 | 25 | 2670 | N/A | FDD | N/A |
|  | n28 | 720 | 5 | 25 | 775 | N/A | FDD | N/A |
|  | n78 | 3714 | 10 | 50 | 3714 | 9.7 | TDD | IMD4 |
| CA\_n7-n66-n77 | n7 | 2560 | 5 | 25 | 2680 | N/A | FDD | N/A |
|  | n66 | 1730 | 5 | 25 | 2130 | N/A | FDD | N/A |
|  | n77 | 3390 | 10 | 50 | 3390 | 16.1 | TDD | IMD3 |
|  | n7 | 2550 | 5 | 25 | 2670 | N/A | FDD | N/A |
|  | n66 | 1750 | 5 | 25 | 2150 | 8.7 | FDD | IMD4 |
|  | n77 | 3625 | 10 | 50 | 3625 | N/A | TDD | N/A |
|  | n7 | 2520 | 5 | 25 | 2640 | 3.4 | FDD | IMD5 |
|  | n66 | 1720 | 5 | 25 | 2120 | N/A | FDD | N/A |
|  | n77 | 3900 | 10 | 50 | 3900 | N/A | TDD | N/A |
|  | n7 | 2520 | 5 | 25 | 2640 | N/A | FDD | N/A |
|  | n66 | 1760 | 5 | 25 | 2160 | N/A | FDD | N/A |
|  | n77 | 4040 | 10 | 50 | 4040 | 4.2 | TDD | IMD5 |
| CA\_n7-n66-n78 | n7 | 2560 | 5 | 25 | 2680 | N/A | FDD | N/A |
|  | n66 | 1730 | 5 | 25 | 2130 | N/A | FDD | N/A |
|  | n78 | 3390 | 10 | 50 | 3390 | 16.1 | TDD | IMD3 |
|  | n7 | 2550 | 5 | 25 | 2670 | N/A | FDD | N/A |
|  | n66 | 1750 | 5 | 25 | 2150 | 8.7 | FDD | IMD4 |
|  | n78 | 3625 | 10 | 50 | 3625 | N/A | TDD | N/A |
| CA\_n12-n30-n77 | n12 | 710 | 5 | 25 | 740 | 15.2 | FDD | IMD31 |
|  | n30 | 2310 | 5 | 25 | 2355 | N/A | FDD | N/A |
|  | n77 | 3880 | 10 | 50 | 3880 | N/A | TDD | N/A |
|  | n12 | 707.5 | 5 | 25 | 737.5 | N/A | FDD | N/A |
|  | n30 | 2310 | 5 | 25 | 2355 | 13.2 | FDD | IMD3 |
|  | n77 | 3770 | 10 | 50 | 3770 | N/A | TDD | N/A |
|  | n12 | 707 | 5 | 25 | 737 | N/A | FDD | N/A |
|  | n30 | 2310 | 5 | 25 | 2355 | N/A | FDD | N/A |
|  | n77 | 3913 | 10 | 50 | 3913 | 16.0 | TDD | IMD3 |
| CA\_n12-n66-n77 | n12 | 710 | 5 | 25 | 740 | 15.2 | FDD | IMD35 |
|  | n66 | 1720 | 5 | 25 | 2120 | N/A | FDD | N/A |
|  | n77 | 4180 | 10 | 50 | 4180 | N/A | TDD | N/A |
|  | n12 | 707 | 5 | 25 | 737 | N/A | FDD | N/A |
|  | n66 | 1726 | 5 | 25 | 2126 | 13.2 | FDD | IMD3 |
|  | n77 | 3540 | 10 | 50 | 3540 | N/A | TDD | N/A |
|  | n12 | 704 | 5 | 25 | 734 | N/A | FDD | N/A |
|  | n66 | 1723 | 5 | 25 | 2123 | N/A | FDD | N/A |
|  | n77 | 4150 | 10 | 50 | 4150 | 16.0 | TDD | IMD31,2,5 |
| CA\_n13-n25-n66 | n13 | 782 | 5 | 25 | 751 | N/A | FDD | N/A |
|  | n66 | 1736 | 5 | 25 | 2156 | 7..2 | FDD | IMD4 |
|  | n25 | 1860 | 5 | 25 | 1940 | N/A | FDD | N/A |
|  | n13 | 780 | 10 | 50 | 749 | N/A | FDD | N/A |
|  | n25 | 1860 | 5 | 25 | 1940 | 6.2 | FDD | IMD4 |
|  | n66 | 1750 | 5 | 25 | 2150 | N/A | FDD | N/A |
| CA\_n13-n25-n77 | n13 | 782 | 5 | 25 | 751 | N/A | FDD | N/A |
|  | n25 | 1896 | 5 | 25 | 1976 | N/A | FDD | N/A |
|  | n77 | 3460 | 10 | 50 | 3460 | 17.3 | TDD | IMD31,2 |
|  | n13 | 782 | 5 | 25 | 751 | N/A | FDD | N/A |
|  | n25 | 1880 | 5 | 25 | 1960 | 16.0 | FDD | IMD3 |
|  | n77 | 3524 | 10 | 50 | 3524 | N/A | TDD | N/A |
| CA\_n13-n66-n77 | n13 | 782 | 5 | 25 | 751 | N/A | FDD | N/A |
|  | n66 | 1746 | 5 | 25 | 2146 | 17.1 | FDD | IMD3 |
|  | n77 | 3710 | 10 | 50 | 3710 | N/A | TDD | N/A |
|  | n13 | 781 | 5 | 25 | 750 | 15.2 | FDD | IMD35 |
|  | n66 | 1710 | 5 | 25 | 2110 | N/A | FDD | N/A |
|  | n77 | 4170 | 10 | 50 | 4170 | N/A | TDD | N/A |
|  | n13 | 782 | 5 | 25 | 751 | N/A | FDD | N/A |
|  | n66 | 1770 | 5 | 25 | 2170 | N/A | FDD | N/A |
|  | n77 | 3334 | 10 | 50 | 3334 | 16.3 | TDD | IMD31,2,5 |
| CA\_n14-n30-n77 | n14 | 793 | 5 | 25 | 763 | 15.2 | FDD | IMD31 |
|  | n30 | 2310 | 5 | 25 | 2355 | N/A | FDD | N/A |
|  | n77 | 3857 | 10 | 50 | 3857 | N/A | TDD | N/A |
|  | n14 | 793 | 5 | 25 | 763 | N/A | FDD | N/A |
|  | n30 | 2310 | 5 | 25 | 2355 | 13.2 | FDD | IMD3 |
|  | n77 | 3941 | 10 | 50 | 3941 | N/A | TDD | N/A |
|  | n14 | 793 | 5 | 25 | 763 | N/A | FDD | N/A |
|  | n30 | 2310 | 5 | 25 | 2355 | N/A | FDD | N/A |
|  | n77 | 3896 | 10 | 50 | 3896 | 16.0 | TDD | IMD3 |
| CA\_n14-n66-n77 | n14 | 793 | 5 | 25 | 763 | 15.2 | FDD | IMD35 |
|  | n66 | 1712.5 | 5 | 25 | 2112.5 | N/A | FDD | N/A |
|  | n77 | 4188 | 10 | 50 | 4188 | N/A | TDD | N/A |
|  | n14 | 793 | 5 | 25 | 763 | N/A | FDD | N/A |
|  | n66 | 1755 | 5 | 25 | 2155 | 13.2 | FDD | IMD3 |
|  | n77 | 3741 | 10 | 50 | 3741 | N/A | TDD | N/A |
|  | n14 | 793 | 5 | 25 | 763 | N/A | FDD | N/A |
|  | n66 | 1755 | 5 | 25 | 2155 | N/A | FDD | N/A |
|  | n77 | 3341 | 10 | 50 | 3341 | 16.0 | TDD | IMD31,2,5 |
| CA\_n24-n41-n48 | n24 | 1649 | 5 | 25 | 1528.5 | N/A | FDD | N/A |
|  | n41 | 2610 | 5 | 25 | 2610 | N/A | TDD | N/A |
|  | n48 | 3571 | 10 | 50 | 3571 | 16.8 | TDD | IMD3 |
|  | n24 | 1630 | 5 | 25 | 1528.5 | N/A | FDD | N/A |
|  | n41 | 2500 | 5 | 25 | 2500 | 5.3 | TDD | IMD5 |
|  | n48 | 3695 | 10 | 50 | 3695 | N/A | TDD | N/A |
|  | n24 | 1631.5 | 5 | 25 | 1530 | 16.4 | FDD | IMD3 |
|  | n41 | 2592.5 | 5 | 25 | 2592.5 | N/A | TDD | N/A |
|  | n48 | 3655 | 10 | 50 | 3655 | N/A | TDD | N/A |
| CA\_n24-n41-n77 | n24 | 1630 | 5 | 25 | 1528.5 | N/A | FDD | N/A |
|  | n41 | 2685 | 5 | 25 | 2685 | N/A | TDD | N/A |
|  | n77 | 3735 | 10 | 50 | 3735 | 16.8 | TDD | IMD31,6 |
|  | n24 | 1630 | 5 | 25 | 1528.5 | N/A | FDD | N/A |
|  | n41 | 2610 | 5 | 25 | 2610 | 5.3 | TDD | IMD56 |
|  | n77 | 3755 | 10 | 50 | 3755 | N/A | TDD | N/A |
|  | n24 | 1630 | 5 | 25 | 1528.5 | 16.4 | FDD | IMD32,6 |
|  | n41 | 2500 | 5 | 25 | 2500 | N/A | TDD | N/A |
|  | n77 | 3465 | 10 | 50 | 3465 | N/A | TDD | N/A |
| CA\_n25-n38-n78 | n25 | 1852.5 | 5 | 25 | 1932.5 | 16.4 | FDD | IMD3 |
|  | n38 | 2617.5 | 5 | 25 | 2617.5 | N/A | TDD | N/A |
|  | n78 | 3305 | 10 | 50 | 3305 | N/A | TDD | N/A |
|  | n25 | 1870 | 5 | 25 | 1950 | N/A | FDD | N/A |
|  | n38 | 2610 | 5 | 25 | 2610 | N/A | TDD | N/A |
|  | n78 | 3350 | 10 | 50 | 3350 | 14.8 | TDD | IMD3 |
|  | n25 | 1880 | 5 | 25 | 1960 | 8.6 | TDD | IMD4 |
|  | n38 | 2570 | 5 | 25 | 2570 | N/A | FDD | N/A |
|  | n78 | 3550 | 10 | 50 | 3550 | N/A | TDD | N/A |
| CA\_n25-n41-n66 | n25 | 1860 | 5 | 25 | 1940 | 11.0 | FDD | IMD4 |
|  | n41 | 2685 | 10 | 50 | 2685 | N/A | TDD | N/A |
|  | n66 | 1715 | 5 | 25 | 2115 | N/A | FDD | N/A |
| CA\_n25-n41-n77 | n25 | 1870 | 5 | 25 | 1950 | N/A | FDD | N/A |
|  | n41 | 2670 | 5 | 25 | 2670 | N/A | TDD | N/A |
|  | n77 | 3470 | 10 | 50 | 3470 | 14.8 | TDD | IMD3 |
|  | n25 | 1900 | 5 | 25 | 1980 | N/A | FDD | N/A |
|  | n41 | 2525 | 5 | 25 | 2645 | N/A | TDD | N/A |
|  | n77 | 3775 | 10 | 50 | 3775 | 4.2 | TDD | IMD5 |
|  | n25 | 1870 | 5 | 25 | 1950 | N/A | FDD | N/A |
|  | n41 | 2640 | 5 | 25 | 2640 | 5.3 | TDD | IMD5ZZ |
|  | n77 | 4125 | 10 | 50 | 4125 | N/A | TDD | N/A |
|  | n25 | 1870 | 5 | 25 | 1950 | 17.6 | FDD | IMD3ZZ |
|  | n41 | 2675 | 5 | 25 | 2675 | N/A | TDD | N/A |
|  | n77 | 3400 | 10 | 50 | 3400 | N/A | TDD | N/A |
|  | n25 | 1870 | 5 | 25 | 1950 | 8.6 | FDD | IMD4 |
|  | n41 | 2550 | 5 | 25 | 2685 | N/A | TDD | N/A |
|  | n77 | 3525 | 10 | 50 | 3525 | N/A | TDD | N/A |
| CA\_n25-n41-n78 | n25 | 1870 | 5 | 25 | 1950 | N/A | FDD | N/A |
|  | n41 | 2610 | 5 | 25 | 2610 | N/A | TDD | N/A |
|  | n78 | 3350 | 10 | 50 | 3350 | 14.8 | TDD | IMD3 |
|  | n25 | 1900 | 5 | 25 | 1980 | N/A | FDD | N/A |
|  | n41 | 2525 | 5 | 25 | 2645 | N/A | TDD | N/A |
|  | n78 | 3775 | 10 | 50 | 3775 | 4.2 | TDD | IMD5 |
|  | n25 | 1870 | 5 | 25 | 1950 | 17.6 | FDD | IMD3 |
|  | n41 | 2565 | 5 | 25 | 2565 | N/A | TDD | N/A |
|  | n78 | 3180 | 10 | 50 | 3310 | N/A | TDD | N/A |
|  | n25 | 1870 | 5 | 25 | 1950 | 8.6 | FDD | IMD4 |
|  | n41 | 2550 | 5 | 25 | 2685 | N/A | TDD | N/A |
|  | n78 | 3525 | 10 | 50 | 3475 | N/A | TDD | N/A |
| CA\_n25-n48-n66 | n25 | 1900 | 5 | 25 | 1980 | N/A | FDD | N/A |
|  | n48 | 3540 | 10 | 50 | 3540 | N/A | TDD | N/A |
|  | n66 | 1760 | 5 | 25 | 2160 | 10.4 | FDD | IMD4 |
|  | n25 | 1880 | 5 | 25 | 1960 | N/A | FDD | N/A |
|  | n48 | 3620 | 10 | 50 | 3620 | 29.4 | TDD | IMD2 |
|  | n66 | 1740 | 5 | 25 | 2140 | N/A | FDD | N/A |
|  | n25 | 1880 | 5 | 25 | 1960 | 32.1 | FDD | IMD21 |
|  | n48 | 3700 | 10 | 50 | 3700 | N/A | TDD | N/A |
|  | n66 | 1740 | 5 | 25 | 2140 | N/A | FDD | N/A |
| CA\_n25-n66-n77 | n25 | 1855 | 5 | 25 | 1935 | N/A | FDD | N/A |
|  | n66 | 1715 | 5 | 25 | 2115 | 29.2 | FDD | IMD2 |
|  | n77 | 3970 | 10 | 50 | 3970 | N/A | TDD | N/A |
|  | n25 | 1900 | 5 | 25 | 1980 | N/A | FDD | N/A |
|  | n66 | 1760 | 5 | 25 | 2160 | 10.4 | FDD | IMD4 |
|  | n77 | 3540 | 10 | 50 | 3540 | 10 | TDD | N/A |
|  | n25 | 1900 | 5 | 25 | 1980 | N/A | FDD | N/A |
|  | n66 | 1760 | 5 | 25 | 2160 | 4.0 | FDD | IMD5 |
|  | n77 | 3930 | 10 | 50 | 3930 | N/A | TDD | N/A |
|  | n25 | 1880 | 5 | 25 | 1960 | 32.1 | FDD | IMD2 |
|  | n66 | 1760 | 5 | 25 | 2160 | N/A | FDD | N/A |
|  | n77 | 3720 | 10 | 50 | 3720 | N/A | TDD | N/A |
|  | n25 | 1880 | 5 | 25 | 1960 | 9.1 | FDD | IMD4ZZ |
|  | n66 | 1770 | 5 | 25 | 2170 | N/A | FDD | N/A |
|  | n77 | 3350 | 10 | 50 | 3350 | N/A | TDD | N/A |
|  | n25 | 1880 | 5 | 25 | 1960 | 2.1 | FDD | IMD5ZZ |
|  | n66 | 1760 | 5 | 25 | 2160 | N/A | FDD | N/A |
|  | n77 | 3620 | 10 | 50 | 3620 | N/A | TDD | N/A |
|  | n25 | 1880 | 5 | 25 | 1960 | N/A | FDD | N/A |
|  | n66 | 1740 | 5 | 25 | 2140 | N/A | FDD | N/A |
|  | n77 | 3620 | 10 | 50 | 3620 | 29.4 | TDD | IMD2ZZ |
|  | n25 | 1880 | 5 | 25 | 1960 | N/A | FDD | N/A |
|  | n66 | 1740 | 5 | 25 | 2140 | N/A | FDD | N/A |
|  | n77 | 3900 | 10 | 50 | 3900 | 8.9 | TDD | IMD4 |
| CA\_n25-n66-n78 | n25 | 1880 | 5 | 25 | 1960 | N/A | FDD | N/A |
|  | n66 | 1740 | 5 | 25 | 2140 | N/A | FDD | N/A |
|  | n78 | 3620 | 10 | 50 | 3620 | 29.4 | TDD | IMD2 |
| CA\_n25-n71-n77 | n25 | 1907.5 | 5 | 25 | 1987.5 | N/A | FDD | N/A |
|  | n71 | 695.5 | 5 | 25 | 649.5 | N/A | FDD | N/A |
|  | n77 | 3305 | 10 | 50 | 3305 | 8.0 | TDD | IMD31,2,5 |
|  | n25 | 1874 | 5 | 25 | 1954 | 16.5 | FDD | IMD32,5 |
|  | n71 | 693 | 5 | 25 | 647 | N/A | FDD | N/A |
|  | n77 | 3340 | 10 | 50 | 3340 | N/A | TDD | N/A |
| CA\_n25-n71-n78 | n25 | 1907.5 | 5 | 25 | 1987.5 | N/A | FDD | N/A |
| n71 | 695.5 | 5 | 25 | 649.5 | N/A | FDD | N/A |
| n78 | 3305 | 10 | 50 | 3305 | 8.0 | TDD | IMD3 |
| n25 | 1874 | 5 | 25 | 1954 | 16.5 | FDD | IMD3 |
| n71 | 693 | 5 | 25 | 647 | N/A | FDD | N/A |
| n78 | 3340 | 10 | 50 | 3340 | N/A | TDD | N/A |
| CA\_n28-n40-n78 | n28 | N/A | 5 | 25 | 800.5 | 11 | IMD3 | IMD3 |
|  | n40 | 2302.5 | 5 | 25 | 2302.5 | N/A | N/A | N/A |
|  | n78 | 3795 | 10 | 50 | 3795 | N/A | N/A | N/A |
|  | n28 | 708 | 5 | 25 | 2120 | N/A | FDD | N/A |
|  | n40 | 2310 | 5 | 25 | 2310 | N/A | TDD | N/A |
|  | n78 | 3736 | 10 | 50 | 3736 | 16.0 | TDD | IMD32 |
|  | n28 | 708 | 5 | 25 | 763 | N/A | FDD | N/A |
|  | n40 | 2134 | 5 | 25 | 2134 | 15.7 | TDD | IMD3 |
|  | n78 | 3550 | 10 | 50 | 3550 | N/A | TDD | N/A |
| CA\_n28-n40-n79 | n28 | 730 | 5 | 25 | 785 | N/A | FDD | N/A |
|  | n40 | 2350 | 5 | 50 | 2350 | N/A | TDD | N/A |
|  | n79 | 4540 | 40 | 216 | 4540 | 10.7 | TDD | IMD4 |
|  | n28 | 720 | 5 | 25 | 775 | N/A | FDD | N/A |
|  | n40 | 2340 | 5 | 50 | 2340 | 9.2 | TDD | IMD4 |
|  | n79 | 4500 | 40 | 216 | 4500 | N/A | TDD | N/A |
| CA\_n28-n41-n77 | n41 | 2642 | 5 | 25 | 2642 | N/A | TDD | N/A |
|  | n77 | 3440 | 10 | 50 | 3440 | N/A | TDD | N/A |
|  | n28 | 743 | 5 | 25 | 798 | 30.8 | FDD | IMD24 |
|  | n41 | 2567.5 | 10 | 50 | 2567.5 | N/A | TDD | N/A |
|  | n77 | 3460 | 10 | 50 | 3460 | N/A | TDD | N/A |
|  | n28 | 727.5 | 5 | 25 | 782.5 | 3.0 | FDD | IMD5 |
|  | n28 | 738 | 5 | 25 | 793 | N/A | FDD | N/A |
|  | n77 | 3380 | 10 | 50 | 3380 | N/A | TDD | N/A |
|  | n41 | 2642 | 5 | 25 | 2642 | 29.5 | TDD | IMD2 |
|  | n41 | 2580 | 5 | 25 | 2580 | N/A | TDD | N/A |
|  | n28 | 743 | 5 | 25 | 798 | N/A | FDD | N/A |
|  | n77 | 3323 | 10 | 50 | 3323 | 28.2 | TDD | IMD24 |
| CA\_n28-n41-n78 | n28 | 738 | 5 | 25 | 793 | N/A | FDD | N/A |
|  | n78 | 3380 | 10 | 50 | 3380 | N/A | TDD | N/A |
|  | n41 | 2642 | 5 | 25 | 2642 | 29.5 | TDD | IMD2 |
|  | n41 | 2642 | 5 | 25 | 2642 | N/A | TDD | N/A |
|  | n78 | 3440 | 10 | 50 | 3440 | N/A | TDD | N/A |
|  | n28 | 743 | 5 | 25 | 798 | 30.8 | FDD | IMD21 |
|  | n41 | 2565 | 5 | 25 | 2565 | N/A | TDD | N/A |
|  | n28 | 745 | 5 | 25 | 800 | N/A | FDD | N/A |
|  | n78 | 3310 | 10 | 50 | 3310 | 29.7 | TDD | IMD22 |
| CA\_n28-n41-n79 | n28 | 725 | 5 | 25 | 780 | 13.0 | FDD | IMD31 |
|  | n41 | 2600 | 10 | 50 | 2600 | N/A | TDD | N/A |
|  | n79 | 4600 | 40 | 216 | 4600 | N/A | TDD | N/A |
|  | n28 | 720 | 5 | 25 | 780 | N/A | FDD | N/A |
|  | n41 | 2600 | 10 | 50 | 2600 | N/A | TDD | N/A |
|  | n79 | 4480 | 40 | 216 | 4600 | 10.1 | TDD | IMD32 |
|  | n28 | 735 | 5 | 25 | 790 | N/A | FDD | N/A |
|  | n41 | 2645 | 10 | 50 | 2645 | 10.4 | TDD | IMD4 |
|  | n79 | 4850 | 40 | 216 | 4850 | N/A | TDD | N/A |
| CA\_n28-n46-n78 | n28 | 710 | 5 | 25 | 765 | N/A | FDD | N/A |
|  | n46 | 5170 | 20 | 100 | 5170 | N/A | FDD | N/A |
|  | n78 | 3750 | 10 | 50 | 3750 | 17 | TDD | IMD31 |
|  | n28 | 725 | 5 | 25 | 780 | 16 | FDD | IMD3 |
|  | n46 | 5900 | 20 | 100 | 5900 | N/A | FDD | N/A |
|  | n78 | 3340 | 10 | 50 | 3340 | N/A | TDD | N/A |
|  | n28 | 740 | 5 | 25 | 795 | N/A | FDD | N/A |
|  | n46 | 5900 | 20 | 100 | 5900 | 22 | TDD | IMD31,2 |
|  | n78 | 3320 | 10 | 50 | 3320 | N/A | TDD | N/A |
| CA\_n28-n77-n79 | n77 | 3620 | 10 | 52 | 3620 | N/A | N/A | n77 |
|  | n79 | 4420 | 40 | 216 | 4420 | N/A | N/A | n79 |
|  | n28 | 745 | 5 | 25 | 800 | 16.2 | IMD21,2 | n28 |
| CA\_n29-n30-n77 | n29 | N/A | 5 | N/A | 722 | 15.2 | SDL | IMD31 |
|  | n30 | 2310 | 5 | 25 | 2355 | N/A | FDD | N/A |
|  | n77 | 3898 | 10 | 50 | 3898 | N/A | TDD | N/A |
| CA\_n29-n66-n77 | n29 | N/A | 5 | N/A | 722 | 15.2 | SDL | IMD37 |
|  | n66 | 1734 | 5 | 25 | 2134 | N/A | FDD | N/A |
|  | n77 | 4190 | 10 | 50 | 4190 | N/A | TDD | N/A |
| CA\_n30-n66-n77 | n30 | 2310 | 5 | 25 | 2355 | 29.2 | FDD | IMD25 |
|  | n66 | 1745 | 5 | 25 | 2145 | N/A | FDD | N/A |
|  | n77 | 4100 | 10 | 50 | 4100 | N/A | TDD | N/A |
|  | n30 | 2310 | 5 | 25 | 2355 | 3.4 | FDD | IMD5 |
|  | n66 | 1735 | 5 | 25 | 2135 | N/A | FDD | N/A |
|  | n77 | 3780 | 10 | 50 | 3780 | N/A | TDD | N/A |
|  | n30 | 2310 | 5 | 25 | 2355 | N/A | FDD | N/A |
|  | n66 | 1760 | 5 | 25 | 2160 | 8.7 | FDD | IMD45 |
|  | n77 | 3390 | 10 | 50 | 3390 | N/A | TDD | N/A |
|  | n30 | 2310 | 5 | 25 | 2355 | N/A | FDD | N/A |
|  | n66 | 1745 | 5 | 25 | 2145 | N/A | FDD | N/A |
|  | n77 | 4055 | 10 | 50 | 4055 | 28.4 | TDD | IMD21,5 |
| CA\_n38-n66-n78 | n38 | 2550 | 5 | 25 | 2550 | N/A | TDD | N/A |
|  | n66 | 1750 | 5 | 25 | 2150 | 8.7 | FDD | IMD4 |
|  | n78 | 3625 | 10 | 50 | 3625 | N/A | TDD | N/A |
|  | n38 | 2610 | 5 | 25 | 2610 | N/A | TDD | N/A |
|  | n66 | 1760 | 5 | 25 | 2160 | N/A | FDD | N/A |
|  | n78 | 3460 | 10 | 50 | 3460 | 15.0 | TDD | IMD3 |
| CA\_n39-n40-n79 | n39 | 1917.5 | 5 | 25 | 1917.5 | N/A | TDD | N/A |
|  | n40 | 2302.5 | 5 | 25 | 2302.5 | N/A | TDD | N/A |
|  | n79 | 4980 | 40 | 216 | 4980 | 5.8 | TDD | IMD4 |
| CA\_n40-n41-n79 | n40 | 2340 | 5 | 25 | 2340 | N/A | TDD | N/A |
|  | n41 | 2600 | 10 | 50 | 2600 | N/A | TDD | N/A |
|  | n79 | 4940 | 40 | 216 | 4940 | 30.5 | TDD | IMD2 |
| CA\_n41-n66-n77 | n41 | 2600 | 5 | 25 | 2600 | N/A | TDD | N/A |
|  | n66 | 1730 | 5 | 25 | 2130 | N/A | FDD | N/A |
|  | n77 | 3470 | 10 | 50 | 3470 | 16.1 | TDD | IMD31,2 |
|  | n41 | 2670 | 5 | 25 | 2670 | 5.2 | TDD | IMD55 |
|  | n66 | 1715 | 5 | 25 | 2115 | N/A | FDD | N/A |
|  | n77 | 4190 | 10 | 50 | 4190 | N/A | TDD | N/A |
|  | n41 | 2640 | 5 | 25 | 2640 | N/A | TDD | N/A |
|  | n66 | 1760 | 5 | 25 | 2160 | 9.0 | FDD | IMD4 |
|  | n77 | 3720 | 10 | 50 | 3720 | N/A | TDD | N/A |
| CA\_n41-n66-n78 | n41 | 2560 | 5 | 25 | 2560 | N/A | TDD | N/A |
|  | n66 | 1730 | 5 | 25 | 2130 | N/A | FDD | N/A |
|  | n77 | 3390 | 10 | 50 | 3390 | 16.1 | TDD | IMD31 |
|  | n41 | 2530 | 5 | 25 | 2530 | N/A | TDD | N/A |
|  | n66 | 1760 | 5 | 25 | 2160 | 9.0 | FDD | IMD4 |
|  | n77 | 3610 | 10 | 50 | 3610 | N/A | TDD | N/A |
| CA\_n41-n71-n77 | n41 | 2615 | 5 | 25 | 2615 | N/A | TDD | N/A |
|  | n71 | 693 | 5 | 25 | 647 | N/A | FDD | N/A |
|  | n77 | 3308 | 10 | 50 | 3308 | 29.1 | TDD | IMD21,5 |
|  | n41 | 2564 | 5 | 25 | 2564 | N/A | TDD | N/A |
|  | n71 | 693 | 5 | 25 | 647 | N/A | FDD | N/A |
|  | n77 | 3950 | 10 | 50 | 3950 | 16.3 | TDD | IMD31 |
|  | n41 | 2580 | 5 | 25 | 2580 | N/A | TDD | N/A |
|  | n71 | 693 | 5 | 25 | 647 | N/A | FDD | N/A |
|  | n77 | 3774 | 10 | 50 | 3774 | 10.3 | TDD | IMD41 |
|  | n41 | 2615 | 5 | 25 | 2615 | 28.7 | TDD | IMD25 |
|  | n71 | 693 | 5 | 25 | 647 | N/A | FDD | N/A |
|  | n77 | 3308 | 10 | 50 | 3308 | N/A | TDD | N/A |
|  | n41 | 2564 | 5 | 25 | 2564 | 15.5 | TDD | IMD3 |
|  | n71 | 693 | 5 | 25 | 647 | N/A | FDD | N/A |
|  | n77 | 3950 | 10 | 50 | 3950 | N/A | TDD | N/A |
|  | 41 | 2680 | 5 | 25 | 2680 | N/A | TDD | N/A |
|  | n71 | 686 | 5 | 25 | 640 | 30.8 | FDD | IMD25 |
|  | n77 | 3320 | 10 | 50 | 3320 | N/A | TDD | N/A |
| CA\_n41-n71-n78 | n41 | 2615 | 5 | 25 | 2615 | N/A | TDD | N/A |
|  | n71 | 693 | 5 | 25 | 647 | N/A | FDD | N/A |
|  | n78 | 3308 | 10 | 50 | 3308 | 29.1 | TDD | IMD21 |
|  | n41 | 2580 | 5 | 25 | 2580 | N/A | TDD | N/A |
|  | n71 | 693 | 5 | 25 | 647 | N/A | FDD | N/A |
|  | n77 | 3774 | 10 | 50 | 3774 | 10.3 | TDD | IMD41 |
|  | n41 | 2615 | 5 | 25 | 2615 | 28.7 | TDD | IMD2 |
|  | n71 | 693 | 5 | 25 | 647 | N/A | FDD | N/A |
|  | n77 | 3308 | 10 | 50 | 3308 | N/A | TDD | N/A |
|  | 41 | 2642 | 5 | 25 | 2642 | N/A | TDD | N/A |
|  | n71 | 743 | 5 | 25 | 798 | 30.8 | FDD | IMD2 |
|  | n77 | 3440 | 10 | 50 | 3440 | N/A | TDD | N/A |
| CA\_n48-n66-n70 | n48 | 3625 | 10 | 50 | 3625 | N/À | TDD | N/A |
|  | n66 | 1742.5 | 5 | 25 | 2142.5 | 2.8 | FDD | IMD5 |
|  | n70 | 1702.5 | 5 | 25 | 2002.5 | N/A | FDD | N/A |
| CA\_n48-n66-n71 | n48 | 3552.5 | 10 | 50 | 3552.5 | N/A | TDD | N/A |
|  | n66 | 1761.5 | 5 | 25 | 2161.5 | 14.4 | FDD | IMD3 |
|  | n71 | 695.5 | 5 | 25 | 649.5 | N/A | FDD | N/A |
|  | n48 | 3695 | 10 | 50 | 3695 | 5.2 | TDD | IMD4 |
|  | n66 | 1712.5 | 5 | 25 | 2112.5 | N/A | FDD | N/A |
|  | n71 | 665.5 | 5 | 25 | 619.5 | N/A | FDD | N/A |
| CA\_n48-n70-n71 | n48 | 3694 | 10 | 50 | 3694 | 9 | TDD | IMD41 |
|  | n70 | 1697.5 | 5 | 25 | 1997.5 | N/A | FDD | N/A |
|  | n71 | 665.5 | 5 | 25 | 619.5 | N/A | FDD | N/A |
| CA\_n66-n71-n77 | n66 | 1720 | 5 | 25 | 2120 | N/A | FDD | N/A |
|  | n71 | 668 | 5 | 25 | 622 | N/A | FDD | N/A |
|  | n77 | 4108 | 10 | 50 | 4108 | 15.9 | TDD | IMD31,2,5 |
|  | n66 | 1750 | 5 | 25 | 2150 | 15.5 | FDD | IMD32 |
|  | n71 | 690 | 5 | 25 | 644 | N/A | FDD | N/A |
|  | n77 | 3530 | 10 | 50 | 3530 | N/A | TDD | N/A |
|  | n66 | 1720 | 5 | 25 | 2120 | N/A | FDD | N/A |
|  | n71 | 686 | 5 | 25 | 640 | 15.3 | FDD | IMD35 |
|  | n77 | 4080 | 10 | 50 | 4080 | N/A | TDD | N/A |
| CA\_n66-n71-n78 | n66 | 1720 | 5 | 25 | 2120 | N/A | FDD | N/A |
|  | n71 | 668 | 5 | 25 | 622 | N/A | FDD | N/A |
|  | n78 | 3724 | 10 | 50 | 3724 | 9 | TDD | IMD41 |
|  | n66 | 1760 | 5 | 25 | 2160 | 15.5 | FDD | IMD3 |
|  | n71 | 693 | 5 | 25 | 647 | N/A | FDD | N/A |
|  | n78 | 3546 | 10 | 50 | 3546 | N/A | TDD | N/A |
| NOTE 1: This band is subject to IMD5 also which MSD is not specified.  NOTE 2: This band is subject to IMD4 also which MSD is not specified.  NOTE 3: The requirements only apply for UEs supporting inter-band carrier aggregation with simultaneous Rx/Tx capability. Simultaneous Rx/Tx capability does not apply for UEs supporting band n78 with a n77 implementation.  NOTE 4: This band is subject to IMD3 also which MSD is not specified.  NOTE 5: For a UE which supports this band combination only when the Band n77 frequency range restriction defined in NOTE 12 of Table 5.2-1 applies, the MSD test point(s) cannot be verified for the band combination and the test point(s) can be skipped.  NOTE 6: This band is subjected to 2nd order IMD but is not expected for the operating frequency range of n77 within USA (3450 – 3550 MHz, 3700 – 3980 MHz).  NOTE 7: The MSD test points cannot be verified for the band combination in US due to the Band n77 frequency range restriction.  NOTE 8: Both of the transmitters shall be set min(+20 dBm, PCMAX\_L,f,c) as defined in clause 6.2A.4 | | | | | | | | |

Table 7.3A.5-2a: 3DL/2UL interband Reference sensitivity QPSK PREFSENS and uplink/downlink configurations for PC2 CA

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Band / Channel bandwidth / NRB / Duplex mode | | | | | | | | Source of IMD |
| NR CA band combination | NR band | UL Fc  (MHz) | UL/DL BW  (MHz) | UL  CLRB | DL Fc (MHz) | MSD  (dB) | Duplex mode |  |
| CA\_n1-n3-n78 | n1 | 1950 | 5 | 25 | 2140 | N/A | FDD | N/A |
|  | n3 | 1735 | 5 | 25 | 1830 | 33.9 |  | IMD2 |
|  | n78 | 3780 | 10 | 52 | 3780 | N/A | TDD | N/A |
| CA\_n2A-n5A-n77A | n2 | 1907.5 | 5 | 25 | 1987.5 | N/A | FDD | N/A |
|  | n5 | 842.5 | 5 | 25 | 887.5 | 13.6 | FDD | IMD55 |
|  | n77 | 3305 | 5 | 25 | 3305 | N/A | TDD | N/A |
|  | n2 | 1907 | 5 | 25 | 1987 | 24.8 | FDD | IMD35 |
|  | n5 | 846.5 | 5 | 25 | 891.5 | N/A | FDD | N/A |
|  | n77 | 3680 | 5 | 25 | 3680 | N/A | TDD | N/A |
| CA\_n2A-n12A-n77A | n2 | 1880 | 5 | 25 | 1960 | 24,8 | FDD | IMD32,5 |
|  | n12 | 707.5 | 5 | 25 | 737.5 | N/A | FDD | N/A |
|  | n77 | 3375 | 10 | 50 | 3375 | N/A | TDD | N/A |
| CA\_n2A-n14A-n77A | n2 | 1874 | 5 | 25 | 1954 | 24.8 | FDD | IMD3 |
|  | n14 | 793 | 5 | 25 | 763 | N/A | FDD | N/A |
|  | n77 | 3540 | 10 | 50 | 3540 | N/A | TDD | N/A |
| CA\_n2A-n30A-n77A | n2 | 1906 | 5 | 25 | 1986 | 19.3 | FDD | IMD45 |
|  | n30 | 2312 | 5 | 25 | 2357 | N/A | FDD | N/A |
|  | n77 | 3305 | 10 | 50 | 3305 | N/A | TDD | N/A |
|  | n2 | 1905 | 5 | 25 | 1985 | N/A | FDD | N/A |
|  | n30 | 2309 | 5 | 25 | 2354 | 22.2 | FDD | IMD45 |
|  | n77 | 3361 | 10 | 50 | 3361 | N/A | TDD | N/A |
|  | n2 | 1860 | 5 | 25 | 1940 | N/A | FDD | N/A |
|  | n30 | 2309 | 5 | 25 | 2354 | 12.9 | FDD | IMD5 |
|  | n77 | 3967 | 10 | 50 | 3967 | N/A | TDD | N/A |
| CA\_n5A-n12A-n77A | n5 | 835 | 5 | 25 | 880 | 14.0 | FDD | IMD5 |
|  | n12 | 707.5 | 5 | 25 | 737.5 | N/A | FDD | N/A |
|  | n77 | 3710 | 10 | 50 | 3710 | N/A | TDD | N/A |
|  | n5 | 835 | 5 | 25 | 880 | N/A | FDD | N/A |
|  | n12 | 710 | 5 | 25 | 740 | 14.9 | FDD | IMD55 |
|  | n77 | 4080 | 10 | 50 | 4080 | N/A | TDD | N/A |
| CA\_n5A-n14A-n77A5 | n5 | 835 | 5 | 25 | 880 | 14.0 | FDD | IMD5 |
|  | n14 | 793 | 5 | 25 | 763 | N/A | FDD | N/A |
|  | n77 | 4052 | 10 | 50 | 4052 | N/A | TDD | N/A |
|  | n5 | 846.5 | 5 | 25 | 891.5 | N/A | FDD | N/A |
|  | n14 | 795.5 | 5 | 25 | 765.5 | 20.3 | FDD | IMD41 |
|  | n77 | 3305 | 10 | 50 | 3305 | N/A | TDD | N/A |
| CA\_n5A-n30A-n77A | n5 | 835 | 5 | 25 | 880 | 23.5 | FDD | IMD31 |
|  | n30 | 2310 | 5 | 25 | 2355 | N/A | FDD | N/A |
|  | n77 | 3740 | 10 | 50 | 3740 | N/A | TDD | N/A |
|  | n5 | 835 | 5 | 25 | 880 | N/A | FDD | N/A |
|  | n30 | 2310 | 5 | 25 | 2355 | 21.4 | FDD | IMD35 |
|  | n77 | 4025 | 10 | 50 | 4025 | N/A | TDD | N/A |
| CA\_n12A-n30A-n77A | n12 | 710 | 5 | 25 | 740 | 23.5 | FDD | IMD31 |
|  | n30 | 2310 | 5 | 25 | 2355 | N/A | FDD | N/A |
|  | n77 | 3880 | 10 | 50 | 3880 | N/A | TDD | N/A |
|  | n12 | 707.5 | 5 | 25 | 737.5 | N/A | FDD | N/A |
|  | n30 | 2310 | 5 | 25 | 2355 | 21.4 | FDD | IMD3 |
|  | n77 | 3770 | 10 | 50 | 3770 | N/A | TDD | N/A |
| CA\_n12A-n66A-n77A | n12 | 710 | 5 | 25 | 740 | 23.5 | FDD | IMD35 |
|  | n66 | 1720 | 5 | 25 | 2120 | N/A | FDD | N/A |
|  | n77 | 4180 | 10 | 50 | 4180 | N/A | TDD | N/A |
|  | n12 | 707 | 5 | 25 | 737 | N/A | FDD | N/A |
|  | n66 | 1726 | 5 | 25 | 2126 | 21.4 | FDD | IMD3 |
|  | n77 | 3540 | 10 | 50 | 3540 | N/A | TDD | N/A |
| CA\_n14A-n30A-n77A | n14 | 793 | 5 | 25 | 763 | 23.5 | FDD | IMD31 |
|  | n30 | 2310 | 5 | 25 | 2355 | N/A | FDD | N/A |
|  | n77 | 3857 | 10 | 50 | 3857 | N/A | TDD | N/A |
|  | n14 | 793 | 5 | 25 | 763 | N/A | FDD | N/A |
|  | n30 | 2310 | 5 | 25 | 2355 | 21.4 | FDD | IMD3 |
|  | n77 | 3941 | 10 | 50 | 3941 | N/A | TDD | N/A |
| CA\_n14A-n66A-n77A | n14 | 793 | 5 | 25 | 763 | 23.5 | FDD | IMD35 |
|  | n66 | 1712.5 | 5 | 25 | 2112.5 | N/A | FDD | N/A |
|  | n77 | 4188 | 10 | 50 | 4188 | N/A | TDD | N/A |
|  | n14 | 793 | 5 | 25 | 763 | N/A | FDD | N/A |
|  | n66 | 1755 | 5 | 25 | 2155 | 21.4 | FDD | IMD3 |
|  | n77 | 3741 | 10 | 50 | 3741 | N/A | TDD | N/A |
| CA\_n30A-n66A-n77A | n30 | 2310 | 5 | 25 | 2355 | 34.2 | FDD | IMD25 |
|  | n66 | 1745 | 5 | 25 | 2145 | N/A | FDD | N/A |
|  | n77 | 4100 | 10 | 50 | 4100 | N/A | TDD | N/A |
|  | n30 | 2310 | 5 | 25 | 2355 | 12.9 | FDD | IMD5 |
|  | n66 | 1735 | 5 | 25 | 2135 | N/A | FDD | N/A |
|  | n77 | 3780 | 10 | 50 | 3780 | N/A | TDD | N/A |
|  | n30 | 2310 | 5 | 25 | 2355 | N/A | FDD | N/A |
|  | n66 | 1760 | 5 | 25 | 2160 | 19.2 | FDD | IMD45 |
|  | n77 | 3390 | 10 | 50 | 3390 | N/A | TDD | N/A |
| NOTE 1: This band is subject to IMD5 also which MSD is not specified.  NOTE 2: This band is subject to IMD4 also which MSD is not specified.  NOTE 3: The requirements only apply for UEs supporting inter-band carrier aggregation with simultaneous Rx/Tx capability. Simultaneous Rx/Tx capability does not apply for UEs supporting band n78 with a n77 implementation.  NOTE 4: This band is subject to IMD3 also which MSD is not specified.  NOTE 5: For a UE which supports this band combination only when the Band n77 frequency range restriction defined in NOTE 12 of Table 5.2-1 applies, the MSD test point(s) cannot be verified for the band combination and the test point(s) can be skipped.  NOTE 6: Both of the transmitters shall be set min(+23 dBm, PCMAX\_L,f,c) as defined in clause 6.2A.4 | | | | | | | | |

## ***<Next change>***

## 7.3E Reference sensitivity for V2X

### 7.3E.1 General

The reference sensitivity power level PREFSENS\_V2X is the minimum mean power applied to each one of the UE antenna port for V2X UE, at which the throughput shall meet or exceed the requirements for the specified reference measurement channel.

### 7.3E.2 Minimum requirements

When UE is configured for NR V2X reception non-concurrent with NR uplink transmissions for NR V2X operating bands specified in Table 5.2E.1-1, the throughput shall be ≥ 95% of the maximum throughput of the reference measurement channels as specified in Annexes A.7.2 with parameters specified in Table 7.3E.2-1.

Table 7.3E.2-1: Reference sensitivity of NR V2X Bands (PC5)

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  |  | Channel bandwidth / PREFSENS\_V2X(dBm) | | | | |
| NR V2X Band | SCS kHz | 10 MHz | 20 MHz | 30 MHz | 40 MHz | Duplex Mode |
| n38 | 15 | -96.5 | -93.2 | -91.4 | -90.1 | HD |
|  | 30 | -96.1 | -93.4 | -91.7 | -90.2 | HD |
|  | 60 | -96.9 | -93.1 | -91.9 | -90.4 | HD |
| n47 | 15 | -92.5 | -89.2 | -87.4 | -86.1 | HD |
|  | 30 | -92.1 | -89.4 | -87.7 | -86.2 | HD |
|  | 60 | -92.9 | -89.1 | -87.9 | -86.4 | HD |
| NOTE 1: Reference measurement channel is defined in A.7.2.  NOTE 2: The signal power is specified per antenna port.  NOTE 3: Void. | | | | | | |

Table 7.3E.2-2: Sidelink TX configuration for reference sensitivity of NR V2X Bands (PC5)

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| NR Band / SCS / Channel bandwidth / Duplex mode | | | | | | |
| NR V2X Band | SCS  kHz | 10 MHz | 20 MHz | 30 MHz | 40 MHz | Duplex Mode |
| n38 | 15 | 50 | 105 | 160 | 216 | HD |
|  | 30 | 24 | 50 | 75 | 105 | HD |
|  | 60 | 102 | 24 | 36 | 50 | HD |
| n47 | 15 | 50 | 105 | 160 | 216 | HD |
|  | 30 | 24 | 50 | 75 | 105 | HD |
|  | 60 | 102 | 24 | 36 | 50 | HD |
| NOTE 1: The sidelink allocated RB (LCRB) size could be adjusted according to resource pool configuration in [7].  NOTE 2: For the case, 11 RB is allowed for S-SSB Block. | | | | | | |

### 7.3E.3 Reference sensitivity power level for V2X con-current operation

When UE is configured for NR V2X reception on V2X carrier con-current with NR uplink and downlink, NR V2X sidelink throughput for the carrier shall be ≥ 95% of the maximum throughput of the reference measurement channels as specified in Annexes A.7.2 with parameters specified in Table 7.3E.2-1 and 7.3E.2-2. Also the NR downlink throughput shall be ≥ 95% of the maximum throughput of the reference measurement channels as specified in Annexes A.3 with parameters specified in table 7.3.2-1, 7.3.2-2 and 7.3.2-3. The reference sensitivity is defined to be met with all downlink component carriers active. The REFSENS of Uu downlink and PC5 sidelink will be tested at the same time.

For the inter-band con-current NR V2X operation, and the UE also supports an NR downlink inter-band con-current configuration in Table 7.3E.3-2, the minimum requirement for reference sensitivity shall be increased by the amount given in ΔRIB,V2X in Table 7.3E.3-2 for the corresponding NR V2X inter-band combinations.

Table 7.3E.3-1: Void

Table 7.3E.3-2: ΔRIB,V2X (two bands)

|  |  |  |
| --- | --- | --- |
| V2X inter-band con-current band Combination | NR Band | ΔRIB,V2X [dB] |
| V2X\_n71-n47 | n71 | 0.0 |

Table 7.3E.3-3: Void

Table 7.3E.3-4: Void

## ***<Next change>***

## 7.4E Maximum input level for V2X

### 7.4E.1 General

Maximum input level is defined as the maximum mean power received at the UE antenna port, at which the specified relative throughput shall meet or exceed the minimum requirements for the specified reference measurement channel. The throughput shall be ≥ 95 % of the maximum throughput of the reference measurement channels as specified in Annexes A.7.3 and A.7.4 with parameters specified in Table 7.4E.1-1.

Table 7.4E.1-1: Maximum input level of NR V2X

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Rx Parameter | Units | Channel bandwidth | | | |
|  |  | 10 MHz | 20 MHz | 30 MHz | 40 MHz |
| Power in Transmission Bandwidth Configuration | dBm | -251 | -251 | -231 | -221 |
|  |  | -272 | -272 | -252 | -242 |
| NOTE 1: Reference measurement channel is A.7.3 for 64 QAM.  NOTE 2: Reference measurement channel is A.7.4 for 256 QAM. | | | | | |

### 7.4E.2 Maximum input level for V2X con-current operation

For the inter-band con-current NR V2X operation, the requirements specified in clause 7.4E.1 shall apply for the NR sidelink reception in the operating Bands in Table 5.2E.1-1 and the requirements specified in clause 7.4 shall apply for the NR downlink reception in licensed band while all downlink carriers are active.

## ***<Next change>***

## 7.5E Adjacent channel selectivity for V2X

### 7.5E.1 General

Adjacent channel selectivity (ACS) is a measure of a receiver's ability to receive an NR signal at its assigned channel frequency in the presence of an adjacent channel signal at a given frequency offset from the centre frequency of the assigned channel. ACS is the ratio of the receive filter attenuation on the assigned channel frequency to the receive filter attenuation on the adjacent channel(s).

The UE shall fulfil the minimum requirements specified in Table 7.5E.1-1 for NR V2X UE. These requirements apply for all values of an adjacent channel interferer up to -25 dBm and for any SCS specified for the channel bandwidth of the wanted signal. However, it is not possible to directly measure the ACS; instead the lower and upper range of test parameters are chosen as in Table 7.5E.1-2 and Table 7.5E.1-3 for verification of the requirements specified in Table 7.5E.1-1. For these test parameters, the throughput shall be ≥ 95 % of the maximum throughput of the reference measurement channels as specified in Annexes A.7.2.

In licensed band, the minimum requirements shall reuse the same ACS values with NR UE.

Table 7.5E.1-1: Adjacent channel selectivity for NR V2X

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| RX parameter | Units | Channel bandwidth | | | |
|  |  | 10 MHz | 20 MHz | 30 MHz | 40 MHz |
| ACS | dB | 33.0 | 27.0 | 25.5 | 24.0 |

Table 7.5E.1-2: Test parameters for Adjacent channel selectivity for V2X, Case 1

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| RX parameter | Units | Channel bandwidth | | | |
|  |  | 10 MHz | 20 MHz | 30 MHz | 40 MHz |
| Power in transmission bandwidth configuration | dBm | PREFSENS\_V2X + 14 dB | | | |
| Pinterferer | dBm | PREFSENS\_V2X + 45.5 dB | PREFSENS\_V2X + 39.5 dB | PREFSENS\_V2X + 38.0 dB | PREFSENS\_V2X + 36.5 dB |
| BWinterferer | MHz | 10 | 10 | 10 | 10 |
| Finterferer (offset) | MHz | 10 / -10 | 15 / -15 | 20 / -20 | 25 / -25 |
| NOTE 1: The interferer is QPSK modulated PUSCH containing data and reference symbols. Normal cyclic prefix is used.  NOTE 2: The absolute value of the interferer offset Finterferer (offset) shall be further adjusted to MHz with SCS the sub-carrier spacing of the wanted signal in MHz. The interferer is an NR signal with 15 kHz SCS. | | | | | |

Table 7.5E.1-3: Test parameters for Adjacent channel selectivity for V2X, Case 2

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| RX parameter | Units | Channel bandwidth | | | |
|  |  | 10 MHz | 20 MHz | 30 MHz | 40 MHz |
| Power in transmission bandwidth configuration | dBm | -56.5 | -50.5 | -49.0 | -47.5 |
| Pinterferer | dBm | -25 | | | |
| BWinterferer | MHz | 10 | 10 | 10 | 10 |
| Finterferer (offset) | MHz | 10 / -10 | 15 / -15 | 20 / -20 | 25 / -25 |
| NOTE 1: The interferer is QPSK modulated PUSCH containing data and reference symbols. Normal cyclic prefix is used.  NOTE 2: The absolute value of the interferer offset Finterferer (offset) shall be further adjusted to MHz with SCS the sub-carrier spacing of the wanted signal in MHz. The interferer is an NR signal with 15 kHz SCS. | | | | | |

### 7.5E.2 Adjacent channel selectivity for V2X con-current operation

For the inter-band con-current NR V2X operation, the requirements specified in clause 7.5E.1 shall apply for the NR sidelink reception in the operating Bands in Table 5.2E.1-1 and the requirements specified in clause 7.5 shall apply for the NR downlink reception in licensed band while all downlink carriers are active.

## ***<Next change>***

## 7.6E Blocking characteristics for V2X

### 7.6E.1 General

The blocking characteristic is a measure of the receiver's ability to receive a wanted signal at its assigned channel frequency in the presence of an unwanted interferer on frequencies other than those of the spurious response or the adjacent channels, without this unwanted input signal causing a degradation of the performance of the receiver beyond a specified limit. The blocking performance shall apply at all frequencies except those at which a spurious response occurs.

### 7.6E.2 In-band blocking

#### 7.6E.2.1 General

The throughput of the wanted signal shall be ≥ 95 % of the maximum throughput of the reference measurement channels as specified in Annex A.7.2 with parameters specified in Table 7.6E.2.1-1 and Table 7.6E.2.1-2. The relative throughput requirement shall be met for any SCS specified for the channel bandwidth of the wanted signal.

Table 7.6E.2.1-1: In-band blocking parameters for NR V2X

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| RX parameter | Units | Channel bandwidth | | | |
|  |  | 10 MHz | 20 MHz | 30 MHz | 40 MHz |
| Power in transmission bandwidth configuration | dBm | PREFSENS\_V2X + channel bandwidth specific value below | | | |
|  | dB | 6 | 9 | 11 | 12 |
| BWinterferer | MHz | 10 | | | |
| FIoffset, case 1 | MHz | 15 | | | |
| FIoffset, case 2 | MHz | 25 | | | |
| NOTE 1: The interferer is QPSK modulated PUSCH containing data and reference symbols. Normal cyclic prefix is used. | | | | | |

Table 7.6E.2.1-2: In-band blocking for NR V2X

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| NR band | Parameter | Unit | Case 1 | Case 2 |
| n38, n47 | Pinterferer | dBm | -44 | -44 |
|  | Finterferer (offset) | MHz | -BW/2 – FIoffset, case 1  and  BW/2 + FIoffset, case 1 | ≤ -BW/2 – FIoffset, case 2  and  ≥ BW/2 + FIoffset, case 2 |
|  | Finterferer | MHz | NOTE 2 | FDL\_low – 30  to  FDL\_high + 30 |
| NOTE 1: For certain bands, the unwanted modulated interfering signal may not fall inside the UE receive band, but within the first 15 MHz below or above the UE receive band.  NOTE 2: For each carrier frequency the requirement is valid for two frequencies:  a. the carrier frequency -BW/2 – FIoffset, case 1 and  b. the carrier frequency +BW/2 + FIoffset, case 1  NOTE 3: FInterferer range values for unwanted modulated interfering signal are interferer center frequencies  NOTE 4: The absolute value of the interferer offset Finterferer (offset) shall be further adjusted to MHz with SCS the sub-carrier spacing of the wanted signal in MHz. The interferer is an NR signal with 15 kHz SCS. | | | | |

#### 7.6E.2.2 In-band blocking for V2X con-current operation

For the inter-band con-current NR V2X operation, the requirements specified in clause 7.6E.2.1 shall apply for the NR sidelink reception in the operating Bands in Table 5.2E.1-1 and the requirements specified in clause 7.6.2 shall apply for the NR downlink reception in licensed band while all downlink carriers are active.

### 7.6E.3 Out-of-band blocking

#### 7.6E.3.1 General

For NR V2X bands out-of-band band blocking is defined for an unwanted CW interfering signal falling outside a frequency range 30 MHz below or above the UE receive band. The throughput of the wanted signal shall be ≥ 95% of the maximum throughput of the reference measurement channels as specified in Annexes A.7.2 with parameters specified in Table 7.6E.3.1-1 and Table 7.6E.3.1-2. The relative throughput requirement shall be met for any SCS specified for the channel bandwidth of the wanted signal.

Table 7.6E.3.1-1: Out-of-band blocking parameters for NR V2X

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| RX parameter | Units | Channel bandwidth | | | |
|  |  | 10 MHz | 20 MHz | 30 MHz | 40 MHz |
| Power in transmission bandwidth configuration | dBm | PREFSENS\_V2X + channel bandwidth specific value below | | | |
|  | dB | 6 | 9 | 11 | 12 |
| NOTE: Reference measurement channel is A.7.2. | | | | | |

Table 7.6E.3.1-2: Out of-band blocking for NR V2X

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| NR band | Parameter | Units | Range 1 | Range 2 | Range 3 |
| n47 | Pinterferer | dBm | -44 | -30 | -15 |
|  | Finterferer (CW) | MHz | FDL\_low -30 to  FDL\_low -60 | FDL\_low -60 to  FDL\_low -85 | FDL\_low -85 to  1 MHz |
|  |  |  | FDL\_high +30 to  FDL\_high + 60 | FDL\_high +60 to  FDL\_high +85 | FDL\_high +85 to  +12750 MHz |
| n38 | Pinterferer | dBm | -44 | -30 | -15 |
|  | Finterferer (CW) | MHz | FDL\_low -30 to  FDL\_low -60 | FDL\_low -60 to  FDL\_low -85 | FDL\_low -85 to  1 MHz |
| NOTE 1: The power level of the interferer (PInterferer) for Range 3 shall be modified to -20 dBm for FInterferer > 4400 MHz. | | | | | |

#### 7.6E.3.2 Out-of-band blocking for V2X con-current operation

For the inter-band con-current NR V2X operation, the requirements specified in clause 7.6E.3.1 shall apply for the NR sidelink reception in Band n47 and the requirements specified in clause 7.6.3 shall apply for the NR downlink reception in licensed band while all downlink carriers are active.

## ***<Next change>***

## 7.7E Spurious response for V2X

### 7.7E.1 General

Spurious response is a measure of the receiver’s ability to receive a wanted signal on its assigned channel frequency without exceeding a given degradation due to the presence of an unwanted CW interfering signal at any other frequency for which a response is obtained, i.e. for which the out-of-band blocking limit as specified in clause 7.6E.3.1 is not met.

The throughput shall be ≥ 95 % of the maximum throughput of the reference measurement channels as specified in Annexes A.7.2 with parameters for the wanted signal as specified in Table 7.7E.1-1 and Table 7.7E.1-2 for NR V2X bands. The relative throughput requirement shall be met for any SCS specified for the channel bandwidth of the wanted signal.

Table 7.7E.1-1: Spurious response parameters for NR V2X

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| RX parameter | Units | Channel bandwidth | | | |
|  |  | 10 MHz | 20 MHz | 30 MHz | 40 MHz |
| Power in transmission bandwidth configuration | dBm | PREFSENS\_V2X + channel bandwidth specific value below | | | |
|  | dB | 6 | 9 | 11 | 12 |
| NOTE 1: Reference measurement channel is A.7.2 | | | | | |

Table 7.7E.1-2: Spurious response for NR V2X

|  |  |  |
| --- | --- | --- |
| Parameter | Unit | Level |
| PInterferer (CW) | dBm | -44 |
| FInterferer | MHz | Spurious response frequencies |

### 7.7E.2 Spurious response for V2X con-current operation

For the inter-band con-current NR V2X operation, the requirements specified in clause 7.7E.1 shall apply for the NR sidelink reception in the operating Bands in Table 5.2E.1-1 and the requirements specified in clause 7.7 shall apply for the NR downlink reception in licensed band while all downlink carriers are active.

## ***<Next change>***

## 7.8E Intermodulation characteristics for V2X

### 7.8E.1 General

Intermodulation response rejection is a measure of the capability of the receiver to receive a wanted signal on its assigned channel frequency in the presence of two or more interfering signals which have a specific frequency relationship to the wanted signal.

### 7.8E.2 Wide band Intermodulation

#### 7.8E.2.1 General

The wide band intermodulation requirement is defined using modulated NR carrier and a CW signal as interferer 1 and interferer 2 respectively. The throughput shall be ≥ 95 % of the maximum throughput of the reference measurement channels as specified in Annexes A.7.2 with parameters specified in Table 7.8E.2-1 for NR V2X bands. The relative throughput requirement shall be met for any SCS specified for the channel bandwidth of the wanted signal.

Table 7.8E.2-1: Wide band intermodulation parameters for NR V2X

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| NR band | Rx parameter | Units | Channel bandwidth | | | |
|  |  |  | 10 MHz | 20 MHz | 30 MHz | 40 MHz |
| n38, n47 | Power in Transmission Bandwidth Configuration | dBm | PREFSENS\_V2X + channel bandwidth specific value below | | | |
|  | 6 | 9 | 11 | 12 |
|  | PInterferer 1 (CW) | dBm | -46 | | | |
|  | PInterferer 2 (Modulated) | dBm | -46 | | | |
|  | BWInterferer 2 | MHz | 10MHz | | | |
|  | FInterferer 1 (Offset) | MHz | -BW/2 – 15  /  +BW/2 + 15 | | | |
|  | FInterferer 2 (Offset) | MHz | 2 \* FInterferer 1 | | | |
| NOTE 1: Reference measurement channel is A.7.2  NOTE 2: The interferer is QPSK modulated PUSCH containing data and reference symbols. Normal cyclic prefix is used. | | | | | | |

#### 7.8E.2.2 Wide band Intermodulation for V2X con-current operation

For the inter-band con-current NR V2X operation, the requirements specified in clause 7.8E.2.1 shall apply for the NR sidelink reception in the operating Bands in in Table 5.2E.1-1 and the requirements specified in clause 7.8 shall apply for the NR downlink reception in licensed band while all downlink carriers are active.

## ***<End of change>***