**3GPP TSG-RAN WG4 Meeting #** **100-e *R4-2115136***

**Electronic meeting, 16th – 27th August, 2021**

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| *CR-Form-v12.1* | | | | | | | | |
| **CHANGE REQUEST** | | | | | | | | |
|  | | | | | | | | |
|  | **38.101-1** | **CR** | **0922** | **rev** | **-** | **Current version:** | **16.8.0** |  |
|  | | | | | | | | |
| *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 part2 (Rel-16) | | | | | | | | | |
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| ***Source to WG:*** | MCC, Samsung | | | | | | | | | |
| ***Source to TSG:*** | R4 | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Work item code:*** | NR\_newRAT-Core  NR\_unlic-Core  5G\_V2X\_NRSL-Core  NR\_band\_n65-Core  NR\_eMIMO-Core  NR\_CA\_R16\_intra-Core  NR\_RF\_FR1-Core  NR\_CADC\_R16\_2BDL\_xBUL-Core | | | | |  | ***Date:*** | | | 2021-08-31 |
|  |  | | | |  | |  | | |  |
| ***Category:*** | **F** |  | | | | | ***Release:*** | | | Rel-16 |
|  | *Use one of the following categories:* ***F*** *(correction)* ***A*** *(mirror corresponding to a change in an earlier release)* ***B*** *(addition of feature),* ***C*** *(functional modification of feature)* ***D*** *(editorial modification)*  Detailed explanations of the above categories 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.  R4-2113434 Draft CR for 38.101-1 to clarify fallback group for bandwidth class  <Reason for change>  Fallback group 3 introduced in previous RAN4 meeting is only applicable to bands identified for use with shared spectrum channel access. However, the specifications didn’t clarify this point clearly. It will cause some ambiguties and NBC issue from network perspective for licensed bands. For example, when UE report bandwidth class C in band n41, it’s unclear whether it supports class B. It’s necessary to clarify it in the spec.  R4-2115071 Delete CA configurations with n46E  <Reason for change>  n46E is for aggregated BW > 300MHz and the widest available spectrum is UNII-2C with 260MHz. so BW class E is not usable in n46 and this is also why 802.11be has no 320MHz channel in 5GHz band.  R4-2112888 Draft CR on editorial correction on 5G V2X UE RF requirements in TS38.101-1 in Rel-16  <Reason for change>  This CR is to update the editorical correction for 5G V2X UE in TS38.101-1.  R4-2111734 CR CatF N65 NS\_24 AMPR  <Reason for change>  AMPR is insufficient and there are RB allocations where AMPR is not defined  R4-2114532 draft CR for 38.101-1 to correct IE and UE capability for half Pi BPSK requirement  <Reason for change>  The name of associated IE and UE capability for Pi/2 BPSK requirement was not aligned with TS 38.331 and TS 38.306.  R4-2114501 Draft CR on Power control for CA for TS 38.101-1  <Reason for change>  The definition of Relative power tolerance for CA and Aggregate power control tolerance for CA are incorrect.  R4-2112870 draft CR for mandatory simultaneous Rx/Tx capability for FR1 NR-DC combinations  <Reason for change>  Based on the LS from RAN2 R2-2102495 and the LS reply from RAN4 R4-2108003, the following statements can be observed.  - The simultaneous Rx/Tx capability is needed for any TDD-TDD and TDD-FDD inter-band NR DC.  - With the legacy RAN2 signalling, it is feasible to indicate simultaneous RxTx UE capability separately for NR CA and NR-DC.  But currently the notes of mandatory simultaneous Rx/Tx capability for FR1 NR-DC configurations are missing.  R4-2112377 Draft CR for TS 38.101-1: Corrections for CA MPR table referencing  <Reason for change>  The UE maximum output power reduction for intra-band contiguous CA text descriptions in clause 6.2A.2.1 are referencing incorrect table numbers which do not exist in the specifications  R4-2114475 Draft CR on intra-band UL CA Pcmax for TS 38.101-1  <Reason for change>  Pcmax,c definition for intra-band UL CA is not correct.  R4-2113415 DraftCR for 38.101-1 to correct the configurations for intra-band CA (Rel-16)  <Reason for change>  Referring to agreed CR R4-2101886 and R4-2103033, some of the corrections have an impact on Rel-16 spec. Some inconsistency can be observed.  R4-2114908 draftCR for TS 38.101-1 Rel-16: Applying n40 and n41 spurious emissions on CA  <Reason for change>  With the resent agreement on n40 and n41 single band emission requirements, the emission limits for CA combinations require an update to match new conditions.  In addition, so we added emission requirements between Band 40 and Japan bands at the RAN4#99e meeting. Band 41 is one of the Japan bands, and it has already been agreed to add requirements for them at the RAN4#98e meeting (R4-2103134). Therefore, these emission limits for CA combinations are added to match new conditions.  R4-2112438 R16 draft CR for 38.101-1 to correct some errors in Refenrence sensitivity due to UL harmonic table  <Reason for change>  Correct errors and make up missing values in Table 7.3A.4-1 Reference sensitivity exceptions due to UL harmonic for NR CA FR1 and Table 7.3A.4-2 Uplink configuration for reference sensitivity exceptions due to UL harmonic interference for NR CA, FR1  Genarally, MSD values due to harmonic of NR CA are reused from values of LTE or ENDC combinations, besides the MSD values shall specify for all victim DL channel bandwidths.  Some MSD values in Table 7.3A.4-1 are incorrect compared to values in TS 38.101-3 and TR 38.716-02-00-g00**.** Besides, values of some bandwidths are absent.  R4-2114909 CR for corrections of band combinations in 38.101-1  <Reason for change>  Corrections 38.101-1  R4-2112809 Support of asymmetric BW for CA  <Reason for change>  The support of asymmetric channel bandwidths in CA configurations of operating bands supporting asymmetric bandwidths is undefined.  An asymmetric UL and DL channel bandwidth combination configured for a CA band combination must be contained in both an asymmetric bandwidth combination set of a band and in a supported bandwidth combination set of the CA configuration for both the UL and DL channel bandwidths.  Example: for a UE supporting BCS#0 for CA\_n2A-n66A and the asymnetric BCS#1 of Band n66, requirements are defined for the asummetric (UL,DL) combination (20,40) MHz but not for (25,40) MHz since the UL channel bandwidth of 25 MHz is not contained in BCS#0 of the CA configuration. A BCS for a CA configuration applies for both the UL and DL.  R4-2114878 Draft CR to TS38.101-1: Inter-band NR CA Tx requirement including intra-band contiguous CA UL configuration  <Reason for change>  As discussed in R4-2112904, Some of the Tx requirements are only defined for ‘nXA-nYA’ type of UL CA configurations, which means intra-band contiguous CA, i.e. ‘nXC’ type of UL CA configurations is missing.  Also as mentioned in [R4-2113022](ftp://ftp.3gpp.org/tsg_ran/WG4_Radio/TSGR4_94_eBis/Docs/R4-2113021.zip), the title of 6.3A.1 Minimum output power was missing in this release. | | | | | | | | |
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| ***Summary of change:*** | | The summary of change in each each endorsed draft CR is copied below.  R4-2113434 Draft CR for 38.101-1 to clarify fallback group for bandwidth class  <Summary of change>  To clarify that fallback group 3 introduced in previous RAN4 meeting is only applicable to bands identified for use with shared spectrum channel access.  R4-2115071 Delete CA configurations with n46E  <Summary of change>  Delete CA configurations CA\_n46E-n48A  R4-2112888 Draft CR on editorial correction on 5G V2X UE RF requirements in TS38.101-1 in Rel-16  <Summary of change>  This CR is to modify some editorial correction as follow   * Editorial correction of SL MIMO in maximum output power * For con-current V2X operation, SL can operated in licensed band not n47. So update the related RF requirements. * Update reference FRC Tables for REFSENS   R4-2111734 CR CatF N65 NS\_24 AMPR  <Summary of change>   1. Modify 5MHz, Fc=2002.5MHz LCRB > 2.16 to LCRB > 1.98MHz in Region A to cover AMPR for LCRB = 2.16MHz 2. Modify 5MHz, Fc=2002.5MHz RBend > 3.78 to RBend > 3.6MHz in Region B to cover AMPR for RBend = 3.78 MHz 3. Modify 10MHz, Fc=1995MHz RBend > 7.56 to RBend > 7.38MHz in Region B to cover AMPR for RBend = 7.56MHz 4. Modify 10MHz, Fc=1995MHz LCRB > 4.5 to LCRB > 4.32MHz in Region A to cover AMPR for LCRB = 4.5MHz 5. Modify 10MHz, Fc=2000MHz RBend > 6.84 to RBend > 6.66MHzin Region A to cover AMPR for RBend = 6.84MHz 6. Modify 10MHz, Fc=2000MHz RBend < 2.88 to RBend < 3.06MHz in Region B to cover AMPR for RBend = 2.88MHz 7. Modify 15MHz, Fc=1987.5MHz LCRB > 7.02 to LCRB > 6.84MHz in Region A to cover AMPR for LCRB = 7.02MHz 8. Modify 15MHz, Fc=1987.5MHz RBend > 11.52 to RBend > 11.34 MHz in Region B to cover AMPR for RBend = 11.52 MHz 9. Modify 15MHz, Fc=1997.5MHz RBend > 9.36 to RBend > 9.18MHz in Region A to cover AMPR for RBend = 9.36MHz 10. Modify 15MHz, Fc=1997.5MHz RBend < 3.6 to RBend < 3.78MHz in Region B to cover AMPR for RBend = 3.6MHz 11. Modify 20MHz, Fc=1990MHz RBend > 13.5 to RBend > 13.32MHz in Region A to cover AMPR for RBend = 13.5MHz 12. Modify 20MHz, Fc=1990MHz RBend < 4.5 to RBend < 4.68MHz in Region B to cover AMPR for RBend = 4.5MHz 13. Modify 20MHz, Fc=1995MHz RBend > 12.6 to RBend > 12.42MHz in Region A to cover AMPR for RBend = 12.6MHz 14. Modify 20MHz, Fc=1995MHz RBend < 5.4 to RBend < 5.58MHz in Region B to cover AMPR for RBend = 5.4MHz 15. Add AMPR A6 to region B for 5MHz Fc=2002.5MHz. 16. Add AMPR A6 to region B for 10MHz Fc=1995MHz. 17. Add AMPR A6 to region B for 15MHz Fc=1987.5MHz   Add AMPR A6 to region B for 15MHz Fc=1987.5MHz  R4-2114532 draft CR for 38.101-1 to correct IE and UE capability for half Pi BPSK requirement  <Summary of change>  Correcting the name of associated IE and UE capability for Pi/2 BPSK requirement to align with TS 38.331 and TS 38.306.  R4-2114501 Draft CR on Power control for CA for TS 38.101-1  <Summary of change>   1. Correcting the minimum requirements for Relative power tolerance in clause 6.3A.4.1.2 and minimum requirements for Aggregate power control tolerance in clause 6.3A.4.1.3 for intra-band contiguous UL CA. 2. Correcting the minimum requirements for Relative power tolerance in clause 6.3A.4.2.2 and minimum requirements for Aggregate power control tolerance in clause 6.3A.4.2.3 for intra-band non-contiguous UL CA.   R4-2112870 draft CR for mandatory simultaneous Rx/Tx capability for FR1 NR-DC combinations  <Summary of change>  Update the note of mandatory simultaneous Rx/Tx capability for some FR1 NR-DC configurations based on the reasons above.  R4-2112377 Draft CR for TS 38.101-1: Corrections for CA MPR table referencing  <Summary of change>   1. In the first paragraph in clause 6.2A.2.1, change Table 6.2A.1.4-1 to Table 6.2A.1.1-1 and change Table 6.2A.2.4-1 to Table 6.2A.2.1-1. 2. In the paragraph right above Table 6.2A.2.1-2 in clause 6.2A.2.1, change Table 6.2A.1.5-1 to Table 6.2A.1.1-1 and change Table 6.2A.2.4-2 to Table 6.2A.2.1-2   R4-2114475 Draft CR on intra-band UL CA Pcmax for TS 38.101-1  <Summary of change>   1. Revise the MPR,c and AMPR,c value be equal to CA MPR and AMPR for intra-band UL CA. 2. Corrections for Pcmax definition. 3. Power tolerance for intra-band UL NC CA follwes the value in power class table 6.2A.1.2-1.   R4-2113415 DraftCR for 38.101-1 to correct the configurations for intra-band CA (Rel-16)  <Summary of change>  To implement the correction in Rel-16 spec based on CR R4-2101886 and R4-2103033.  R4-2114908 draftCR for TS 38.101-1 Rel-16: Applying n40 and n41 spurious emissions on CA  <Summary of change>   1. Changed emission limit for n40 to -40dBm/MHz: CA\_n41, CA\_n3-n41, CA\_n8n-n41, CA\_n39-n41, CA\_n41-n50, CA\_n41-n79 2. Added emission limit for n40 to -40dBm/MHz: CA\_n1-n41, CA\_n28-n41, CA\_n41-n78   R4-2112438 R16 draft CR for 38.101-1 to correct some errors in Refenrence sensitivity due to UL harmonic table  <Summary of change>  Correct and make up values for below combinations:   1. For CA\_n2-n77, make up missing value of 70MHz, and correct values of 80/90/100MHz 2. For CA\_n5-n77, make up missing value of 70MHz, and correct values of 80/90/100MHz 3. For CA\_n2-n78, make up missing values of 25/30MHz for the CA configuration supports 25/30MHz of BCS0. 4. For CA\_n66-n77, make up missing value of 70MHz, and correct values of 80/90/100MHz   R4-2114909 CR for corrections of band combinations in 38.101-1  <Summary of change>  Corrections:   * Remove not defined 10, 15 and 20 MHz in band n79 from CA\_n8A-n79A * Remove not defined 90 MHz in band n79 for CA\_n39A-n41A-n79A * Remove not defined 100 MHz in band n39 for CA\_n39A-n41A-n79A   R4-2112809 Support of asymmetric BW for CA  <Summary of change>  Sub-clause 5.5A.0: the applicability of requirements for channel bandwidths of CA configurations with one or more operating band supporting asymmetric channel bandwidths is defined.  R4-2114878 Draft CR to TS38.101-1: Inter-band NR CA Tx requirement including intra-band contiguous CA UL configuration  <Summary of change>  The definition/description of some Tx requirements are added to support intra-band contiguous CA, i.e. ‘nXC’ type of UL CA configurations.  Add the missing title 6.3A.1 Minimum output power in this release | | | | | | | | |
|  | |  | | | | | | | | |
| ***Consequences if not approved:*** | | The consequences if not approved for each endorsed draft CR are coppied below.  R4-2113434 Draft CR for 38.101-1 to clarify fallback group for bandwidth class  <Consequences if not approved>  It’s unclear whether fallback group 3 is only applicable to bands identified for use with shared spectrum channel access.  R4-2115071 Delete CA configurations with n46E  <Consequences if not approved>  n46E CA configurations are in error and can cause implementation issues  R4-2112888 Draft CR on editorial correction on 5G V2X UE RF requirements in TS38.101-1 in Rel-16  <Consequences if not approved>  NR V2X RF requirements have some typo and mis-aligned referencing for RF requirements.  R4-2111734 CR CatF N65 NS\_24 AMPR  <Consequences if not approved>  UE cannot meet NS requirement  R4-2114532 draft CR for 38.101-1 to correct IE and UE capability for half Pi BPSK requirement  <Consequences if not approved>  The indication of IE and UE capability for Pi/2 BPSK requirement would keep incorrect.  R4-2114501 Draft CR on Power control for CA for TS 38.101-1  <Consequences if not approved>  The errors in clause 6.3A.4 are incorrect.  R4-2112870 draft CR for mandatory simultaneous Rx/Tx capability for FR1 NR-DC combinations  <Consequences if not approved>  The notes of mandatory simultaneous Rx/Tx capability for some FR1 NR-DC configurations remain missing and the specification remains unclear.  R4-2112377 Draft CR for TS 38.101-1: Corrections for CA MPR table referencing  <Consequences if not approved>  Incorrect table numbers are referenced for intra-band contiguous CA MPR requirements.  R4-2114475 Draft CR on intra-band UL CA Pcmax for TS 38.101-1  <Consequences if not approved>  The spec is not correct intra-band UL CA Pcmax.  R4-2113415 DraftCR for 38.101-1 to correct the configurations for intra-band CA (Rel-16)  <Consequences if not approved>  Some inconsistency can be observed between Rel-17 and Rel-16.  R4-2114908 draftCR for TS 38.101-1 Rel-16: Applying n40 and n41 spurious emissions on CA  <Consequences if not approved>  Emission requirements for all CA combinations with n40 are wrong. Also, n40 is not properly protected from CA between n41 and Japan band.  R4-2112438 R16 draft CR for 38.101-1 to correct some errors in Refenrence sensitivity due to UL harmonic table  <Consequences if not approved>  Table 7.3A.4-1 and Table 7.3A.4-2 have some mistakes.  R4-2114909 CR for corrections of band combinations in 38.101-1  <Consequences if not approved>  Corrections 38.101-1 are not made  R4-2112809 Support of asymmetric BW for CA  <Consequences if not approved>  The support of asymmetric channel bandwidths in CA configurations of operating bands (FDD) supporting asymmetric bandwidths is undefined.  R4-2114878 Draft CR to TS38.101-1: Inter-band NR CA Tx requirement including intra-band contiguous CA UL configuration  <Consequences if not approved>  Incomplete inter-band UL CA requirements, and the title 6.3A.1 Minimum output power in this release was still missing. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Clauses affected:*** | | 5.3A.5; 5.5A.3; 6.2E.1, 6.2E.2.3, 6.2E.3, 6.3E.1, 6.3E.2, 6.3E.2, 6.3E.3.4, 6.3E.4.3, 6.4E.1, 6.4E.2.6, 6.5E.1, 6.5E.2.2, 6.5E.2.4, 6.5E.4, 7.3E.2, 7.4E.2, 7.5E.2, 7.6E.2.2, 7.7E.2 and 7.8E.3; 6.2.3.15; 6.4.2.4.1; 6.3A.4.1.2, 6.3A.4.1.3, 6.3A.4.2.2, 6.3A.4.2.3; 5.5B.7.1; 6.2A.2.1; 6.2A.4; 5.5A.1, 5.5A.2; 6.5A.3.2; 7.3A.4; 5.5A.0; 6.2A.1.3, 6.2A.2.3, 6.2A.3.1.3, 6.3.1A.1, 6.3A.2.3, 6.3A.1.3, 6.3A.2.3, 6.3A.3.3, 6.4A.1.3, 6.4A.2.3, 6.5A.1.3, 6.5A.2.2.3, 6.5A.2.4.1.3, 6.5A.3.2.3, 6.5A.4.2.3 | | | | | | | | |
|  | |  | | | | | | | | |
|  | | **Y** | **N** |  | | | |  | | |
| ***Other specs*** | |  | **X** | Other core specifications | | | | TS/TR ... CR ... | | |
| ***affected:*** | | **X** |  | Test specifications | | | | TS 38.521-1; 38.521-3 | | |
| ***(show related CRs)*** | |  | **X** | O&M Specifications | | | | TS/TR ... CR ... | | |
|  | |  | | | | | | | | |
| ***Other comments:*** | |  | | | | | | | | |
|  | |  | | | | | | | | |
| ***This CR's revision history:*** | |  | | | | | | | | |

## **<<Start of Change1>>**

### 5.3A.5 UE channel bandwidth per operating band for CA

The requirements for carrier aggregation in this specification are defined for carrier aggregation configurations.

For intra-band contiguous carrier aggregation, a carrier aggregation configuration is a single operating band supporting a carrier aggregation bandwidth class with associated bandwidth combination sets specified in clause 5.5A.1. For each carrier aggregation configuration, requirements are specified for all aggregated channel bandwidths contained in a bandwidth combination set, a UE can indicate support of several bandwidth combination sets per carrier aggregation configuration. For intra-band non-contiguous carrier aggregation, a carrier aggregation configuration is a single operating band supporting two or more sub-blocks, each supporting a carrier aggregation bandwidth class.

For intra-band non-contiguous uplink carrier aggregation, frequency separation class (Fs) specified in Table 5.3A.5-2 indicates the maximum frequency span between lower edge of lowest component carrier and upper edge of highest component carrier that UE can support per band combination in uplink in non-contiguous intra-band operation when the signalling is absent for dualPA-Architecture IE.

For inter-band carrier aggregation, a carrier aggregation configuration is a combination of operating bands, each supporting a carrier aggregation bandwidth class.

Table 5.3A.5-1: NR CA bandwidth classes

|  |  |  |  |
| --- | --- | --- | --- |
| NR CA bandwidth class | Aggregated channel bandwidth | Number of contiguous CC | Fallback group |
| A | BWChannel ≤ BWChannel,max | 1 | 1, 2, 34 |
| B | 20 MHz ≤ BWChannel\_CA ≤ 100 MHz | 2 | 2, 34 |
| C | 100 MHz < BWChannel\_CA ≤ 2 x BWChannel,max | 2 | 1, 34 |
| D | 200 MHz < BWChannel\_CA ≤ 3 x BWChannel,max | 3 |  |
| E | 300 MHz < BWChannel\_CA ≤ 4 x BWChannel,max | 4 |  |
| G | 100 MHz < BWChannel\_CA ≤ 150 MHz | 3 | 2 |
| H | 150 MHz < BWChannel\_CA ≤ 200 MHz | 4 |  |
| I | 200 MHz < BWChannel\_CA ≤ 250 MHz | 5 |  |
| J | 250 MHz < BWChannel\_CA ≤ 300 MHz | 6 |  |
| K | 300 MHz < BWChannel\_CA ≤ 350 MHz | 7 |  |
| L | 350 MHz < BWChannel\_CA ≤ 400 MHz | 8 |  |
| M3 | 50 MHz ≤ BWChannel\_CA ≤ 200 MHz | 3 | 34 |
| N3 | 80 MHz ≤ BWChannel\_CA ≤ 300 MHz | 4 |  |
| O3 | 100 MHz ≤ BWChannel\_CA ≤ 400 MHz | 5 |  |
| NOTE 1: BWChannel, max is maximum channel bandwidth supported among all bands in a release  NOTE 2: It is mandatory for a UE to be able to fallback to lower order NR CA bandwidth class configuration within a fallback group. It is not mandatory for a UE to be able to fallback to lower order NR CA bandwidth class configuration that belong to a different fallback group.  NOTE 3: This bandwidth class is only applicable to bands identified for use with shared spectrum channel access in Table 5.2-1.  NOTE 4: Fallback group 3 is only applicable to bands identified for use with shared spectrum channel access in Table 5.2-1. | | | |

Table 5.3A.5-2: NR intra-band non-contiguous UL CA frequency separation classes

|  |  |
| --- | --- |
| NR NC UL CA frequency separation class | Maximum allowed frequency separation |
| I | 100 MHz |
| II | 200 MHz |
| III | [600 MHz] |

## **<<End of Change1>>**

## **<<Start of Change2>>**

## 5.5A Configurations for CA

### 5.5A.0 General

The configurations for CA operating band including Band n41 also apply for the corresponding CA operating bands with Band n90 replacing Band n41 but with otherwise identical parameters. For brevity the said configuration for CA operating bands with Band n90 are not listed in the tables below but are covered by this specification.

Non‑contiguous resource allocation and almost contiguous allocation are not applicable for each NR carrier of intra‑band contiguous and non-contiguous CA configurations.

For a CA configuration with one or more operating band supporting asymmetric channel bandwidths as specified in sub-clause 5.3.6, requirements are defined for an asymmetric UL and DL channel bandwidth combination of a supported asymmetric channel bandwidth combination set for an operating band of the CA configuration when the said UL and DL channel bandwidths are also contained in a supported bandwidth combination set of the CA configuration.

## **<<End of Change2>>**

## **<<Start of Change3>>**

### 5.5A.1 Configurations for intra-band contiguous CA

Table 5.5A.1-1: NR CA configurations and bandwidth combination sets defined for intra-band contiguous CA

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| NR CA configuration / Bandwidth combination set | | | | | | | | |
| NR CA configuration | Uplink CA configurations | Channel bandwidths for carrier (MHz) | Channel bandwidths for carrier (MHz) | Channel bandwidths for carrier (MHz) | Channel bandwidths for carrier (MHz) | Channel bandwidths for carrier (MHz) | Maximum aggregated  bandwidth (MHz) | Bandwidth combination set |
| CA\_n1B | - | 10 | 10,15 |  |  |  | 40 | 0 |
|  |  | 15 | 15,20 |  |  |  |  |  |
|  |  | 20 | 20 |  |  |  |  |  |
| CA\_n7B | CA\_n7B | 10 | 10, 15, 20, 30, 40 |  |  |  | 50 | 0 |
|  |  | 15 | 15, 20, 30 |  |  |  |  |  |
|  |  | 20 | 20, 30 |  |  |  |  |  |
| CA\_n40B | - | 20 | 80 |  |  |  | 100 | 0 |
|  |  | 50 | 50 |  |  |  |  |  |
| CA\_n41B | CA\_n41B | 10, 20, 30, 40, 50 | 10, 20, 30, 40, 50 |  |  |  | 100 | 0 |
| CA\_n41C | CA\_n41C | 40 | 80, 100 |  |  |  | 180 | 0 |
|  |  | 50, 60, 80 | 60, 80, 100 |  |  |  |  |  |
|  |  | 10 | 100 |  |  |  | 190 | 1 |
|  |  | 15, 20 | 90, 100 |  |  |  |  |  |
|  |  | 40 | 80, 90, 100 |  |  |  |  |  |
|  |  | 50, 60, 80, 90 | 60, 80, 90, 100 |  |  |  |  |  |
| CA\_n46B | - | 20, 40, 60 | 20, 40 |  |  |  | 100 | 0 |
| CA\_n46C | - | 60, 80 | 60, 80 |  |  |  | 160 | 0 |
| CA\_n46D | - | 60, 80 | 80 | 80 |  |  | 240 | 0 |
| CA\_n46E | - | 80 | 80 | 80 | 80 |  | 320 | 0 |
| CA\_n46M | - | 20, 40, 60 | 20, 40 | 20, 40 |  |  | 140 | 0 |
| CA\_n46N | - | 20, 40, 80 | 20, 40 | 20, 40 | 20, 40 |  | 200 | 0 |
| CA\_n46O | - | 20, 60 | 20, 40 | 20, 40 | 20, 40 | 20, 40 | 220 | 0 |
| CA\_n48B | CA\_n48B | 5 | 15, 20 |  |  |  | 40 | 0 |
|  | 10, 15, 20 | 10, 15, 20 |  |  |  |
|  | 15, 20 | 15, 20 |  |  |  |
|  | - | 10 | 50, 60, 80, 90 |  |  |  | 100 | 1 |
|  |  | 15, 20 | 40, 50, 60, 80 |  |  |  |  |  |
|  |  | 40 | 40, 50, 60 |  |  |  |  |  |
| CA\_n48C | - | 10 | 100 |  |  |  | 140 | 0 |
|  |  | 15 | 90,100 |  |  |  |  |  |
|  |  | 20 | 90, 100 |  |  |  |  |  |
|  |  | 40 | 80, 90, 100 |  |  |  |  |  |
| CA\_n66B | - | 5 1 | 20, 40 |  |  |  | 50 | 0 |
|  |  | 10 | 15, 20, 40 |  |  |  |  |  |
|  |  | 15 | 15, 20 |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |
| CA\_n71B | - | 5 | 20 |  |  |  | 25 | 0 |
|  |  | 10 | 15 |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |
|  |  | 10 | 20 |  |  |  | 35 | 1 |
|  |  | 15 | 15, 20 |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |
| CA\_n77C | CA\_n77C | 50 | 60, 80, 100 |  |  |  | 200 | 0 |
|  |  | 60 | 60, 80, 100 |  |  |  |  |  |
|  |  | 80 | 80, 100 |  |  |  |  |  |
|  |  | 100 | 100 |  |  |  |  |  |
|  |  | 10 | 100 |  |  |  | 200 | 1 |
| 15, 20 | 90, 100 |  |  |  |
| 25, 30 | 80, 90, 100 |  |  |  |
| 40 | 70, 80, 90, 100 |  |  |  |
| 50, 60, 70, 80, 90, 100 | 60, 70, 80, 90, 100 |  |  |  |
| CA\_n77D | - | 100 | 100 | 100 |  |  | 300 | 0 |
| CA\_n78B | - | 20 | 50 |  |  |  | 70 | 0 |
| CA\_n78C | CA\_n78C | 50 | 60, 80, 100 |  |  |  | 200 | 0 |
| 60 | 60, 80, 100 |  |  |  |  |  |
| 80 | 80, 100 |  |  |  |  |  |
| 100 | 100 |  |  |  |  |  |
| 10 | 100 |  |  |  | 200 | 1 |
| 15, 20 | 90, 100 |  |  |  |
| 25, 30 | 80, 90, 100 |  |  |  |
| 40 | 70, 80, 90, 100 |  |  |  |
| 50, 60, 70, 80, 90, 100 | 60, 70, 80, 90, 100 |  |  |  |
| CA\_n78D | - | 100 | 100 | 100 |  |  | 300 | 0 |
| CA\_n79C | CA\_n79C | 50 | 60, 80, 100 |  |  |  | 200 | 0 |
|  |  | 60 | 60, 80, 100 |  |  |  |  |  |
|  |  | 80 | 80, 100 |  |  |  |  |  |
|  |  | 100 | 100 |  |  |  |  |  |
| CA\_n79D | - | 100 | 100 | 100 |  |  | 300 | 0 |
| NOTE 1: 5 MHz is not applicable for 30/60 kHz SCS. | | | | | | | | |

Table 5.5A.1-2: Void

## *< Unchanged sections are omitted >*

### 5.5A.2 Configurations for intra-band non-contiguous CA

Table 5.5A.2-1: NR CA configurations and bandwidth combination sets defined for intra-band non-contiguous CA

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| NR CA Configuration | Uplink Configurations | Channel bandwidths for carrier  (MHz) | Channel bandwidths for carrier  (MHz) | Channel bandwidths for carrier  (MHz) | Channel bandwidths for carrier  (MHz) | Maximum  Aggregated bandwidth  (MHz) | Bandwidth combination set |
| CA\_n3(2A) | - | 5, 10, 15, 20 | 5, 10, 15, 20 |  |  | 40 | 0 |
| CA\_n7(2A) | - | 5, 10, 15, 20 | 5, 10, 15, 20 |  |  | 40 | 0 |
| CA\_n25(2A) | - | 5, 10, 15, 20 | 5, 10, 15, 20 |  |  | 40 | 0 |
| CA\_n41(2A) | CA\_n41(2A) | 40, 50, 60, 80 | 40, 50, 60, 80, 100 |  |  | 180 | 0 |
|  |  | 10, 15, 20, 40, 50, 60, 80, 90 | 10, 15, 20, 40, 50, 60, 80, 90, 100 |  |  | 190 | 1 |
| CA\_n48(2A) |  | 10, 15, 20, 40, 50, 60 | 10, 15, 20, 40, 50, 60, 80, 90, 100 |  |  | 1402 | 0 |
| CA\_n48(3A) | - | 10, 15, 20, 40,50, 60, 80, 90, 100 | 10, 15, 20, 40,50, 60, 80, 90, 100 | 10, 15, 20, 40,50, 60, 80, 90, 100 |  | 1402 | 0 |
| CA\_n48(4A) | - | 10, 15, 20, 40, 50, 60, 80, 90, 100 | 10, 15, 20, 40, 50, 60, 80, 90, 100 | 10, 15, 20, 40, 50, 60, 80, 90, 100 | 10, 15, 20, 40, 50, 60, 80, 90, 100 | 1352 | 0 |
| CA\_n66(2A) | - | 5, 10, 15, 20 | 5, 10, 15, 20, 40 |  |  | 60 | 0 |
| CA\_n77(2A) | CA\_n77(2A) | 20, 40, 80, 100 | 20, 40, 80, 100 |  |  | 200 | 0 |
| CA\_n78(2A) | CA\_n78(2A) | 10, 20, 40, 50, 60, 80, 90, 100 | 10, 20, 40, 50, 60, 80, 90, 100 |  |  | 200 | 0 |
|  |  | 10, 20, 25, 30, 40, 50, 60, 80, 90, 100 | 10, 20, 25, 30, 40, 50, 60, 80, 90, 100 |  |  | 200 | 1 |
|  |  | 10, 20, 25, 30, 40, 50, 60, 70, 80, 90, 100 | 10, 20, 25, 30, 40, 50, 60, 70, 80, 90, 100 |  |  | 200 | 2 |
| NOTE 1: Void.  NOTE 2: Parameter value accounts for both, the maximum frequency range of band n48 (150 MHz), and the minimum frequency gaps in between NR non-contiguous component carriers. | | | | | | | |

## **<<End of Change3>>**

## **<<Start of Change4>>**

#### 5.5A.3.1 Configurations for inter-band CA (two bands)

Table 5.5A.3.1-1: NR CA configurations and bandwidth combinations sets defined for inter-band CA (two bands)

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| NR CA configuration | Uplink CA configuration | NR Band | Channel bandwidth (MHz) (NOTE 3) | | | | | | | | | | | | | Bandwidth combination set |
|  |  |  | 5 | 10 | 15 | 20 | 25 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 |  |
| CA\_n1A-n3A | CA\_n1A-n3A | n1 | 5 | 10 | 15 | 20 |  |  |  |  |  |  |  |  |  | 0 |
|  |  | n3 | 5 | 10 | 15 | 20 | 25 | 30 |  |  |  |  |  |  |  |  |
| CA\_n1B-n3A | CA\_n1A-n3A | n1 | See CA\_n1B Bandwidth Combination Set 0 in Table 5.5A.1-1 | | | | | | | | | | | | | 0 |
|  |  | n3 | 5 | 10 | 15 | 20 | 25 | 30 |  |  |  |  |  |  |  |  |
| CA\_n1A-n3(2A) | CA\_n1A-n3A | n1 | 5 | 10 | 15 | 20 |  |  |  |  |  |  |  |  |  | 0 |
|  |  | n3 | See CA\_n3(2A) bandwidth combination set 0 in Table 5.5A.2-1 | | | | | | | | | | | | |  |
| CA\_n1A-n7A | CA\_n1A-n7A | n1 | 5 | 10 | 15 | 20 |  |  |  |  |  |  |  |  |  | 0 |
|  |  | n7 | 5 | 10 | 15 | 20 | 25 | 30 | 40 | 50 |  |  |  |  |  |  |
| CA\_n1A-n7B | - | n1 | 5 | 10 | 15 | 20 |  |  |  |  |  |  |  |  |  | 0 |
|  |  | n7 | See CA\_n7B Bandwidth Combination Set 0 in Table 5.5A.1-1 | | | | | | | | | | | | |  |
| CA\_n1A-n8A | CA\_n1A-n8A | n1 | 5 | 10 | 15 | 20 |  |  |  |  |  |  |  |  |  | 0 |
|  |  | n8 | 5 | 10 | 15 | 20 |  |  |  |  |  |  |  |  |  |  |
| CA\_n1A-n28A | CA\_n1A-n28A | n1 | 5 | 10 | 15 | 20 |  |  |  |  |  |  |  |  |  | 0 |
|  |  | n28 | 5 | 10 | 15 | 20 |  |  |  |  |  |  |  |  |  |  |
| CA\_n1A-n40A | CA\_n1A-n40A | n1 | 5 | 10 | 15 | 20 |  |  |  |  |  |  |  |  |  | 0 |
|  |  | n40 | 5 | 10 | 15 | 20 | 25 | 30 | 40 | 50 | 60 |  | 80 |  |  |  |
| CA\_n1A-n41A | CA\_n1A-n41A | n1 | 5 | 10 | 15 | 20 |  |  |  |  |  |  |  |  |  | 0 |
|  |  | n41 |  | 10 | 15 | 20 |  |  | 40 | 50 | 60 |  | 80 | 90 | 100 |  |
| CA\_n1A-n77A | - | n1 | 5 | 10 | 15 | 20 |  |  |  |  |  |  |  |  |  | 0 |
|  |  | n77 |  | 10 | 15 | 20 |  |  | 40 | 50 | 60 |  | 80 | 90 | 100 |  |
| CA\_n1A-n78A | CA\_n1A-n78A | n1 | 5 | 10 | 15 | 20 |  |  |  |  |  |  |  |  |  | 0 |
|  |  | n78 |  | 10 | 15 | 20 |  |  | 40 | 50 | 60 |  | 80 | 90 | 100 |  |
| CA\_n1A-n78(2A) | CA\_n1A-n78A | n1 | 5 | 10 | 15 | 20 |  |  |  |  |  |  |  |  |  | 0 |
|  |  | n78 | See CA\_n78(2A) Bandwidth Combination Set 0 in Table 5.5A.2-1 | | | | | | | | | | | | |  |
| CA\_n1A-n78C | CA\_n1A-n78A | n1 | 5 | 10 | 15 | 20 |  |  |  |  |  |  |  |  |  | 0 |
|  |  | n78 | See CA\_n78C Bandwidth Combination Set 0 in Table 5.5A.1-1 | | | | | | | | | | | | |  |
| CA\_n1A-n79A | CA\_n1A-n79A | n1 | 5 | 10 | 15 | 20 |  |  |  |  |  |  |  |  |  | 0 |
|  |  | n79 |  |  |  |  |  |  | 40 | 50 | 60 |  | 80 |  | 100 |  |
| CA\_n1A-n79C | CA\_n1A-n79A | n1 | 5 | 10 | 15 | 20 |  |  |  |  |  |  |  |  |  | 0 |
|  |  | n79 | See CA\_n79C Bandwidth Combination Set 0 in Table 5.5A.1-1 | | | | | | | | | | | | |  |
| CA\_n2A-n5A | CA\_n2A-n5A | n2 | 5 | 10 | 15 | 20 |  |  |  |  |  |  |  |  |  | 0 |
|  |  | n5 | 5 | 10 | 15 | 20 |  |  |  |  |  |  |  |  |  |  |
| CA\_n2A-n48A | CA\_n2A-n48A | n2 | 5 | 10 | 15 | 20 |  |  |  |  |  |  |  |  |  | 0 |
|  |  | n48 | 5 | 10 | 15 | 20 |  |  | 40 | 501 | 601 |  | 801 | 901 | 1001 |  |
| CA\_n2A-n48C | CA\_n2A-n48A | n2 | 5 | 10 | 15 | 20 |  |  |  |  |  |  |  |  |  | 0 |
|  |  | n48 | See CA\_n48C Bandwidth Combination Set 0 in Table 5.5A.1-1 | | | | | | | | | | | | |  |
| CA\_n2A-n66A | - | n2 | 5 | 10 | 15 | 20 |  |  |  |  |  |  |  |  |  | 0 |
|  |  | n66 | 5 | 10 | 15 | 20 |  |  | 40 |  |  |  |  |  |  |  |
| CA\_n2A-n77A | CA\_n2A-n77A | n2 | 5 | 10 | 15 | 20 |  |  |  |  |  |  |  |  |  | 0 |
|  |  | n77 |  | 10 | 15 | 20 | 25 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 |  |
| CA\_n2A-n78A | CA\_n2A-n78A | n2 | 5 | 10 | 15 | 20 |  |  |  |  |  |  |  |  |  | 0 |
|  |  | n78 |  | 10 | 15 | 20 | 25 | 30 | 40 | 50 | 60 |  | 80 | 90 | 100 |  |
| CA\_n2A-n78(2A) | CA\_n2A-n78A | n2 | 5 | 10 | 15 | 20 |  |  |  |  |  |  |  |  |  | 0 |
|  |  | n78 | See CA\_n78(2A) Bandwidth Combination Set 1 in Table 5.5A.2-1 | | | | | | | | | | | | |  |
| CA\_n3A-n7A | CA\_n3A-n7A | n3 | 5 | 10 | 15 | 20 | 25 | 30 |  |  |  |  |  |  |  | 0 |
|  |  | n7 | 5 | 10 | 15 | 20 | 25 | 30 | 40 | 50 |  |  |  |  |  |  |
| CA\_n3A-n7B | - | n3 | 5 | 10 | 15 | 20 | 25 | 30 |  |  |  |  |  |  |  | 0 |
|  |  | n7 | See CA\_n7B Bandwidth Combination Set 0 in Table 5.5A.1-1 | | | | | | | | | | | | |  |
| CA\_n3A-n8A | CA\_n3A-n8A | n3 | 5 | 10 | 15 | 20 | 25 | 30 |  |  |  |  |  |  |  | 0 |
|  |  | n8 | 5 | 10 | 15 | 20 |  |  |  |  |  |  |  |  |  |  |
| CA\_n3A-n28A | CA\_n3A-n28A | n3 | 5 | 10 | 15 | 20 | 25 | 30 |  |  |  |  |  |  |  | 0 |
|  |  | n28 | 5 | 10 | 15 | 20 |  |  |  |  |  |  |  |  |  |  |
| CA\_n3A-n38A | CA\_n3A-n38A | n3 | 5 | 10 | 15 | 20 | 25 | 30 |  |  |  |  |  |  |  | 0 |
|  |  | n38 | 5 | 10 | 15 | 20 |  |  | 40 |  |  |  |  |  |  |  |
| CA\_n3A-n40A | CA\_n3A-n40A | n3 | 5 | 10 | 15 | 20 | 25 | 30 |  |  |  |  |  |  |  | 0 |
|  |  | n40 | 5 | 10 | 15 | 20 | 25 | 30 | 40 | 50 | 60 |  | 80 |  |  |  |
| CA\_n3A-n41A | CA\_n3A-n41A | n3 | 5 | 10 | 15 | 20 | 25 | 30 |  |  |  |  |  |  |  | 0 |
|  |  | n41 |  | 10 | 15 | 20 |  |  | 40 | 50 | 60 |  | 80 | 90 | 100 |  |
|  |  | n3 | 5 | 10 | 15 | 20 | 25 | 30 |  |  |  |  |  |  |  | 1 |
|  |  | n41 |  | 10 | 15 | 20 |  |  | 40 | 50 | 60 |  |  |  |  |  |
| CA\_n3A-n41C | CA\_n3A-n41A | n3 | 5 | 10 | 15 | 20 | 25 | 30 |  |  |  |  |  |  |  | 0 |
|  |  | n41 | See CA\_n41C Bandwidth Combination Set 0 in Table 5.5A.1-1 | | | | | | | | | | | | |  |
| CA\_n3A-n41(2A) | CA\_n3A-n41A | n3 | 5 | 10 | 15 | 20 | 25 | 30 |  |  |  |  |  |  |  | 0 |
|  |  | n41 | See CA\_n41(2A) Bandwidth Combination Set 0 in Table 5.5A.2-1 | | | | | | | | | | | | |  |
| CA\_n3A-n77A | CA\_n3A-n77A | n3 | 5 | 10 | 15 | 20 | 25 | 30 |  |  |  |  |  |  |  | 0 |
|  |  | n77 |  | 10 | 15 | 20 |  |  | 40 | 50 | 60 |  | 80 | 90 | 100 |  |
| CA\_n3A-n77(2A) | CA\_n3A-n77A | n3 | 5 | 10 | 15 | 20 | 25 | 30 |  |  |  |  |  |  |  | 0 |
|  |  | n77 | See CA\_n77(2A) Bandwidth Combination Set 0 in Table 5.5A.2-1 | | | | | | | | | | | | |  |
| CA\_n3A-n78A | CA\_n3A-n78A | n3 | 5 | 10 | 15 | 20 | 25 | 30 |  |  |  |  |  |  |  | 0 |
|  |  | n78 |  | 10 | 15 | 20 |  |  | 40 | 50 | 60 |  | 80 | 90 | 100 |  |
| CA\_n3A-n78C | CA\_n3A-n78A | n3 | 5 | 10 | 15 | 20 | 25 | 30 |  |  |  |  |  |  |  | 0 |
|  |  | n78 | See CA\_n78C Bandwidth Combination Set 0 in Table 5.5A.1-1 | | | | | | | | | | | | |  |
| CA\_n3A-n78(2A) | - | n3 | 5 | 10 | 15 | 20 | 25 | 30 |  |  |  |  |  |  |  | 0 |
|  |  | n78 | See CA\_n78(2A) Bandwidth Combination Set 0 in Table 5.5A.2-1 | | | | | | | | | | | | |  |
| CA\_n3A-n79A | CA\_n3A-n79A | n3 | 5 | 10 | 15 | 20 | 25 | 30 |  |  |  |  |  |  |  | 0 |
|  |  | n79 |  |  |  |  |  |  | 40 | 50 | 60 |  | 80 |  | 100 |  |
| CA\_n3A-n79C | CA\_n3A-n79A | n3 | 5 | 10 | 15 | 20 | 25 | 30 |  |  |  |  |  |  |  | 0 |
|  |  | n79 | See CA\_n79C Bandwidth Combination Set 0 in Table 5.5A.1-1 | | | | | | | | | | | | |  |
| CA\_n5A-n7A | - | n5 | 5 | 10 | 15 | 20 |  |  |  |  |  |  |  |  |  | 0 |
|  |  | n7 | 5 | 10 | 15 | 20 | 25 | 30 | 40 | 50 |  |  |  |  |  |  |
| CA\_n5A-n7B | - | n5 | 5 | 10 | 15 | 20 |  |  |  |  |  |  |  |  |  | 0 |
|  |  | n7 | See CA\_n7B Bandwidth Combination Set 0 in Table 5.5A.1-1 | | | | | | | | | | | | |  |
| CA\_n5A-n66A | CA\_n5A-n66A | n5 | 5 | 10 | 15 | 20 |  |  |  |  |  |  |  |  |  | 0 |
|  |  | n66 | 5 | 10 | 15 | 20 |  |  | 40 |  |  |  |  |  |  |  |
| CA\_n5A-n77A | CA\_n5A-n77A | n5 | 5 | 10 | 15 | 20 |  |  |  |  |  |  |  |  |  | 0 |
|  |  | n77 |  | 10 | 15 | 20 | 25 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 |  |
| CA\_n5A-n78A | CA\_n5A-n78A | n5 | 5 | 10 | 15 | 20 |  |  |  |  |  |  |  |  |  | 0 |
|  |  | n78 |  | 10 | 15 | 20 |  |  | 40 | 50 | 60 |  | 80 | 90 | 100 |  |
| CA\_n5A-n78C | CA\_n5A-n78A | n5 | 5 | 10 | 15 | 20 |  |  |  |  |  |  |  |  |  | 0 |
|  |  | n78 | See CA\_n78C Bandwidth Combination Set 0 in Table 5.5A.1-1 | | | | | | | | | | | | |  |
| CA\_n5A-n79A | CA\_n5A-n79A | n5 | 5 | 10 | 15 | 20 |  |  |  |  |  |  |  |  |  | 0 |
|  |  | n79 |  |  |  |  |  |  | 40 | 50 | 60 |  | 80 |  | 100 |  |
| CA\_n5A-n79C | CA\_n5A-n79A | n5 | 5 | 10 | 15 | 20 |  |  |  |  |  |  |  |  |  | 0 |
|  |  | n79 | See CA\_n79C Bandwidth Combination Set 0 in Table 5.5A.1-1 | | | | | | | | | | | | |  |
| CA\_n7A-n25A | CA\_n7A-n25A | n7 | 5 | 10 | 15 | 20 | 25 | 30 | 40 |  |  |  |  |  |  | 0 |
|  |  | n25 | 5 | 10 | 15 | 20 | 25 | 30 | 40 |  |  |  |  |  |  |  |
| CA\_n7A-n25(2A) | CA\_n7A-n25A | n7 | 5 | 10 | 15 | 20 | 25 | 30 | 40 |  |  |  |  |  |  | 0 |
|  |  | n25 | See CA\_n25(2A) Bandwidth Combination Set 0 in Table 5.5A.2-1 | | | | | | | | | | | | |  |
| CA\_n7(2A)-n25A | CA\_n7A-n25A | n25 | 5 | 10 | 15 | 20 | 25 | 30 | 40 |  |  |  |  |  |  | 0 |
|  |  | n7 | See CA\_n7(2A) Bandwidth Combination Set 0 in Table 5.5A.2-1 | | | | | | | | | | | | |  |
| CA\_n7(2A)-n25(2A) | CA\_n7A-n25A | n7 | See CA\_n7(2A) Bandwidth Combination Set 0 in Table 5.5A.2-1 | | | | | | | | | | | | | 0 |
|  |  | n25 | See CA\_n25(2A) Bandwidth Combination Set 0 in Table 5.5A.2-1 | | | | | | | | | | | | |  |
| CA\_n7A-n28A | CA\_n7A-n28A | n7 | 5 | 10 | 15 | 20 | 25 | 30 | 40 | 50 |  |  |  |  |  | 0 |
|  |  | n28 | 5 | 10 | 15 | 20 |  |  |  |  |  |  |  |  |  |  |
| CA\_n7B-n28A | - | n7 | See CA\_n7B Bandwidth Combination Set 0 in Table 5.5A.1-1 | | | | | | | | | | | | | 0 |
|  |  | n28 | 5 | 10 | 15 | 20 |  |  |  |  |  |  |  |  |  |  |
| CA\_n7A-n66A | CA\_n7A-n66A | n7 | 5 | 10 | 15 | 20 |  |  |  |  |  |  |  |  |  | 0 |
|  |  | n66 |  | 10 | 15 | 20 |  |  | 40 |  |  |  |  |  |  |  |
| CA\_n7A-n78A | CA\_n7A-n78A | n7 | 5 | 10 | 15 | 20 |  |  |  |  |  |  |  |  |  | 0 |
|  |  | n78 |  | 10 | 15 | 20 |  |  | 40 | 50 | 60 |  | 80 | 90 | 100 |  |
| CA\_n7A-n78(2A) | CA\_n7A-n78A | n7 | 5 | 10 | 15 | 20 | 25 | 30 | 40 | 50 |  |  |  |  |  | 0 |
|  |  | n78 | See CA\_n78(2A) Bandwidth Combination Set 0 in Table 5.5A.2-1 | | | | | | | | | | | | |  |
| CA\_n7(2A)-n78A | CA\_n7A-n78A | n7 | See CA\_n7(2A) Bandwidth Combination Set 0 in Table 5.5A.2-1 | | | | | | | | | | | | | 0 |
|  |  | n78 |  | 10 | 15 | 20 |  |  | 40 | 50 | 60 |  | 80 | 90 | 100 |  |
| CA\_n7(2A)-n78(2A) | CA\_n7A-n78A | n7 | See CA\_n7(2A) Bandwidth Combination Set 0 in Table 5.5A.2-1 | | | | | | | | | | | | | 0 |
|  |  | n78 | See CA\_n78(2A) Bandwidth Combination Set 0 in Table 5.5A.2-1 | | | | | | | | | | | | |  |
| CA\_n8A-n39A | CA\_n8A-n39A | n8 | 5 | 10 | 15 | 20 |  |  |  |  |  |  |  |  |  | 0 |
|  |  | n39 | 5 | 10 | 15 | 20 | 25 | 30 | 40 |  |  |  |  |  |  |  |
| CA\_n8A-n40A | CA\_n8A-n40A | n8 | 5 | 10 | 15 | 20 |  |  |  |  |  |  |  |  |  | 0 |
|  |  | n40 | 5 | 10 | 15 | 20 | 25 | 30 | 40 | 50 | 60 |  | 80 |  |  |  |
| CA\_n8A-n41A | CA\_n8A-n41A | n8 | 5 | 10 | 15 | 20 |  |  |  |  |  |  |  |  |  | 0 |
|  |  | n41 |  | 10 | 15 | 20 |  |  | 40 | 50 | 60 |  | 80 | 90 | 100 |  |
|  |  | n8 | 5 | 10 | 15 | 20 |  |  |  |  |  |  |  |  |  | 1 |
|  |  | n41 |  | 10 | 15 | 20 |  |  | 40 | 50 | 60 |  |  |  |  |  |
| CA\_n8A-n75A | - | n8 | 5 | 10 | 15 | 20 |  |  |  |  |  |  |  |  |  | 0 |
|  |  | n75 | 5 | 10 | 15 | 20 |  |  |  |  |  |  |  |  |  |  |
| CA\_n8A-n78A | CA\_n8A-n78A | n8 | 5 | 10 | 15 | 20 |  |  |  |  |  |  |  |  |  | 0 |
|  |  | n78 |  | 10 | 15 | 20 |  |  | 40 | 50 | 60 |  | 80 | 90 | 100 |  |
| CA\_n8A-n79A | CA\_n8A-n79A | n8 | 5 | 10 | 15 | 20 |  |  |  |  |  |  |  |  |  | 0 |
|  |  | n79 |  |  |  |  |  |  | 40 | 50 | 60 |  | 80 |  | 100 |  |
| CA\_n20A-n28A | CA\_n20A-n28A | n20 | 5 | 10 | 15 | 20 |  |  |  |  |  |  |  |  |  | 0 |
|  |  | n28 | 5 | 10 | 15 | 20 |  |  |  |  |  |  |  |  |  |  |
| CA\_n20A-n75A | - | n20 | 5 | 10 | 15 | 20 |  |  |  |  |  |  |  |  |  | 0 |
|  |  | n75 | 5 | 10 | 15 | 20 |  |  |  |  |  |  |  |  |  |  |
| CA\_n20A-n78A | CA\_n20A-n78A | n20 | 5 | 10 | 15 | 20 |  |  |  |  |  |  |  |  |  | 0 |
|  |  | n78 |  | 10 | 15 | 20 |  |  | 40 | 50 | 60 |  | 80 | 90 | 100 |  |
| CA\_n25A-n41A | CA\_n25A-n41A | n25 | 5 | 10 | 15 | 20 |  |  |  |  |  |  |  |  |  | 0 |
|  |  | n41 |  | 10 | 15 | 20 |  |  | 40 | 50 | 60 |  | 80 | 90 | 100 |  |
| CA\_n25(2A)-n41A | CA\_n25A-n41A | n25 | See CA\_n25(2A) Bandwidth Combination Set 0 in Table 5.5A.2-1 | | | | | | | | | | | | | 0 |
|  |  | n41 |  | 10 | 15 | 20 |  |  | 40 | 50 | 60 |  | 80 | 90 | 100 |  |
| CA\_n25A-n41C | CA\_n25A-n41A | n25 | 5 | 10 | 15 | 20 |  |  |  |  |  |  |  |  |  | 0 |
|  |  | n41 | See CA\_n41C Bandwidth Combination Set 0 in Table 5.5A.1-1 | | | | | | | | | | | | |  |
| CA\_n25A-n41(2A) | CA\_n25A-n41A | n25 | 5 | 10 | 15 | 20 |  |  |  |  |  |  |  |  |  | 0 |
|  |  | n41 | See CA\_n41(2A) Bandwidth Combination Set 1 in Table 5.5A.2-1 | | | | | | | | | | | | |  |
| CA\_n25A-n66A | CA\_n25A-n66A | n25 | 5 | 10 | 15 | 20 | 25 | 30 | 40 |  |  |  |  |  |  | 0 |
|  |  | n66 | 5 | 10 | 15 | 20 |  | 30 | 40 |  |  |  |  |  |  |  |
| CA\_n25A-n66(2A) | CA\_n25A-n66A | n25 | 5 | 10 | 15 | 20 | 25 | 30 | 40 |  |  |  |  |  |  | 0 |
|  |  | n66 | See CA\_n66(2A) Bandwidth Combination Set 0 in Table 5.5A.2-1 | | | | | | | | | | | | |  |
| CA\_n25(2A)-n66A | CA\_n25A-n66A | n25 | See CA\_n25(2A) Bandwidth Combination Set 0 in Table 5.5A.2-1 | | | | | | | | | | | | | 0 |
|  |  | n66 |  | 10 | 15 | 20 |  | 30 | 40 |  |  |  |  |  |  |  |
| CA\_n25(2A)-n66(2A) | CA\_n25A-n66A | n25 | See CA\_n25(2A) Bandwidth Combination Set 0 in Table 5.5A.2-1 | | | | | | | | | | | | | 0 |
|  |  | n66 | See CA\_n66(2A) Bandwidth Combination Set 0 in Table 5.5A.2-1 | | | | | | | | | | | | |  |
| CA\_n25A-n71A | CA\_n25A-n71A | n25 | 5 | 10 | 15 | 20 |  |  |  |  |  |  |  |  |  | 0 |
|  |  | n71 | 5 | 10 | 15 | 20 |  |  |  |  |  |  |  |  |  |  |
| CA\_n25A-n78A | CA\_n25A-n78A | n25 | 5 | 10 | 15 | 20 | 25 | 30 | 40 |  |  |  |  |  |  | 0 |
|  |  | n78 |  | 10 | 15 | 20 | 25 | 30 | 40 | 50 | 60 |  | 80 | 90 | 100 |  |
| CA\_n25A-n78(2A) | CA\_n25A-n78A | n25 | 5 | 10 | 15 | 20 | 25 | 30 | 40 |  |  |  |  |  |  | 0 |
|  |  | n78 | See CA\_n78(2A) Bandwidth Combination Set 0 in Table 5.5A.2-1 | | | | | | | | | | | | |  |
| CA\_n25(2A)-n78A | CA\_n25A-n78A | n25 | See CA\_n25(2A) Bandwidth Combination Set 0 in Table 5.5A.2-1 | | | | | | | | | | | | | 0 |
|  |  | n78 |  | 10 | 15 | 20 | 25 | 30 | 40 | 50 | 60 |  | 80 | 90 | 100 |  |
| CA\_n25(2A)-n78(2A) | CA\_n25A-n78A | n25 | See CA\_n25(2A) Bandwidth Combination Set 0 in Table 5.5A.2-1 | | | | | | | | | | | | | 0 |
|  |  | n78 | See CA\_n78(2A) Bandwidth Combination Set 1 in Table 5.5A.2-1 | | | | | | | | | | | | |  |
| CA\_n25A-n46A | - | n25 | 5 | 10 | 15 | 20 |  |  |  |  |  |  |  |  |  | 0 |
|  |  | n46 |  |  |  | 20 |  |  | 40 |  | 60 |  | 80 |  |  |  |
| CA\_n28A-n40A | CA\_n28A-n40A | n28 | 5 | 10 | 15 | 20 |  |  |  |  |  |  |  |  |  | 0 |
|  |  | n40 | 5 | 10 | 15 | 20 | 25 | 30 | 40 | 50 | 60 |  | 80 |  |  |  |
| CA\_n28A-n41A | CA\_n28A-n41A | n28 | 5 | 10 | 15 | 20 |  |  |  |  |  |  |  |  |  | 0 |
|  |  | n41 |  | 10 | 15 | 20 |  |  | 40 | 50 | 60 |  | 80 | 90 | 100 |  |
| CA\_n28A-n50A | CA\_n28A-n50A | n28 | 5 | 10 | 15 | 20 |  |  |  |  |  |  |  |  |  | 0 |
|  |  | n50 | 5 | 10 | 15 | 20 |  |  | 40 | 50 | 60 |  | 801 |  |  |  |
| CA\_n28A-n75A | - | n28 | 5 | 10 | 15 | 20 |  |  |  |  |  |  |  |  |  | 0 |
|  |  | n75 | 5 | 10 | 15 | 20 |  |  |  |  |  |  |  |  |  |  |
| CA\_n28A-n75A | - | n28 | 5 | 10 | 15 | 20 |  |  |  |  |  |  |  |  |  | 1 |
|  |  | n75 | 5 | 10 | 15 | 20 | 25 | 30 | 40 | 50 |  |  |  |  |  |  |
| CA\_n28A-n77A | CA\_n28A-n77A | n28 | 5 | 10 | 15 | 20 |  |  |  |  |  |  |  |  |  | 0 |
|  |  | n77 |  | 10 | 15 | 20 |  |  | 40 | 50 | 60 |  | 80 | 90 | 100 |  |
| CA\_n28A-n77(2A) | CA\_n28A-n77A | n28 | 5 | 10 | 15 | 20 |  |  |  |  |  |  |  |  |  | 0 |
|  |  | n77 | See CA\_n77(2A) Bandwidth Combination Set 0 in Table 5.5A.2-1 | | | | | | | | | | | | |  |
| CA\_n28A-n78A | CA\_n28A-n78A | n28 | 5 | 10 | 15 | 20 |  |  |  |  |  |  |  |  |  | 0 |
|  |  | n78 |  | 10 | 15 | 20 |  |  | 40 | 50 | 60 |  | 80 | 90 | 100 |  |
| CA\_n28A-n78(2A) | CA\_n28A-n78A | n28 | 5 | 10 | 15 | 20 |  |  |  |  |  |  |  |  |  | 0 |
|  |  | n78 | See CA\_n78(2A) Bandwidth Combination Set 0 in Table 5.5A.2-1 | | | | | | | | | | | | |  |
| CA\_n29A-n66A | - | n29 | 5 | 10 |  |  |  |  |  |  |  |  |  |  |  | 0 |
|  |  | n66 | 5 | 10 | 15 | 20 |  |  | 40 |  |  |  |  |  |  |  |
| CA\_n29A-n66B | - | n29 | 5 | 10 |  |  |  |  |  |  |  |  |  |  |  | 0 |
|  |  | n66 | See CA\_n66B Bandwidth Combination Set 0 in Table 5.5A.1-1 | | | | | | | | | | | | |  |
| CA\_n29A-n66(2A) | - | n29 | 5 | 10 |  |  |  |  |  |  |  |  |  |  |  | 0 |
|  |  | n66 | See CA\_n66(2A) Bandwidth Combination Set 0 in Table 5.5A.2-1 | | | | | | | | | | | | |  |
| CA\_n29A-n70A | - | n29 | 5 | 10 |  |  |  |  |  |  |  |  |  |  |  | 0 |
|  |  | n70 | 5 | 10 | 15 | 201 | 251 |  |  |  |  |  |  |  |  |  |
| CA\_n38A-n66A | CA\_n38A-n66A | n38 | 5 | 10 | 15 | 20 |  |  |  |  |  |  |  |  |  | 0 |
|  |  | n66 | 5 | 10 | 15 | 20 |  | 30 | 40 |  |  |  |  |  |  |  |
| CA\_n38A-n78A | CA\_n38A-n78A | n38 | 5 | 10 | 15 | 20 |  |  |  |  |  |  |  |  |  | 0 |
|  |  | n78 |  | 10 | 15 | 20 | 25 | 30 | 40 | 50 | 60 |  | 80 | 90 | 100 |  |
| CA\_n38A-n78(2A) | CA\_n38A-n78A | n38 | 5 | 10 | 15 | 20 |  |  |  |  |  |  |  |  |  | 0 |
|  |  | n78 | See CA\_n78(2A) Bandwidth Combination 0 in Table 5.5A.2-1 | | | | | | | | | | | | |  |
| CA\_n39A-n40A | CA\_n39A-n40A | n39 | 5 | 10 | 15 | 20 | 25 | 30 | 40 |  |  |  |  |  |  | 0 |
|  |  | n40 | 5 | 10 | 15 | 20 | 25 | 30 | 40 | 50 | 60 |  | 80 |  |  |  |
| CA\_n39A-n41A | CA\_n39A-n41A | n39 | 5 | 10 | 15 | 20 | 25 | 30 | 40 |  |  |  |  |  |  | 0 |
|  |  | n41 |  | 10 | 15 | 20 |  |  | 40 | 50 | 60 |  | 80 | 90 | 100 |  |
| CA\_n39A-n41C | CA\_n39A-n41A | n39 | 5 | 10 | 15 | 20 | 25 | 30 | 40 |  |  |  |  |  |  | 0 |
|  |  | n41 | See CA\_n41C Bandwidth Combination Set 0 in Table 5.5A.1-1 | | | | | | | | | | | | |  |
| CA\_n39A-n41(2A) | CA\_n39A-n41A | n39 | 5 | 10 | 15 | 20 | 25 | 30 | 40 |  |  |  |  |  |  | 0 |
|  |  | n41 | See CA\_n41(2A) Bandwidth Combination Set 0 in Table 5.5A.2-1 | | | | | | | | | | | | |  |
| CA\_n39A-n79A | CA\_n39A-n79A | n39 | 5 | 10 | 15 | 20 | 25 | 30 | 40 |  |  |  |  |  |  | 0 |
|  |  | n79 |  |  |  |  |  |  | 40 | 50 | 60 |  | 80 |  | 100 |  |
| CA\_n40A-n41A | CA\_n40A-n41A | n40 | 5 | 10 | 15 | 20 | 25 | 30 | 40 | 50 | 60 |  | 80 |  |  | 0 |
|  |  | n41 |  | 10 | 15 | 20 |  |  | 40 | 50 | 60 |  | 80 | 90 | 100 |  |
|  |  | n40 | 5 | 10 | 15 | 20 | 25 | 30 | 40 |  |  |  |  |  |  | 1 |
|  |  | n41 |  | 10 | 15 | 20 |  |  | 40 | 50 | 60 |  |  |  |  |  |
| CA\_n40A-n78A | CA\_n40A-n78A | n40 | 5 | 10 | 15 | 20 | 25 | 30 | 40 | 50 | 60 |  | 80 |  |  | 0 |
|  |  | n78 |  | 10 | 15 | 20 |  |  | 40 | 50 | 60 |  | 80 | 90 | 100 |  |
| CA\_n40A-n78(2A) | CA\_n40A-n78A | n40 | 5 | 10 | 15 | 20 | 25 | 30 | 40 | 50 | 60 |  | 80 |  |  | 0 |
|  |  | n78 | See CA\_n78(2A) Bandwidth Combination Set 1 in Table 5.5A.2-1 | | | | | | | | | | | | |  |
| CA\_n40A-n79A | CA\_n40A-n79A | n40 | 5 | 10 | 15 | 20 | 25 | 30 | 40 | 50 | 60 |  | 80 |  |  | 0 |
|  |  | n79 |  |  |  |  |  |  | 40 | 50 | 60 |  | 80 |  | 100 |  |
|  |  | n40 | 5 | 10 | 15 | 20 | 25 | 30 | 40 |  |  |  |  |  |  | 1 |
|  |  | n79 |  |  |  |  |  |  | 40 | 50 | 60 |  | 80 |  | 100 |  |
| CA\_n41A-n50A | CA\_n41A-n50A | n41 |  | 10 | 15 | 20 |  |  | 40 | 50 | 60 |  | 80 | 90 | 100 | 0 |
|  |  | n50 | 5 | 10 | 15 | 20 |  |  | 40 | 50 | 60 |  | 801 |  |  |  |
| CA\_n41A-n66A | CA\_n41A-n66A | n41 |  | 10 | 15 | 20 |  |  | 40 | 50 | 60 |  | 80 | 90 | 100 | 0 |
|  |  | n66 | 5 | 10 | 15 | 20 |  |  | 40 |  |  |  |  |  |  |  |
| CA\_n41(2A)-n66A | - | n41 | See CA\_n41(2A) Bandwidth Combination Set 1 inTable 5.5A.2-1 | | | | | | | | | | | | | 0 |
|  |  | n66 | 5 | 10 | 15 | 20 |  |  | 40 |  |  |  |  |  |  |  |
| CA\_n41C-n66A | - | n41 | See CA\_n41C Bandwidth Combination Set 0 in Table 5.5A.1-1 | | | | | | | | | | | | | 0 |
|  |  | n66 | 5 | 10 | 15 | 20 |  |  | 40 |  |  |  |  |  |  |  |
| CA\_n41A-n71A | CA\_n41A-n71A | n41 |  | 10 | 15 | 20 |  |  | 40 | 50 | 60 |  | 80 | 90 | 100 | 0 |
|  |  | n71 | 5 | 10 | 15 | 20 |  |  |  |  |  |  |  |  |  |  |
| CA\_n41A-n71B | - | n41 |  | 10 | 15 | 20 |  | 30 | 40 | 50 | 60 |  | 80 | 90 | 100 | 0 |
|  |  | n71 | See CA\_n71B Bandwidth Combination Set 0 in Table 5.5A.1-1 | | | | | | | | | | | | |  |
| CA\_n41C-n71A | - | n41 | See CA\_n41C Bandwidth Combination Set 0 in Table 5.5A.1-1 | | | | | | | | | | | | | 0 |
|  |  | n71 | 5 | 10 | 15 | 20 |  |  |  |  |  |  |  |  |  |  |
| CA\_n41(2A)-n71A | - | n41 | See CA\_n41(2A) Bandwidth Combination Set 1 in Table 5.5A.2-1 | | | | | | | | | | | | | 0 |
|  |  | n71 | 5 | 10 | 15 | 20 |  |  |  |  |  |  |  |  |  |  |
| CA\_n41(2A)-n71B | - | n41 | See CA\_n41(2A) Bandwidth Combination Set 1 in Table 5.5A.2-1 | | | | | | | | | | | | | 0 |
|  |  | n71 | See CA\_n71B Bandwidth Combination Set 0 in Table 5.5A.1-1 | | | | | | | | | | | | |  |
| CA\_n41C-n71B | - | n41 | See CA\_n41C Bandwidth Combination Set 0 in Table 5.5A.1-1 | | | | | | | | | | | | | 0 |
|  |  | n71 | See CA\_n71B Bandwidth Combination Set 0 in Table 5.5A.1-1 | | | | | | | | | | | | |  |
| CA\_n41A-n78A | CA\_n41A-n78A | n41 |  | 10 | 15 | 20 |  |  | 40 | 50 | 60 |  | 80 |  | 100 | 0 |
|  |  | n78 |  | 10 | 15 | 20 |  |  | 40 | 50 | 60 |  | 80 | 90 | 100 |  |
| CA\_n41A-n78A | CA\_n41A-n78A | n41 |  | 10 | 15 | 20 |  | 30 | 40 | 50 | 60 |  | 80 | 90 | 100 | 1 |
|  |  | n78 |  | 10 | 15 | 20 | 25 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 |  |
| CA\_n41A-n79A | CA\_n41A-n79A | n41 |  | 10 | 15 | 20 |  |  | 40 | 50 | 60 |  | 80 | 90 | 100 | 0 |
|  |  | n79 |  |  |  |  |  |  | 40 | 50 | 60 |  | 80 |  | 100 |  |
|  |  | n41 |  | 10 | 15 | 20 |  |  | 40 | 50 | 60 |  |  |  |  | 1 |
|  |  | n79 |  |  |  |  |  |  | 40 | 50 | 60 |  | 80 |  | 100 |  |
| CA\_n41C-n79A | CA\_n41A-n79A  CA\_n41C | n41 | See CA\_n41C Bandwidth Combination Set 0 in Table 5.5A.1-1 | | | | | | | | | | | | | 0 |
|  |  | n79 |  |  |  |  |  |  | 40 | 50 | 60 |  | 80 |  | 100 |  |
| CA\_n46A-n48A | CA\_n46A-n48A | n46 |  |  |  | 20 |  |  | 40 |  | 60 |  | 80 |  |  | 0 |
|  |  | n48 |  |  |  | 20 |  |  |  |  |  |  |  |  |  |  |
| CA\_n46B-n48A | CA\_n46A-n48A | n46 | See CA\_n46B Bandwidth Combination Set 0 in 38.101-1 Table 5.5A.1-1 | | | | | | | | | | | | | 0 |
|  |  | n48 |  |  |  | 20 |  |  |  |  |  |  |  |  |  |  |
| CA\_n46C-n48A | CA\_n46A-n48A | n46 | See CA\_n46C Bandwidth Combination Set 0 in 38.101-1 Table 5.5A.1-1 | | | | | | | | | | | | | 0 |
|  |  | n48 |  |  |  | 20 |  |  |  |  |  |  |  |  |  |  |
| CA\_n46D-n48A | CA\_n46A-n48A | n46 | See CA\_n46D Bandwidth Combination Set 0 in 38.101-1 Table 5.5A.1-1 | | | | | | | | | | | | | 0 |
|  |  | n48 |  |  |  | 20 |  |  |  |  |  |  |  |  |  |  |
| CA\_n46A-n66A | - | n46 |  |  |  | 20 |  |  | 40 |  | 60 |  | 80 |  |  | 0 |
|  |  | n66 | 5 | 10 | 15 | 20 | 25 | 30 | 40 |  |  |  |  |  |  |  |
| CA\_n48A-n66A | CA\_n48A-n66A | n48 | 5 | 10 | 15 | 20 |  |  | 40 | 501 | 601 |  | 801 | 901 | 1001 | 0 |
|  |  | n66 | 5 | 10 | 15 | 20 |  |  | 40 |  |  |  |  |  |  |  |
| CA\_n48C-n66A | CA\_n48A-n66A | n48 | See CA\_n48C Bandwidth Combination Set 0 in Table 5.5A.1-1 | | | | | | | | | | | | | 0 |
|  |  | n66 | 5 | 10 | 15 | 20 |  |  | 40 |  |  |  |  |  |  |  |
| CA\_n48(2A)-n66A | CA\_n48A-n66A | n48 | See CA\_n48(2A) Bandwidth Combination Set 0 in Table 5.5A.2-1 | | | | | | | | | | | | | 0 |
|  |  | n66 | 5 | 10 | 15 | 20 |  |  | 40 |  |  |  |  |  |  |  |
| CA\_n50A-n78A | CA\_n50A-n78A | n50 | 5 | 10 | 15 | 20 |  | 30 | 40 | 50 | 60 |  | 801 |  |  | 0 |
|  |  | n78 |  | 10 | 15 | 20 |  |  | 40 | 50 | 60 |  | 80 | 90 | 100 |  |
| CA\_n66A-n70A | - | n66 | 5 | 10 | 15 | 20 |  |  | 40 |  |  |  |  |  |  | 0 |
|  |  | n70 | 5 | 10 | 15 | 201 | 251 |  |  |  |  |  |  |  |  |  |
| CA\_n66B-n70A | - | n66 | See CA\_n66B Bandwidth Combination Set 0 in Table 5.5A.1-1 | | | | | | | | | | | | | 0 |
|  |  | n70 | 5 | 10 | 15 | 201 | 251 |  |  |  |  |  |  |  |  |  |
| CA\_n66(2A)-n70A | - | n66 | See CA\_n66(2A) Bandwidth Combination Set 0 in Table 5.5A.2-1 | | | | | | | | | | | | | 0 |
|  |  | n70 | 5 | 10 | 15 | 201 | 251 |  |  |  |  |  |  |  |  |  |
| CA\_n66A-n71A | CA\_n66A-n71A | n66 | 5 | 10 | 15 | 20 |  |  | 40 |  |  |  |  |  |  | 0 |
|  |  | n71 | 5 | 10 | 15 | 20 |  |  |  |  |  |  |  |  |  |  |
| CA\_n66(2A)-n71A | CA\_n66A-n71A | n66 | See CA\_n66(2A) Bandwidth Combination Set 0 in Table 5.5A.2-1 | | | | | | | | | | | | | 0 |
|  |  | n71 | 5 | 10 | 15 | 20 |  |  |  |  |  |  |  |  |  |  |
| CA\_n66B-n71A | CA\_n66A-n71A | n66 | See CA\_n66B Bandwidth Combination Set 0 in Table 5.5A.1-1 | | | | | | | | | | | | | 0 |
|  |  | n71 | 5 | 10 | 15 | 20 |  |  |  |  |  |  |  |  |  |  |
| CA\_n66A-n77A | CA\_n66A-n77A | n66 | 5 | 10 | 15 | 20 |  |  | 40 |  |  |  |  |  |  | 0 |
|  |  | n77 |  | 10 | 15 | 20 | 25 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 |  |
| CA\_n66A-n78A | CA\_n66A-n78A | n66 | 5 | 10 | 15 | 20 |  |  | 40 |  |  |  |  |  |  | 0 |
|  |  | n78 |  | 10 | 15 | 20 |  |  | 40 | 50 | 60 |  | 80 | 90 | 100 |  |
| CA\_n66A-n78(2A) | CA\_n66A-n78A | n66 | 5 | 10 | 15 | 20 |  | 30 | 40 |  |  |  |  |  |  | 0 |
|  |  | n78 | See CA\_n78(2A) Bandwidth Combination Set 1 in Table 5.5A.2-1 | | | | | | | | | | | | |  |
| CA\_n66(2A)-n78A | CA\_n66A-n78A | n66 | See CA\_n66(2A) Bandwidth Combination Set 0 in Table 5.5A.2-1 | | | | | | | | | | | | | 0 |
|  |  | n78 |  | 10 | 15 | 20 | 25 | 30 | 40 | 50 | 60 |  | 80 | 90 | 100 |  |
| CA\_n66(2A)-n78(2A) | CA\_n66A-n78A | n66 | See CA\_n66(2A) Bandwidth Combination Set 0 in Table 5.5A.2-1 | | | | | | | | | | | | | 0 |
|  |  | n78 | See CA\_n78(2A) Bandwidth Combination Set 1 in Table 5.5A.2-1 | | | | | | | | | | | | |  |
| CA\_n70A-n71A | CA\_n70A-n71A | n70 | 5 | 10 | 15 | 201 | 251 |  |  |  |  |  |  |  |  | 0 |
|  |  | n71 | 5 | 10 | 15 | 20 |  |  |  |  |  |  |  |  |  |  |
| CA\_n75A-n78A | - | n75 | 5 | 10 | 15 | 20 |  |  |  |  |  |  |  |  |  | 0 |
|  |  | n78 |  | 10 | 15 | 20 |  |  | 40 | 50 | 60 |  | 80 | 90 | 100 |  |
| CA\_n75A-n78(2A) | - | n75 | 5 | 10 | 15 | 20 |  |  |  |  |  |  |  |  |  | 0 |
|  |  | n78 | See CA\_n78(2A) Bandwidth Combination Set 1 in Table 5.5A.2-1 | | | | | | | | | | | | |  |
| CA\_n76A-n78A | - | n76 | 5 |  |  |  |  |  |  |  |  |  |  |  |  | 0 |
|  |  | n78 |  | 10 | 15 | 20 |  |  | 40 | 50 | 60 |  | 80 | 90 | 100 |  |
| CA\_n77A-n78A2 |  | n77 |  | 10 | 15 | 20 |  |  | 40 | 50 | 60 |  | 80 | 90 | 100 | 0 |
|  |  | n78 |  | 10 | 15 | 20 |  |  | 40 | 50 | 60 |  | 80 | 90 | 100 |  |
| CA\_n77A-n79A | - | n77 |  | 10 | 15 | 20 |  |  | 40 | 50 | 60 |  | 80 | 90 | 100 | 0 |
|  |  | n79 |  |  |  |  |  |  | 40 | 50 | 60 |  | 80 |  | 100 |  |
| CA\_n78A-n79A | - | n78 |  | 10 | 15 | 20 |  |  | 40 | 50 | 60 |  | 80 | 90 | 100 | 0 |
|  |  | n79 |  |  |  |  |  |  | 40 | 50 | 60 |  | 80 |  | 100 |  |
| CA\_n78A-n92A | CA\_n78A-n92A | n78 |  | 10 | 15 | 20 |  |  | 40 | 50 | 60 |  | 80 | 90 | 100 | 0 |
|  |  | n92 | 5 | 10 | 15 | 20 |  |  |  |  |  |  |  |  |  |  |
| CA\_n78(2A)-n92A | CA\_n78A-n92A | n78 | See CA\_n78(2A) Bandwidth Combination Set 0 in Table 5.5A.2-1 | | | | | | | | | | | | | 0 |
|  |  | n92 | 5 | 10 | 15 | 20 |  |  |  |  |  |  |  |  |  |  |
| NOTE 1: This UE channel bandwidth is applicable only to downlink.  NOTE 2: The minimum requirements for intra-band contiguous or non-contiguous CA apply.  NOTE 3: The SCS of each channel bandwidth for NR band refers to Table 5.3.5-1. | | | | | | | | | | | | | | | | |

#### 5.5A.3.2 Configurations for inter-band CA (three bands)

Table 5.5A.3.2-1: NR CA configurations and bandwidth combinations sets defined for inter-band CA (three bands)

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| NR CA configuration | Uplink CA configuration | NR Band | Channel bandwidth (MHz) (NOTE 3) | | | | | | | | | | | | Bandwidth combination set |
|  |  |  | 5 | 10 | 15 | 20 | 25 | 30 | 40 | 50 | 60 | 80 | 90 | 100 |  |
| CA\_n1A-n3A-n7A | - | n1 | 5 | 10 | 15 | 20 |  |  |  |  |  |  |  |  | 0 |
|  |  | n3 | 5 | 10 | 15 | 20 | 25 | 30 |  |  |  |  |  |  |  |
|  |  | n7 | 5 | 10 | 15 | 20 | 25 | 30 | 40 | 50 |  |  |  |  |  |
| CA\_n1A-n3A-n7B | - | n1 | 5 | 10 | 15 | 20 |  |  |  |  |  |  |  |  | 0 |
|  |  | n3 | 5 | 10 | 15 | 20 | 25 | 30 |  |  |  |  |  |  |  |
|  |  | n7 | See CA\_n7B Bandwidth Combination Set 0 in Table 5.5A.1-1 | | | | | | | | | | | |  |
| CA\_n1A-n3A-n8A | - | n1 | 5 | 10 | 15 | 20 |  |  |  |  |  |  |  |  | 0 |
|  |  | n3 | 5 | 10 | 15 | 20 | 25 | 30 |  |  |  |  |  |  |  |
|  |  | n8 | 5 | 10 | 15 | 20 |  |  |  |  |  |  |  |  |  |
| CA\_n1A-n3A-n28A | - | n1 | 5 | 10 | 15 | 20 |  |  |  |  |  |  |  |  | 0 |
|  |  | n3 | 5 | 10 | 15 | 20 | 25 | 30 |  |  |  |  |  |  |  |
|  |  | n28 | 5 | 10 | 15 | 202 |  |  |  |  |  |  |  |  |  |
| CA\_n1A-n3A-n41A | CA\_n1A-n3A  CA\_n1A-n41A  CA\_n3A-n41A | n1 | 5 | 10 | 15 | 20 |  |  |  |  |  |  |  |  | 0 |
|  |  | n3 | 5 | 10 | 15 | 20 | 25 | 30 |  |  |  |  |  |  |  |
|  |  | n41 |  | 10 | 15 | 20 |  | 30 | 40 | 50 | 60 | 80 | 90 | 100 |  |
| CA\_n1A-n3A-n78A | CA\_n1A-n3A  CA\_n1A-n78A  CA\_n3A-n78A | n1 | 5 | 10 | 15 | 20 |  |  |  |  |  |  |  |  | 0 |
|  |  | n3 | 5 | 10 | 15 | 20 | 25 | 30 |  |  |  |  |  |  |  |
|  |  | n78 |  | 10 | 15 | 20 |  |  | 40 | 50 | 60 | 80 | 90 | 100 |  |
| CA\_n1A-n8A-n78A | - | n1 | 5 | 10 | 15 | 20 |  |  |  |  |  |  |  |  | 0 |
|  |  | n8 | 5 | 10 | 15 | 20 |  |  |  |  |  |  |  |  |  |
|  |  | n78 |  | 10 | 15 | 20 |  |  | 40 | 50 | 60 | 80 | 90 | 100 |  |
| CA\_n1A-n7A-n28A | CA\_n1A-n7A  CA\_n1A-n28A  CA\_n7A-n28A | n1 | 5 | 10 | 15 | 20 |  |  |  |  |  |  |  |  | 0 |
|  |  | n7 | 5 | 10 | 15 | 20 | 25 | 30 | 40 | 50 |  |  |  |  |  |
|  |  | n28 | 5 | 10 | 15 | 20 |  |  |  |  |  |  |  |  |  |
| CA\_n1A-n7A-n78A | CA\_n1A-n7A  CA\_n1A-n78A  CA\_n7A-n78A | n1 | 5 | 10 | 15 | 20 |  |  |  |  |  |  |  |  | 0 |
|  |  | n7 | 5 | 10 | 15 | 20 | 25 | 30 | 40 | 50 |  |  |  |  |  |
|  |  | n78 |  | 10 | 15 | 20 |  |  | 40 | 50 | 60 | 80 | 901 | 100 |  |
| CA\_n1A-n7A-n78(2A) | CA\_n1A-n7A  CA\_n1A-n78A  CA\_n7A-n78A | n1 | 5 | 10 | 15 | 20 |  |  |  |  |  |  |  |  | 0 |
|  |  | n7 | 5 | 10 | 15 | 20 | 25 | 30 | 40 | 50 |  |  |  |  |  |
|  |  | n78 | See CA\_n78(2A) Bandwidth Combination Set 0 in Table 5.5A.2-1 in TS 38.101-1 | | | | | | | | | | | |  |
| CA\_n1A-n28A-n78A | - | n1 | 5 | 10 | 15 | 20 |  |  |  |  |  |  |  |  | 0 |
|  |  | n28 | 5 | 10 | 15 | 202 |  |  |  |  |  |  |  |  |  |
|  |  | n78 |  | 10 | 15 | 20 |  |  | 40 | 50 | 60 | 80 | 90 | 100 |  |
| CA\_n1A-n40A-n78A | - | n1 | 5 | 10 | 15 | 20 |  |  |  |  |  |  |  |  | 0 |
|  |  | n40 | 5 | 10 | 15 | 20 | 25 | 30 | 40 | 50 |  |  |  |  |  |
|  |  | n78 |  | 10 | 15 | 20 |  |  | 40 | 50 | 60 | 80 | 90 | 100 |  |
| CA\_n3A-n7A-n28A | - | n3 | 5 | 10 | 15 | 20 | 25 | 30 |  |  |  |  |  |  | 0 |
|  |  | n7 | 5 | 10 | 15 | 20 | 25 | 30 | 40 | 50 |  |  |  |  |  |
|  |  | n28 | 5 | 10 | 15 | 20 |  |  |  |  |  |  |  |  |  |
| CA\_n3A-n7B-n28A | - | n3 | 5 | 10 | 15 | 20 | 25 | 30 |  |  |  |  |  |  | 0 |
|  |  | **n7** | See CA\_n7B Bandwidth Combination Set 0 in Table 5.5A.1-1 | | | | | | | | | | | |  |
|  |  | n28 | 5 | 10 | 15 | 20 |  |  |  |  |  |  |  |  |  |
| CA\_n3A-n7A-n78A | - | n3 | 5 | 10 | 15 | 20 | 25 | 30 |  |  |  |  |  |  | 0 |
|  |  | n7 | 5 | 10 | 15 | 20 | 25 | 30 | 40 | 50 |  |  |  |  |  |
|  |  | n78 |  | 10 | 15 | 20 | 25 | 30 | 40 | 50 | 60 | 80 | 90 | 100 |  |
| CA\_n3A-n7B-n78A | - | n3 | 5 | 10 | 15 | 20 | 25 | 30 |  |  |  |  |  |  | 0 |
|  |  | **n7** | See CA\_n7B Bandwidth Combination Set 0 in Table 5.5A.1-1 | | | | | | | | | | | |  |
|  |  | n78 |  | 10 | 15 | 20 | 25 | 30 | 40 | 50 | 60 | 80 | 90 | 100 |  |
| CA\_n3A-n8A-n78A | CA\_n3A-n8A  CA\_3A-n78A  CA\_n8A-n78A | n3 | 5 | 10 | 15 | 20 | 25 | 30 |  |  |  |  |  |  | 0 |
|  |  | n8 | 5 | 10 | 15 | 20 |  |  |  |  |  |  |  |  |  |
|  |  | n78 |  | 10 | 15 | 20 |  |  | 40 | 50 | 60 | 80 | 90 | 100 |  |
| CA\_n3A-n28A-n77A | CA\_n3A-n28A  CA\_n3A-n77A  CA\_n28A-n77A | n3 | 5 | 10 | 15 | 20 | 25 | 30 |  |  |  |  |  |  | 0 |
|  |  | n28 | 5 | 10 | 15 | 20 |  |  |  |  |  |  |  |  |  |
|  |  | n77 |  | 10 | 15 | 20 |  |  | 40 | 50 | 60 | 80 | 90 | 100 |  |
| CA\_n3A-n28A-n77(2A) | CA\_n3A-n28A  CA\_n3A-n77A  CA\_n28A-n77A | n3 | 5 | 10 | 15 | 20 | 25 | 30 |  |  |  |  |  |  | 0 |
|  |  | n28 | 5 | 10 | 15 | 20 |  |  |  |  |  |  |  |  |  |
|  |  | n77 | See CA\_n77(2A) Bandwidth Combination Set 0 in Table 5.5A.2-1 | | | | | | | | | | | |  |
| CA\_n3A-n28A-n78A | - | n3 | 5 | 10 | 15 | 20 |  |  |  |  |  |  |  |  | 0 |
|  |  | n28 | 5 | 10 | 15 | 202 |  |  |  |  |  |  |  |  |  |
|  |  | n78 |  | 10 | 15 | 20 |  |  | 40 | 50 | 60 | 80 | 90 | 100 |  |
| CA\_n3A-n28A-n78(2A) | - | n3 | 5 | 10 | 15 | 20 |  |  |  |  |  |  |  |  | 0 |
|  |  | n28 | 5 | 10 | 15 | 202 |  |  |  |  |  |  |  |  |  |
|  |  | n78 | See CA\_n78(2A) Bandwidth Combination Set 0 in Table 5.5A.2-1 | | | | | | | | | | | |  |
| CA\_n3A-n40A-n41A | CA\_n3A-n40A  CA\_n3A-n41A  CA\_n40A-n41A | n3 | 5 | 10 | 15 | 20 | 25 | 30 |  |  |  |  |  |  | 0 |
|  |  | n40 | 5 | 10 | 15 | 20 | 25 | 30 | 40 | 50 | 60 | 80 |  |  |  |
|  |  | n41 |  | 10 | 15 | 20 |  |  | 40 | 50 | 60 | 80 | 90 | 100 |  |
| CA\_n3A-n41A-n79A | - | n3 | 5 | 10 | 15 | 20 | 25 | 30 |  |  |  |  |  |  | 0 |
|  |  | n41 |  | 10 | 15 | 20 |  |  | 40 | 50 | 60 | 80 |  | 100 |  |
|  |  | n79 |  |  |  |  |  |  | 40 | 50 | 60 | 80 |  | 100 |  |
|  |  | n3 | 5 | 10 | 15 | 20 | 25 | 30 |  |  |  |  |  |  | 1 |
|  |  | n41 |  | 10 | 15 | 20 |  |  | 40 | 50 | 60 | 80 |  |  |  |
|  |  | n79 |  |  |  |  |  |  | 40 | 50 | 60 | 80 |  | 100 |  |
| CA\_n5A-n66A-n78A | CA\_n5A-n66A  CA\_n5A-n78A  CA\_n66A-n78A | n5 | 5 | 10 | 15 | 20 |  |  |  |  |  |  |  |  | 0 |
|  |  | n66 | 5 | 10 | 15 | 20 | 25 | 30 | 40 |  |  |  |  |  |  |
|  |  | n78 |  | 10 | 15 | 20 | 25 | 30 | 40 | 50 | 60 | 80 | 90 | 100 |  |
| CA\_n7A-n25A-n66A | CA\_n7A-n25A  CA\_n7A-n66A  CA\_n25A-n66A | n7 | 5 | 10 | 15 | 20 | 25 | 30 | 40 | 50 |  |  |  |  | 0 |
|  |  | n25 | 5 | 10 | 15 | 20 | 25 | 30 | 40 |  |  |  |  |  |  |
|  |  | n66 | 5 | 10 | 15 | 20 | 25 | 30 | 40 |  |  |  |  |  |  |
| CA\_n7A-n28A-n78A | - | n7 | 5 | 10 | 15 | 20 | 25 | 30 | 40 | 50 |  |  |  |  | 0 |
|  |  | n28 | 5 | 10 | 15 | 20 |  |  |  |  |  |  |  |  |  |
|  |  | n78 |  | 10 | 15 | 20 | 25 | 30 | 40 | 50 | 60 | 80 | 90 | 100 |  |
| CA\_n7B-n28A-n78A | - | n7 | See CA\_n7B Bandwidth Combination Set 0 in Table 5.5A.1-1 | | | | | | | | | | | | 0 |
|  |  | n28 | 5 | 10 | 15 | 20 |  |  |  |  |  |  |  |  |  |
|  |  | n78 |  | 10 | 15 | 20 | 25 | 30 | 40 | 50 | 60 | 80 | 90 | 100 |  |
| CA\_n7A-n66A-n78A | CA\_n7A-n66A  CA\_n7A-n78A  CA\_n66A-n78A | n7 | 5 | 10 | 15 | 20 | 25 | 30 | 40 | 50 |  |  |  |  | 0 |
|  |  | n66 | 5 | 10 | 15 | 20 | 25 | 30 | 40 |  |  |  |  |  |  |
|  |  | n78 |  | 10 | 15 | 20 | 25 | 30 | 40 | 50 | 60 | 80 | 90 | 100 |  |
| CA\_n7A-n66A-n78(2A) | CA\_n7A-n66A  CA\_n7A-n78A  CA\_n66A-n78A | n7 | 5 | 10 | 15 | 20 | 25 | 30 | 40 | 50 |  |  |  |  | 0 |
|  |  | n66 | 5 | 10 | 15 | 20 | 25 | 30 | 40 |  |  |  |  |  |  |
|  |  | n78 | See CA\_n78(2A) Bandwidth Combination Set 1 in Table 5.5A.2-1 | | | | | | | | | | | |  |
| CA\_n8A-n39A-n41A | - | n8 | 5 | 10 | 15 | 20 |  |  |  |  |  |  |  |  | 0 |
| n39 | 5 | 10 | 15 | 20 | 25 | 30 | 40 |  |  |  |  |  |  |
| n41 |  | 10 | 15 | 20 |  |  | 40 | 50 | 60 | 80 |  | 100 |  |
|  |  | n8 | 5 | 10 | 15 | 20 |  |  |  |  |  |  |  |  | 1 |
| n39 | 5 | 10 | 15 | 20 | 25 | 30 | 40 |  |  |  |  |  |  |
| n41 |  | 10 | 15 | 20 |  |  | 40 | 50 | 60 |  |  |  |  |
| CA\_n8A-n41A-n79A | - | n8 | 5 | 10 | 15 | 20 |  |  |  |  |  |  |  |  | 0 |
|  |  | n41 |  | 10 | 15 | 20 |  |  | 40 | 50 | 60 | 80 |  | 100 |  |
|  |  | n79 |  |  |  |  |  |  | 40 | 50 | 60 | 80 |  | 100 |  |
|  |  | n8 | 5 | 10 | 15 | 20 |  |  |  |  |  |  |  |  | 1 |
|  |  | n41 |  | 10 | 15 | 20 |  |  | 40 | 50 | 60 |  |  |  |  |
|  |  | n79 |  |  |  |  |  |  | 40 | 50 | 60 | 80 |  | 100 |  |
| CA\_n20A-n28A-n78A | - | n20 | 5 | 10 | 15 | 20 |  |  |  |  |  |  |  |  | 0 |
|  |  | n28 | 5 | 10 | 15 | 20 |  |  |  |  |  |  |  |  |  |
|  |  | n78 |  | 10 | 15 | 20 |  | 30 | 40 | 50 | 60 | 80 | 90 | 100 |  |
| CA\_n25A-n41A-n66A | - | n25 | 5 | 10 | 15 | 20 |  |  |  |  |  |  |  |  | 0 |
|  |  | n41 |  | 10 | 15 | 20 |  | 30 | 40 | 50 | 60 | 80 | 90 | 100 |  |
|  |  | n66 | 5 | 10 | 15 | 20 |  |  | 40 |  |  |  |  |  |  |
| CA\_n25A-n41C-n66A | - | n25 | 5 | 10 | 15 | 20 |  |  |  |  |  |  |  |  | 0 |
|  |  | n41 | See CA\_n41C Bandwidth Combination Set 0 in 38.101-1 Table 5.5A.1-1 | | | | | | | | | | | |  |
|  |  | n66 | 5 | 10 | 15 | 20 |  |  | 40 |  |  |  |  |  |  |
| CA\_n25A-n41(2A)-n66A | - | n25 | 5 | 10 | 15 | 20 |  |  |  |  |  |  |  |  | 0 |
|  |  | n41 | See CA\_n41(2A) Bandwidth Combination Set 1 in 38.101-1 Table 5.5A.2-1 | | | | | | | | | | | |  |
|  |  | n66 | 5 | 10 | 15 | 20 |  |  | 40 |  |  |  |  |  |  |
| CA\_n25A-n41A-n71A | - | n25 | 5 | 10 | 15 | 20 |  |  |  |  |  |  |  |  | 0 |
|  |  | n41 |  | 10 | 15 | 20 |  | 30 | 40 | 50 | 60 | 80 | 90 | 100 |  |
|  |  | n71 | 5 | 10 | 15 | 20 |  |  |  |  |  |  |  |  |  |
| CA\_n25A-n41(2A)-n71A | - | n25 | 5 | 10 | 15 | 20 |  |  |  |  |  |  |  |  | 0 |
|  |  | n41 | See CA\_n41(2A) Bandwidth Combination Set 1 in 38.101-1 Table 5.5A.2-1 | | | | | | | | | | | |  |
|  |  | n71 | 5 | 10 | 15 | 20 |  |  |  |  |  |  |  |  |  |
| CA\_n25A-n41C-n71A | - | n25 | 5 | 10 | 15 | 20 |  |  |  |  |  |  |  |  | 0 |
|  |  | n41 | See CA\_n41C Bandwidth Combination Set 0 in 38.101-1 Table 5.5A.1-1 | | | | | | | | | | | |  |
|  |  | n71 | 5 | 10 | 15 | 20 |  |  |  |  |  |  |  |  |  |
| CA\_n25A-n66A-n71A | - | n25 | 5 | 10 | 15 | 20 |  |  |  |  |  |  |  |  | 0 |
|  |  | n66 | 5 | 10 | 15 | 20 |  |  | 40 |  |  |  |  |  |  |
|  |  | n71 | 5 | 10 | 15 | 20 |  |  |  |  |  |  |  |  |  |
| CA\_n25A-n66A-n78A | CA\_n25A-n66A  CA\_n25A-n78A  CA\_n66A-n78A - | n25 | 5 | 10 | 15 | 20 | 25 | 30 | 40 |  |  |  |  |  | 0 |
|  |  | n66 | 5 | 10 | 15 | 20 | 25 | 30 | 40 |  |  |  |  |  |  |
|  |  | n78 |  | 10 | 15 | 20 | 25 | 30 | 40 | 50 | 60 | 80 | 90 | 100 |  |
| CA\_n28A-n40A-n78A | - | n28 | 5 | 10 | 15 | 20 |  |  |  |  |  |  |  |  | 0 |
|  |  | n40 | 5 | 10 | 15 | 20 | 25 | 30 | 40 | 50 |  |  |  |  |  |
|  |  | n78 |  | 10 | 15 | 20 |  |  | 40 | 50 | 60 | 80 | 90 | 100 |  |
| CA\_n28A-n41A-n78A | CA\_n28A-n41A  CA\_n41A-n78A  CA\_n28A-n78A | n28 | 5 | 10 | 15 | 20 |  |  |  |  |  |  |  |  | 0 |
|  |  | n41 |  | 10 | 15 | 20 |  | 30 | 40 | 50 | 60 |  | 90 | 100 |  |
|  |  | n78 |  | 10 | 15 | 20 | 25 | 30 | 40 | 50 | 60 | 80 | 90 | 100 |  |
| CA\_n29A-n66A-n70A | - | n29 | 5 | 10 |  |  |  |  |  |  |  |  |  |  | 0 |
|  |  | n66 | 5 | 10 | 15 | 20 |  |  | 40 |  |  |  |  |  |  |
|  |  | n70 | 5 | 10 | 15 | 201 | 251 |  |  |  |  |  |  |  |  |
| CA\_n29A-n66B-n70A | - | n29 | 5 | 10 |  |  |  |  |  |  |  |  |  |  | 0 |
|  |  | n66 | See CA\_n66B Bandwidth Combination Set 0 in Table 5.5A.1-1 in TS38.101-1 | | | | | | | | | | | |  |
|  |  | n70 | 5 | 10 | 15 | 201 | 251 |  |  |  |  |  |  |  |  |
| CA\_n29A-n66(2A)-n70A | - | n29 | 5 | 10 |  |  |  |  |  |  |  |  |  |  | 0 |
|  |  | n66 | See CA\_n66(2A) Bandwidth Combination Set 0 in Table 5.5A.2-1 in TS38.101-1 | | | | | | | | | | | |  |
|  |  | n70 | 5 | 10 | 15 | 201 | 251 |  |  |  |  |  |  |  |  |
| CA\_n39A-n41A-n79A | - | n39 | 5 | 10 | 15 | 20 | 25 | 30 | 40 |  |  |  |  |  | 0 |
|  |  | n41 |  | 10 | 15 | 20 |  |  | 40 | 50 | 60 | 80 | 90 | 100 |  |
|  |  | n79 |  |  |  |  |  |  | 40 | 50 | 60 | 80 |  |  |  |
|  |  | n39 | 5 | 10 | 15 | 20 | 25 | 30 | 40 |  |  |  |  |  | 1 |
|  |  | n41 |  | 10 | 15 | 20 |  |  | 40 | 50 | 60 |  |  | 100 |  |
|  |  | n79 |  |  |  |  |  |  | 40 | 50 | 60 | 80 |  |  |  |
| CA\_n40A-n41A-n79A | CA\_n40A-n41A  CA\_n40A-n79A  CA\_n41A-n79A | n40 | 5 | 10 | 15 | 20 | 25 | 30 | 40 | 50 | 60 | 80 |  |  | 0 |
|  |  | n41 |  | 10 | 15 | 20 |  |  | 40 | 50 | 60 | 80 |  | 100 |  |
|  |  | n79 |  |  |  |  |  |  | 40 | 50 | 60 | 80 |  | 100 |  |
|  |  | n40 | 5 | 10 | 15 | 20 | 25 | 30 | 40 |  |  |  |  |  | 1 |
|  |  | n41 |  | 10 | 15 | 20 |  |  | 40 | 50 | 60 |  |  |  |  |
|  |  | n79 |  |  |  |  |  |  | 40 | 50 | 60 | 80 |  | 100 |  |
| CA\_n41A-n66A-n71A | - | n41 |  | 10 | 15 | 20 |  | 30 | 40 | 50 | 60 | 80 | 90 | 100 | 0 |
|  |  | n66 | 5 | 10 | 15 | 20 |  |  | 40 |  |  |  |  |  |  |
|  |  | n71 | 5 | 10 | 15 | 20 |  |  |  |  |  |  |  |  |  |
| CA\_n41(2A)-n66A-n71A | - | n41 | See CA\_n41(2A) Bandwidth Combination Set 1 in 38.101-1 Table 5.5A.2-1 | | | | | | | | | | | | 0 |
|  |  | n66 | 5 | 10 | 15 | 20 |  |  | 40 |  |  |  |  |  |  |
|  |  | n71 | 5 | 10 | 15 | 20 |  |  |  |  |  |  |  |  |  |
| CA\_n41C-n66A-n71A | - | n41 | See CA\_n41C Bandwidth Combination Set 0 in 38.101-1 Table 5.5A.1-1 | | | | | | | | | | | | 0 |
|  |  | n66 | 5 | 10 | 15 | 20 |  |  | 40 |  |  |  |  |  |  |
|  |  | n71 | 5 | 10 | 15 | 20 |  |  |  |  |  |  |  |  |  |
| CA\_n66A-n70A-n71A | CA\_n66A-n71A  CA\_n70A-n71A | n66 | 5 | 10 | 15 | 20 |  |  | 40 |  |  |  |  |  | 0 |
|  |  | n70 | 5 | 10 | 15 | 201 | 251 |  |  |  |  |  |  |  |  |
|  |  | n71 | 5 | 10 | 15 | 20 |  |  |  |  |  |  |  |  |  |
| CA\_n66B-n70A-n71A | CA\_n66A-n71A  CA\_n70A-n71A | n66 | See CA\_n66B Bandwidth Combination Set 0 in Table 5.5A.1-1 in TS 38.101-1 | | | | | | | | | | | | 0 |
|  |  | n70 | 5 | 10 | 15 | 201 | 251 |  |  |  |  |  |  |  |  |
|  |  | n71 | 5 | 10 | 15 | 20 |  |  |  |  |  |  |  |  |  |
| CA\_n66(2A)-n70A-n71A | CA\_n66A-n71A  CA\_n70A-n71A | n66 | See CA\_n66(2A) Bandwidth Combination Set 0 in Table 5.5A.2-1 in TS 38.101-1 | | | | | | | | | | | | 0 |
|  |  | n70 | 5 | 10 | 15 | 201 | 251 |  |  |  |  |  |  |  |  |
|  |  | n71 | 5 | 10 | 15 | 20 |  |  |  |  |  |  |  |  |  |
| NOTE 1: This UE channel bandwidth is applicable only to downlink  NOTE 2: For the 20 MHz bandwidth, the minimum requirements are specified for NR UL carrier frequencies confined to either 713-723 MHz or 728-738 MHz.  NOTE 3: The SCS of each channel bandwidth for NR band refers to Table 5.3.5-1. | | | | | | | | | | | | | | | |

## **<<End of Change4>>**

## **<<Start of Change5>>**

## 5.5B Configurations for DC

For an NR DC configuration specified in 5.5B.1-1, the bandwidth combination sets for the corresponding NR CA configuration in 5.5A.3,i.e.,dual uplink inter-band carrier aggregation with uplink assigned to two NR bands, are applicable to Dual Connectivity.

Table 5.5B.1-1: Inter-band NR DC configurations (two bands)

| NR DC  configuration | Uplink NR DC  configuration |
| --- | --- |
| DC\_n2A-n5A | DC\_n2A-n5A |
| DC\_n3A-n28A | DC\_n3A-n28A |
| DC\_n3A-n77A1 | DC\_n3A-n77A |
| DC\_n3A-n77(2A) 1 | DC\_n3A-n77A |
| DC\_n3A-n78A1 | DC\_n3A-n78A |
| DC\_n28A-n77A1 | DC\_n28A-n77A |
| DC\_n28A-n78A1 | DC\_n28A-n78A |
| NOTE 1: Applicable for UE supporting inter-band NR DC with mandatory simultaneous Rx/Tx capability. | |

## **<<End of Change5>>**

## **<<Start of Change6>>**

#### 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 | >6.66 |  | A5 | <3.06 |  | A5 | ≥3.06  ≤6.66 | >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 | >9.18 |  | A5 | <3.78 |  | A5 | ≥3.78  ≤9.18 | >1.44 | A6 |
| 20MHz | Fc=1990 | >13.32 |  | A5 | <4.68 |  | A5 | ≥4.68  ≤13.32 | >2.16 | A6 |
| 20MHz | Fc=1995 | >12.42 |  | A5 | <5.58 |  | A5 | ≥5.58  ≤12.42 | >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 | | | | | | | |

## **<<End of Change6>>**

## **<<Start of Change7>>**

##### 6.4.2.4.1 Requirements for Pi/2 BPSK modulation

These requirements apply if the IE *powerBoostPi2BPSK* is set to 1 for power class 3 capable UE operating in TDD bands n40, n41, n77, n78 and n79 with Pi/2 BPSK modulation and UE indicates support for UE capability *powerBoosting-pi2BPSK* and 40 % or less slots in radio frame are used for UL transmission. These requirements also apply if the IE *dmrs-UplinkTransformPrecoding-r16* is configured and UE indicates support for UE capability *lowPAPR-DMRS-PUSCHwithPrecoding-r16*. Otherwise the requirements for EVM equalizer spectrum flatness defined in clause 6.4.2.4 apply.

The EVM equalizer coefficients across the allocated uplink block shall be modified to fit inside the mask specified in Table 6.4.2.4.1-1 for normal conditions, prior to the calculation of EVM. The limiting mask shall be placed to minimize the change in equalizer coefficients in a sum of squares sense.

Table 6.4.2.4.1-1: Mask for EVM equalizer coefficients for Pi/2 BPSK, normal conditions

|  |  |  |
| --- | --- | --- |
| Frequency range | Parameter | Maximum ripple (dB) |
| |FUL\_Meas – Fcenter| ≤ X MHz  (Range 1) | X1 | 6 (p-p) |
| |FUL\_Meas – Fcenter| > X MHz  (Range 2) | X2 | 14 (p-p) |
| NOTE 1: FUL\_Meas refers to the sub-carrier frequency for which the equalizer coefficient is evaluated  NOTE 2: Fcenter refers to the center frequency of an allocated block of PRBs  NOTE 3: X, in MHz, is equal to 25% of the bandwidth of the PRB allocation  NOTE 4: See Figure 6.4.2.4.1-1 for description of X1, X2 | | |



Figure 6.4.2.4.1-1: The limits for EVM equalizer spectral flatness with the maximum allowed variation. .

For Pi/2 BPSK modulation the UE shall be allowed to employ spectral shaping and the shaping filter shall be restricted so that the impulse response of the shaping filter itself shall meet

│*ãt*(*t*,0)│ ≥ │*ãt*(*t*, *τ*)│ ∀*τ* ≠ 0

20*log*10│*ãt*(*t*,*τ*)│< -15 dB 1< *τ* < M - 1,

where│*ãt*(*t*, *τ*)│=*IDFT*{│*ãt*(*t*,*f*)│*ejφ (t*,*f)*}, *f* is the frequency of the *M* allocated subcarriers , *ã*(*t*,*f*) and *φ*(*t*,*f*) are the amplitude and phase response.

0 dB reference is defined as20*log*10│*ãt*(*t*,0)│.

## **<<End of Change7>>**

## **<<Start of Change8>>**

#### 6.2A.1.3 UE maximum output power for Inter-band CA

For inter-band downlink carrier aggregation with one uplink carrier assigned to one NR band, the transmitter power requirements in clause 6.2 apply.

For inter-band carrier aggregation with two uplink contiguous carrier assigned to one NR band, the transmitter power requirements specified in subclause 6.2A.1.1 apply.

For inter-band uplink carrier aggregation with uplink assigned to two NR bands, UE maximum output power shall be measured over all component carriers from different bands. If each band has separate antenna connectors, maximum output power is defined as the sum of maximum output power from each UE antenna connector. The period of measurement shall be at least one sub frame (1 ms). The maximum output power is specified in Table 6.2A.1.3-1.

For PC3 inter-band carrier aggregation with one uplink component carrier assigned to one NR band in NR band n41, n77, n78, and n79, the requirements for power class 2 are not applicable and the corresponding requirements for a power class 3 UE shall apply.

Table 6.2A.1.3-1 UE Power Class for uplink inter-band CA (two bands)

### *<Unchanged texts are omitted>*

#### 6.2A.2.1 UE maximum output power reduction for Intra-band contiguous CA

For intra-band contiguous carrier aggregation the allowed Maximum Power Reduction (MPR) for the maximum output power in Table 6.2A.1.1-1 with contiguous RB allocation is specified in Table 6.2A.2.1-1 for UE power class 3 CA bandwidth classes B and C.

In case the modulation format is different on different component carriers then the MPR is determined by the rules applied to higher order of those modulations.

Unless otherwise specified, pi/2 BPSK in following A-MPR tables refers to both variants of pi/2 BPSK referenced in 6.2.2 tables 6.2.2-1.

Table 6.2A.2.1-1: Contiguous RB allocation for Power Class 3

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Modulation | | MPR for bandwidth class B(dB) | | MPR for bandwidth class C(dB) | |
|  | | inner | outer | inner | outer |
| DFT-s-OFDM | Pi/2 BPSK | 1.0 | 3.5 | 2.5 | 7 |
|  | QPSK | 1.0 | 3.5 | 2.5 | 7 |
|  | 16QAM | 1.5 | 3.5 | 2.5 | 7 |
|  | 64QAM | 3.0 | 4.0 | 5 | 7 |
|  | 256QAM | 5.5 | 6.0 | 7 | 7.5 |
| CP-OFDM | QPSK | 2.0 | 4.0 | 3.5 | 8 |
|  | 16QAM | 2.5 | 4.0 | 3.5 | 8 |
|  | 64QAM | 3.5 | 4.0 | 5 | 8 |
|  | 256QAM | 6.5 | 6.5 | 7 | 8 |

For CA bandwidth class B and bandwidth class C with contiguous RB allocation, the following parameters are defined to specify valid RB allocation ranges for Inner and Outer RB allocations:

An RB allocation is contiguous if LCRB1 = 0 or LCRB2 = 0 or (LCRB1 ≠ 0 and LCRB2 ≠ 0 and RBStart1 + LCRB1 = NRB1 andRBStart2 = 0), where RBStart1, LCRB1, and NRB1 are for CC1, RBStart2, LCRB2, and NRB2 are for CC2, CC1 is the component carrier with lower frequency.

In contiguous CA, a contiguous allocation is an inner allocation if

RBStart,Low ≤ RBStart\_CA ≤ RBStart,High,and NRB\_alloc ≤ ceil(NRB,agg /2),

where

RBStart,Low = max(1, floor(NRB\_alloc /2))

RBStart,High = NRB,agg – RBStart,Low – NRB,alloc,

with

NRB\_alloc= LCRB1 ∙ 2^µ1 + LCRB2 ∙ 2^µ2

NRB\_alloc= (NRB1 - RBStart1)∙ 2^µ1 + (RBStart2 + LCRB2 ) ∙ 2^µ2,

NRB,agg=NRB1∙2^µ1+ NRB2∙2^µ2.

If LCRB1 =0, RBStart\_CA = NRB1∙2^µ1+ RBStart2∙2^µ2,

if LCRB1 > 0, RBStart\_CA = RBStart1∙2^µ1.

A contiguous allocation that is not an Inner contiguous allocation is an Outer contiguous allocation.

For intra-band contiguous carrier aggregation the allowed Maximum Power Reduction (MPR) for the maximum output power in Table 6.2A.1.1-1 with non-contiguous RB allocation is specified in Table 6.2A.2.1-2 for UE power class 3 CA bandwidth classes B and C.

Table 6.2A.2.1-2: non-contiguous RB allocation for Power Class 3

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Modulation | | MPR for bandwidth class B(dB) | | | MPR for bandwidth class C(dB) | | |
|  | | inner | Outer11 | Outer22 | inner | Outer11 | Outer22 |
| DFT-s-OFDM | Pi/2 BPSK | 2 | 5.5 | 11.5 | 2.5 | 6 | 13 |
|  | QPSK | 2 | 5.5 |  | 2.5 | 6 |  |
|  | 16QAM | 2.5 | 5.5 |  | 3 | 6 |  |
|  | 64QAM | 4.5 | 6 |  | 5 | 6 |  |
|  | 256QAM | 6 | 6.5 |  | 6.5 | 6.5 |  |
| CP-OFDM | QPSK | 2.5 | 6.5 | 12 | 3.5 | 7 | 14 |
|  | 16QAM | 3 | 7 |  | 3.5 | 7 |  |
|  | 64QAM | 5 | 7 |  | 5 | 7 |  |
|  | 256QAM | 7.5 | 7.5 |  | 7.5 | 7.5 |  |
| NOTE 1: Outer 1 MPR for Pi/2 BPSK and QPSK is reduced by 2dB for aggregated allocation bandwidth > 10MHz  NOTE 2: Outer 2 MPR is reduced by 4.5dB for aggregated allocation bandwidth > 10MHz | | | | | | | |

For CA bandwidth classes B and C with non-contiguous RB allocation, the following parameters are defined to specify valid RB allocation ranges for Inner, Outer1 and Outer2 RB allocations:

Non-Contiguous RB allocation is defined as RBStart1 + LCRB1 < NRB1, orRBStart2 > 0, when both uplink CCs are activated and allocated with RB(s), where RBStart1, LCRB1, and NRB1 are for CC1, RBStart2, LCRB2, and NRB2 are for CC2, CC1 is the component carrier with lower frequency.

In contiguous CA, a non-contiguous RB allocation is a non-contiguous Inner RB allocation if the following conditions are met:

RBStart,Low ≤ RBStart\_CA ≤ RBStart,High and NRB\_alloc ≤ ceil((BWChannel\_CA / 3 – BWgap ) / 0.18MHz),

where

NRB\_alloc = (NRB1 - RBStart1)∙ 2^µ1 + (RBStart2 + LCRB2 ) ∙ 2^µ2, RBStart\_CA = RBStart1∙2^μ1

RBStart,Low = max(1, floor(NRB\_alloc + (BWgap – BWGB,low)/0.18MHz))

RBStart,High = floor((BWChannel\_CA – 2 ∙ BWgap – BWGB,low)/0.18MHz – 2 ∙ NRB\_alloc)

BWGB,low =Foffset,low – (NRB1∙12+1)∙SCS1/2

BWgap is the bandwidth of the gap between NRB1 and NRB2 possible allocations of CC1 and CC2 respectively.

In contiguous CA, a non-contiguous RB allocation is a non-contiguous outer 1 RB allocation if the following conditions are met:

RBStart,Low ≤ RBStart\_CA ≤ RBStart,High and NRB\_alloc ≤ ceil((3 BWChannel\_CA / 5 – BWgap) / 0.18MHz)

where

RBStart,Low = max(1, 2 ∙ NRB\_alloc – floor( (BWChannel\_CA – 2 ∙ BWgap + BWGB,low)/0.18MHz)),

RBStart,High = floor((2 ∙ BWChannel\_CA – 3 ∙ BWgap – BWGB,low) / 0.18MHz – 3 ∙ NRB\_alloc)

NRB\_alloc , RBStart\_CA , BWgap and BWGB,low are as defined for the Inner region.

In contiguous CA, a non-contiguous allocation is an Outer 2 allocation if it is neither a non-contiguous Inner allocation nor an Outer 1 allocation.

### *<Unchanged texts are omitted>*

#### 6.2A.2.3 UE maximum output power reduction for Inter-band CA

For inter-band carrier aggregation with two uplink contiguous carrier assigned to one NR band, the maximum output power reduction requirements for intra-band contiguous carrier aggregation in subclause 6.2A.2.1 apply for that band.

For inter-band carrier aggregation with uplink assigned to two NR bands, the requirements in clause 6.2.2 apply for each uplink component carrier.

### *<Unchanged texts are omitted>*

##### 6.2A.3.1.3 UE additional maximum output power reduction for Inter-band CA

Unless otherwise stated, for inter-band carrier aggregation with two uplink contiguous carrier assigned to one NR band, the additional maximum output power reduction requirements for intra-band contiguous carrier aggregation in subclause 6.2A.3.1.1 apply for that band, for inter-band carrier aggregation with uplink assigned to two NR bands, the requirements in clause 6.2.3 apply for each uplink component carrier.

### *<Unchanged texts are omitted>*

### 6.2A.4 Configured output power for CA

#### 6.2A.4.1 Configured transmitted power level

##### 6.2A.4.1.1 Configured transmitted power for Intra-band contiguous CA

For uplink carrier aggregation the UE is allowed to set its configured maximum output power PCMAX,*c* for serving cell *c* and its total configured maximum output power PCMAX.

The configured maximum output power PCMAX,c on serving cell c shall be set as specified in clause 6.2.4, but with MPRc = MPR and A-MPRc = A-MPR with MPR and A-MPR as determined by subclause 6.2A.2 and 6.2A.3, respectively. For PH reporting the following exception applies: if the UE is configured with multiple uplink serving cells, the power PCMAX,c used for the purpose of PH reporting on first serving cell c = c1 does not consider for computation of the PH report transmissions on a second serving cell c2 as exempted in subclause 7.7.1 in [8]. There is one power management term for the UE, denoted P-MPR, and P-MPR c = P-MPR. The total configured maximum output power PCMAX shall be set within the following bounds:

PCMAX\_L ≤ PCMAX ≤ PCMAX\_H

For uplink intra-band contiguous carrier aggregation when same slot pattern is used in all aggregated serving cells,

PCMAX\_L  = MIN{10 log10 ∑ pEMAX,c  - TC , PEMAX,CA,PPowerClass,CA – MAX(MAX(MPR, A-MPR) + ΔTIB,c + TC + TRxSRS, P-MPRc ) }

PCMAX\_H  = MIN{10 log10 ∑ pEMAX,c , PEMAX,CA ,PPowerClass,CA}

where

- pEMAX,c is the linear value of PEMAX,*c* which is given by IE *P-Max* for serving cell *c* in [7];

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

- MPR and A-MPR are specified in clause 6.2A.2 and 6.2A.3, respectively;

- TIB,c is the additional tolerance for serving cell *c* as specified in clause 6.2A.4.2 for NR CA, clause 6.2C.2 for SUL, or TS 38.101-3 clause 6.2B.4.2 for EN-DC; In case the UE supports more than one of band combinations for CA, SUL or DC, and an operating band belongs to more than one band combinations then

a) When the operating band frequency range is ≤ 1 GHz, the applicable additional ∆TIB,c shall be the average value for all band combinations defined in clause 6.2A.4.2, 6.2C.2 in this specification and 6.2B.4.2 in TS 38.101-3 [3], truncated to one decimal place that apply for that operating band among the supported band combinations. In case there is a harmonic relation between low band UL and high band DL, then the maximum ∆TIB,c among the different supported band combinations involving such band shall be applied

b) When the operating band frequency range is > 1 GHz, the applicable additional ∆TIB,c shall be the maximum value for all band combinations defined in clause 6.2A.4.2, 6.2C.2 in this specification and 6.2B.4.2 in TS 38.101-3 [3] for the applicable operating bands.

- P-MPR is the power management term for the UE;

- TC is the highest value TC,c among all serving cells *c*;

- ∆TRxSRS is the highest value among all serving cells *c;*

- PEMAX,CA is the value indicated by *p-NR-FR1* or by *p-UE-FR1* whichever is the smallest if both are present.

For uplink intra-band contiguous carrier aggregation, when at least one different numerology/slot pattern is used in aggregated cells, the UE is allowed to set its configured maximum output power PCMAX,c(i),i for serving cell c(i) of slot numerology type *i*, and its total configured maximum output power PCMAX.

The configured maximum output power PCMAX,c(i),i (p) in slot p of serving cell c(i) on slot numerology type *i* shall be set within the following bounds:

PCMAX\_L,f,c(i),i (p) ≤ PCMAX,f,c(i), i (p) ≤ PCMAX\_H,f,c(i),i (p)

where PCMAX\_L,f,c (i),i (p) and PCMAX\_H,f,c(i),i (p) are the limits for a serving cell c(i) of slot numerology type i as specified in clause 6.2.4.

The total UE configured maximum output power PCMAX (p,q) in a slot p of slot numerology or symbol pattern *i*, and a slot q of slot numerology or symbol pattern *j* that overlap in time shall be set within the following bounds unless stated otherwise:

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

When slots p and q have different transmissions lengths and belong to different cells on different or same bands:

PCMAX\_L (p,q) = MIN {10 log10 [pCMAX\_L,f,c(i),i (p) + pCMAX\_L,f,c(i),j (q)], PPowerClass,CA, PEMAX,CA}

PCMAX\_H (p,q) = MIN {10 log10 [pCMAX\_ H,f,c(i),i (p) + pCMAX\_ H,f,c(i),j (q)], PPowerClass,CA, PEMAX,CA}

where pCMAX\_L,f,c (i),i and pCMAX\_ H,f,c(i),i are the respective limits PCMAX\_L,f,c (i),i and PCMAX\_H,f,c(i),i expressed in linear scale.

TREF and Teval are specified in Table 6.2A.4.1.1-0 when same and different slot patterns are used in aggregated carriers. For each TREF, the PCMAX\_L is evaluated per Teval and given by the minimum value taken over the transmission(s) within the Teval; the minimum PCMAX\_L over the one or more Teval is then applied for the entire TREF. The lesser of PPowerClass,CA and PEMAX,CA shall not be exceeded by the UE during any period of time.

Table 6.2A.4.1.1-0: PCMAX evaluation window for different slot and channel durations

|  |  |  |
| --- | --- | --- |
| TREF | Teval | Teval with frequency hopping |
| TREF of largest slot duration over both UL CCs | Physical channel length | Min(Tno\_hopping, Physical Channel Length) |

If the UE is configured with multiple TAGs and transmissions of the UE on slot *i* for any serving cell in one TAG overlap some portion of the first symbol of the transmission on slot *i* +1 for a different serving cell in another TAG, the UE minimum of PCMAX\_L for slots *i* and *i* + 1 applies for any overlapping portion of slots *i* and *i* + 1. The lesser of PPowerClass,CA and PEMAX,CA shall not be exceeded by the UE during any period of time.

The measured maximum output power PUMAX over all serving cells with same slot pattern shall be within the following range:

PCMAX\_L – MAX{TL, TLOW(PCMAX\_L) } ≤ PUMAX  ≤ PCMAX\_H + THIGH(PCMAX\_H)

PUMAX = 10 log10 ∑ pUMAX,c

where pUMAX,c denotes the measured maximum output power for serving cell *c* expressed in linear scale. The tolerances TLOW(PCMAX) and THIGH(PCMAX) for applicable values of PCMAX are specified in Table 6.2A.4.1.1-1. The tolerance TL is the absolute value of the lower tolerance for applicable NR CA configuration as specified in Table 6.2A.1.1-1 for intra-band carrier aggregation.

The measured maximum output power PUMAX over all serving cells, when at least one slot has a different transmission numerology or slot pattern, shall be within the following range:

P'CMAX\_L– MAX{TL, TLOW (P'CMAX\_L)} ≤ P'UMAX  ≤ P'CMAX\_H + THIGH (P'CMAX\_H)

P'UMAX = 10 log10 ∑ p'UMAX,c

where p'UMAX,c denotes the average measured maximum output power for serving cell *c* expressed in linear scale over TREF. The tolerances TLOW(P'CMAX) and THIGH(P'CMAX) for applicable values of P'CMAX are specified in Table 6.2A.4.1.1-1 for intra-band carrier aggregation. The tolerance TL is the absolute value of the lower tolerance for applicable NR CA configuration as specified in Table 6.2A.1.1-1 for inter-band carrier aggregation.

where:

P'CMAX\_L  = MIN{ MIN {10log10∑( pCMAX\_L,f,c(i),i), PPowerClass,CA} over all overlapping slots in TREF}

P'CMAX\_H = MAX{ MIN{10 log10 ∑ pEMAX,c , PPowerClass,CA} over all overlapping slots in TREF}

Table 6.2A.4.1.1-1: PCMAX tolerance for uplink intra-band contiguous CA

|  |  |  |
| --- | --- | --- |
| PCMAX (dBm) | Tolerance TLOW(PCMAX) (dB) | Tolerance THIGH(PCMAX) (dB) |
| 21 ≤ PCMAX ≤ 23 | 2.0 | |
| 20 ≤ PCMAX < 21 | 2.5 | |
| 19 ≤ PCMAX < 20 | 3.5 | |
| 18 ≤ PCMAX < 19 | 4.0 | |
| 13 ≤ PCMAX < 18 | 5.0 | |
| 8 ≤ PCMAX < 13 | 6.0 | |
| -40 ≤ PCMAX < 8 | 7.0 | |

##### 6.2A.4.1.2 Configured transmitted power for Intra-band non-contiguous CA

For uplink carrier aggregation the UE is allowed to set its configured maximum output power PCMAX,*c* for serving cell *c* and its total configured maximum output power PCMAX.

The configured maximum output power PCMAX,*c* on serving cell *c* shall be set as specified in subclause 6.2.4.

The configured maximum output power PCMAX,c on serving cell c shall be set as specified in subclause 6.2.4, but with MPRc = MPR and A-MPRc = A-MPR with MPR and A-MPR as determined by subclause 6.2A.2 and 6.2A.3, respectively. For PH reporting the following exception applies: if the UE is configured with multiple uplink serving cells, the power PCMAX,c used for the purpose of PH reporting on first serving cell c = c1 does not consider for computation of the PH report transmissions on a second serving cell c2 as exempted in subclause 7.7.1 in [8]. There is one power management term for the UE, denoted P-MPR, and P-MPR c = P-MPR.

The total configured maximum output power PCMAX shall be set within the following bounds:

PCMAX\_L ≤ PCMAX ≤ PCMAX\_H

For uplink intra-band non-contiguous carrier aggregation when same slot pattern is used in all aggregated serving cells,

PCMAX\_L  = MIN{10 log10 ∑ pEMAX,c  - TC , PEMAX,CA,PPowerClass,CA – MAX(MAX(MPRc, A-MPRc) + ΔTIB,c + TC + TRxSRS, P-MPRc ) }

PCMAX\_H  = MIN{10 log10 ∑ pEMAX,c , PEMAX,CA ,PPowerClass,CA}

where

- pEMAX,c is the linear value of PEMAX,*c* which is given by IE *P-Max* for serving cell *c* in [7];

- PPowerClass,CA is the maximum UE power specified in Table 6.2A.1.2-1 without taking into account the tolerance;

- MPR and A-MPR are specified in subclause 6.2A.2 and subclause 6.2A.3 respectively;

- TIB,c is the additional tolerance for serving cell *c* as specified in Table 6.2A.4.2.3-1;

- P-MPR is the power management term for the UE;

- TC is the highest value TC,c among all serving cells *c*;

- ∆TRxSRS is the highest value among all serving cells *c;*

- PEMAX,CA is the value indicated by *p-NR-FR1* or by *p-UE-FR1* whichever is the smallest if both are present.[For uplink intra-band non-contiguous carrier aggregation, when at least one different numerology/slot pattern is used in aggregated cells, the UE is allowed to set its configured maximum output power PCMAX,c(i),i for serving cell c(i) of slot numerology type *i*, and its total configured maximum output power PCMAX.

The configured maximum output power PCMAX,c(i),i (p) in slot p of serving cell c(i) on slot numerology type *i* shall be set within the following bounds:

PCMAX\_L,f,c(i),i (p) ≤ PCMAX,f,c(i), i (p) ≤ PCMAX\_H,f,c(i),i (p)

where PCMAX\_L,f,c (i),i (p) and PCMAX\_H,f,c(i),i (p) are the limits for a serving cell c(i) of slot numerology type i as specified in subclause 6.2.4.

The total UE configured maximum output power PCMAX (p,q) in a slot p of slot numerology or symbol pattern *i*, and a slot q of slot numerology or symbol pattern *j* that overlap in time shall be set within the following bounds unless stated otherwise:

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

When slots p and q have different transmissions lengths and belong to different cells on different or same bands:

PCMAX\_L (p,q) = MIN {10 log10 [pCMAX\_L,f,c(i),i (p) + pCMAX\_L,f,c(i),j (q)], PPowerClass,CA, PEMAX,CA}

PCMAX\_H (p,q) = MIN {10 log10 [pCMAX\_ H,f,c(i),i (p) + pCMAX\_ H,f,c(i),j (q)], PPowerClass,CA, PEMAX,CA}

where pCMAX\_L,f,c (i),i and pCMAX\_ H,f,c(i),i are the respective limits PCMAX\_L,f,c (i),i and PCMAX\_H,f,c(i),i expressed in linear scale.]

TREF and Teval are specified in Table 6.2A.4.1.2-1 when same and different slot patterns are used in aggregated carriers. For each TREF, the PCMAX\_L is evaluated per Teval and given by the minimum value taken over the transmission(s) within the Teval; the minimum PCMAX\_L over the one or more Teval is then applied for the entire TREF. The lesser of PPowerClass,CA and PEMAX,CA shall not be exceeded by the UE during any period of time.

Table 6.2A.4.1.2-1: PCMAX evaluation window for different slot and channel durations

|  |  |  |
| --- | --- | --- |
| TREF | Teval | Teval with frequency hopping |
| TREF of largest slot duration over both UL CCs | Physical channel length | Min(Tno\_hopping, Physical Channel Length) |

If the UE is configured with multiple TAGs and transmissions of the UE on slot *i* for any serving cell in one TAG overlap some portion of the first symbol of the transmission on slot *i* +1 for a different serving cell in another TAG, the UE minimum of PCMAX\_L for slots *i* and *i* + 1 applies for any overlapping portion of slots *i* and *i* + 1. The lesser of PPowerClass,CA and PEMAX,CA shall not be exceeded by the UE during any period of time.

The measured maximum output power PUMAX over all serving cells with same slot pattern shall be within the following range:

PCMAX\_L – MAX{TL, TLOW(PCMAX\_L) } ≤ PUMAX  ≤ PCMAX\_H + THIGH(PCMAX\_H)

PUMAX = 10 log10 ∑ pUMAX,c

where pUMAX,c denotes the measured maximum output power for serving cell *c* expressed in linear scale. The tolerances TLOW(PCMAX) and THIGH(PCMAX) for applicable values of PCMAX are specified in Table 6.2A.4.1.2-2. The tolerance TL is the absolute value of the lower tolerance for applicable NR CA configuration as specified in Table 6.2A.1.2-1 for intra-band carrier aggregation.

The measured maximum output power PUMAX over all serving cells, when at least one slot has a different transmission numerology or slot pattern, shall be within the following range:

P'CMAX\_L– MAX{TL, TLOW (P'CMAX\_L)} ≤ P'UMAX  ≤ P'CMAX\_H + THIGH (P'CMAX\_H)

P'UMAX = 10 log10 ∑ p'UMAX,c

where p'UMAX,c denotes the average measured maximum output power for serving cell *c* expressed in linear scale over TREF. The tolerances TLOW(P'CMAX) and THIGH(P'CMAX) for applicable values of P'CMAX are specified in Table 6.2A.4.1.2-2 for intra-band carrier aggregation. The tolerance TL is the absolute value of the lower tolerance for applicable NR CA configuration as specified in Table 6.2A.1.2-2 for intra-band carrier aggregation.

where:

P'CMAX\_L  = MIN{ MIN {10log10∑( pCMAX\_L,f,c(i),i), PPowerClass,CA} over all overlapping slots in TREF}

P'CMAX\_H = MAX{ MIN{10 log10 ∑ pEMAX,c , PPowerClass,CA} over all overlapping slots in TREF}

Table 6.2A.4.1.2-2: PCMAX tolerance for uplink intra-band non-contiguous CA

|  |  |  |
| --- | --- | --- |
| PCMAX (dBm) | Tolerance TLOW(PCMAX) (dB) | Tolerance THIGH(PCMAX) (dB) |
| 21 ≤ PCMAX ≤ 23 | 3.0 | 2.0 |
| 20 ≤ PCMAX < 21 | 2.5 | |
| 19 ≤ PCMAX < 20 | 3.5 | |
| 18 ≤ PCMAX < 19 | 4.0 | |
| 13 ≤ PCMAX < 18 | 5.0 | |
| 8 ≤ PCMAX < 13 | 6.0 | |
| -40 ≤ PCMAX < 8 | 7.0 | |

### *<Unchanged texts are omitted>*

## 6.3A Output power dynamics for CA

For inter-band carrier aggregation with one uplink carrier assigned to one NR band, the output power dynamics requirements in clause 6.3 apply.

### 6.3A.1 Minimum output power for CA

#### 6.3A.1.1 Minimum output power for intra-band contiguous CA

For intra-band contiguous carrier aggregation, the minimum output power is defined per carrier and the requirement is specified in clause 6.3.1.

#### 6.3A.1.2 Minimum output power for intra-band non-contiguous CA

For intra-band non-contiguous carrier aggregation, the minimum output power is defined per carrier and the requirement is specified in clause 6.3.1.

#### 6.3A.1.3 Minimum output power for inter-band CA

For inter-band carrier aggregation with two uplink contiguous carrier assigned to one NR band, the minimum output power requirements in subclause 6.3A.1.1apply for those carriers.

For inter-band carrier aggregation with uplink assigned to two NR bands, the minimum output power is defined per carrier and the requirement is specified in clause 6.3.1.

#### 6.3A.1.4 Void

### 6.3A.2 Transmit OFF power for CA

#### 6.3A.2.1 Transmit OFF power for intra-band contiguous CA

For intra-band contiguous carrier aggregation, the transmit OFF power specified in clause 6.3.2.1 is applicable for each component carrier when the transmitter is OFF on all component carriers. The transmitter is considered to be OFF when the UE is not allowed to transmit on any of its ports.

#### 6.3A.2.2 Transmit OFF power for intra-band non-contiguous CA

For intra-band non-contiguous carrier aggregation, the transmit OFF power specified in clause 6.3.2.1 is applicable for each component carrier when the transmitter is OFF on all component carriers. The transmitter is considered to be OFF when the UE is not allowed to transmit on any of its ports.

#### 6.3A.2.3 Transmit OFF power for inter-band CA

For inter-band carrier aggregation with two contiguous carriers assigned to one NR band, the transmit OFF power requirements in subclause 6.3A.2.1 apply for those carriers.

For inter-band carrier aggregation with uplink assigned to two NR bands, the transmit OFF power specified in clause 6.3.2.1 is applicable for each component carrier when the transmitter is OFF on all component carriers. The transmitter is considered to be OFF when the UE is not allowed to transmit on any of its ports.

#### 6.3A.2.4 Void

### 6.3A.3 Transmit ON/OFF time mask for CA

#### 6.3A.3.1 Transmit ON/OFF time mask for intra-band contiguous CA

For s intra-band contiguous carrier aggregation, the general output power ON/OFF time mask specified in clause 6.3.3.1 is applicable for each component carrier during the ON power period and the transient periods. The OFF period as specified in clause 6.3.3.1 shall only be applicable for each component carrier when all the component carriers are OFF.

#### 6.3A.3.2 Transmit ON/OFF time mask for intra-band non-contiguous CA

For s intra-band non-contiguous carrier aggregation, the general output power ON/OFF time mask specified in clause 6.3.3.1 is applicable for each component carrier during the ON power period and the transient periods. The OFF period as specified in clause 6.3.3.1 shall only be applicable for each component carrier when all the component carriers are OFF.

#### 6.3A.3.3 Transmit ON/OFF time mask for inter-band CA

##### 6.3A.3.3.1 General

For inter-band carrier aggregation with two contiguous carriers assigned to one NR band, the transmit ON/OFF time mask requirements in subclause 6.3A.3.1 apply for those carriers.

For inter-band carrier aggregation with uplink assigned to two NR bands, the general output power ON/OFF time mask specified in clause 6.3.3.1 is applicable for each component carrier during the ON power period and the transient periods. The OFF period as specified in clause 6.3.3.1 shall only be applicable for each component carrier when all the component carriers are OFF.

### *<Unchanged texts are omitted>*

### 6.3A.4 Power control for CA

#### 6.3A.4.1 Power control for intra-band contiguous CA

##### 6.3A.4.1.1 Absolute power tolerance

The absolute power tolerance is the ability of the UE transmitter to set its initial output power to a specific value for the first sub-frame at the start of a contiguous transmission or non-contiguous transmission with a transmission gap on each active component carriers larger than 20ms. The requirement can be tested by time aligning any transmission gaps on the component carriers.

6.3A.4.1.1.1 Minimum requirements

For intra-band contiguous carrier aggregation the absolute power control tolerance per component carrier is given in Table 6.3.4.2-1.

##### 6.3A.4.1.2 Relative power tolerance

6.3A.4.1.2.1 Minimum requirements

For intra-band contiguous carrier aggregation, the requirements apply when the power of the target and reference sub-frames on each component carrier exceed the minimum output power as defined in clause 6.3A.1 and the total power is limited by PUMAX as defined in clause 6.2A.4. The UE shall meet the following requirements for transmission on both assigned component carriers when the average transmit power per PRB is aligned across both assigned carriers in the reference sub-frame:

a) for all possible combinations of PUSCH and PUCCH transitions per component carrier, the corresponding requirements given in Table 6.3.4.3-1;

b) for SRS transitions on each component carrier, the requirements for combinations of PUSCH/PUCCH and SRS transitions given in Table 6.3.4.2-1 with simultaneous SRS of constant SRS bandwidth allocated in the target and reference subrames;

c) for RACH on the primary component carrier, the requirements given in Table 6.3.4.3-1 for PRACH.

For a) and b) above, the power step P between the reference and target subframes shall be set by a TPC command and/or an uplink scheduling grant transmitted by means of an appropriate DCI Format.

##### 6.3A.4.1.3 Aggregate power control tolerance

For intra-band contiguous carrier aggregation, the aggregate power tolerance per component carrier is given in Table 6.3.4.4-1. The average power per PRB shall be aligned across both assigned carriers before the start of the test. The requirement can be tested with the transmission gaps time aligned between component carriers.

#### 6.3A.4.2 Power control for intra-band non-contiguous CA

#### 6.3A.4.2.1 Absolute power tolerance

The absolute power tolerance is the ability of the UE transmitter to set its initial output power to a specific value for the first sub-frame at the start of a contiguous transmission or non-contiguous transmission with a transmission gap on each active component carriers larger than 20ms. The requirement can be tested by time aligning any transmission gaps on the component carriers.

##### 6.3A.4.2.1.1 Minimum requirements

For intra-band non-contiguous carrier aggregation the absolute power control tolerance per component carrier is given in Table 6.3.4.2-1.

#### 6.3A.4.2.2 Relative power tolerance

##### 6.3A.4.2.2.1 Minimum requirements

For intra-band non-contiguous carrier aggregation, the requirements apply when the power of the target and reference sub-frames on each component carrier exceed the minimum output power as defined in subclause 6.3A.1 and the total power is limited by PUMAX as defined in subclause 6.2A.4. The UE shall meet the following requirements for transmission on both assigned component carriers when the average transmit power per PRB is aligned across both assigned carriers in the reference sub-frame:

a) for all possible combinations of PUSCH and PUCCH transitions per component carrier, the corresponding requirements given in Table 6.3.4.3-1;

b) for SRS transitions on each component carrier, the requirements for combinations of PUSCH/PUCCH and SRS transitions given in Table 6.3.4.3-1 with simultaneous SRS of constant SRS bandwidth allocated in the target and reference subrames;

c) for RACH on the primary component carrier, the requirements given in Table 6.3.4.3-1for PRACH.

For a) and b) above, the power step P between the reference and target subframes shall be set by a TPC command and/or an uplink scheduling grant transmitted by means of an appropriate DCI Format.

#### 6.3A.4.2.3 Aggregate power control tolerance

For intra-band non-contiguous carrier aggregation, the aggregate power tolerance per component carrier is given in Table 6.3.4.4-1. The average power per PRB shall be aligned across both assigned carriers before the start of the test. The requirement can be tested with the transmission gaps time aligned between component carriers.

### *<Unchanged texts are omitted>*

## 6.4A Transmit signal quality for CA

### 6.4A.1 Frequency error for CA

#### 6.4A.1.1 Frequency error for intra-band contiguous CA

For intra-band contiguous carrier aggregation the UE modulated carrier frequencies per band shall be accurate to within ±0.1 PPM observed over a period of one timeslot compared to the carrier frequency of primary component carrier received in the corresponding band

#### 6.4A.1.2 Frequency error for intra-band non-contiguous CA

For intra-band non-contiguous carrier aggregation the requirements in Section 6.4.1 applies per component carrier.

#### 6.4A.1.3 Frequency error for inter-band CA

For inter-band carrier aggregation with two contiguous carriers assigned to one NR band, the frequency error requirements in subclause 6.4A.1.1 apply for those carriers.

For inter-band carrier aggregation with uplink assigned to two NR bands, the frequency error requirements defined in clause 6.4.1 shall apply on each component carrier with all component carriers active.

### *<Unchanged texts are omitted>*

### 6.4A.2 Transmit modulation quality for CA

### *<Unchanged texts are omitted>*

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

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 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.

### *<Unchanged texts are omitted>*

#### 6.5A.1.3 Occupied bandwidth for Inter-band CA

For inter-band carrier aggregation with two contiguous carriers assigned to one NR band, the occupied bandwidth requirements in subclause 6.5A.1.1a apply for that band.

For inter-band carrier aggregation with uplink assigned to two NR bands, the occupied bandwidth is defined per component carrier. Occupied bandwidth is the bandwidth containing 99 % of the total integrated mean power of the transmitted spectrum on assigned channel bandwidth on the component carrier. The occupied bandwidth shall be less than the channel bandwidth specified in Table 6.5.1-1.

### *<Unchanged texts are omitted>*

##### 6.5A.2.2.3 Spectrum emission mask for Inter-band CA

For inter-band carrier aggregation with two contiguous carriers assigned to one NR band, the spectrum emission mask requirements in subclause 6.5A.2.2.1 apply for that band.

For inter-band carrier aggregation with uplink assigned to two NR bands, the spectrum emission mask of the UE is defined per component carrier while both component carriers are active and the requirements are specified in clauses 6.5.2.1 and 6.5.2.2. If for some frequency spectrum emission masks of component carriers overlap then spectrum emission mask allowing higher power spectral density applies for that frequency. If for some frequency a component carrier spectrum emission mask overlaps with the channel bandwidth of another component carrier, then the emission mask does not apply for that frequency.

### *<Unchanged texts are omitted>*

6.5A.2.4.1.3 NR ACLR for Inter-band CA

For inter-band carrier aggregation with two contiguous carriers assigned to one NR band, the NR Adjacent Channel Leakage power Ratio (NRACLR) requirements in subclause 6.5A.2.4.1.1apply for that band.

For inter-band carrier aggregation with uplink assigned to two NR bands, the NR Adjacent Channel Leakage power Ratio (NRACLR) is defined per component carrier while both component carriers are active and the requirement is specified in clause 6.5.2.4.1.

### *<Unchanged texts are omitted>*

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

##### 6.5A.3.2.1 Spurious emissions for UE co-existence for intra-band contiguous CA

This clause specifies the requirements for the specified intra-band contiguous carrier aggregation configurations for coexistence with protected bands, the requirements in Table 6.5A.3.2.1-1 apply.

NOTE: For measurement conditions at the edge of each frequency range, the lowest frequency of the measurement position in each frequency range should be set at the lowest boundary of the frequency range plus MBW/2. The highest frequency of the measurement position in each frequency range should be set at the highest boundary of the frequency range minus MBW/2. MBW denotes the measurement bandwidth defined for the protected band.

Table 6.5A.3.2.1-1: Requirements for uplink intra-band contiguous carrier aggregation

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| NR CA combination | Spurious emission | | | | | | |
|  | Protected Band | Frequency range (MHz) | | | Maximum Level (dBm) | MBW (MHz) | NOTE |
| CA\_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 |  |
| CA\_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 |  |
|  | NR Band n79 | FDL\_low | - | FDL\_high | -50 | 1 | 2, 4 |
|  | E-UTRA Band 9, 11, 18, 19, 21 | FDL\_low | - | FDL\_high | -50 | 1 | 6 |
|  | E-UTRA Band 40 | FDL\_low | - | FDL\_high | -40 | 1 |  |
|  | Frequency range | 1884.5 |  | 1915.7 | -41 | 0.3 | 5, 6 |
| CA\_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 |  |
| CA\_n77 | 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 | 5 |
| CA\_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 | 5 |
| CA\_n79 | E-UTRA Band 1, 3, 5, 8, 11, 18, 19, 21, 28, 34, 39, 40, 41, 42, 65 | FDL\_low | - | FDL\_high | -50 | 1 |  |
|  | Frequency range | 1884.5 | - | 1915.7 | -41 | 0.3 | 5 |
| NOTE 1: Void  NOTE 2: Void  NOTE 3: Void  NOTE 4: 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 5: Applicable when co-existence with PHS system operating in 1884.5 - 1915.7 MHz.  NOTE 6: This requirement applies when the NR carrier is confined within 2545 – 2575 MHz or 2595 – 2645 MHz and the channel bandwidth is 10 or 20 MHz | | | | | | | |

##### 6.5A.3.2.2 Spurious emissions for UE co-existence for intra-band non-contiguous CA

This clause specifies the requirements for the specified intra-band non-contiguous carrier aggregation configurations for coexistence with protected bands, the requirements in Table 6.5A.3.2.2-1 apply.

NOTE: For measurement conditions at the edge of each frequency range, the lowest frequency of the measurement position in each frequency range should be set at the lowest boundary of the frequency range plus MBW/2. The highest frequency of the measurement position in each frequency range should be set at the highest boundary of the frequency range minus MBW/2. MBW denotes the measurement bandwidth defined for the protected band.

Table 6.5A.3.2.2-1: Requirements for uplink intra-band non-contiguous carrier aggregation

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| NR CA combination | Spurious emission | | | | | | |
|  | Protected Band | Frequency range (MHz) | | | Maximum Level (dBm) | MBW (MHz) | NOTE |
| CA\_n41 | E-UTRA Band 1, 2, 3, 4, 5, 8, 10, 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 |  |
|  | NR Band n79 | FDL\_low | - | FDL\_high | -50 | 1 | 1, 2 |
|  | E-UTRA Band 40 | FDL\_low | - | FDL\_high | -40 | 1 |  |
|  | E-UTRA Band 9, 11, 18, 19, 21 | FDL\_low | - | FDL\_high | -50 | 1 | 2 |
| CA\_n77 | 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 |  |
|  |
| CA\_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 |  |
|  |
| NOTE 1: 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 2: This requirement applies when the NR carrier is confined within 2545 – 2575 MHz or 2595 – 2645 MHz and the channel bandwidth is 10 or 20 MHz | | | | | | | |

##### 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-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-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 | 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-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-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-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-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-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\_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\_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-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-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-n78 | E-UTRA Band 1, 2, 3, 4, 5, 7, 8, 111, 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-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\_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\_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-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, n78 | 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-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\_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-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, 79 | 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 | 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-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\_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-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\_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\_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, 7, 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\_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 |
| 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 180kHz), 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: Applicable when co-existence with PHS system operating in 1884.5 -1915.7 MHz  NOTE 4: 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 5: Void.  NOTE 6: This requirement is applicable for any channel bandwidths within the range 1920 – 1980 MHz with the following restriction: for carriers of 15 MHz bandwidth when carrier centre frequency is within the range 1927.5 - 1929.5 MHz and for carriers of 20 MHz bandwidth when 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 7: For these adjacent bands, the emission limit could imply risk of harmful interference to UE(s) operating in the protected operating band.  NOTE 8: This requirement is only applicable for carriers with bandwidth 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.  NOTE 9: Void.  NOTE 10: Void.  NOTE 11: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 12: 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 13: 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 14: 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 15: As exceptions, measurements with a level up to the applicable requirement of -36 dBm/MHz is permitted for each assigned E-UTRA 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 5.6-1) for which the 3rd harmonic totally or partially overlaps the measurement bandwidth (MBW).  NOTE 17: Void.  NOTE 18: This requirement is applicable for any channel bandwidths 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 19: This requirement is applicable for power class 3 UE for any channel bandwidths within the range 2570 - 2615 MHz with the following restriction: for carriers of 15 MHz bandwidth when carrier centre frequency is within the range 2605.5 - 2607.5 MHz and for carriers of 20 MHz bandwidth when 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 power class 2 UE for any channel bandwidths within the range 2570 - 2615 MHz, NS\_44 shall apply. For power class 2 or 3 UE for carriers with channel bandwidth 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: To simplify Table 6.5A.3.2.3-1, 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.

### *<Unchanged texts are omitted>*

6.5A.4.2.3 Transmit intermodulation for Inter-band CA

For inter-band carrier aggregation with two contiguous carriers assigned to one NR band, the transmit intermodulation requirements in subclause 6.5A.4.2.1apply for that band.

For inter-band carrier aggregation with uplink assigned to two NR bands, the transmit intermodulation requirement is specified in Table 6.5.4-1 which shall apply on each component carrier with both component carriers active.

### *<Unchanged texts are omitted>*

**Table 7.3A.4-1: Reference sensitivity exceptions due to UL harmonic for NR CA FR1**

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | | **MSD due to harmonic exception for the DL band** | | | | | | | | | | | | | |
| **UL band** | **DL band** | | **5 MHz** | **10 MHz** | **15 MHz** | **20 MHz** | **25 MHz** | **30 MHz** | **40 MHz** | **50 MHz** | **60 MHz** | **70**  **MHz** | **80 MHz** | **90 MHz** | **100 MHz** |
|  |  | | **dB** | **dB** | **dB** | **dB** | **dB** | **dB** | **dB** | **dB** | **dB** |  | **dB** | **dB** | **dB** |
| n1 | n771,2 | |  | 23.9 | 22.1 | 20.9 |  |  | 17.9 | 16.8 | 16.0 |  | 14.8 | 14.3 | 13.8 |
|  | n773 | |  | 1.1 | 0.8 | 0.3 |  |  |  |  |  |  |  |  |  |
| n2 | n481, 2 | | 27.1 | 23.9 | 22.1 | 20.9 |  |  | 17.9 | 16.912 | 16.112 |  | 14.812 | 14.312 | 13.812 |
|  | n483 | | 1.9 | 1.1 | 0.8 | 0.3 |  |  |  |  |  |  |  |  |  |
| n2 | n771, 2 | |  | 23.9 | 22.1 | 20.9 | 19.8 | 19.0 | 17.9 | 16.8 | 16.0 | 15.5 | 14.8 | 14.3 | 13.8 |
|  | n773 | |  | 1.1 | 0.8 | 0.3 | 0.1 |  |  |  |  |  |  |  |  |
| 2 | n781,2 | |  | 23.9 | 22.1 | 20.9 | 19.8 | 19.0 | 17.9 | 16.8 | 16.0 |  | 14.8 | 14.3 | 13.8 |
|  | n783 | |  | 1.1 | 0.8 | 0.3 |  |  |  |  |  |  |  |  |  |
| n3 | n771,2 | |  | 23.9 | 22.1 | 20.9 |  |  | 17.9 | 16.9 | 16.1 |  | 14.8 | 14.3 | 13.8 |
|  | n773 | |  | 1.1 | 0.8 | 0.3 |  |  |  |  |  |  |  |  |  |
|  | n781,2 | |  | 23.9 | 22.1 | 20.9 |  |  | 17.9 | 16.9 | 16.1 |  | 14.8 | 14.3 | 13.8 |
|  | n783 | |  | 1.1 | 0.8 | 0.3 |  |  |  |  |  |  |  |  |  |
| n5 | n774, 5 | |  | 10.5 | 8.9 | 7.8 | 7.2 | 6.5 | 5.1 | 4.2 | 3.5 | 2.8 | 2.3 | 2.1 | 1.4 |
| n5 | n776,7 | |  | 10.4 | 8.9 | 7.8 | 7.4 | 6.5 | 4.7 | 3.7 | 3 | 2.35 | 1.7 | 1.2 | 0.7 |
| n5 | n784,5 | |  | 10.5 | 8.9 | 7.8 |  |  | 5.4 | 4.2 | 3.5 |  | 2.3 | 2.1 | 1.4 |
| n8 | n311 | | N/A | N/A | N/A | N/A | N/A | N/A |  |  |  |  |  |  |  |
|  | n418,9 | |  | 13.0 | 11.3 | 10.1 |  |  | 7.0 | 6.1 | 5.5 |  | 4.3 | 3.9 | 3.5 |
|  | n784,5 | |  | 10.8 | 9.1 | 8.0 |  |  | 5.1 | 4.2 | 3.5 |  | 2.3 | 2.1 | 1.4 |
|  | n796,7 | |  |  |  |  |  |  | 6.8 | 6.2 | 5.6 |  | 4.9 |  | 4.4 |
| n20 | n784,5 | |  | 10.8 | 9.1 | 8 |  |  | 6 | 4.0 | 3.2 |  | 2.0 | 1.5 | 1.0 |
| 25 | n781,2 | |  | 23.9 | 22.1 | 20.9 |  |  | 17.9 | 16.8 | 16.0 |  | 14.8 | 14.3 | 13.8 |
|  | n783 | |  | 1.1 | 0.8 | 0.3 |  |  |  |  |  |  |  |  |  |
| n28 | n18,9 | | 10.2 | 7.6 | 6.2 | 5.3 |  |  |  |  |  |  |  |  |  |
|  | n501,2 | |  | 19.8 | 18.0 | 16.8 |  |  | 13.8 | 12.8 | 12.0 |  | 10.8 |  |  |
|  | n751,2 | | 28.1 | 25.3 | 24.0 | 22.8 | 21.8 | 21.0 | 19.7 | 18.7 |  |  |  |  |  |
|  | n776,7 | |  | 10.4 | 8.9 | 7.8 |  |  | 4.7 | 3.7 | 3 |  | 1.7 | 1.2 | 0.7 |
|  | n786,7 | |  | 10.4 | 8.9 | 7.8 |  |  | 4.7 | 3.7 | 3 |  | 1.7 | 1.2 | 0.7 |
| n66 | n481, 2 | | 27.1 | 23.9 | 22.1 | 20.9 |  |  | 17.9 | 16.912 | 16.112 |  | 14.812 | 14.312 | 13.812 |
|  | n483 | | 1.9 | 1.1 | 0.8 | 0.3 |  |  |  |  |  |  |  |  |  |
| n66 | n771, 2 | |  | 23.9 | 22.1 | 20.9 | 19.8 | 19.0 | 17.9 | 16.8 | 16.0 | 15.3 | 14.8 | 14.3 | 13.8 |
|  | n773 | |  | 1.1 | 0.8 | 0.3 | 0.1 |  |  |  |  |  |  |  |  |
| n66 | n781,2 | |  | 23.9 | 22.1 | 20.9 |  |  | 17.9 | 16.8 | 16.0 |  | 14.8 | 14.3 | 13.8 |
|  | n783 | |  | 1.1 | 0.8 | 0.3 |  |  |  |  |  |  |  |  |  |
| n71 | n2510 | | 10 | 7.5 | 6 | 5.1 |  |  |  |  |  |  |  |  |  |
|  | n414,5 | |  | 10.8 | 9.1 | 8.0 |  |  | 5.1 | 4.2 | 3.5 |  | 2.3 | 2.1 | 1.4 |
|  | n708,9 | | 9.9 | 7.1 | 6.7 | 4.9 | 4.1 |  |  |  |  |  |  |  |  |
| n92 | n784,5 | |  | 10.8 | 9.1 | 8 |  |  | 6 | 4.0 | 3.2 |  | 2.0 | 1.5 | 1.0 |
|  | | NOTE 1: These requirements apply when there is at least one individual RE within the uplink transmission bandwidth of the aggressor (lower) band for which the 2nd transmitter harmonic is within the downlink transmission bandwidth of a victim (higher) band and a range ∆FHD above and below the edge of this downlink transmission bandwidth. The value ∆FHD depends on the band combination: ∆FHD = 10 MHz for CA\_n1-n77, CA\_n2-n78, CA\_n3-n77, CA\_n3-n78, CA\_n2-n48, CA\_n25-n78, CA\_n48-n66, CA\_n66-n78.  NOTE 2: The requirements should be verified for UL NR-ARFCN of the aggressor (lower) band (superscript LB) such that in MHz and  with carrier frequency in the victim (higher) band in MHz and  the channel bandwidth configured in the lower band.  NOTE 3: The requirements are only applicable to channel bandwidths no larger than 20 MHz and with a carrier frequency at  MHz offset from  in the victim (higher band) with , whereandare the channel bandwidths configured in the aggressor (lower) and victim (higher) bands in MHz, respectively.  NOTE 4: These requirements apply when there is at least one individual RE within the uplink transmission bandwidth of a low band for which the 4th transmitter harmonic is within the downlink transmission bandwidth of a high band.  NOTE 5: The requirements should be verified for UL NR‑ARFCN of a low band (superscript LB) such that in MHz and  with the carrier frequency of a high band in MHz and  the channel bandwidth configured in the low band.  NOTE 6: These requirements apply when there is at least one individual RE within the uplink transmission bandwidth of a low band for which the 5th transmitter harmonic is within the downlink transmission bandwidth of a high band.  NOTE 7: The requirements should be verified for UL NR‑ARFCN of a low band (superscript LB) such that in MHz and  with the carrier frequency of a high band in MHz and  the channel bandwidth configured in the low band.  NOTE 8: These requirements apply when there is at least one individual RE within the uplink transmission bandwidth of the aggressor (lower) band for which the 3nd transmitter harmonic is within the downlink transmission bandwidth of a victim (higher) band.  NOTE 9: The requirements should be verified for UL NR-ARFCN of the aggressor (lower) band (superscript LB) such that in MHz and  with carrier frequency in the victim (higher) band in MHz and  the channel bandwidth configured in the lower band.  NOTE 10: These requirements apply when the lower edge frequency of the 10 MHz, 15 MHz, or 20 MHz uplink channel in Band 71 is located at or below 668 MHz and the downlink channel in Band n25 is located with its upper edge at 1995 MHz.  NOTE 11: No requirements apply when there is at least one individual RE within the uplink transmission bandwidth of the low band for which the 2nd transmitter harmonic is within the downlink transmission bandwidth of the high band. The reference sensitivity for all active downlink component carriers is only verified when this is not the case (the requirements specified in clause 7.3.2 apply unless otherwise specified).  NOTE 12: For these bandwidths, the minimum requirements are restricted to operation when carrier is configured as a downlink carrier part of CA configuration. | | | | | | | | | | | | | |

## *< Unchanged sections are omitted >*

Table 7.3A.4-2: Uplink configuration for reference sensitivity exceptions due to UL harmonic interference for NR CA, FR1

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | NR Band / Channel bandwidth of the high band | | | | | | | | | | | | | | |
| UL band | | DL band | 5 MHz | 10 MHz | 15 MHz | 20 MHz | 25 MHz | 30 MHz | 40 MHz | 50 MHz | 60 MHz | 70  MHz | 80 MHz | 90 MHz | 100 MHz |
| n1 | | n77 |  | 25 | 36 | 50 |  |  | 100 | 100 | 100 |  | 100 | 100 | 100 |
| n2 | | n48 | 25 | 50 | 50 | 50 |  |  | 50 | 50 | 50 |  | 50 | 50 | 50 |
| n2 | | n77 |  | 25 | 36 | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 50 |
| n2 | | n78 |  | 25 | 36 | 50 | 50 | 50 | 50 | 50 | 50 |  | 50 | 50 | 50 |
| n3 | | n77 |  | 25 | 36 | 50 |  |  | 50 | 50 | 50 |  | 50 | 50 | 50 |
| n3 | | n78 |  | 25 | 36 | 50 |  |  | 50 | 50 | 50 |  | 50 | 50 | 50 |
| n5 | | n77 |  | 16 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 |
| n5 | | n78 |  | 16 | 25 | 25 |  |  | 25 | 25 | 25 |  | 25 | 25 | 25 |
| n8 | | n41 |  | 16 | 25 | 25 |  |  | 25 | 25 | 25 |  | 25 | 25 | 25 |
| n8 | | n78 |  | 16 | 25 | 25 |  |  | 25 | 25 | 25 |  | 25 | 25 | 25 |
| n8 | | n79 |  |  |  |  |  |  | 25 | 25 | 25 |  | 25 |  | 25 |
| n20 | | n78 |  | 16 | 25 | 25 |  |  | 25 | 25 | 25 |  | 25 | 25 | 25 |
| n25 | | n78 |  | 25 | 36 | 50 |  |  | 50 | 50 | 50 |  | 50 | 50 | 50 |
| n28 | | n1 | 8 | 16 | 25 | 25 |  |  |  |  |  |  |  |  |  |
| n28 | | n50 |  | 25 | 25 | 25 |  |  | 25 | 25 | 25 |  | 25 |  |  |
| n28 | | n75 | 12 | 25 | 36 | 50 | 50 | 50 | 50 | 50 |  |  |  |  |  |
| n28 | | n77 |  | 10 | 15 | 20 |  |  | 25 | 25 | 25 |  | 25 | 25 | 25 |
| n28 | | n78 |  | 10 | 15 | 20 |  |  | 25 | 25 | 25 |  | 25 | 25 | 25 |
| n66 | | n48 | 12 | 25 | 36 | 50 |  |  | 100 | 128 | 160 |  | 200 | 200 | 200 |
| n66 | | n77 |  | 25 | 36 | 50 | 64 | 80 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| n66 | | n78 |  | 25 | 36 | 50 |  |  | 100 | 100 | 100 |  | 100 | 100 | 100 |
| n71 | | n25 | 84 | 84 | 84 | 84 |  |  |  |  |  |  |  |  |  |
| n71 | | n41 |  | 16 | 25 | 25 |  |  | 25 | 25 | 25 |  | 25 | 25 | 25 |
| n71 | | n70 | 8 | 16 | 20 | 20 | 20 |  |  |  |  |  |  |  |  |
| n92 | | n78 |  | 16 | 25 | 25 |  |  | 25 | 25 | 25 |  | 25 | 25 | 25 |
|  | NOTE 1: 15 kHz SCS is assumed for UL band.  NOTE 2: The UL configuration applies regardless of the channel bandwidth of the low band unless the UL resource blocks exceed that specified in Table 7.3.2-3 for the uplink bandwidth in which case the allocation according to Table 7.3.2-3 applies.  NOTE 3: Unless stated otherwise, UL resource blocks shall be centred within the transmission bandwidth configuration for the channel bandwidth.  NOTE 4: These requirements apply when the lower edge frequency of the uplink channel in Band n71 is located at or below 668 MHz and the downlink channel in Band n25 is located with its upper edge at 1990 MHz. | | | | | | | | | | | | | | |

## **<<End of Change8>>**

## **<<Start of Change9>>**

## 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 |  |  |  |  | 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.

## *< Unchanged sections are omitted >*

#### 6.2E.2.3 MPR for Power class 3 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 apply for NR sidelink operation in licensed band or Band n47.

## *< Unchanged sections are omitted >*

### 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 clause 6.2E.3.

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 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 | |

## *< Unchanged sections are omitted >*

### 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 shall apply for the sidelink in licensed band or Band n47.

## *< Unchanged sections are omitted >*

### 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 clause 6.3E.2.1 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 shall apply for the sidelink in licensed band or Band n47.

## *< Unchanged sections are omitted >*

#### 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 shall apply for the sidelink in licensed band or Band n47.

## *< Unchanged sections are omitted >*

#### 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 shall apply for the sidelink in licensed band or Band n47.

## *< Unchanged sections are omitted >*

### 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 shall apply for the sidelink in licensed band or Band n47.

## *< Unchanged sections are omitted >*

#### 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 shall apply for the sidelink in licensed band or Band n47.

## *< Unchanged sections are omitted >*

### 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 shall apply for the sidelink in licensed band or Band n47.

## *< Unchanged sections are omitted >*

#### 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 shall apply for the sidelink in licensed band or Band n47.

## *< Unchanged sections are omitted >*

#### 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 shall apply for the sidelink in licensed band or Band n47.

## *< Unchanged sections are omitted >*

### 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 shall apply for the sidelink in licensed band or Band n47.

## *< Unchanged sections are omitted >*

## 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 7.2 with parameters specified in Table 7.3E.3-1. Also the NR downlink throughput shall be ≥ 95% of the maximum throughput of the reference measurement channels as specified in Annexes A.3.

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.

## *< Unchanged sections are omitted >*

### 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 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.

## *< Unchanged sections are omitted >*

### 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 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.

## *< Unchanged sections are omitted >*

#### 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 7.6E2 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.

## *< Unchanged sections are omitted >*

### 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 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.

## *< Unchanged sections are omitted >*

### 7.8E.3 Intermodulation for V2X con-current operation

For the inter-band con-current NR V2X operation, the requirements specified in clause 7.8E 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 Change9>>**