**3GPP TSG-RAN WG4 Meeting #102-e *R4-2207490***

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

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| *CR-Form-v12.2* |
| **CHANGE REQUEST** |
|  |
|  | **38.104** | **CR** | **0374** | **rev** |  | **Current version:** | **17.4.0** |  |
|  |
| *For* [***HE******LP***](http://www.3gpp.org/3G_Specs/CRs.htm#_blank)*on using this form: comprehensive instructions can be found at* [*http://www.3gpp.org/Change-Requests*](http://www.3gpp.org/Change-Requests)*.* |
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| ***Proposed change affects:*** | UICC apps |  | ME |  | Radio Access Network | **X** | Core Network |  |

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|  |
| ***Title:***  | Big CR for TS 38.104 Maintenance RF part (Rel-17, CAT F) |
|  |  |
| ***Source to WG:*** | MCC, Ericsson |
| ***Source to TSG:*** | R4 |
|  |  |
| ***Work item code:*** | NR\_unlic-Core, NR\_unlic, TEI17 |  | ***Date:*** | 2022-03-07 |
|  |  |  |  |  |
| ***Category:*** | F |  | ***Release:*** | Rel-17 |
|  | *Use one of the following categories:****F*** *(correction)****A*** *(mirror corresponding to a change in an earlier release)****B*** *(addition of feature),* ***C*** *(functional modification of feature)****D*** *(editorial modification)*Detailed explanations of the above categories canbe found in 3GPP [TR 21.900](http://www.3gpp.org/ftp/Specs/html-info/21900.htm). | *Use one of the following releases:Rel-8 (Release 8)Rel-9 (Release 9)Rel-10 (Release 10)Rel-11 (Release 11)…Rel-16 (Release 16)Rel-17 (Release 17)Rel-18 (Release 18)Rel-19 (Release 19)* |
|  |  |
| ***Reason for change:*** | This big CR merges the multiple endorsed draft CRs. The reason for change in each endorsed draft CR is copied below.**R4-2203616 Correction to n46 channel raster**For band n46 the ARFCNs specified in 38.104 are not aligned with the defined ARFCNs in 38.101-1. Also the values in 38.104 correspong to some rather arbitrary values and not the frequency limits of the band.**R4-2205197 Draft CR to 38.104 with addition of absolute values to NR-U masks and clarifications for NR-U bands**This draft CR introduces following updates related to NR-U Rel-16:1. In specified Rel-16 masks for NR-U bands n46 and n96 the -40dBm/100kHz limit applies only for offsets ≥N, and there is no absolute limit defined for offsets <N.

As the actual relative limits for offsets up to N do not comprise a floor (like e.g. ACLR), it could be quite a challenge for the required TX dynamic range. As Prated,x  in table 6.6.4.2.4A-2 is the rated power per carrier, the level of variation between a single carrier operation and a fully occupied band operation can be significant. For example: Up to 59x20MHz carriers are possible in 5925 to 7125MHz range (band n96): 1x20MHz carrier at Prated,x  BS vs 59x20MHz carriers Prated,x BS – 10LOG(59) ≈ +18dB dynamic range extension. Also it should be noted that according to EN303687, the spectrum mask shall be limited by a floor, i.e. the spurious emission limit (see section 4.3.4.3.2 of EN303687). The spurious emission limit in 1GHz to 26GHz range is defined as -30dBm/MHz and this aligns with the -40dBm/100kHz limit (same as depicted in TS38.104 for offsets >N).1. Addition of clarifications that there are no requirements for BS type 1-O for band n46 and n96, and no requirements for BS type 1-H for n46.

**Note:** This draft CR is category F, as compare to CR to Rel-16 Cat. F R4-2205196 includes on top of that also new band n102 that is introducing to Rel-17.**R4-2205487 Draft maintenance CR to TS38.104**25MHz in Table 6.6.3.2-2a is missing and add it back. |
|  |  |
| ***Summary of change:*** | The summary of change in each each endorsed draft CR is copied below.**R4-2203616 Correction to n46 channel raster**Update ARFCNs for n46 to match the values from 38.101-1.**R4-2205197 Draft CR to 38.104 with addition of absolute values to NR-U masks and clarifications for NR-U bands**1. Addtion of absolute values for offsets <N for OBUE mask in table 6.6.4.2.4A-1 and 6.6.4.2.4A-2.
2. Clarification in clause 6.1 that there are no requirements specified for BS type 1-H for n46.
3. Clarification in clause 9.2.1 that there are no requirements specified for BS type 1-O for n46, n96 and n102.

**R4-2205487 Draft maintenance CR to TS38.104**To add 25MHz in Table 6.6.3.2-2a |
|  |  |
| ***Consequences if not approved:*** | The consequences if not approved for each endorsed draft CR are copied below.**R4-2203616 Correction to n46 channel raster**Incorrect ARFCN remains in the spec.**R4-2205197 Draft CR to 38.104 with addition of absolute values to NR-U masks and clarifications for NR-U bands**Without absolute limits for NR-U mask for offsets <N there will exist only relative limits for these offsets, that would be challenge for Tx dynamic range.It would be unclear for NR-U for which BS types and bands requirements are specified.**R4-2205487 Draft maintenance CR to TS38.104**The requirement for 25MHz in Table 6.6.3.2-2a is missing. |
|  |  |
| ***Clauses affected:*** | **R4-2203616 Correction to n46 channel raster**5.4.2.3**R4-2205197 Draft CR to 38.104 with addition of absolute values to NR-U masks and clarifications for NR-U bands**6.1, 6.6.4.2.4A, 9.2.1**R4-2205487 Draft maintenance CR to TS38.104**6.6.3.2 |
|  |  |
|  | **Y** | **N** |  |  |
| ***Other specs*** | **X** |  |  Other core specifications  | 38.101-1  |
| ***affected:*** | **X** |  |  Test specifications | 38.141-1 |
| ***(show related CRs)*** |  | **X** |  O&M Specifications |  |
|  |  |
| ***Other comments:*** |  |
|  |  |
| ***This CR's revision history:*** |  |

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

The RF channel positions on the channel raster in each NR *operating band* are given through the applicable NR-ARFCN in table 5.4.2.3-1 for FR1 and table 5.4.2.3-2 for FR2, using the channel raster to resource element mapping in clause 5.4.2.2.

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

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

- For NR *operating bands* with 15 kHz and 60 kHz channel raster above 3 GHz, ΔFRaster = *I* ×ΔFGlobal, where *I* ϵ {1, 2}. In this case, every *Ith* NR‑ARFCN within the *operating band* are applicable for the channel raster within the *operating band* and the step size for the channel raster in table 5.4.2.3-1 and table 5.4.2.3-2 is given as <*I*>.

- For frequency bands with two ΔFRaster in FR1, the higher ΔFRaster applies to channels using only the SCS that is equal to or larger than the higher ΔFRaster and SSB SCS is equal to the higher ΔFRaster.

- For frequency bands with two ΔFRaster in FR2, the higher ΔFRaster applies to channels using only the SCS that is equal to the higher ΔFRaster and the SSB SCS that is equal to or larger than the higher ΔFRaster.

Table 5.4.2.3-1: Applicable NR-ARFCN per *operating band* in FR1

|  |  |  |  |
| --- | --- | --- | --- |
| NR *operating band* | ΔFRaster(kHz)  | Uplinkrange of NREF(First – <Step size> – Last) | Downlinkrange of NREF(First – <Step size> – Last) |
| n1 | 100 | 384000 – <20> – 396000 | 422000 – <20> – 434000 |
| n2 | 100 | 370000 – <20> – 382000 | 386000 – <20> – 398000 |
| n3 | 100 | 342000 – <20> – 357000 | 361000 – <20> – 376000 |
| n5 | 100 | 164800 – <20> – 169800 | 173800 – <20> – 178800 |
| n7 | 100 | 500000 – <20> – 514000 | 524000 – <20> – 538000 |
| n8 | 100 | 176000 – <20> – 183000 | 185000 – <20> – 192000 |
| n12 | 100 | 139800 – <20> – 143200 | 145800 – <20> – 149200 |
| n13 | 100 | 155400 – <20> – 157400 | 149200 – <20> – 151200 |
| n14 | 100 | 157600 – <20> –159600 | 151600 – <20> – 153600 |
| n18 | 100 | 163000 – <20> – 166000 | 172000 – <20> – 175000 |
| n20 | 100 | 166400 – <20> – 172400 | 158200 – <20> – 164200 |
| n25 | 100 | 370000 – <20> – 383000 | 386000 – <20> – 399000 |
| n24 | 100 | 325300 – <20> – 332100 | 305000 – <20> – 311800 |
| n26 | 100 | 162800 – <20> – 169800 | 171800 – <20> – 178800 |
| n28 | 100 | 140600 – <20> – 149600 | 151600 – <20> – 160600 |
| n29 | 100 | N/A | 143400 – <20> – 145600 |
| n30 | 100 | 461000 – <20> – 463000 | 470000 – <20> – 472000 |
| n34 | 100 | 402000 – <20> – 405000 | 402000 – <20> – 405000 |
| n38 | 100 | 514000 – <20> – 524000 | 514000 – <20> – 524000 |
| n39 | 100 | 376000 – <20> – 384000 | 376000 – <20> – 384000 |
| n40 | 100 | 460000 – <20> – 480000 | 460000 – <20> – 480000 |
| n41 | 15 | 499200 – <3> – 537999 | 499200 – <3> – 537999 |
|  | 30 | 499200 – <6> – 537996 | 499200 – <6> – 537996 |
| n461 | 15 | 743334 – <1> – 795000 | 743334 – <1> – 795000 |
| n48 | 15 | 636667 – <1> – 646666 | 636667 – <1> – 646666 |
|  | 30 | 636668 – <2> – 646666 | 636668 – <2> – 646666 |
| n50 | 100 | 286400 – <20> – 303400 | 286400 – <20> – 303400 |
| n51 | 100 | 285400 – <20> – 286400 | 285400 – <20> – 286400 |
| n53 | 100 | 496700 – <20> – 499000 | 496700 – <20> – 499000 |
| n65 | 100 | 384000 – <20> – 402000 | 422000 – <20> – 440000 |
| n66 | 100 | 342000 – <20> – 356000 | 422000 – <20> – 440000 |
| n67 | 100 | N/A | 147600 – <20> – 151600 |
| n70 | 100 | 339000 – <20> – 342000 | 399000 – <20> – 404000 |
| n71 | 100 | 132600 – <20> – 139600 | 123400 – <20> – 130400 |
| n74 | 100 | 285400 – <20> – 294000 | 295000 – <20> – 303600 |
| n75 | 100 | N/A | 286400 – <20> – 303400 |
| n76 | 100 | N/A | 285400 – <20> – 286400 |
| n77 | 15 | 620000 – <1> – 680000 | 620000 – <1> – 680000 |
|  | 30 | 620000 – <2> – 680000 | 620000 – <2> – 680000 |
| n78 | 15 | 620000 – <1> – 653333 | 620000 – <1> – 653333 |
|  | 30 | 620000 – <2> – 653332 | 620000 – <2> – 653332 |
| n79 | 15 | 693334 – <1> – 733333 | 693334 – <1> – 733333 |
|  | 30 | 693334 – <2> – 733332 | 693334 – <2> – 733332 |
| n80 | 100 | 342000 – <20> – 357000 | N/A |
| n81 | 100 | 176000 – <20> – 183000 | N/A |
| n82 | 100 | 166400 – <20> – 172400  | N/A |
| n83 | 100 | 140600 – <20> –149600 | N/A |
| n84 | 100 | 384000 – <20> – 396000 | N/A |
| n85 | 100 | 139600 – <20> – 143200 | 145600 – <20> – 149200 |
| n86 | 100 | 342000 – <20> – 356000 | N/A |
| n89 | 100 | 164800 – <20> – 169800 | N/A |
|  | 15 | 499200 – <3> – 537999 | 499200 – <3> – 537999 |
| n90 | 30 | 499200 – <6> – 537996 | 499200 – <6> – 537996 |
|  | 100 | 499200 – <20> – 538000 | 499200 – <20> – 538000 |
| n91 | 100 | 166400 – <20> – 172400 | 285400 – <20> – 286400 |
| n92 | 100 | 166400 – <20> – 172400 | 286400 – <20> – 303400 |
| n93 | 100 | 176000 – <20> – 183000 | 285400 – <20> – 286400 |
| n94 | 100 | 176000 – <20> – 183000 | 286400 – <20> – 303400 |
| n95 | 100 | 402000 – <20> – 405000 | N/A |
| n962 | 15 | 795000 – <1> – 875000 | 795000 – <1> – 875000 |
| n97 | 100 | 460000 – <20> – 480000 | N/A |
| n98 | 100 | 376000 – <20> – 384000 | N/A |
| n99 | 100 | 325300 -- <20> – 332100 | N/A |
| NOTE 1: Applicable NR-ARFCN for band n46 for 10 MHz channel bandwidth, NREF = {782000, 788668} for 20 MHz channel bandwidth, NREF = {744000, 745332, 746668, 748000, 749332, 750668, 752000, 753332, 754668, 756000, 765332, 766668, 768000, 769332, 770668, 772000, 773332, 774668, 776000, 777332, 778668, 780000, 781332, 783000, 784332, 785668, 787000, 788332, 789668, 791000, 792332, 793668}; for 40 MHz channel bandwidth, NREF = {744668, 746000, 748668, 751332, 754000, 755332, 766000, 767332, 770000, 772668, 775332, 778000, 780668, 783668, 786332, 787668, 790332, 793000}; for 60 MHz channel bandwidth, NREF = {745332, 746668, 748000, 752000, 753332, 754668, 766668, 768000, 769332, 773332, 774668, 778668, 780000, 784332, 785668, 791000, 792332}; for 80 MHz channel bandwidth, NREF = {746000, 747332, 752668, 754000, 767332, 768668, 774000, 779332, 785000, 791668}NOTE 2: Applicable NR-ARFCN for band n96 for 20 MHz channel bandwidth, NREF = {797000, 798332, 799668, 801000, 802332, 803668, 805000, 806332, 807668, 809000, 810332, 811668, 813000, 814332, 815668, 817000, 818332, 819668, 821000, 822332, 823668, 825000, 826332, 827668, 829000, 830332, 831668, 833000, 834332, 835668, 837000, 838332, 839668, 841000, 842332, 843668, 845000, 846332, 847668, 849000, 850332, 851668, 853000, 854332, 855668, 857000, 858332, 859668, 861000, 862332, 863668, 865000, 866332, 867668, 869000, 870332, 871668, 873000, 874332} for 40 MHz channel bandwidth, NREF = {797668, 800332, 803000, 805668, 808332, 811000, 813668, 816332, 819000, 821668, 824332, 827000, 829668, 832332, 835000, 837668, 840332, 843000, 845668, 848332, 851000, 853668, 856332, 859000, 861668, 864332, 867000, 869668, 872332} for 60 MHz channel bandwidth, NREF = {798332, 799668, 803668, 805000, 809000, 810332, 814332, 815668, 819668, 821000, 825000, 826332, 830332, 831668, 835668, 837000, 841000, 842332, 846332, 847668, 851668, 853000, 857000, 858332, 862332, 863668, 867668, 869000, 873000} for 80 MHz channel bandwidth, NREF = {799000, 804332, 809668, 815000, 820332, 825668, 831000, 836332, 841668, 847000, 852332, 857668, 863000, 868332} |

Table 5.4.2.3-2: Applicable NR-ARFCN per *operating band* in FR2

|  |  |  |
| --- | --- | --- |
| NR *operating band* | ΔFRaster(kHz)  | Uplink and Downlinkrange of NREF(First – <Step size> – Last) |
| n257 | 60 | 2054166 – <1> – 2104165 |
|  | 120 | 2054167 – <2> – 2104165 |
| n258 | 60 | 2016667 – <1> – 2070832 |
|  | 120 | 2016667 – <2> – 2070831 |
| n259 | 60 | 2270833 – <1> – 2337499 |
|  | 120 | 2270833 – <2> – 2337499 |
| n260 | 60 | 2229166 – <1> – 2279165 |
|  | 120 | 2229167 – <2> – 2279165 |
| n261 | 60 | 2070833 – <1> – 2084999 |
|  | 120 | 2070833 – <2> – 2084999 |
| n262 | 60 | 2399166 – <1> – 2415832 |
|  | 120 | 2399167 – <2> – 2415831 |

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*End of change\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*Next changed section\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

## 6.1 General

Unless otherwise stated, the conducted transmitter characteristics are specified at the *antenna connector* for *BS type 1-C* and at the *TAB connector* for *BS type 1-H*, with a full complement of transceiver units for the configuration in normal operating conditions.

For *BS type 1-H* the manufacturer shall declare the minimum number of supported geographical cells (i.e. geographical areas covered by beams). The minimum number of supported geographical cells (Ncells) relates to the BS setting with the minimum amount of cell splitting supported with transmission on all *TAB connectors* supporting the *operating band*, or with minimum amount of transmitted beams.

For *BS type 1-H* manufacturer shall also declare *TAB connector TX min cell groups*. Every *TAB connector* of the *BS type 1-H* supporting transmission in an *operating band* shall map to one *TAB connector* *TX min cell group* supporting the same *operating band*,where mapping of *TAB connector*s to cells/beams is implementation dependent.

The number of *active transmitter units* that are considered when calculating the conducted TX emissions limits (NTXU,counted) for *BS type 1-H* is calculated as follows:

 NTXU,counted = *min(NTXU,active , 8×Ncells)*

NTXU,countedpercell is used for scaling of *basic limits* and is derived as NTXU,countedpercell = NTXU,counted / Ncells

NOTE: NTXU,active depends on the actual number of *active transmitter unit*s and is independent to the declaration of Ncells.

For *BS type 1-H* there is no requirement specified for band n46.

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*End of change\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*Next changed section\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

### 6.6.3 Adjacent Channel Leakage Power Ratio

#### 6.6.3.1 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.

The requirements shall apply outside the *Base Station RF Bandwidth* or *Radio Bandwidth* whatever the type of transmitter considered (single carrier or multi-carrier) and for all transmission modes foreseen by the manufacturer’s specification.

The requirements shall also apply if the BS supports NB-IoT operation in NR in-band.

For a BS operating in *non-contiguous spectrum*, the ACLR requirement in clause 6.6.3.2 shall apply in *sub-block gaps* for the frequency ranges defined in table 6.6.3.2-2a, while the CACLR requirement in clause 6.6.3.2 shall apply in *sub-block gaps* for the frequency ranges defined in table 6.6.3.2-3.

For a *multi-band connector*, the ACLR requirement in clause 6.6.3.2 shall apply in *Inter RF Bandwidth gaps* for the frequency ranges defined in table 6.6.3.2-2a, while the CACLR requirement in clause 6.6.3.2 shall apply in *Inter RF Bandwidth gaps* for the frequency ranges defined in table 6.6.3.2-3.

The requirement shall apply during the *transmitter ON period*.

#### 6.6.3.2 Limits and *Basic limits*

The ACLR is defined with a square filter of bandwidth equal to the transmission bandwidth configuration of the transmitted signal (BWConfig) centred on the assigned channel frequency and a filter centred on the adjacent channel frequency according to the tables below.

For operation in paired and unpaired spectrum, the ACLR shall be higher than the value specified in table 6.6.3.2‑1 in any operating band except for band n46 and n96.

Table 6.6.3.2-1: Base station ACLR limit

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| *BS channel bandwidth* of *lowest/highest carrier* transmitted BWChannel (MHz) | BS adjacent channel centre frequency offset below the lowest or above the highest carrier centre frequency transmitted | Assumed adjacent channel carrier (informative) | Filter on the adjacent channel frequency and corresponding filter bandwidth | ACLR limit |
| 5, 10, 15, 20, 25, 30, 35, 40, 45, 50, 60, 70, 80, 90,100 | BWChannel | NR of same BW (Note 2) | Square (BWConfig) | 45 dB |
|  | 2 x BWChannel | NR of same BW (Note 2) | Square (BWConfig) | 45 dB |
|  | BWChannel /2 + 2.5 MHz | 5 MHz E-UTRA | Square (4.5 MHz) | 45 dB (Note 3) |
|  | BWChannel /2 + 7.5 MHz | 5 MHz E-UTRA | Square (4.5 MHz) | 45 dB (Note 3) |
| NOTE 1: BWChannel and BWConfig are the *BS channel bandwidth* and *transmission bandwidth configuration* of the *lowest/highest carrier* transmitted on the assigned channel frequency.NOTE 2: With SCS that provides largest transmission bandwidth configuration (BWConfig).NOTE 3: The requirements are applicable when the band is also defined for E-UTRA or UTRA. |

For band n46 and n96, the ACLR shall be higher than the value specified in Table 6.6.3.2-1a.

Table 6.6.3.2-1a: Base station ACLR limit for band n46 and n96

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| *BS channel bandwidth* of lowest/highest NR carrier transmitted BWChannel (MHz)  | BS adjacent channel centre frequency offset below the lowest or above the highest carrier centre frequency transmitted | Assumed adjacent channel carrier (informative) | Filter on the adjacent channel frequency and corresponding filter bandwidth | ACLR limit |
| 10, 20, 40, 60, 80  | BWChannel | NR of same BW (Note 2) | Square (BWConfig) | 35 dB |
|  | 2 x BWChannel | NR of same BW (Note 2) | Square (BWConfig) | 40 dB |
| NOTE 1: BWChannel and BWConfig are the *BS channel bandwidth* and transmission bandwidth configuration of the lowest/highest NR carrier transmitted on the assigned channel frequency.NOTE 2: With SCS that provides largest transmission bandwidth configuration (BWConfig). |

The ACLR absolute *basic limit* is specified in table 6.6.3.2‑2.

Table 6.6.3.2-2: Base station ACLR absolute *basic limit*

|  |  |
| --- | --- |
| BS category / BS class | ACLR absolute *basic limit* |
| Category A Wide Area BS | -13 dBm/MHz |
| Category B Wide Area BS | -15 dBm/MHz |
| Medium Range BS | -25 dBm/MHz |
| Local Area BS | -32 dBm/MHz |

For operation in non-contiguous spectrum or multiple bands, the ACLR shall be higher than the value specified in Table 6.6.3.2‑2a in any operating band except for band n46 and n96.

Table 6.6.3.2-2a: Base Station ACLR limit in non-contiguous spectrum or multiple bands

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| *BS channel bandwidth* of *lowest/highest carrier* transmitted BWChannel (MHz) | Sub-block or Inter RF Bandwidth gap size (Wgap) where the limit applies (MHz) | BS adjacent channel centre frequency offset below or above the sub-block or Base Station RF Bandwidth edge (inside the gap) | Assumed adjacent channel carrier | Filter on the adjacent channel frequency and corresponding filter bandwidth | ACLR limit |
| 5, 10, 15, 20 | Wgap ≥ 15 (Note 3)Wgap ≥ 45 (Note 4) | 2.5 MHz | 5 MHz NR (Note 2) | Square (BWConfig) | 45 dB |
|  | Wgap ≥ 20 (Note 3)Wgap ≥ 50 (Note 4) | 7.5 MHz | 5 MHz NR (Note 2) | Square (BWConfig) | 45 dB |
| 25, 30, 35, 40, 45, 50, 60, 70, 80, 90, 100 | Wgap ≥ 60 (Note 4)Wgap ≥ 30 (Note 3)  | 10 MHz | 20 MHz NR (Note 2) | Square (BWConfig) | 45 dB |
|  | Wgap ≥ 80 (Note 4)Wgap ≥ 50 (Note 3) | 30 MHz | 20 MHz NR (Note 2) | Square (BWConfig) | 45 dB |
| NOTE 1: BWConfig is the transmission bandwidth configuration of the assumed adjacent channel carrier.NOTE 2: With SCS that provides largest transmission bandwidth configuration (BWConfig).NOTE 3: Applicable in case the *BS channel bandwidth* of the NR carrier transmitted at the other edge of the gap is 5, 10, 15, 20 MHz.NOTE 4: Applicable in case the *BS channel bandwidth* of the NR carrier transmitted at the other edge of the gap is 25, 30, 35, 40, 45, 50, 60, 70, 80, 90, 100 MHz. |

For operation in non-contiguous spectrum for band n46 and n96, the ACLR shall be higher than the value specified in Table 6.6.3.2-2b.

Table 6.6.3.2-2b: Base Station ACLR limit in non-contiguous spectrum for band n46 and n96

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| *BS channel bandwidth* of lowest/highest NR carrier transmitted BWChannel (MHz)  | Sub-block or Inter RF Bandwidth gap size (Wgap) where the limit applies (MHz) | BS adjacent channel centre frequency offset below or above the sub-block or Base Station RF Bandwidth edge (inside the gap) | Assumed adjacent channel carrier | Filter on the adjacent channel frequency and corresponding filter bandwidth | ACLR limit |
| 10, 20, 40, 60, 80 | Wgap ≥ 60 | 10 MHz | 20 MHz NR (Note 2) | Square (BWConfig) | 35 dB |
|  | Wgap ≥ 80 | 30 MHz | 20 MHz NR (Note 2) | Square (BWConfig) | 40 dB |
| NOTE 1: BWConfig is the transmission bandwidth configuration of the assumed adjacent channel carrier.NOTE 2: With SCS that provides largest transmission bandwidth configuration (BWConfig). |

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*End of change\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*Next changed section\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

##### 6.6.4.2.4A Basic limits for Local Area and Medium Range BS for band n46 and n96 (Category A and B)

For Local Area and Medium Range BS operating in Band n46, basic limits for 10 MHz channel bandwidth are specified in table 6.6.4.2.4A-1. For Local Area and Medium Range BS operating in Band n46 and Band n96, basic limits for 20 MHz, 40 MHz, 60 MHz and 80 MHz channel bandwidth are specified in table 6.6.4.2.4A-2. The nominal bandwidth N = BWChannel of the transmitted carrier. For one non-transmitted channel basic limits are specified in table 6.6.4.2.4A-3, and for two non-transmitted channels basic limits are specified in table 6.6.4.2.4A-4.

Table 6.6.4.2.4A-1: Medium Range BS and Local Area BS operating band unwanted emission limits for 10 MHz channel bandwidth for band n46

|  |  |  |  |
| --- | --- | --- | --- |
| Frequency offset of measurement filter ‑3dB point, Δf | Frequency offset of measurement filter centre frequency, f\_offset | Basic limits (Note 1) | Measurement bandwidth  |
| 0 MHz ≤ Δf < 0.5 MHz | 0.05 MHz ≤ f\_offset < 0.55 MHz | Max($P\_{rated,x}-19.5dB-20\left(\frac{f\\_offset}{MHz}-0.05\right)dB$, -40dBm) | 100 kHz  |
| 0.5 MHz ≤ Δf < 5 MHz | 0.55 MHz ≤ f\_offset < min(5.05 MHz, f\_offsetmax) | Max($P\_{rated,x}-29.5dB-\frac{16}{9}\left(\frac{f\\_offset}{MHz}-0.55\right)dB$, -40dBm) | 100 kHz  |
| 5 MHz ≤ Δf < min(10 MHz, Δfmax) | 5.05 MHz ≤ f\_offset < min(10.05 MHz, f\_offsetmax) | Max($P\_{rated,x}-37.5dB-\frac{12}{5}\left(\frac{f\\_offset}{MHz}-5.05\right)dB$, -40dBm) | 100 kHz  |
| 10 MHz ≤ Δf < min(85 MHz, Δfmax) | 10.05 MHz ≤ f\_offset < min(85.05 MHz, f\_offsetmax) | Max(Prated,x – 59.5dB, -40dBm) | 100 kHz |
| 85 MHz ≤ Δf < min(103 MHz, Δfmax) | 85.05 MHz ≤ f\_offset < min(103.05 MHz, f\_offsetmax) | Max(Prated,x – 61.5dB, -40dBm) | 100 kHz  |
| 103 MHz ≤ Δf ≤ Δfmax | 103.05 MHz ≤ f\_offset < f\_offsetmax | Max(Prated,x – 66.5dB, -40dBm) | 100 kHz |
| NOTE 1: For a BS supporting non-contiguous spectrum operation within any operating band, the minimum requirement within *sub-block gaps* is calculated as a cumulative sum of contributions from adjacent *sub-blocks* on each side of the *sub-block* *gap*. Exception is f ≥ 10 MHz from both adjacent *sub-blocks* on each side of the *sub-block gap*, where the minimum requirement within *sub-block gaps* shall be Max (Prated,x – 59.5dB, -40 dBm)/100kHz. |

Table 6.6.4.2.4A-2: Medium Range BS and Local Area BS operating band unwanted emission limits for 20 MHz, 40 MHz, 60 MHz and 80 MHz channel bandwidth for band n46 and n96

|  |  |  |  |
| --- | --- | --- | --- |
| Frequency offset of measurement filter ‑3dB point, Δf | Frequency offset of measurement filter centre frequency, f\_offset | Basic limits (Note 1) | Measurement bandwidth  |
| 0 MHz ≤ Δf < 1 MHz | 0.05 MHz ≤ f\_offset < 1.05 MHz | Max($P\_{rated,x}-10log10\left(\frac{BW\_{channel}}{100kHz}\right)-20\left(\frac{f\\_offset}{MHz}-0.05\right)dB$, -40dBm) | 100 kHz  |
| 1 MHz ≤ Δf < min(0.5N MHz, Δfmax) | 1.05 MHz ≤ f\_offset < min((0.5N+0.05) MHz, f\_offsetmax) | Max($P\_{rated,x}-10log10\left(\frac{BW\_{Channel}}{100kHz}\right)-20-\frac{8}{0.5N-1}\left(\frac{f\\_offset}{MHz}-1.05\right)dB$, -40dBm) | 100 kHz  |
| 0.5N MHz ≤ Δf < min(N MHz, Δfmax) | (0.5N+0.05) MHz ≤ f\_offset < min((N+0.05) MHz, f\_offsetmax) | Max($P\_{rated,x}-10log10\left(\frac{BW\_{Channel}}{100kHz}\right)-28-\frac{12}{0.5N}\left(\frac{f\\_offset}{MHz}-0.5N-0.05\right)dB$, -40dBm) | 100 kHz  |
| N MHz ≤ Δf < min(8.5N MHz, Δfmax) | (N+0.05) MHz ≤ f\_offset < min((8.5N+0.05) MHz, f\_offsetmax) | $$Max\left(P\_{rated,x}-10log10\left(\frac{BW\_{Channel}}{100kHz}\right)-40dB,-40dBm\right)$$ | 100 kHz |
| 8.5N MHz ≤ Δf < min(10.3N MHz, Δfmax) | (8.5N+0.05) MHz ≤ f\_offset < min((10.3N+0.05) MHz, f\_offsetmax) | $$Max\left(P\_{rated,x}-10log10\left(\frac{BW\_{Channel}}{100kHz}\right)-42dB,-40dBm\right)$$ | 100 kHz  |
| 10.3N MHz ≤ Δf ≤ Δfmax | (10.3N+0.05) MHz ≤ f\_offset < f\_offsetmax | $$Max\left(P\_{rated,x}-10log10\left(\frac{BW\_{Channel}}{100kHz}\right)-47dB,-40dBm\right)$$ | 100 kHz |
| NOTE 1: For a BS supporting non-contiguous spectrum operation within any operating band, the minimum requirement within *sub-block gaps* is calculated as a cumulative sum of contributions from adjacent *sub-blocks* on each side of the *sub-block* *gap*. Exception is f ≥ N MHz from both adjacent *sub-blocks* on each side of the *sub-block gap*, where the minimum requirement within *sub-block gaps* shall be $Max\left(P\_{rated,x}-10log10\left(\frac{BW\_{Channel}}{100kHz}\right)-40dB,-40dBm\right)$ |

In the case of one or two non-transmitted 20 MHz channels between transmitted channels, when a NR-U channel bandwidth of 60 MHz or 80 MHz have been assigned, the spectrum emission mask for non-transmitted channels specified in Table 6.6.4.2.4A-3 and Table 6.6.4.2.4A-4 applies for one and two non-transmitted channels respectively. The spectrum emission mask for non-transmitted channels apply to frequencies (ΔfBE\_offset) starting from the edge of the last transmitted channel of the channels assigned for NR-U channel bandwidth. The relative power of any BS emission shall not exceed the most stringent levels given by Table 6.6.4.2.4A-2 and Table 6.6.4.2.4A-3 in the case of non-transmitted channels between transmitted channels.

Table 6.6.4.2.4A-3: Medium Range BS and Local Area BS operating band unwanted emission limits for one non-transmitted channel for 60 MHz and 80MHz channel bandwidth for band n46 and n96

|  |  |  |  |
| --- | --- | --- | --- |
| Frequency offset of measurement filter ‑3dB point, Δf | Frequency offset of measurement filter centre frequency, f\_BE\_offset | *Basic limits*  | Measurement bandwidth  |
| 0 MHz  ΔfBE\_offset < 1 MHz | 0.05 MHz  f\_BE\_offset < 1.05 MHz | $$P\_{rated,x}-10log10\left(\frac{BW\_{Channel}}{100kHz}\right)-20\left(\frac{f\\_BE\\_offset}{MHz}-0.05\right)dB$$ | 100 kHz |
| 1 MHz  ΔfBE\_offset < 10 MHz | 1.05 MHz  f\_BE\_offset < 10.05 MHz | $$P\_{rated,x}-10log10\left(\frac{BW\_{Channel}}{100kHz}\right)-20-\frac{1}{3}\left(\frac{f\\_BE\\_offset}{MHz}-1.05\right)dB$$ | 100 kHz |
| 10 MHz  ΔfBE\_offset < 19 MHz | 10.05 MHz  f\_BE offset < 19.05 MHz | $$P\_{rated,x}-10log10\left(\frac{BW\_{Channel}}{100kHz}\right)-23+\frac{1}{3}\left(\frac{f\\_BE\\_offset}{MHz}-10.05\right)dB$$ | 100 kHz |
| 19 MHz  ΔfBE\_offset < 19.9 MHz | 19.05 MHz  f\_BE\_offset < 19.95 MHz | $$P\_{rated,x}-10log10\left(\frac{BW\_{Channel}}{100kHz}\right)-20+20\left(\frac{f\\_BE\\_offset}{MHz}-19.05\right)dB$$ | 100 kHz |

Table 6.6.4.2.4A-4: Medium Range BS and Local Area BS operating band unwanted emission limits for two non-transmitted channels of 80 MHz channel bandwidth for band n46 and n96

|  |  |  |  |
| --- | --- | --- | --- |
| Frequency offset of measurement filter ‑3dB point, f | Frequency offset of measurement filter centre frequency, f\_BE\_offset | *Basic limits*  | Measurement bandwidth  |
| 0 MHz  ΔfBE\_offset < 1 MHz | 0.05 MHz  f\_BE\_offset < 1.05 MHz | $$P\_{rated,x}-10log10\left(\frac{BW\_{Channel}}{100kHz}\right)-20\left(\frac{f\\_BE\\_offset}{MHz}-0.05\right)dB$$ | 100 kHz |
| 1 MHz  ΔfBE\_offset <10 MHz | 1.05 MHz  f\_BE\_offset < 10.05 MHz | $$P\_{rated,x}-10log10\left(\frac{BW\_{Channel}}{100kHz}\right)-20-\frac{5}{9}\left(\frac{f\\_BE\\_offset}{MHz}-1.05\right)dB$$ | 100 kHz |
| 10 MHz  ΔfBE\_offset <30 MHz | 10.05 MHz  f\_BE offset < 30.05 MHz | $$P\_{rated,x}-10log10\left(\frac{BW\_{Channel}}{100kHz}\right)-25dB$$ | 100 kHz |
| 30 MHz  ΔfBE\_offset < 39 MHz | 30.05 MHz  f\_BE\_offset < 39.05 MHz | $$P\_{rated,x}-10log10\left(\frac{BW\_{Channel}}{100kHz}\right)-25+\frac{5}{9}\left(\frac{f\\_BE\\_offset}{MHz}-30.05\right)dB$$ | 100 kHz |
| 39 MHz  ΔfBE\_offset < 39.9 MHz | 39.05 MHz  f\_BE\_offset < 39.95 MHz | $$P\_{rated,x}-10log10\left(\frac{BW\_{Channel}}{100kHz}\right)-20+20\left(\frac{f\\_BE\\_offset}{MHz}-39.05\right)dB$$ | 100 kHz |

In the case of non-transmitted 20 MHz channel(s) on the edges of an assigned NR-U channel bandwidth the general spectrum emission mask specified in Table 6.6.4.2.4A-2 is applied to the remaining transmitted channels to form an additional spectrum emission mask. The additional spectrum emission mask is applied to the total bandwidth of the remaining transmitted channels.

The additional spectrum emission mask is floored a t $P\_{rated,x}-10log10\left(\frac{BW\_{Channel}}{100kHz}\right)-28dB$.

The relative power of any BS emission shall not exceed the most stringent levels given by the initial general spectrum emission mask with full channel bandwidth and the additional spectrum emission mask with the channel bandwidth of the transmitted channels in the case of non-transmitted channels at the edge of an assigned NR-U channel bandwidth.

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*End of change\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*Next changed section\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

### 9.2.1 General

*BS type 1-H, BS type 1-O* and *BS type 2-O* are declared to support one or more beams, as per manufacturer's declarations specified in TS 38.141-2 [6]. Radiated transmit power is defined as the EIRP level for a declared beam at a specific *beam peak direction*.

For each beam, the requirement is based on declaration of a beam identity, *reference beam direction pair*, beamwidth, *rated beam EIRP*, *OTA peak directions set*, the *beam direction pairs* at the maximum steering directions and their associated *rated beam EIRP* and beamwidth(s).

For a declared beam and *beam direction pair*, the *rated beam EIRP* level is the maximum power that the base station is declared to radiate at the associated *beam peak direction* during the *transmitter ON period*.

For each *beam peak direction* associated with a *beam direction pair* within the *OTA peak directions set*, a specific *rated beam EIRP* level may be claimed. Any claimed value shall be met within the accuracy requirement as described below. *Rated beam EIRP* is only required to be declared for the *beam direction pairs* subject to conformance testing as detailed in TS 38.141-2 [6].

NOTE 1: *OTA peak directions set* is set of *beam peak directions* for which the EIRP accuracy requirement is intended to be met. The *beam peak directions* are related to a corresponding contiguous range or discrete list of *beam centre directions* by the *beam direction pairs* included in the set.

NOTE 2: A *beam direction pair* is data set consisting of the *beam centre direction* and the related *beam peak direction.*

NOTE 3: A declared EIRP value is a value provided by the manufacturer for verification according to the conformance specification declaration requirements, whereas a claimed EIRP value is provided by the manufacturer to the equipment user for normal operation of the equipment and is not subject to formal conformance testing.

 For *operating bands* where the supported *fractional bandwidth* (FBW) is larger than 6%, two rated carrier EIRP may be declared by manufacturer:

- Prated,c,FBWlow for lower supported frequency range, and

- Prated,c,FBWhigh for higher supported frequency range.

For frequencies in between FFBWlow and FFBWhigh the rated carrier EIRP is:

- Prated,c,FBWlow, for the carrier whose carrier frequency is within frequency range FFBWlow ≤ f < (FFBWlow +FFBWhigh) / 2,

- Prated,c,FBWhigh, for the carrier whose carrier frequency is within frequency range (FFBWlow +FFBWhigh) / 2 ≤ f ≤FFBWhigh.

For *BS type 1-O* there is no requirement specified for bands n46, n96 and n102.