**3GPP TSG-RAN WG4 Meeting #102-e  R4-220zzzz**

**E-meeting, 21st Feb – 3rd Mar 2022**

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| *CR-Form-v12.1* |
| **CHANGE REQUEST** |
|  |
|  | **38.141-1** | **CR** | **0260** | **rev** | **1** | **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:***  | CR to 38.141-1 on introduction of n100 and n101 requirements |
|  |  |
| ***Source to WG:*** | Nokia, Nokia Shanghai Bell |
| ***Source to TSG:*** | RAN4 |
|  |  |
| ***Work item code:*** | NR\_RAIL\_EU\_900MHz-PerfNR\_RAIL\_EU\_1900MHz\_TDD-Perf |  | ***Date:*** | 2022-02-25 |
|  |  |  |  |  |
| ***Category:*** | **B** |  | ***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-15 (Release 15)Rel-16 (Release 16)Rel-17 (Release 17)Rel-18 (Release 18)* |
|  |  |
| ***Reason for change:*** | Introduction of n100 and n101 requirements. |
|  |  |
| ***Summary of change:*** | Relevant sections for n100 and n101 are updated. |
|  |  |
| ***Consequences if not approved:*** | n100 and n101 requirements are not defined. |
|  |  |
| ***Clauses affected:*** | 2, 6.2.1, 6.6.4.5.3.2, 6.6.4.5.6.7, 6.6.5.5.1.3, 6.6.5.5.1.4, 7.4.2.5.1, 7.5.5.3 |
|  |  |
|  | **Y** | **N** |  |  |
| ***Other specs*** | **X** |  |  Other core specifications  | TS 38.104 CRs 0367, 0371, zzzz |
| ***affected:*** | **X** |  |  Test specifications | TS 38.141-2 CR 0383 |
| ***(show related CRs)*** |  | **x** |  O&M Specifications | TS/TR ... CR ...  |
|  |  |
| ***Other comments:*** |  |
|  |  |
| ***This CR's revision history:*** |  |

# 2 References

The following documents contain provisions which, through reference in this text, constitute provisions of the present document.

- References are either specific (identified by date of publication, edition number, version number, etc.) or non‑specific.

- For a specific reference, subsequent revisions do not apply.

- For a non-specific reference, the latest version applies. In the case of a reference to a 3GPP document (including a GSM document), a non-specific reference implicitly refers to the latest version of that document *in the same Release as the present document*.

[1] 3GPP TR 21.905: "Vocabulary for 3GPP Specifications"

[2] 3GPP TS 38.104: "NR Base Station (BS) radio transmission and reception"

[3] 3GPP TS 38.141-2: "NR, Base Station (BS) conformance testing, Part 2: Radiated conformance testing"

[4] ITU-R Recommendation M.1545, "Measurement uncertainty as it applies to test limits for the terrestrial component of International Mobile Telecommunications-2000"

[5] ITU-R Recommendation SM.329: "Unwanted emissions in the spurious domain"

[6] IEC 60 721-3-3: "Classification of environmental conditions - Part 3-3: Classification of groups of environmental parameters and their severities - Stationary use at weather protected locations"

[7] IEC 60 721-3-4: "Classification of environmental conditions - Part 3: Classification of groups of environmental parameters and their severities - Clause 4: Stationary use at non-weather protected locations"

[8] IEC 60 721: "Classification of environmental conditions"

[9] IEC 60 068-2-1 (2007): "Environmental testing - Part 2: Tests. Tests A: Cold"

[10] IEC 60 068-2-2: (2007): "Environmental testing - Part 2: Tests. Tests B: Dry heat"

[11] IEC 60 068-2-6: (2007): "Environmental testing - Part 2: Tests - Test Fc: Vibration (sinusoidal)"

[12] ITU-R Recommendation SM.328: "Spectra and bandwidth of emissions"

[13] Federal Communications Commission: "Title 47 of the Code of Federal Regulations (CFR) "

[14] ECC/DEC/(17)06: "The harmonised use of the frequency bands 1427-1452 MHz and 1492-1518 MHz for Mobile/Fixed Communications Networks Supplemental Downlink (MFCN SDL)"

[15] 3GPP TR 25.942: "RF system scenarios"

[16] 3GPP TS 38.212: "NR; Multiplexing and channel coding"

[17] 3GPP TS 38.211: "NR; Physical channels and modulation"

[18] 3GPP TS 38.214: "NR; Physical layer procedures for data"

[19] 3GPP TS 38.331: "NR; Radio Resource Control (RRC) protocol specification"

[20] 3GPP TR 38.901: "Study on channel model for frequencies from 0.5 to 100 GHz"

[21] 3GPP TS 38.101-1: "NR; User Equipment (UE) radio transmission and reception; Part 1: Range 1 Standalone"

[22] 3GPP TS 36.104: "Evolved Universal Terrestrial Radio Access (E-UTRA); Base Station (BS) radio transmission and reception"

[23] ITU-T Recommendation O.150, "Equipment for the measurement of digital and analogue/digital parameters"

[24] 3GPP TS 36.141: "Evolved Universal Terrestrial Radio Access (E-UTRA); Base Station (BS) conformance testing"

[25] ECC Decision(20)02: “Harmonised use of the paired frequency bands 874.4-880.0 MHz and 919.4-925.0 MHz and of the unpaired frequency band 1900-1910 MHz for Railway Mobile Radio (RMR)”

--------------------------------------------------- NEXT CLAUSE ------------------------------------------------

### 6.2.1 Definition and applicability

The conducted BS output power requirements are specified at *single-band connector*, or at *multi-band connector*.

The *rated carrier output power* of the *BS type 1-C* shall be as specified in table 6.2.1-1.

Table 6.2.1-1: *Rated carrier output power* limits for *BS type 1-C*

|  |  |
| --- | --- |
| BS class | Prated,c,AC |
| Wide Area BS | (Note) |
| Medium Range BS | ≤ 38 dBm |
| Local Area BS | ≤ 24 dBm |
| NOTE: There is no upper limit for the Prated,c,AC rated output power of the Wide Area Base Station. |

The *rated carrier output power* of the *BS type 1-H* shall be as specified in table 6.2.1-2.

Table 6.2.1-2: *Rated carrier output power* limits for *BS type 1-H*

| BS class | Prated,c,sys | Prated,c,TABC |
| --- | --- | --- |
| Wide Area BS | (Note) | (Note) |
| Medium Range BS | ≤ 38 dBm +10log(NTXU,counted) | ≤ 38 dBm |
| Local Area BS | ≤ 24 dBm +10log(NTXU,counted) | ≤ 24 dBm |
| NOTE: There is no upper limit for the Prated,c,sys or Prated,c,TABC of the Wide Area Base Station. |

In addition, for operation with shared spectrum channel access operation, the BS may have to comply with the applicable BS power limits established regionally, when deployed in regions where those limits apply and under the conditions declared by the manufacturer.

For Band n41 and n90 operation in Japan, the rated output power, Prated,c.sys for BS type 1-H or the sum of Prated,c,AC over all *antenna connectors* for BS type 1-C declared by the manufacturer shall be equal to or less than 20 W per 10 MHz bandwidth.

For band n100 in CEPT countries, Prated,c,AC shall not exceed 51.5 dBm/5MHz + (fDL-922.1) x 40/3 dB, with fDL being the centre frequency in MHz. This limit is derived from ECC Decision (20)02 [25] assuming a 13 dBi maximum gain (antenna gain and losses).

For band n101 in CEPT countries, Prated,c,AC shall not exceed 51 dBm/10MHz or 48 dBm/5MHz. This limit is derived from ECC Decision (20)02 [25] assuming a 14 dBi maximum gain (antenna gain and losses).

#### The output power limit for the respective BS classes in tables 6.2.1.-1 and 6.2.1-2 shall be compared to the rated output power and the declared BS class. It is not subject to testing.----------------------------------------- NEXT CLAUSE ----------------------------------------------------

###### 6.6.4.5.3.2 Category B requirements (Option 2)

The limits in this clause are intended for Europe and may be applied regionally for BS operating in Bands n1, n3, n7, n8, n38, n65, n100 or n101.

For a BS operating in Bands n1, n3, n8, n65 or *BS type 1-C* operating in bands n7, n38, n100 or n101 *basic limits* are specified in table 6.6.4.5.3.2-1:

Table 6.6.4.5.3.2-1: Regional Wide Area BS operating band unwanted emission limits for Category B

|  |  |  |  |
| --- | --- | --- | --- |
| Frequency offset of measurement filter ‑3dB point, Δf | Frequency offset of measurement filter centre frequency, f\_offset | *Basic limit* (Note 1, 2) | Measurement bandwidth |
| 0 MHz ≤ Δf < 0.2 MHz | 0.015 MHz ≤ f\_offset < 0.215 MHz  | -12.5dBm | 30 kHz  |
| 0.2 MHz ≤ Δf < 1 MHz | 0.215 MHz ≤ f\_offset < 1.015 MHz |  | 30 kHz  |
| (Note 4) | 1.015 MHz ≤ f\_offset < 1.5 MHz  | -24.5dBm | 30 kHz  |
| 1 MHz ≤ Δf ≤min( 10 MHz, Δfmax)  | 1.5 MHz ≤ f\_offset <min(10.5 MHz, f\_offsetmax) | -11.5dBm | 1 MHz  |
| 10 MHz ≤ Δf ≤ Δfmax | 10.5 MHz ≤ f\_offset < f\_offsetmax  | -15 dBm (Note 3) | 1 MHz  |
| 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, where the contribution from the far-end sub-block shall be scaled according to the measurement bandwidth of the near-end sub-block. Exception is f ≥ 10MHz from both adjacent sub blocks on each side of the sub-block gap, where the minimum requirement within sub-block gaps shall be -15dBm/1MHz.NOTE 2: For a *multi-band connector* with Inter RF Bandwidth gap < 2\*ΔfOBUE the minimum requirement within the Inter RF Bandwidth gaps is calculated as a cumulative sum of contributions from adjacent sub-blocks or RF Bandwidth on each side of the Inter RF Bandwidth gap, where the contribution from the far-end sub-block or RF Bandwidth shall be scaled according to the measurement bandwidth of the near-end sub-block or RF Bandwidth.NOTE 3: The requirement is not applicable when Δfmax < 10 MHz.NOTE 4: This frequency range ensures that the range of values of f\_offset is continuous. |

##### -------------------------------------------- NEXT CLAUSE -------------------------------------------------------------

##### 6.6.4.5.6 Basic limits for additional requirements

###### 6.6.4.5.6.1 Limits in FCC Title 47

In addition to the requirements in clauses 6.6.4.5.2 to 6.6.4.5.5, the BS may have to comply with the applicable emission limits established by FCC Title 47 [13], when deployed in regions where those limits are applied, and under the conditions declared by the manufacturer.

###### 6.6.4.5.6.2 Protection of DTT

In certain regions the following requirement may apply for protection of DTT. For *BS type 1-C* or *BS type 1-H* operating in Band n20, the level of emissions in the band 470-790 MHz, measured in an 8 MHz filter bandwidth on centre frequencies Ffilter according to table 6.6.4.5.6.2-1, *basic limit* is PEM,N declared by the manufacturer. This requirement applies in the frequency range 470-790 MHz even though part of the range falls in the spurious domain.

Table 6.6.4.5.6.2-1: Declared emissions *basic limit* for protection of DTT

|  |  |  |
| --- | --- | --- |
| Filter centre frequency, Ffilter | Measurement bandwidth | Declared emission *basic limit* (dBm) |
| Ffilter = 8\*N + 306 (MHz); 21 ≤ N ≤ 60 | 8 MHz | PEM,N |

Note: The regional requirement is defined in terms of EIRP (effective isotropic radiated power), which is dependent on both the BS emissions at the *antenna connector* and the deployment (including antenna gain and feeder loss). The requirement defined above provides the characteristics of the BS needed to verify compliance with the regional requirement. Compliance with the regional requirement can be determined using the method outlined in TS 36.104 [22], annex G.

###### 6.6.4.5.6.3 Additional operating band unwanted emissions limits for Band n48

The following requirement may apply to BS operating in Band n48 in certain regions. Emissions shall not exceed the maximum levels specified in Table 6.6.4.5.6.3-1.

Table 6.6.4.5.6.3-1: Additional operating band unwanted emission limits for Band n48

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Channel bandwidth | Frequency offset of measurement filter ‑3dB point, Δf | Frequency offset of measurement filter centre frequency, f\_offset | Minimum requirement | Measurement bandwidth (Note) |
| All | 0 MHz ≤ Δf < 10 MHz | 0.5 MHz ≤ f\_offset < 9.5 MHz | -13 dBm | 1 MHz |

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

###### 6.6.4.5.6.4 Additional operating band unwanted emissions limits for Band n53

The following requirement may apply to BS operating in Band n53 in certain regions. Emissions shall not exceed the maximum levels specified in table 6.6.4.5.6.4-1.

Table 6.6.4.5.6.4-1: Additional operating band unwanted emission limits for Band n53

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Channel bandwidth (MHz) | Frequency range (MHz) | Frequency offset of measurement filter ‑3dB point, Δf | Frequency offset of measurement filter centre frequency, f\_offset | Minimum requirement | Measurement bandwidth (Note) |
| 5 | 2400 - 2477.5 | 6 MHz ≤ Δf < 83.5 MHz | 6.5 MHz ≤ f\_offset < 83 MHz | -25 dBm | 1 MHz |
| 10 | 2400 - 2473.5 | 10 MHz ≤ Δf < 83.5 MHz | 10.5 MHz ≤ f\_offset < 83 MHz | -25 dBm | 1 MHz |
| 5 | 2477.5 - 2478.5 | 5 MHz ≤ Δf < 6 MHz | 5.5 MHz | -13 dBm | 1 MHz |
| 10 | 2473.5 - 2478.5 | 5 MHz ≤ Δf < 10 MHz | 5.5 MHz ≤ f\_offset < 9.5 MHz | -13 dBm | 1 MHz |
| All | 2478.5 - 2483.5 | 0 MHz ≤ Δf < 5 MHz | 0.5 MHz ≤ f\_offset < 4.5 MHz | -10 dBm | 1 MHz |
| 5 | 2495 - 2501 | 0 MHz ≤ Δf < 6 MHz | 0.5 MHz ≤ f\_offset < 5.5 MHz | -13 dBm | 1 MHz |
| 10 | 2495 - 2505 | 0 MHz ≤ Δf < 10 MHz | 0.5 MHz ≤ f\_offset < 9.5 MHz | -13 dBm | 1 MHz |
| 5 | 2501 - 2690 | 6 MHz ≤ Δf < 195 MHz | 6.5 MHz ≤ f\_offset < 194.5 MHz | -25 dBm | 1 MHz |
| 10 | 2505 - 2690 | 10 MHz ≤ Δf < 195 MHz | 10.5 MHz ≤ f\_offset < 194.5 MHz | -25 dBm | 1 MHz |

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

###### 6.6.4.5.6.5 Protection of GPS

In regions where FCC regulation applies, requirements for protection of GPS according to FCC Order DA 10-48 applies for operation in Band n24. The following normative requirement covers *BS type 1-C* or *BS type 1-H* operating in Band n24, to be used together with other information about the site installation to verify compliance with the requirement in FCC Order DA 10-48.

The level of emissions in the 1541 – 1650 MHz band, measured in measurement bandwidth according to Table 6.6.4.5.6.5-1 shall not exceed the *basic limits* PEM\_B24,a, PEM\_B24,b, PEM\_B24,c, PEM\_B24,d, PEM\_B24,e, and PEM\_B24,f declared by the manufacturer.

Table 6.6.4.5.6.5-1: Declared emissions *basic limits* for protection of GPS

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Operating Band | Frequency range (MHz) | Declared emission level (dBW) (Measurement bandwidth = 1 MHz) | Declared emission *basic limit* (dBW) of discrete emissions of less than 700 Hz bandwidth(Measurement bandwidth = 1 kHz) | Declared emission *basic limit* (dBW) of discrete emissions of less than 2 kHz bandwidth(Measurement bandwidth = 1 kHz) |
| n24 | 1541 - 1559 | PEM\_B24,a |  | PEM\_B24,f |
| 1559 - 1610 | PEM\_B24,b | PEM\_B24,d |  |
| 1610 - 1650 | PEM\_B24,c | PEM\_B24,e |  |

Note: The regional requirements in FCC Order DA 20-48 are defined in terms of EIRP (effective isotropic radiated power), which is dependent on both the BS emissions at the antenna connector and the deployment (including antenna gain and feeder loss). The EIRP level is calculated using: PEIRP = PEM + Gant where PEM denotes the unwanted emission level at the antenna connector and Gant equals the RDN and antenna array gain. The requirement defined above provides the characteristics of the base station needed to verify compliance with the regional requirement.

6.6.4.5.6.6 Additional operating band unwanted emissions limits for operation with shared spectrum channel access

In addition, for operation with shared spectrum channel access, the BS may have to comply with the applicable operating band unwanted emission limits established regionally, when deployed in regions where those limits apply and under the conditions declared by the manufacturer. The regional requirements may be in the form of conducted power, power spectral density, EIRP and other types of limits. In case of regulatory limits based on EIRP, assessment of the EIRP level is described in Annex F.2.

6.6.4.5.6.7 Additional operating band unwanted emissions limits for Band n100

In CEPT countries where ECC Decision (20)02 ([25]) applies, the emissions shall not exceed the maximum levels specified in table 6.6.4.5.6.7-1.

Table 6.6.4.5.6.7-1: Additional operating band unwanted emission limits for Band n100

|  |  |  |  |
| --- | --- | --- | --- |
| Frequency offset of measurement filter ‑3dB point, Δf | Frequency offset of measurement filter centre frequency, f\_offset | *Basic limits* (Note) | *Measurement bandwidth* |
| 0 MHz ≤ Δf < 0.2 MHz | 0.1 MHz ≤ f\_offset < 0.3 MHz | 19.5 dBm | 200 kHz  |
| 0.2 MHz ≤ Δf < 1 MHz | 0.6MHz ≤ f\_offset <1.4 MHz | 1 dBm | 800 kHz  |
| 1 MHz ≤ Δf ≤ 10 MHz | 1.5 MHz ≤ f\_offset < 10.5 | -8 dBm  | 1 MHz  |
| NOTE: The basic limits are derived from ECC Decision(20)02 [25] assuming a 13 dBi maximum gain (antenna gain and losses). |

#### ----------------------------------------- NEXT CLAUSE ----------------------------------------------------

###### 6.6.5.5.1.3 Additional spurious emissions requirements

These requirements may be applied for the protection of system operating in frequency ranges other than the BS downlink *operating band*. The limits may apply as an optional protection of such systems that are deployed in the same geographical area as the BS, or they may be set by local or regional regulation as a mandatory requirement for an NR *operating band*. It is in some cases not stated in the present document whether a requirement is mandatory or under what exact circumstances that a limit applies, since this is set by local or regional regulation. An overview of regional requirements in the present document is given in clause 4.4.

Some requirements may apply for the protection of specific equipment (UE, MS and/or BS) or equipment operating in specific systems (GSM, CDMA, UTRA, E-UTRA, NR, etc.) as listed below.

The power of any spurious emission shall not exceed the *basic limits* of table 6.6.5.5.1.3-1 for a BS where requirements for co-existence with the system listed in the first column apply. For a *multi-band connector*, the exclusions and conditions in the Note column of table 6.6.5.5.1.3-1 apply for each supported *operating band*.

Table 6.6.5.5.1.3-1: BS spurious emissions limits for BS for co-existence with systems operating in other frequency bands

| System type for NR to co-exist with | Frequency range for co-existence requirement | *Basic limit* | Measurement bandwidth | Note |
| --- | --- | --- | --- | --- |
| GSM900 | 921 – 960 MHz | -57 dBm | 100 kHz | This requirement does not apply to BS operating in band n8 |
|  | 876 – 915 MHz | -61 dBm | 100 kHz | For the frequency range 880-915 MHz, this requirement does not apply to BS operating in band n8, since it is already covered by the requirement in clause 6.6.5.5.1.2. |
| DCS1800 | 1805 – 1880 MHz | -47 dBm | 100 kHz | This requirement does not apply to BS operating in band n3.  |
|  | 1710 – 1785 MHz | -61 dBm | 100 kHz | This requirement does not apply to BS operating in band n3, since it is already covered by the requirement in clause 6.6.5.5.1.2. |
| PCS1900 | 1930 – 1990 MHz | -47 dBm | 100 kHz | This requirement does not apply to BS operating in band n2, n25 or band n70. |
|  | 1850 – 1910 MHz | -61 dBm | 100 kHz | This requirement does not apply to BS operating in band n2 or n25 since it is already covered by the requirement in clause 6.6.5.5.1.2.  |
| GSM850 or CDMA850 | 869 – 894 MHz | -57 dBm | 100 kHz | This requirement does not apply to BS operating in band n5 or n26.  |
|  | 824 – 849 MHz | -61 dBm | 100 kHz | This requirement does not apply to BS operating in band n5 or n26, since it is already covered by the requirement in clause 6.6.5.5.1.2. |
| UTRA FDD Band I or | 2110 – 2170 MHz | -52 dBm | 1 MHz | This requirement does not apply to BS operating in band n1 or n65 |
| E-UTRA Band 1 or NR Band n1 | 1920 – 1980 MHz | -49 dBm | 1 MHz | This requirement does not apply to BS operating in band n1 or n65, since it is already covered by the requirement in clause 6.6.5.5.1.2. |
| UTRA FDD Band II or | 1930 – 1990 MHz | -52 dBm | 1 MHz | This requirement does not apply to BS operating in band n2 or n70. |
| E-UTRA Band 2 or NR Band n2 | 1850 – 1910 MHz | -49 dBm | 1 MHz | This requirement does not apply to BS operating in band n2, since it is already covered by the requirement in clause 6.6.5.5.1.2. |
| UTRA FDD Band III or | 1805 – 1880 MHz | -52 dBm | 1 MHz | This requirement does not apply to BS operating in band n3. |
| E-UTRA Band 3 or NR Band n3 | 1710 – 1785 MHz | -49 dBm | 1 MHz | This requirement does not apply to BS operating in band n3, since it is already covered by the requirement in clause 6.6.5.5.1.2.  |
| UTRA FDD Band IV or | 2110 – 2155 MHz | -52 dBm | 1 MHz | This requirement does not apply to BS operating in band n66 |
| E-UTRA Band 4 | 1710 – 1755 MHz | -49 dBm | 1 MHz | This requirement does not apply to BS operating in band n66, since it is already covered by the requirement in clause 6.6.5.5.1.2. |
| UTRA FDD Band V or | 869 – 894 MHz | -52 dBm | 1 MHz | This requirement does not apply to BS operating in band n5 or n26.  |
| E-UTRA Band 5 or NR Band n5 | 824 – 849 MHz | -49 dBm | 1 MHz | This requirement does not apply to BS operating in band n5 or n26, since it is already covered by the requirement in clause 6.6.5.5.1.2. |
| UTRA FDD Band VI, XIX or | 860 – 890 MHz  | -52 dBm | 1 MHz | This requirement does not apply to BS operating in band n18. |
| E-UTRA Band 6, 18, 19 or NR Band n18 | 815 – 830 MHz  | -49 dBm | 1 MHz | This requirement does not apply to BS operating in band n18, since it is already covered by the requirement in clause 6.6.5.2.2. |
|  | 830 – 845 MHz | -49 dBm | 1 MHz |  |
| UTRA FDD Band VII or | 2620 – 2690 MHz | -52 dBm | 1 MHz | This requirement does not apply to BS operating in band n7. |
| E-UTRA Band 7 or NR Band n7 | 2500 – 2570 MHz | -49 dBm | 1 MHz | This requirement does not apply to BS operating in band n7, since it is already covered by the requirement in clause 6.6.5.5.1.2. |
| UTRA FDD Band VIII or | 925 – 960 MHz | -52 dBm | 1 MHz | This requirement does not apply to BS operating in band n8 or n100. |
| E-UTRA Band 8 or NR Band n8 | 880 – 915 MHz | -49 dBm | 1 MHz | This requirement does not apply to BS operating in band n8, since it is already covered by the requirement in clause 6.6.5.5.1.2. |
| UTRA FDD Band IX or | 1844.9 – 1879.9 MHz | -52 dBm | 1 MHz | This requirement does not apply to BS operating in band n3. |
| E-UTRA Band 9 | 1749.9 – 1784.9 MHz | -49 dBm | 1 MHz | This requirement does not apply to BS operating in band n3, since it is already covered by the requirement in clause 6.6.5.5.1.2. |
| UTRA FDD Band X or | 2110 – 2170 MHz | -52 dBm | 1 MHz | This requirement does not apply to BS operating in band n66 |
| E-UTRA Band 10 | 1710 – 1770 MHz | -49 dBm | 1 MHz | This requirement does not apply to BS operating in band n66, since it is already covered by the requirement in clause 6.6.5.5.1.2. |
| UTRA FDD Band XI or XXI or | 1475.9 – 1510.9 MHz | -52 dBm | 1 MHz | This requirement does not apply to BS operating in Band n50, n74, n75, n92 or n94. |
| E-UTRA Band 11 or 21 | 1427.9 – 1447.9 MHz  | -49 dBm | 1 MHz | This requirement does not apply to BS operating in Band n50, n51, n74, n75, n76, n91, n92, n93 or n94. |
|  | 1447.9 – 1462.9 MHz | -49 dBm | 1 MHz | This requirement does not apply to BS operating in Band n50, n74, n75, n92 or n94. |
| UTRA FDD Band XII or | 729 – 746 MHz | -52 dBm | 1 MHz | This requirement does not apply to BS operating in band n12 or n85. |
| E-UTRA Band 12 or NR Band n12 | 699 – 716 MHz | -49 dBm | 1 MHz | This requirement does not apply to BS operating in band n12 or n85, since it is already covered by the requirement in clause 6.6.5.5.1.2.For NR BS operating in n29, it applies 1 MHz below the Band n29 downlink operating band (Note 5). |
| UTRA FDD Band XIII or | 746 – 756 MHz | -52 dBm | 1 MHz | This requirement does not apply to BS operating in band n13. |
| E-UTRA Band 13 or NR Band n13 | 777 – 787 MHz | -49 dBm | 1 MHz | This requirement does not apply to BS operating in band n13, since it is already covered by the requirement in clause 6.6.5.5.1.2 |
| UTRA FDD Band XIV or | 758 – 768 MHz | -52 dBm | 1 MHz | This requirement does not apply to BS operating in band n14. |
| E-UTRA Band 14 or NR Band n14 | 788 – 798 MHz | -49 dBm | 1 MHz | This requirement does not apply to BS operating in band n14, since it is already covered by the requirement in clause 6.6.5.5.1.2 |
|  E-UTRA Band 17 | 734 – 746 MHz | -52 dBm | 1 MHz |  |
|  | 704 – 716 MHz | -49 dBm | 1 MHz | For NR BS operating in n29, it applies 1 MHz below the Band n29 downlink operating band (Note 5). |
| UTRA FDD Band XX or E-UTRA Band 20 or NR Band n20 | 791 – 821 MHz | -52 dBm | 1 MHz | This requirement does not apply to BS operating in band n20 or n28. |
|  | 832 – 862 MHz | -49 dBm | 1 MHz | This requirement does not apply to BS operating in band n20, since it is already covered by the requirement in clause 6.6.5.5.1.2. |
| UTRA FDD Band XXII or E-UTRA Band 22 | 3510 – 3590 MHz | -52 dBm | 1 MHz | This requirement does not apply to BS operating in band n48, n77 or n78. |
|  | 3410 – 3490 MHz | -49 dBm | 1 MHz | This is not applicable to BS operating in Band n77 or n78. |
| E-UTRA Band 24 or NR Band n24 | 1525 – 1559 MHz | -52 dBm | 1 MHz |  |
|  | 1626.5 – 1660.5 MHz | -49 dBm | 1 MHz |  |
| UTRA FDD Band XXV or | 1930 – 1995 MHz | -52 dBm | 1 MHz | This requirement does not apply to BS operating in band n2, n25 or n70. |
| E-UTRA Band 25 or NR band n25 | 1850 – 1915 MHz | -49 dBm | 1 MHz | This requirement does not apply to BS operating in band n25 since it is already covered by the requirement in clause 6.6.5.5.1.2. For BS operating in Band n2, it applies for 1910 MHz to 1915 MHz, while the rest is covered in clause 6.6.5.5.1.2. |
| UTRA FDD Band XXVI or | 859 – 894 MHz | -52 dBm | 1 MHz | This requirement does not apply to BS operating in band n5 or n26.  |
| E-UTRA Band 26 or NR Band n26 | 814 – 849 MHz | -49 dBm | 1 MHz | This requirement does not apply to BS operating in band n26 since it is already covered by the requirement in clause 6.6.5.5.1.2. For BS operating in Band n5, it applies for 814 MHz to 824 MHz, while the rest is covered in clause 6.6.5.5.1.2. |
| E-UTRA Band 27 | 852 – 869 MHz | -52 dBm | 1 MHz | This requirement does not apply to BS operating in Band n5. |
|  | 807 – 824 MHz | -49 dBm | 1 MHz | This requirement also applies to BS operating in Band n28, starting 4 MHz above the Band n28 downlink *operating band* (Note 5). |
| E-UTRA Band 28 or NR Band n28 | 758 – 803 MHz | -52 dBm | 1 MHz | This requirement does not apply to BS operating in band n20, n67 or n28. |
|  | 703 – 748 MHz | -49 dBm | 1 MHz | This requirement does not apply to BS operating in band n28, since it is already covered by the requirement in clause 6.6.5.5.1.2. For BS operating in band n67, it applies for 703 MHz to 736 MHz. |
| E-UTRA Band 29 or NR Band n29 | 717 – 728 MHz | -52 dBm | 1 MHz | This requirement does not apply to BS operating in Band n29 or n85. |
| E-UTRA Band 30 or NR Band n30 | 2350 – 2360 MHz | -52 dBm | 1 MHz | This requirement does not apply to BS operating in band n30. |
|  | 2305 – 2315 MHz | -49 dBm | 1 MHz | This requirement does not apply to BS operating in band n30, since it is already covered by the requirement in clause 6.6.5.5.1.2.  |
| E-UTRA Band 31 | 462.5 -467.5 MHz | -52 dBm | 1 MHz |  |
|  | 452.5 -457.5 MHz | -49 dBm | 1 MHz |  |
| UTRA FDD band XXXII or E-UTRA band 32 | 1452 – 1496 MHz | -52 dBm | 1 MHz | This requirement does not apply to BS operating in Band n50, n74, n75, n92 or n94. |
| UTRA TDD Band a) or E-UTRA Band 33 | 1900 – 1920 MHz | -52 dBm | 1 MHz |  |
| UTRA TDD Band a) or E-UTRA Band 34 or NR band n34 | 2010 – 2025 MHz | -52 dBm | 1 MHz | This requirement does not apply to BS operating in Band n34. |
| UTRA TDD Band b) or E-UTRA Band 35 | 1850 – 1910 MHz | -52 dBm | 1 MHz |  |
| UTRA TDD Band b) or E-UTRA Band 36 | 1930 – 1990 MHz | -52 dBm | 1 MHz | This requirement does not apply to BS operating in Band n2 or n25. |
| UTRA TDD Band c) or E-UTRA Band 37 | 1910 – 1930 MHz | -52 dBm | 1 MHz |  |
| UTRA TDD Band d) or E-UTRA Band 38 or NR Band n38 | 2570 – 2620 MHz | -52 dBm | 1 MHz | This requirement does not apply to BS operating in Band n38.  |
| UTRA TDD Band f) or E-UTRA Band 39 or NR band n39 | 1880 – 1920MHz | -52 dBm | 1 MHz | This requirement does not apply to BS operating in Band n39. |
| UTRA TDD Band e) or E-UTRA Band 40 or NR Band n40 | 2300 – 2400MHz | -52 dBm | 1 MHz | This requirement does not apply to BS operating in Bands n30 or n40. |
| E-UTRA Band 41 or NR Band n41 | 2496 – 2690 MHz | -52 dBm | 1 MHz | This is not applicable to BS operating in Band n41 or n53. |
| E-UTRA Band 42 | 3400 – 3600 MHz | -52 dBm | 1 MHz | This is not applicable to BS operating in Band n48, n77 or n78. |
| E-UTRA Band 43 | 3600 – 3800 MHz | -52 dBm | 1 MHz | This is not applicable to BS operating in Band n48, n77 or n78. |
| E-UTRA Band 44 | 703 – 803 MHz | -52 dBm | 1 MHz | This is not applicable to BS operating in Band n28. |
| E-UTRA Band 45 | 1447 – 1467 MHz | -52 dBm | 1 MHz |  |
| E-UTRA Band 46 or NR Band n46 | 5150 – 5925 MHz | -52 dBm | 1 MHz | This is not applicable to BS operating in Band n46 or n96. |
| E-UTRA Band 47 | 5855 – 5925 MHz | -52 dBm | 1 MHz |  |
| E-UTRA Band 48 or NR Band n48 | 3550 – 3700 MHz | -52 dBm | 1 MHz | This requirement does not apply to BS operating in Band n48, n77 and n78. |
| E-UTRA Band 50 or NR band n50 | 1432 – 1517 MHz | -52 dBm | 1 MHz | This requirement does not apply to BS operating in Band n50, n51, n74, n75, n76, n91, n92, n93 or n94. |
| E-UTRA Band 51 or NR Band n51 | 1427 – 1432 MHz | -52 dBm | 1 MHz | This requirement does not apply to BS operating in Band n50, n51, n75, n76, n91, n92, n93 or n94. |
| E-UTRA Band 53 or NR Band n53 | 2483.5 - 2495 MHz | -52 dBm | 1 MHz | This requirement does not apply to BS operating in Band n41, n53 or n90. |
| E-UTRA Band 65 or NR Band n65 | 2110 – 2200 MHz | -52 dBm | 1 MHz | This requirement does not apply to BS operating in Band n1 or n65  |
|  | 1920 – 2010 MHz | -49 dBm | 1 MHz | For BS operating in Band n1, it applies for 1980 MHz to 2010 MHz, while the rest is covered in clause 6.6.5.5.1.2.This requirement does not apply to BS operating in band n65, since it is already covered by the requirement in clause 6.6.5.5.1.2. |
| E-UTRA Band 66 or NR Band n66 | 2110 – 2200 MHz | -52 dBm | 1 MHz | This requirement does not apply to BS operating in band n66. |
|  | 1710 – 1780 MHz | -49 dBm | 1 MHz | This requirement does not apply to BS operating in band n66, since it is already covered by the requirement in clause 6.6.5.5.1.2. |
| E-UTRA Band 67 or NR Band n67 | 738 – 758 MHz | -52 dBm | 1 MHz | This requirement does not apply to BS operating in Band n28 or n67. |
| E-UTRA Band 68 | 753 -783 MHz | -52 dBm | 1 MHz | This requirement does not apply to BS operating in band n28. |
|  | 698-728 MHz | -49 dBm | 1 MHz | For BS operating in Band n28, this requirement applies between 698 MHz and 703 MHz, while the rest is covered in clause 6.6.5.5.1.2. |
| E-UTRA Band 69 | 2570 – 2620 MHz | -52 dBm | 1 MHz | This requirement does not apply to BS operating in Band n38. |
| E-UTRA Band 70 or NR Band n70 | 1995 – 2020 MHz | -52 dBm | 1 MHz | This requirement does not apply to BS operating in band n2, n25 or n70 |
|  | 1695 – 1710 MHz | -49 dBm | 1 MHz | This requirement does not apply to BS operating in band n70, since it is already covered by the requirement in clause 66.6.5.5.1.2. |
| E-UTRA Band 71 or NR Band n71 | 617 – 652 MHz | -52 dBm | 1 MHz | This requirement does not apply to BS operating in band n71 |
|  | 663 – 698 MHz | -49 dBm | 1 MHz | This requirement does not apply to BS operating in band n71, since it is already covered by the requirement in clause 6.6.5.5.1.2. |
| E-UTRA Band 72 | 461 – 466 MHz | -52 dBm | 1 MHz |  |
|  | 451 – 456 MHz | -49 dBm | 1 MHz |  |
| E-UTRA Band 74 or NR Band n74 | 1475 – 1518 MHz | -52 dBm | 1 MHz | This requirement does not apply to BS operating in Band n50, n75, n75, n92 or n94. |
|  | 1427 – 1470 MHz | -49 dBm | 1MHz | This requirement does not apply to BS operating in Band n50, n51, n74, n75, n76, n91, n92, n93 or n94. |
| E-UTRA Band 75 or NR Band n75 | 1432 – 1517 MHz | -52 dBm | 1 MHz | This requirement does not apply to BS operating in Band n50, n51, n74, n75, n76, n91, n92, n93 or n94. |
| E-UTRA Band 76 or NR Band n76 | 1427 – 1432 MHz | -52 dBm | 1 MHz | This requirement does not apply to BS operating in Band n50, n51, n75, n76, n91, n92, n93 or n94. |
| NR Band n77 | 3.3 – 4.2 GHz | -52 dBm | 1 MHz | This requirement does not apply to BS operating in Band n48, n77 or n78 |
| NR Band n78 | 3.3 – 3.8 GHz | -52 dBm | 1 MHz | This requirement does not apply to BS operating in Band n48, n77 or n78 |
| NR Band n79 | 4.4 – 5.0 GHz | -52 dBm | 1 MHz | This requirement does not apply to BS operating in Band n79 |
| NR Band n80 | 1710 – 1785 MHz | -49 dBm | 1 MHz | This requirement does not apply to BS operating in band n3, since it is already covered by the requirement in clause 6.6.5.5.1.2. |
| NR Band n81 | 880 – 915 MHz | -49 dBm | 1 MHz | This requirement does not apply to BS operating in band n8, since it is already covered by the requirement in clause 6.6.5.5.1.2. |
| NR Band n82 | 832 – 862 MHz | -49 dBm | 1 MHz | This requirement does not apply to BS operating in band n20, since it is already covered by the requirement in clause 6.6.5.5.1.2. |
| NR Band n83 | 703 – 748 MHz | -49 dBm | 1 MHz | This requirement does not apply to BS operating in band n28, since it is already covered by the requirement in clause 6.6.5.5.1.2. For BS operating in Band n67, it applies for 703 MHz to 736 MHz. |
| NR Band n84 | 1920 – 1980 MHz | -49 dBm | 1 MHz | This requirement does not apply to BS operating in band n1, since it is already covered by the requirement in clause 6.6.5.5.1.2. |
| E-UTRA Band 85 or NR Band n85 | 728 - 746 MHz | -52 dBm | 1 MHz | This requirement does not apply to BS operating in band n12 or n85. |
|  | 698 - 716 MHz | -49 dBm | 1 MHz | This requirement does not apply to BS operating in band n12 or n85, since it is already covered by the requirement in clause 6.6.5.5.1.2.For NR BS operating in n29, it applies 1 MHz below the Band n29 downlink operating band (Note 5). |
| NR Band n86 | 1710 – 1780 MHz | -49 dBm | 1 MHz | This requirement does not apply to BS operating in band n66, since it is already covered by the requirement in clause 6.6.5.5.1.2. |
| NR Band n89 | 824 – 849 MHz | -49 dBm | 1 MHz | This requirement does not apply to BS operating in band n5, since it is already covered by the requirement in clause 6.6.5.5.1.2. |
| NR Band n91 | 1427 – 1432 MHz | -52 dBm | 1 MHz | This requirement does not apply to BS operating in Band n50, n51, n75 or n76. |
|  | 832 – 862 MHz | -49 dBm | 1 MHz | This requirement does not apply to BS operating in band n20, since it is already covered by the requirement in clause 6.6.5.5.1.2. |
| NR Band n92 | 1432 – 1517 MHz | -52 dBm | 1 MHz | This requirement does not apply to BS operating in Band n50, n51, n74, n75 or n76. |
|  | 832 – 862 MHz | -49 dBm | 1 MHz | This requirement does not apply to BS operating in band n20, since it is already covered by the requirement in clause 6.6.5.5.1.2. |
| NR Band n93 | 1427 – 1432 MHz | -52 dBm | 1 MHz | This requirement does not apply to BS operating in Band n50, n51, n75 or n76. |
|  | 880 – 915 MHz | -49 dBm | 1 MHz | This requirement does not apply to BS operating in band n8, since it is already covered by the requirement in clause 6.6.5.5.1.2. |
| NR Band n94 | 1432 – 1517 MHz | -52 dBm | 1 MHz | This requirement does not apply to BS operating in Band n50, n51, n74, n75 or n76. |
|  | 880 – 915 MHz | -49 dBm | 1 MHz | This requirement does not apply to BS operating in band n8, since it is already covered by the requirement in clause 6.6.5.5.1.2. |
| NR Band n95 | 2010 – 2025 MHz | -52 dBm | 1 MHz |  |
| NR Band n96 | 5925 – 7125 MHz | -52 dBm | 1 MHz | This requirement does not apply to BS operating in Band n46 or n96. |
| NR Band n97 | 2300 – 2400MHz | -52 dBm | 1 MHz |  |
| NR Band n98 | 1880 – 1920MHz | -52 dBm | 1 MHz |  |
| NR Band n99 | 1626.5 – 1660.5 MHz | -49 dBm | 1 MHz | This requirement does not apply to BS operating in band n24, since it is already covered by the requirement in clause 6.6.5.5.1.2. |
| NR Band n100 | 919.4 – 925 MHz | -52 dBm | 1 MHz | This requirement does not apply to E-UTRA BS operating in Band n8 or n100. |
| 874.4 – 880 MHz | -49 dBm | 1 MHz | This requirement does not apply to BS operating in band n100, since it is already covered by the requirement in clause 6.6.5.5.1.2. |
| NR Band n101 | 1900 – 1910 MHz | -52 dBm | 1 MHz | This requirement does not apply to BS operating in Band n101. |

NOTE 1: As defined in the scope for spurious emissions in this clause, except for the cases where the noted requirements apply to a BS operating in Band n28, the co-existence requirements in table 6.6.5.5.1.3-1do not apply for the ΔfOBUE frequency range immediately outside the downlink *operating band* (see TS 38.104 [2], table 5.2-1). Emission limits for this excluded frequency range may be covered by local or regional requirements.

NOTE 2: Table 6.6.5.5.1.3-1 assumes that two *operating bands*, where the frequency ranges in TS 38.104 [2], table 5.2-1 would be overlapping, are not deployed in the same geographical area. For such a case of operation with overlapping frequency arrangements in the same geographical area, special co-existence requirements may apply that are not covered by the 3GPP specifications.

NOTE 3: TDD base stations deployed in the same geographical area, that are synchronized and use the same or adjacent *operating bands* can transmit without additional co-existence requirements. For unsynchronized base stations, special co-existence requirements may apply that are not covered by the 3GPP specifications.

NOTE 4: For Band n28 BS, specific solutions may be required to fulfil the spurious emissions limits for BS for co-existence with E-UTRA Band 27 UL *operating band*.

NOTE 5: For NR Band n29 BS, specific solutions may be required to fulfil the spurious emissions limits for NR BS for co-existence with UTRA Band XII, E-UTRA Band 12 or NR Band n12 UL operating band, E-UTRA Band 17 UL operating band or E-UTRA Band 85 UL or NR Band n85 UL operating band.

The following requirement may be applied for the protection of PHS. This requirement is also applicable at specified frequencies falling between ΔfOBUE below the lowest BS transmitter frequency of the downlink *operating band* and ΔfOBUE above the highest BS transmitter frequency of the downlink *operating band*. ΔfOBUE is defined in clause 6.6.1.

The *basic limits* for this requirement is:

Table 6.6.5.5.1.3-2: BS spurious emissions *basic limits* for BS for co-existence with PHS

|  |  |  |  |
| --- | --- | --- | --- |
| Frequency range | Basic limit | Measurement bandwidth | Note |
| 1884.5 – 1915.7 MHz | -41 dBm | 300 kHz | Applicable when co-existence with PHS system operating in 1884.5 - 1915.7 MHz  |

Table 6.6.5.5.1.3-3: Void

In certain regions, the following requirement may apply to BS operating in Band n50 and n75 within 1432-1452 MHz, and in Band n51 and Band n76. The *basic limits* are specified in table 6.6.5.5.1.3-4. This requirement is also applicable at the frequency range from ΔfOBUE below the lowest frequency of the BS downlink *operating band* up to ΔfOBUE above the highest frequency of the BS downlink *operating band*.

Table 6.6.5.5.1.3-4: Additional operating band unwanted emission *basic limits* for BS operating in Band n50 and n75 within 1432-1452 MHz, and in Band 51 and 76

|  |  |  |
| --- | --- | --- |
| Filter centre frequency, filter | Basic limit | Measurement bandwidth |
| Ffilter = 1413.5 MHz | -42 dBm | 27 MHz |

In certain regions, the following requirement may apply to BS operating in NR Band n50 within 1492-1517 MHz. The maximum level of emissions, measured on centre frequencies Ffilter with filter bandwidth according to table 6.6.5.5.1.3-5, shall be defined according to the *basic limits* PEM,n50,a and PEM,B50,b declared by the manufacturer.

Table 6.6.5.5.1.3-5: Operating band n50, n74 and n75 declared emission above 1518 MHz

|  |  |  |
| --- | --- | --- |
| Filter centre frequency, Ffilter | Declared emission *basic limit* (dBm) | Measurement bandwidth |
| 1518.5 MHz ≤ Ffilter ≤ 1519.5 MHz | PEM, n50,a | 1 MHz |
| 1520.5 MHz ≤ Ffilter ≤ 1558.5 MHz | PEM,n50,b | 1 MHz |

NOTE: The regional requirement, included in ECC/DEC/(17)06 [14], is defined in terms of EIRP, which is dependent on both the BS emissions at the antenna connector and the deployment (including antenna gain and feeder loss). The requirement defined above provides the characteristics of the base station needed to verify compliance with the regional requirement. The assessment of the EIRP level is described in TS 38.104 [2] annex E.

In certain regions, the following requirement shall be applied to BS operating in Band n13 and n14 to ensure that appropriate interference protection is provided to 700 MHz public safety operations. This requirement is also applicable at the frequency range from 10 MHz below the lowest frequency of the BS downlink operating band up to 10 MHz above the highest frequency of the BS downlink operating band.

The power of any spurious emission shall not exceed:

Table 6.6.5.5.1.3-6: BS Spurious emissions limits for protection of 700 MHz public safety operations

|  |  |  |  |
| --- | --- | --- | --- |
| Operating Band | Frequency range | Maximum Level | Measurement Bandwidth |
| n13 | 763 - 775 MHz | -46 dBm | 6.25 kHz |
| n13 | 793 - 805 MHz | -46 dBm | 6.25 kHz |
| n14 | 769 – 775 MHz | -46 dBm | 6.25 kHz |
| n14 | 799 – 805 MHz | -46 dBm | 6.25 kHz |

The following requirement may apply to NR BS operating in Band n30 in certain regions. This requirement is also applicable at the frequency range from 10 MHz below the lowest frequency of the BS downlink operating band up to 10 MHz above the highest frequency of the BS downlink operating band.

The power of any spurious emission shall not exceed:

Table 6.6.5.5.1.3-7: Additional NR BS Spurious emissions limits for Band n30

|  |  |  |
| --- | --- | --- |
| Frequency range | Basic limit | Measurement bandwidth |
| 2200 – 2345 MHz | -45 dBm |  |
| 2362.5 – 2365 MHz | -25 dBm |  |
| 2365 – 2367.5 MHz | -40 dBm | 1 MHz |
| 2367.5 – 2370 MHz | -42 dBm |  |
| 2370 – 2395 MHz | -45 dBm |  |

The following requirement may apply to BS operating in Band n48 in certain regions. The power of any spurious emission shall not exceed:

Table 6.6.5.2.3-8: Additional BS Spurious emissions limits for Band n48

|  |  |  |  |
| --- | --- | --- | --- |
| Frequency range | Maximum Level | Measurement Bandwidth (NOTE) | Note |
| 3530MHz – 3720MHz | -25dBm | 1 MHz | Applicable 10MHz from the assigned channel edge  |
| 3100MHz – 3530MHz3720MHz – 4200MHz | -40dBm | 1 MHz |  |

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

The following requirement shall be applied to BS operating in Band n26 to ensure that appropriate interference protection is provided to 800 MHz public safety operations. This requirement is also applicable at the frequency range from 10 MHz below the lowest frequency of the BS downlink operating band up to 10 MHz above the highest frequency of the BS downlink operating band.

The power of any spurious emission shall not exceed:

Table 6.6.5.2.3-9: BS Spurious emissions limits for protection of 800 MHz public safety operations

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Operating Band | Frequency range | Maximum Level | Measurement Bandwidth | Note |
| n26 | 851 - 859 MHz | -13 dBm | 100 kHz | Applicable for offsets > 37.5kHz from the channel edge |

The following requirement may apply to BS for Band n41 and n90 operation in Japan. This requirement is also applicable at the frequency range from ΔfOBUE below the lowest frequency of the BS downlink operating band up to ΔfOBUE above the highest frequency of the BS downlink operating band.

The power of any spurious emission shall not exceed:

Table 6.6.5.5.1.3-10: Additional BS Spurious emissions limits for Band n41 and n90

|  |  |  |
| --- | --- | --- |
| Frequency range | *Basic limit* | *Measurement Bandwidth* |
| 2505 MHz – 2535 MHz | -42 dBm | 1 MHz |
| NOTE: This requirement applies for carriers allocated within 2545-2645 MHz. |

The following requirement may apply to BS operating in 3.45-3.55 GHz in Band n77 in certain regions. Emissions shall not exceed the maximum levels specified in table 6.6.5.5.1.3-11.

Table 6.6.5.5.1.3-11: Additional BS spurious emissions limits for Band n77

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Channel bandwidth [MHz] | Frequency range [MHz] | Filter centre frequency, Ffilter [MHz] | Minimum requirement [dBm] | *Measurement bandwidth* [MHz] |
| All | 3430 – 34403560 – 3570 | 3430.5 ≤ Ffilter < 3439.53560.5 ≤ Ffilter < 3569.5 | -25 | 1 |
| All | ≤ 3430> 3570 | Ffilter < 3429.53570.5 ≤ Ffilter | -40 | 1 |

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

The following requirement may apply to BS operating in Band n100 in CEPT countries. The power of any spurious emission shall not exceed:

Table 6.6.5.5.1.3-12: Additional BS Spurious emissions limits for Band n100

|  |  |  |  |
| --- | --- | --- | --- |
| Frequency range | Maximum Level | *Measurement Bandwidth*  | Note |
| 880 MHz – 915 MHz | -62 dBm | 5 MHz | This limit is derived from ECC Decision (20)02 [25] assuming a 13 dBi maximum gain (antenna gain and losses). |

The following requirement may apply to BS operating in Band n101 in CEPT countries. The power of any spurious emission shall not exceed:

Table 6.6.5.5.1.3-13: Additional BS Spurious emissions limits for Band n101

|  |  |  |  |
| --- | --- | --- | --- |
| Frequency range | Maximum Level | *Measurement Bandwidth*  | Note |
| 1920 MHz – 1980 MHz | -57 dBm | 5 MHz | This limit is derived from ECC Decision (20)02 [25] assuming a 14 dBi maximum gain (antenna gain and losses). |

###### 6.6.5.5.1.4 Co-location with other base stations

These requirements may be applied for the protection of other BS receivers when GSM900, DCS1800, PCS1900, GSM850, CDMA850, UTRA FDD, UTRA TDD, E-UTRA and/or NR BS are co-located with a BS.

The requirements assume a 30 dB coupling loss between transmitter and receiver and are based on co-location with base stations of the same class.

The *basic limits* are in table 6.6.5.5.1.4-1 for a BS where requirements for co-location with a BS type listed in the first column apply, depending on the declared BS class (D.2). For a *multi-band connector*, the exclusions and conditions in the Note column of table 6.6.5.5.1.4-1 shall apply for each supported *operating band*.

Table 6.6.5.5.1.4-1: BS spurious emissions *basic limits* for BS co-located with another BS

| Type of co-located BS | Frequency range for | Basic limit | Measurement | Note |
| --- | --- | --- | --- | --- |
|  | co-location requirement | WA BS | MR BS | LA BS | bandwidth |  |
| GSM900 | 876-915 MHz | -98 dBm | -91 dBm | -70 dBm | 100 kHz |  |
| DCS1800 | 1710 – 1785 MHz | -98 dBm | -91 dBm | -80 dBm | 100 kHz |  |
| PCS1900 | 1850 – 1910 MHz | -98 dBm | -91 dBm | -80 dBm | 100 kHz |  |
| GSM850 or CDMA850 | 824 – 849 MHz | -98 dBm | -91 dBm | -70 dBm | 100 kHz |  |
| UTRA FDD Band I or E-UTRA Band 1 or NR Band n1 | 1920 – 1980 MHz | -96 dBm | -91 dBm | -88 dBm | 100 kHz |  |
| UTRA FDD Band II or E-UTRA Band 2 or NR Band n2 | 1850 – 1910 MHz | -96 dBm | -91 dBm | -88 dBm | 100 kHz |  |
| UTRA FDD Band III or E-UTRA Band 3 or NR Band n3 | 1710 – 1785 MHz | -96 dBm | -91 dBm | -88 dBm | 100 kHz |  |
| UTRA FDD Band IV or E-UTRA Band 4 | 1710 – 1755 MHz | -96 dBm | -91 dBm | -88 dBm | 100 kHz |  |
| UTRA FDD Band V or E-UTRA Band 5 or NR Band n5 | 824 – 849 MHz | -96 dBm | -91 dBm | -88 dBm | 100 kHz |  |
| UTRA FDD Band VI, XIX or E-UTRA Band 6, 19 | 830 – 845 MHz  | -96 dBm | -91 dBm | -88 dBm | 100 kHz |  |
| UTRA FDD Band VII or E-UTRA Band 7 or NR Band n7 | 2500 – 2570 MHz | -96 dBm | -91 dBm | -88 dBm | 100 kHz |  |
| UTRA FDD Band VIII or E-UTRA Band 8 or NR Band n8 | 880 – 915 MHz | -96 dBm | -91 dBm | -88 dBm | 100 kHz |  |
| UTRA FDD Band IX or E-UTRA Band 9 | 1749.9 – 1784.9 MHz | -96 dBm | -91 dBm | -88 dBm | 100 kHz |  |
| UTRA FDD Band X or E-UTRA Band 10 | 1710 – 1770 MHz | -96 dBm | -91 dBm | -88 dBm | 100 kHz |  |
| UTRA FDD Band XI or E-UTRA Band 11 | 1427.9 –1447.9 MHz | -96 dBm | -91 dBm | -88 dBm | 100 kHz | This is not applicable to BS operating in Band n50, n75, n91, n92, n93 or n94 |
| UTRA FDD Band XII orE-UTRA Band 12 or NR Band n12 | 699 – 716 MHz | -96 dBm | -91 dBm | -88 dBm | 100 kHz |  |
| UTRA FDD Band XIII orE-UTRA Band 13 or NR Band n13 | 777 – 787 MHz | -96 dBm | -91 dBm | -88 dBm | 100 kHz |  |
| UTRA FDD Band XIV orE-UTRA Band 14 or NR Band n14 | 788 – 798 MHz | -96 dBm | -91 dBm | -88 dBm | 100 kHz |  |
| E-UTRA Band 17 | 704 – 716 MHz | -96 dBm | -91 dBm | -88 dBm | 100 kHz |  |
| E-UTRA Band 18 or NR Band n18 | 815 – 830 MHz | -96 dBm | -91 dBm | -88 dBm | 100 kHz |  |
| UTRA FDD Band XX or E-UTRA Band 20 or NR Band n20 | 832 – 862 MHz | -96 dBm | -91 dBm | -88 dBm | 100 kHz |  |
| UTRA FDD Band XXI or E-UTRA Band 21 | 1447.9 – 1462.9 MHz | -96 dBm | -91 dBm | -88 dBm | 100 kHz | This is not applicable to BS operating in Band n50, n75, n92 or n94 |
| UTRA FDD Band XXII or E-UTRA Band 22 | 3410 – 3490 MHz | -96 dBm | -91 dBm | -88 dBm | 100 kHz | This is not applicable to BS operating in Band n48, n77 or n78 |
| E-UTRA Band 24 or NR Band n24 | 1626.5 – 1660.5 MHz | -96 dBm | -91 dBm | -88 dBm | 100 kHz |  |
| UTRA FDD Band XXV orE-UTRA Band 25 or NR Band n25 | 1850 – 1915 MHz | -96 dBm | -91 dBm | -88 dBm | 100 kHz |  |
| UTRA FDD Band XXVI orE-UTRA Band 26 or NR Band n26 | 814 – 849 MHz | -96 dBm | -91 dBm | -88 dBm | 100 kHz |  |
| E-UTRA Band 27 | 807 – 824 MHz  | -96 dBm | -91 dBm | -88 dBm | 100 kHz |  |
| E-UTRA Band 28 or NR Band n28 | 703 – 748 MHz | -96 dBm | -91 dBm | -88 dBm | 100 kHz |  |
| E-UTRA Band 30 or NR Band n30 | 2305 – 2315 MHz  | -96 dBm | -91 dBm | -88 dBm | 100 kHz |  |
| E-UTRA Band 31 | 452.5 -457.5 MHz | -96 dBm | -91 dBm | -88 dBm | 100 kHz |  |
| UTRA TDD Band a) or E-UTRA Band 33 | 1900 – 1920 MHz | -96 dBm | -91 dBm | -88 dBm | 100 kHz |  |
| UTRA TDD Band a) or E-UTRA Band 34 or NR band n34 | 2010 – 2025 MHz | -96 dBm | -91 dBm | -88 dBm | 100 kHz | This is not applicable to BS operating in Band n34 |
| UTRA TDD Band b) or E-UTRA Band 35 | 1850 – 1910 MHz | -96 dBm | -91 dBm | -88 dBm | 100 kHz |  |
| UTRA TDD Band b) or E-UTRA Band 36 | 1930 – 1990 MHz | -96 dBm | -91 dBm | -88 dBm | 100 kHz | This is not applicable to BS operating in Band n2 or band n25 |
| UTRA TDD Band c) or E-UTRA Band 37 | 1910 – 1930 MHz | -96 dBm | -91 dBm | -88 dBm | 100 kHz |  |
| UTRA TDD Band d) or E-UTRA Band 38 or NR Band n38 | 2570 – 2620 MHz | -96 dBm | -91 dBm | -88 dBm | 100 kHz | This is not applicable to BS operating in Band n38. |
| UTRA TDD Band f) or E-UTRA Band 39 or NR band n39 | 1880 – 1920MHz | -96 dBm | -91 dBm | -88 dBm | 100 kHz | This is not applicable to BS operating in Band n39 |
| UTRA TDD Band e) or E-UTRA Band 40 or NR Band n40 | 2300 – 2400MHz | -96 dBm | -91 dBm | -88 dBm | 100 kHz | This is not applicable to BS operating in Bands n30 or n40. |
| E-UTRA Band 41 or NR Band n41 | 2496 – 2690 MHz | -96 dBm | -91 dBm | -88 dBm | 100 kHz | This is not applicable to BS operating in Band n41 or n53 |
| E-UTRA Band 42 | 3400 – 3600 MHz | -96 dBm | -91 dBm | -88 dBm | 100 kHz | This is not applicable to BS operating in Band n48, n77 or n78 |
| E-UTRA Band 43 | 3600 – 3800 MHz | -96 dBm | -91 dBm | -88 dBm | 100 kHz | This is not applicable to BS operating in Band n48, n77 or n78 |
| E-UTRA Band 44 | 703 – 803 MHz | -96 dBm | -91 dBm | -88 dBm | 100 kHz | This is not applicable to BS operating in Band n28 |
| E-UTRA Band 45 | 1447 – 1467 MHz | -96 dBm | -91 dBm | -88 dBm | 100 kHz |  |
| E-UTRA Band 46 or NR Band n46 | 5150 – 5925 MHz | N/A | -91 dBm | -88 dBm | 100 kHz | This is not applicable to BS operating in Band n46 or n96 |
| E-UTRA Band 48 or NR Band n48 | 3550 – 3700 MHz | -96 dBm | -91 dBm | -88 dBm | 100 kHz | This is not applicable to BS operating in Band n48, n77 or n78 |
| E-UTRA Band 50 or NR band n50 | 1432 – 1517 MHz | -96 dBm | -91 dBm | -88 dBm | 100 kHz | This is not applicable to BS operating in Band n51, n74, n75, n91, n92, n93 or n94 |
| E-UTRA Band 51 or NR Band n51 | 1427 – 1432 MHz | N/A | N/A | -88 dBm | 100 kHz | This is not applicable to BS operating in Band n50, n74, n75, n76, n91, n92, n93 or n94 |
| E-UTRA Band 53 or NR Band n53 | 2483.5 – 2495 MHz | N/A | -91 dBm | -88 dBm | 100 kHz | This is not applicable to BS operating in Band n41, n53 or n90 |
| E-UTRA Band 65 or NR Band n65 | 1920 – 2010 MHz | -96 dBm | -91 dBm | -88 dBm | 100 kHz |  |
| E-UTRA Band 66 or NR Band n66 | 1710 – 1780 MHz | -96 dBm | -91 dBm | -88 dBm | 100 kHz |  |
| E-UTRA Band 68 | 698 – 728 MHz | -96 dBm | -91 dBm | -88 dBm | 100 kHz |  |
| E-UTRA Band 70 or NR Band n70 | 1695 – 1710 MHz | -96 dBm | -91 dBm | -88 dBm | 100 kHz |  |
| E-UTRA Band 71 or NR Band n71 | 663 – 698 MHz | -96 dBm | -91 dBm | -88 dBm | 100 kHz |  |
| E-UTRA Band 72 | 451 – 456 MHz | -96 dBm | -91 dBm | -88 dBm | 100 kHz |  |
| E-UTRA Band 74 or NR Band n74 | 1427 – 1470 MHz | -96 dBm | -91 dBm | -88 dBm | 100 kHz | This is not applicable to BS operating in Band n50, n51, n91, n92, n93 or n94 |
| NR Band n77 | 3.3 – 4.2 GHz | -96 dBm | -91 dBm | -88 dBm | 100 kHz | This is not applicable to BS operating in Band n48, n77 or n78 |
| NR Band n78 | 3.3 – 3.8 GHz | -96 dBm | -91 dBm | -88 dBm | 100 kHz | This is not applicable to BS operating in Band n48, n77 or n78 |
| NR Band n79 | 4.4 – 5.0 GHz | -96 dBm | -91 dBm | -88 dBm | 100 kHz |  |
| NR Band n80 | 1710 – 1785 MHz | -96 dBm | -91 dBm | -88 dBm | 100 kHz |  |
| NR Band n81 | 880 – 915 MHz | -96 dBm | -91 dBm | -88 dBm | 100 kHz |  |
| NR Band n82 | 832 – 862 MHz | -96 dBm | -91 dBm | -88 dBm | 100 kHz |  |
| NR Band n83 | 703 – 748 MHz | -96 dBm | -91 dBm | -88 dBm | 100 kHz |  |
| NR Band n84 | 1920 – 1980 MHz | -96 dBm | -91 dBm | -88 dBm | 100 kHz |  |
| E-UTRA Band 85 or NR Band n85 | 698 - 716 MHz | -96 dBm | -91 dBm | -88 dBm | 100 kHz |  |
| NR Band n86 | 1710 – 1780 MHz | -96 dBm | -91 dBm | -88 dBm | 100 kHz |  |
| NR Band n89 | 824 – 849 MHz | -96 dBm | -91 dBm | -88 dBm | 100 kHz |  |
| NR Band n91 | 832 – 862 MHz | N/A | N/A | -88 dBm | 100 kHz |  |
| NR Band n92 | 832 – 862 MHz | -96 dBm | -91 dBm | -88 dBm | 100 kHz |  |
| NR Band n93 | 880 – 915 MHz | N/A | N/A | -88 dBm | 100 kHz |  |
| NR Band n94 | 880 – 915 MHz | -96 dBm | -91 dBm | -88 dBm | 100 kHz |  |
| NR Band n95 | 2010 – 2025 MHz | -96 dBm | -91 dBm | -88 dBm | 100 kHz |  |
| NR Band n96 | 5925 – 7125 MHz | N/A | -90 dBm | -87 dBm | 100 kHz | This is not applicable to BS operating in Band n46 or n96 |
| NR Band n97 | 2300 – 2400MHz | -96 dBm | -91 dBm | -88 dBm | 100 kHz |  |
| NR Band n98 | 1880 – 1920MHz | -96 dBm | -91 dBm | -88 dBm | 100 kHz |  |
| NR Band n99 | 1626.5 – 1660.5 MHz | -96 dBm | -91 dBm | -88 dBm | 100 kHz |  |
| NR Band n100 | 874.4 – 880 MHz | -96 dBm | N/A | N/A | 100 kHz |  |
| NR Band n101 | 1900 – 1910 MHz | -96 dBm | N/A | N/A | 100 kHz |  |

NOTE 1: As defined in the scope for spurious emissions in this clause, the co-location requirements in table 6.6.5.5.1.4-1 do not apply for the frequency range extending ΔfOBUE immediately outside the BS transmit frequency range of a downlink *operating band* (see TS 38.104 [2] table 5.2-1). The current state-of-the-art technology does not allow a single generic solution for co-location with other system on adjacent frequencies for 30dB BS-BS minimum coupling loss. However, there are certain site-engineering solutions that can be used. These techniques are addressed in TR 25.942 [15].

NOTE 2: Table 6.6.5.5.1.4-1 assumes that two *operating bands*, where the corresponding BS transmit and receive frequency ranges in TS 38.104 [2] table 5.2-1 would be overlapping, are not deployed in the same geographical area. For such a case of operation with overlapping frequency arrangements in the same geographical area, special co-location requirements may apply that are not covered by the 3GPP specifications.

NOTE 3: Co-located TDD base stations that are synchronized and using the same or adjacent *operating band* can transmit without special co-locations requirements. For unsynchronized base stations, special co-location requirements may apply that are not covered by the 3GPP specifications.

--------------------------------------------------- NEXT CLAUSE ------------------------------------------------

##### 7.4.2.5.1 Additional requirement for Band n100

The following requirement may apply to BS operating in Band n100 in CEPT region. For the wanted and interfering signal coupled to the *antenna connector*, using the parameters in table 7.4.2.5.1-1, the throughput shall be ≥ 95 % of the *maximum throughput* of the reference measurement channel.

Table 7.4.2.5.1-1: Additional in-band blocking requirement for n100

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| BS channel bandwidth of the lowest/highest carrier received (MHz) | Wanted signal mean power (dBm) | Interfering signal mean power (dBm) | Interfering signal centre frequency minimum offset from the lower/upper Base Station RF Bandwidth edge or sub-block edge inside a sub-block gap (MHz) | Type of interfering signal |
| 5 | PREFSENS + 3 dB | -34 | 870.1 - 874.3  | [FFS] |
| NOTE: PREFSENS depends on the *BS channel bandwidth* as specified in table 7.2.5-1. |

#### ----------------------------------------- NEXT CLAUSE ----------------------------------------------------

#### 7.5.5.3 Additional requirement

##### 7.5.5.3.1 Additional requirement for Band n101

The following requirement may apply to BS operating in Band n101 in CEPT region. For the wanted and interfering signal coupled to the *antenna connector*, using the parameters in table 7.5.5.3.1-1, the throughput shall be ≥ 95 % of the *maximum throughput* of the reference measurement channel.

Table 7.5.5.3.1-1: Additional out-of-band blocking requirement for n101

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| BS channel bandwidth of the lowest/highest carrier received (MHz) | Wanted signal mean power (dBm) | Interfering signal mean power (dBm) | Interfering signal centre frequency minimum offset from the lower/upper Base Station RF Bandwidth edge or sub-block edge inside a sub-block gap (MHz) | Type of interfering signal |
| 5, 10 | PREFSENS +3 dB | -20 | 1807.5 - 1877.5 | 5 MHz LTE signal |
| NOTE: PREFSENS depends on the *BS channel bandwidth* as specified in table 7.2.5-1. |