**3GPP TSG- RAN WG4 Meeting # 102-e *R4-22xxxx***

**Electronic meeting, Feb 21 - Mar 3, 2022**

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| *CR-Form-v12.2* | | | | | | | | |
| **CHANGE REQUEST** | | | | | | | | |
|  | | | | | | | | |
|  | **38.104** | **CR** |  | **rev** |  | **Current version:** | **17.4.0** |  |
|  | | | | | | | | |
| *For* ***[HELP](http://www.3gpp.org/3G_Specs/CRs.htm" \l "_blank)*** *on using this form: comprehensive instructions can be found at  <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:*** | draft CR to TS38.104 the introduction of 6425-7125MHz | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Source to WG:*** | ZTE | | | | | | | | | |
| ***Source to TSG:*** | R4 | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Work item code:*** | NR\_6GHz | | | | |  | ***Date:*** | | | 2022-2-5 |
|  |  | | | |  | |  | | |  |
| ***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 can be found in 3GPP [TR 21.900](http://www.3gpp.org/ftp/Specs/html-info/21900.htm). | | | | | | | | *Use one of the following releases: Rel-8 (Release 8) Rel-9 (Release 9) Rel-10 (Release 10) Rel-11 (Release 11) … Rel-16 (Release 16) Rel-17 (Release 17) Rel-18 (Release 18) Rel-19 (Release 19)* | |
|  |  | | | | | | | | | |
| ***Reason for change:*** | | licensed band 6425-7125MHzis missing. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Summary of change:*** | | To introduce the licensed band 6425-7125MHz into the spec. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Consequences if not approved:*** | | licensed band 6425-7125MHz is missing. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Clauses affected:*** | | 5.2, 5.3.5, 5.4.2.3,5.4.3.3,6.6.3, 6.6.4, 6.6.5,7.2, 7.3, 7.4,7.6, 7.7,7.8, 9.7, 10.3, 10.4, 10.5, 10.7, 10.8, 10.9 | | | | | | | | |
|  | |  | | | | | | | | |
|  | | **Y** | **N** |  | | | |  | | |
| ***Other specs*** | | **X** |  | Other core specifications | | | | 37.104, 36.104, 38.133. | | |
| ***affected:*** | | **X** |  | Test specifications | | | | 38.141-1, 38.141-2 | | |
| ***(show related CRs)*** | |  | **X** | O&M Specifications | | | | TS/TR ... CR ... | | |
|  | |  | | | | | | | | |
| ***Other comments:*** | |  | | | | | | | | |
|  | |  | | | | | | | | |
| ***This CR's revision history:*** | |  | | | | | | | | |

#### < START OF CHANGE>

## 5.2 *Operating bands*

NR is designed to operate in the *operating bands* defined in table 5.2-1 and 5.2-2.

NB-IoT is designed to operate in the NR operating bands n1, n2, n3, n5, n7, n8, n12, n13, n14, n18, n20, n25, n26, n28, n41, n65, n66, n70, n71, n74, n85, n90 which are defined in Table 5.2-1.

Table 5.2-1: NR *operating bands* in FR1

|  |  |  |  |
| --- | --- | --- | --- |
| NR *operating band* | Uplink (UL) *operating band* BS receive / UE transmit  FUL,low – FUL,high | Downlink (DL) *operating band* BS transmit / UE receive  FDL,low – FDL,high | Duplex mode |
| n1 | 1920 MHz – 1980 MHz | 2110 MHz – 2170 MHz | FDD |
| n2 | 1850 MHz – 1910 MHz | 1930 MHz – 1990 MHz | FDD |
| n3 | 1710 MHz – 1785 MHz | 1805 MHz – 1880 MHz | FDD |
| n5 | 824 MHz – 849 MHz | 869 MHz – 894 MHz | FDD |
| n7 | 2500 MHz – 2570 MHz | 2620 MHz – 2690 MHz | FDD |
| n8 | 880 MHz – 915 MHz | 925 MHz – 960 MHz | FDD |
| n12 | 699 MHz – 716 MHz | 729 MHz – 746 MHz | FDD |
| n13 | 777 MHz – 787 MHz | 746 MHz – 756 MHz | FDD |
| n14 | 788 MHz – 798 MHz | 758 MHz – 768 MHz | FDD |
| n18 | 815 MHz – 830 MHz | 860 MHz – 875 MHz | FDD |
| n20 | 832 MHz – 862 MHz | 791 MHz – 821 MHz | FDD |
| n247 | 1626.5 MHz – 1660.5 MHz | 1525 MHz – 1559 MHz | FDD |
| n25 | 1850 MHz – 1915 MHz | 1930 MHz – 1995 MHz | FDD |
| n26 | 814 MHz – 849 MHz | 859 MHz – 894 MHz | FDD |
| n28 | 703 MHz – 748 MHz | 758 MHz – 803 MHz | FDD |
| n29 | N/A | 717 MHz – 728 MHz | SDL |
| n30 | 2305 MHz – 2315 MHz | 2350 MHz – 2360 MHz | FDD |
| n34 | 2010 MHz – 2025 MHz | 2010 MHz – 2025 MHz | TDD |
| n38 | 2570 MHz – 2620 MHz | 2570 MHz – 2620 MHz | TDD |
| n39 | 1880 MHz – 1920 MHz | 1880 MHz – 1920 MHz | TDD |
| n40 | 2300 MHz – 2400 MHz | 2300 MHz – 2400 MHz | TDD |
| n41 | 2496 MHz – 2690 MHz | 2496 MHz – 2690 MHz | TDD |
| n46 | 5150 MHz – 5925 MHz | 5150 MHz – 5925 MHz | TDD3 |
| n48 | 3550 MHz – 3700 MHz | 3550 MHz – 3700 MHz | TDD |
| n50 | 1432 MHz – 1517 MHz | 1432 MHz – 1517 MHz | TDD |
| n51 | 1427 MHz – 1432 MHz | 1427 MHz – 1432 MHz | TDD |
| n53 | 2483.5 MHz – 2495 MHz | 2483.5 MHz – 2495 MHz | TDD |
| n65 | 1920 MHz – 2010 MHz | 2110 MHz – 2200 MHz | FDD |
| n66 | 1710 MHz – 1780 MHz | 2110 MHz – 2200 MHz | FDD |
| n67 | N/A | 738 MHz – 758 MHz | SDL |
| n70 | 1695 MHz – 1710 MHz | 1995 MHz – 2020 MHz | FDD |
| n71 | 663 MHz – 698 MHz | 617 MHz – 652 MHz | FDD |
| n74 | 1427 MHz – 1470 MHz | 1475 MHz – 1518 MHz | FDD |
| n75 | N/A | 1432 MHz – 1517 MHz | SDL |
| n76 | N/A | 1427 MHz – 1432 MHz | SDL |
| n77 | 3300 MHz – 4200 MHz | 3300 MHz – 4200 MHz | TDD |
| n78 | 3300 MHz – 3800 MHz | 3300 MHz – 3800 MHz | TDD |
| n79 | 4400 MHz – 5000 MHz | 4400 MHz – 5000 MHz | TDD |
| n80 | 1710 MHz – 1785 MHz | N/A | SUL |
| n81 | 880 MHz – 915 MHz | N/A | SUL |
| n82 | 832 MHz – 862 MHz | N/A | SUL |
| n83 | 703 MHz – 748 MHz | N/A | SUL |
| n84 | 1920 MHz – 1980 MHz | N/A | SUL |
| n85 | 698 MHz – 716 MHz | 728 MHz – 746 MHz | FDD |
| n86 | 1710 MHz – 1780 MHz | N/A | SUL |
| n89 | 824 MHz – 849 MHz | N/A | SUL |
| n90 | 2496 MHz – 2690 MHz | 2496 MHz – 2690 MHz | TDD |
| n91 | 832 MHz – 862 MHz | 1427 MHz – 1432 MHz | FDD2 |
| n92 | 832 MHz – 862 MHz | 1432 MHz – 1517 MHz | FDD2 |
| n93 | 880 MHz – 915 MHz | 1427 MHz – 1432 MHz | FDD2 |
| n94 | 880 MHz – 915 MHz | 1432 MHz – 1517 MHz | FDD2 |
| n951 | 2010 MHz – 2025 MHz | N/A | SUL |
| n964 | 5925 MHz – 7125 MHz | 5925 MHz – 7125 MHz | TDD3 |
| n975 | 2300 MHz – 2400 MHz | N/A | SUL |
| n985 | 1880 MHz – 1920 MHz | N/A | SUL |
| n996 | 1626.5 MHz -1660.5 MHz | N/A | SUL |
| n104 | 6425 MHz – 7125 MHz | 6425 MHz – 7125 MHz | TDD |
| NOTE 1: This band is applicable in China only.  NOTE 2: Variable duplex operation does not enable dynamic variable duplex configuration by the network, and is used such that DL and UL frequency ranges are supported independently in any valid frequency range for the band.  NOTE 3: This band is restricted to operation with shared spectrum channel access as defined in [20].  NOTE 4: This band is applicable in the USA only subject to FCC Report and Order [FCC 20-51].  NOTE 5: The requirements for this band are applicable only where no other NR or E-UTRA TDD operating band(s) are used within the frequency range of this band in the same geographical area. For scenarios where other NR or E-UTRA TDD operating band(s) are used within the frequency range of this band in the same geographical area, special co-existence requirements may apply that are not covered by the 3GPP specifications.  NOTE 6: UL operation is restricted to 1627.5 – 1637.5 MHz and 1646.5 – 1656.5 MHz per FCC Order DA 20-48.  NOTE 7: DL operation is restricted to 1526-1536 MHz frequency range. UL operation is restricted to 1627.5 – 1637.5 MHz and 1646.5 – 1656.5 MHz per FCC Order DA 20-48. | | | |

#### < Next OF CHANGE>

### 5.3.5 *BS channel bandwidth* per *operating band*

The requirements in this specification apply to the combination of *BS channel bandwidths*, SCS and *operating bands* shown in table 5.3.5-1 for FR1 and in table 5.3.5-2 for FR2. The *transmission bandwidth configuration* in table 5.3.2-1 and table 5.3.2-2 shall be supported for each of the *BS channel bandwidths* within the BS capability. The *BS channel bandwidths* are specified for both the Tx and Rx path.

Table 5.3.5-1: *BS channel bandwidths* and SCS per *operating band* in FR1

| NR Band | SCS (kHz) | *BS channel bandwidth* (MHz) | | | | | | | | | | | | | | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 5 | 10 | 15 | 20 | 25 | 30 | 35 | 40 | 45 | 50 | 60 | 70 | 80 | 90 | 100 |
|  | 15 | 5 | 10 | 15 | 20 | 25 | 30 |  | 40 | 45 | 50 |  |  |  |  |  |
| n1 | 30 |  | 10 | 15 | 20 | 25 | 30 |  | 40 | 45 | 50 |  |  |  |  |  |
|  | 60 |  | 10 | 15 | 20 | 25 | 30 |  | 40 | 45 | 50 |  |  |  |  |  |
|  | 15 | 5 | 10 | 15 | 20 | 25 | 30 | 35 | 40 |  |  |  |  |  |  |  |
| n2 | 30 |  | 10 | 15 | 20 | 25 | 30 | 35 | 40 |  |  |  |  |  |  |  |
|  | 60 |  | 10 | 15 | 20 | 25 | 30 | 35 | 40 |  |  |  |  |  |  |  |
|  | 15 | 5 | 10 | 15 | 20 | 25 | 30 | 35 | 40 | 45 | 50 |  |  |  |  |  |
| n3 | 30 |  | 10 | 15 | 20 | 25 | 30 | 35 | 40 | 45 | 50 |  |  |  |  |  |
|  | 60 |  | 10 | 15 | 20 | 25 | 30 | 35 | 40 | 45 | 50 |  |  |  |  |  |
|  | 15 | 5 | 10 | 15 | 20 | 257 |  |  |  |  |  |  |  |  |  |  |
| n5 | 30 |  | 10 | 15 | 20 | 257 |  |  |  |  |  |  |  |  |  |  |
|  | 60 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  | 15 | 5 | 10 | 15 | 20 | 25 | 30 | 35 | 40 |  | 50 |  |  |  |  |  |
| n7 | 30 |  | 10 | 15 | 20 | 25 | 30 | 35 | 40 |  | 50 |  |  |  |  |  |
|  | 60 |  | 10 | 15 | 20 | 25 | 30 | 35 | 40 |  | 50 |  |  |  |  |  |
|  | 15 | 5 | 10 | 15 | 20 |  |  | 35 |  |  |  |  |  |  |  |  |
| n8 | 30 |  | 10 | 15 | 20 |  |  | 35 |  |  |  |  |  |  |  |  |
|  | 60 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  | 15 | 5 | 10 | 15 |  |  |  |  |  |  |  |  |  |  |  |  |
| n12 | 30 |  | 10 | 15 |  |  |  |  |  |  |  |  |  |  |  |  |
|  | 60 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| n13 | 15 | 5 | 10 |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 30 |  | 10 |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 60 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  | 15 | 5 | 10 |  |  |  |  |  |  |  |  |  |  |  |  |  |
| n14 | 30 |  | 10 |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  | 60 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  | 15 | 5 | 10 | 15 |  |  |  |  |  |  |  |  |  |  |  |  |
| n18 | 30 |  | 10 | 15 |  |  |  |  |  |  |  |  |  |  |  |  |
|  | 60 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  | 15 | 5 | 10 | 15 | 20 |  |  |  |  |  |  |  |  |  |  |  |
| n20 | 30 |  | 10 | 15 | 20 |  |  |  |  |  |  |  |  |  |  |  |
|  | 60 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  | 15 | 5 | 10 |  |  |  |  |  |  |  |  |  |  |  |  |  |
| n24 | 30 |  | 10 |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  | 60 |  | 10 |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  | 15 | 5 | 10 | 15 | 20 | 25 | 30 | 35 | 40 | 45 |  |  |  |  |  |  |
| n25 | 30 |  | 10 | 15 | 20 | 25 | 30 | 35 | 40 | 45 |  |  |  |  |  |  |
|  | 60 |  | 10 | 15 | 20 | 25 | 30 | 35 | 40 | 45 |  |  |  |  |  |  |
| n26 | 15 | 5 | 10 | 15 | 20 |  |  |  |  |  |  |  |  |  |  |  |
|  | 30 |  | 10 | 15 | 20 |  |  |  |  |  |  |  |  |  |  |  |
|  | 15 | 5 | 10 | 15 | 20 |  | 30 |  | 40 |  |  |  |  |  |  |  |
| n28 | 30 |  | 10 | 15 | 20 |  | 30 |  | 40 |  |  |  |  |  |  |  |
|  | 60 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  | 15 | 5 | 10 |  |  |  |  |  |  |  |  |  |  |  |  |  |
| n29 | 30 |  | 10 |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  | 60 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  | 15 | 5 | 10 |  |  |  |  |  |  |  |  |  |  |  |  |  |
| n30 | 30 |  | 10 |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  | 60 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  | 15 | 5 | 10 | 15 |  |  |  |  |  |  |  |  |  |  |  |  |
| n34 | 30 |  | 10 | 15 |  |  |  |  |  |  |  |  |  |  |  |  |
|  | 60 |  | 10 | 15 |  |  |  |  |  |  |  |  |  |  |  |  |
|  | 15 | 5 | 10 | 15 | 20 | 25 | 30 |  | 40 |  |  |  |  |  |  |  |
| n38 | 30 |  | 10 | 15 | 20 | 25 | 30 |  | 40 |  |  |  |  |  |  |  |
|  | 60 |  | 10 | 15 | 20 | 25 | 30 |  | 40 |  |  |  |  |  |  |  |
|  | 15 | 5 | 10 | 15 | 20 | 25 | 30 |  | 40 |  |  |  |  |  |  |  |
| n39 | 30 |  | 10 | 15 | 20 | 25 | 30 |  | 40 |  |  |  |  |  |  |  |
|  | 60 |  | 10 | 15 | 20 | 25 | 30 |  | 40 |  |  |  |  |  |  |  |
|  | 15 | 54 | 10 | 15 | 20 | 25 | 30 |  | 40 |  | 50 |  |  |  |  |  |
| n40 | 30 |  | 10 | 15 | 20 | 25 | 30 |  | 40 |  | 50 | 60 | 70 | 80 | 90 | 100 |
|  | 60 |  | 10 | 15 | 20 | 25 | 30 |  | 40 |  | 50 | 60 | 70 | 80 | 90 | 100 |
|  | 15 |  | 10 | 15 | 20 |  | 30 |  | 40 |  | 50 |  |  |  |  |  |
| n41 | 30 |  | 10 | 15 | 20 |  | 30 |  | 40 |  | 50 | 60 | 70 | 80 | 90 | 100 |
|  | 60 |  | 10 | 15 | 20 |  | 30 |  | 40 |  | 50 | 60 | 70 | 80 | 90 | 100 |
|  | 15 |  | 106 |  | 20 |  |  |  | 40 |  |  |  |  |  |  |  |
| n46 | 30 |  | 106 |  | 20 |  |  |  | 40 |  |  | 60 |  | 80 |  |  |
|  | 60 |  | 106 |  | 20 |  |  |  | 40 |  |  | 60 |  | 80 |  |  |
|  | 15 | 52 | 10 | 15 | 20 |  | 30 |  | 40 |  | 501 |  |  |  |  |  |
| n48 | 30 |  | 10 | 15 | 20 |  | 30 |  | 40 |  | 501 | 601 | 701 | 801 | 901 | 1001 |
|  | 60 |  | 10 | 15 | 20 |  | 30 |  | 40 |  | 501 | 601 | 701 | 801 | 901 | 1001 |
|  | 15 | 52 | 10 | 15 | 20 |  | 30 |  | 40 |  | 50 |  |  |  |  |  |
| n50 | 30 |  | 10 | 15 | 20 |  | 30 |  | 40 |  | 50 | 60 |  | 80 |  |  |
|  | 60 |  | 10 | 15 | 20 |  | 30 |  | 40 |  | 50 | 60 |  | 80 |  |  |
|  | 15 | 5 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| n51 | 30 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  | 60 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  | 15 | 5 | 10 |  |  |  |  |  |  |  |  |  |  |  |  |  |
| n53 | 30 |  | 10 |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  | 60 |  | 10 |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  | 15 | 5 | 10 | 15 | 20 |  |  |  |  |  | 50 |  |  |  |  |  |
| n65 | 30 |  | 10 | 15 | 20 |  |  |  |  |  | 50 |  |  |  |  |  |
|  | 60 |  | 10 | 15 | 20 |  |  |  |  |  | 50 |  |  |  |  |  |
|  | 15 | 5 | 10 | 15 | 20 | 25 | 30 | 35 | 40 | 45 |  |  |  |  |  |  |
| n66 | 30 |  | 10 | 15 | 20 | 25 | 30 | 35 | 40 | 45 |  |  |  |  |  |  |
|  | 60 |  | 10 | 15 | 20 | 25 | 30 | 35 | 40 | 45 |  |  |  |  |  |  |
|  | 15 | 5 | 10 | 15 | 20 |  |  |  |  |  |  |  |  |  |  |  |
| n67 | 30 |  | 10 | 15 | 20 |  |  |  |  |  |  |  |  |  |  |  |
|  | 60 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  | 15 | 5 | 10 | 15 | 20 | 25 |  |  |  |  |  |  |  |  |  |  |
| n70 | 30 |  | 10 | 15 | 20 | 25 |  |  |  |  |  |  |  |  |  |  |
|  | 60 |  | 10 | 15 | 20 | 25 |  |  |  |  |  |  |  |  |  |  |
|  | 15 | 5 | 10 | 15 | 20 | 25 | 30 | 35 |  |  |  |  |  |  |  |  |
| n71 | 30 |  | 10 | 15 | 20 | 25 | 30 | 35 |  |  |  |  |  |  |  |  |
|  | 60 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  | 15 | 5 | 10 | 15 | 20 |  |  |  |  |  |  |  |  |  |  |  |
| n74 | 30 |  | 10 | 15 | 20 |  |  |  |  |  |  |  |  |  |  |  |
|  | 60 |  | 10 | 15 | 20 |  |  |  |  |  |  |  |  |  |  |  |
|  | 15 | 5 | 10 | 15 | 20 | 25 | 30 |  | 40 |  | 50 |  |  |  |  |  |
| n75 | 30 |  | 10 | 15 | 20 | 25 | 30 |  | 40 |  | 50 |  |  |  |  |  |
|  | 60 |  | 10 | 15 | 20 | 25 | 30 |  | 40 |  | 50 |  |  |  |  |  |
|  | 15 | 5 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| n76 | 30 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  | 60 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  | 15 |  | 10 | 15 | 20 | 25 | 30 |  | 40 |  | 50 |  |  |  |  |  |
| n77 | 30 |  | 10 | 15 | 20 | 25 | 30 |  | 40 |  | 50 | 60 | 70 | 80 | 90 | 100 |
|  | 60 |  | 10 | 15 | 20 | 25 | 30 |  | 40 |  | 50 | 60 | 70 | 80 | 90 | 100 |
|  | 15 |  | 10 | 15 | 20 | 25 | 30 |  | 40 |  | 50 |  |  |  |  |  |
| n78 | 30 |  | 10 | 15 | 20 | 25 | 30 |  | 40 |  | 50 | 60 | 70 | 80 | 90 | 100 |
|  | 60 |  | 10 | 15 | 20 | 25 | 30 |  | 40 |  | 50 | 60 | 70 | 80 | 90 | 100 |
|  | 15 |  | 10 |  | 20 |  | 30 |  | 40 |  | 50 |  |  |  |  |  |
| n79 | 30 |  | 10 |  | 20 |  | 30 |  | 40 |  | 50 | 60 | 70 | 80 | 90 | 100 |
|  | 60 |  | 10 |  | 20 |  | 30 |  | 40 |  | 50 | 60 | 70 | 80 | 90 | 100 |
|  | 15 | 5 | 10 | 15 | 20 | 25 | 30 |  | 40 |  |  |  |  |  |  |  |
| n80 | 30 |  | 10 | 15 | 20 | 25 | 30 |  | 40 |  |  |  |  |  |  |  |
|  | 60 |  | 10 | 15 | 20 | 25 | 30 |  | 40 |  |  |  |  |  |  |  |
|  | 15 | 5 | 10 | 15 | 20 |  |  |  |  |  |  |  |  |  |  |  |
| n81 | 30 |  | 10 | 15 | 20 |  |  |  |  |  |  |  |  |  |  |  |
|  | 60 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  | 15 | 5 | 10 | 15 | 20 |  |  |  |  |  |  |  |  |  |  |  |
| n82 | 30 |  | 10 | 15 | 20 |  |  |  |  |  |  |  |  |  |  |  |
|  | 60 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  | 15 | 5 | 10 | 15 | 20 |  | 30 |  | 40 |  |  |  |  |  |  |  |
| n83 | 30 |  | 10 | 15 | 20 |  | 30 |  | 40 |  |  |  |  |  |  |  |
|  | 60 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  | 15 | 5 | 10 | 15 | 20 | 25 | 30 |  | 40 |  | 50 |  |  |  |  |  |
| n84 | 30 |  | 10 | 15 | 20 | 25 | 30 |  | 40 |  | 50 |  |  |  |  |  |
|  | 60 |  | 10 | 15 | 20 | 25 | 30 |  | 40 |  | 50 |  |  |  |  |  |
|  | 15 | 5 | 10 | 15 |  |  |  |  |  |  |  |  |  |  |  |  |
| n85 | 30 |  | 10 | 15 |  |  |  |  |  |  |  |  |  |  |  |  |
|  | 60 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  | 15 | 5 | 10 | 15 | 20 |  |  |  | 40 |  |  |  |  |  |  |  |
| n86 | 30 |  | 10 | 15 | 20 |  |  |  | 40 |  |  |  |  |  |  |  |
|  | 60 |  | 10 | 15 | 20 |  |  |  | 40 |  |  |  |  |  |  |  |
|  | 15 | 5 | 10 | 15 | 20 |  |  |  |  |  |  |  |  |  |  |  |
| n89 | 30 |  | 10 | 15 | 20 |  |  |  |  |  |  |  |  |  |  |  |
|  | 60 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  | 15 |  | 10 | 15 | 20 |  | 30 |  | 40 |  | 50 |  |  |  |  |  |
| n90 | 30 |  | 10 | 15 | 20 |  | 30 |  | 40 |  | 50 | 60 | 70 | 80 | 90 | 100 |
|  | 60 |  | 10 | 15 | 20 |  | 30 |  | 40 |  | 50 | 60 | 70 | 80 | 90 | 100 |
|  | 15 | 5 | 103 |  |  |  |  |  |  |  |  |  |  |  |  |  |
| n91 | 30 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  | 60 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  | 15 | 5 | 10 | 15 | 20 |  |  |  |  |  |  |  |  |  |  |  |
| n92 | 30 |  | 10 | 15 | 20 |  |  |  |  |  |  |  |  |  |  |  |
|  | 60 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  | 15 | 5 | 103 |  |  |  |  |  |  |  |  |  |  |  |  |  |
| n93 | 30 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  | 60 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  | 15 | 5 | 10 | 15 | 20 |  |  |  |  |  |  |  |  |  |  |  |
| n94 | 30 |  | 10 | 15 | 20 |  |  |  |  |  |  |  |  |  |  |  |
|  | 60 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  | 15 | 5 | 10 | 15 |  |  |  |  |  |  |  |  |  |  |  |  |
| n95 | 30 |  | 10 | 15 |  |  |  |  |  |  |  |  |  |  |  |  |
|  | 60 |  | 10 | 15 |  |  |  |  |  |  |  |  |  |  |  |  |
|  | 15 |  |  |  | 20 |  |  |  | 40 |  |  |  |  |  |  |  |
| n96 | 30 |  |  |  | 20 |  |  |  | 40 |  |  | 60 |  | 80 |  |  |
|  | 60 |  |  |  | 20 |  |  |  | 40 |  |  | 60 |  | 80 |  |  |
| n97 | 15 | 5 | 10 | 15 | 20 | 25 | 30 |  | 40 |  | 50 |  |  |  |  |  |
| 30 |  | 10 | 15 | 20 | 25 | 30 |  | 40 |  | 50 | 60 | 70 | 80 | 90 | 100 |
| 60 |  | 10 | 15 | 20 | 25 | 30 |  | 40 |  | 50 | 60 | 70 | 80 | 90 | 100 |
| n98 | 15 | 5 | 10 | 15 | 20 | 25 | 30 |  | 40 |  |  |  |  |  |  |  |
| 30 |  | 10 | 15 | 20 | 25 | 30 |  | 40 |  |  |  |  |  |  |  |
| 60 |  | 10 | 15 | 20 | 25 | 30 |  | 40 |  |  |  |  |  |  |  |
| n99 | 15 | 5 | 10 |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 30 |  | 10 |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 60 |  | 10 |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  | 15 |  |  |  | 20 |  | 30 |  | 40 |  | 50 |  |  |  |  |  |
| n104 | 30 |  |  |  | 20 |  | 30 |  | 40 |  | 50 | 60 | 70 | 80 | 90 | 100 |
|  | 60 |  |  |  | 20 |  | 30 |  | 40 |  | 50 | 60 | 70 | 80 | 90 | 100 |
| NOTE 1: For this bandwidth, the minimum requirements are restricted to operation when carrier is configured as an downlink SCell part of CA configuration.  NOTE 2: For this bandwidth, the minimum requirements are restricted to operation when carrier is configured as an SCell part of DC or CA configuration.  NOTE 3: For this bandwidth, it only applies for UL transmission.  NOTE 4: For this bandwidth, the minimum requirements are restricted to operation when carrier is configured as an SCell part of DC or CA configuration.  NOTE 5: Void.  NOTE 6: This bandwidth can only be applied in certain regions where the absence of non 3GPP technologies can be guaranteed on a long term basis in this version of specification.  NOTE 7: For this bandwidth, it only applies for DL transmission. | | | | | | | | | | | | | | | | |

#### < Next OF CHANGE>

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

The RF channel positions on the channel raster in each NR *operating band* are given through the applicable NR-ARFCN in table 5.4.2.3-1 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) | Uplink  range of NREF  (First – <Step size> – Last) | Downlink  range of NREF  (First – <Step size> – Last) |
| n1 | 100 | 384000 – <20> – 396000 | 422000 – <20> – 434000 |
| n2 | 100 | 370000 – <20> – 382000 | 386000 – <20> – 398000 |
| n3 | 100 | 342000 – <20> – 357000 | 361000 – <20> – 376000 |
| n5 | 100 | 164800 – <20> – 169800 | 173800 – <20> – 178800 |
| n7 | 100 | 500000 – <20> – 514000 | 524000 – <20> – 538000 |
| n8 | 100 | 176000 – <20> – 183000 | 185000 – <20> – 192000 |
| n12 | 100 | 139800 – <20> – 143200 | 145800 – <20> – 149200 |
| n13 | 100 | 155400 – <20> – 157400 | 149200 – <20> – 151200 |
| n14 | 100 | 157600 – <20> –159600 | 151600 – <20> – 153600 |
| n18 | 100 | 163000 – <20> – 166000 | 172000 – <20> – 175000 |
| n20 | 100 | 166400 – <20> – 172400 | 158200 – <20> – 164200 |
| 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 | 744000 – <1> – 794333 | 744000 – <1> – 794333 |
| 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 |
| n104 | [15] | [828334 – <1> – 875000] | [828334 – <1> – 875000] |
|  | [30] | [828334 – <2> – 875000] | [828334 – <2> – 875000] |
| 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} | | | |

#### < Next OF CHANGE>

#### 5.4.3.3 Synchronization raster entries for each operating band

The synchronization raster for each band is give in table 5.4.3.3-1. The distance between applicable GSCN entries is given by the <Step size> indicated in table 5.4.3.3-1 for FR1 and table 5.4.3.3-2 for FR2.

Table 5.4.3.3-1: Applicable SS raster entries per *operating band* (FR1)

|  |  |  |  |
| --- | --- | --- | --- |
| NR *operating band* | SS Block SCS | SS Block pattern (NOTE 1) | Range of GSCN  (First – <Step size> – Last) |
| n1 | 15 kHz | Case A | 5279 – <1> – 5419 |
| n2 | 15 kHz | Case A | 4829 – <1> – 4969 |
| n3 | 15 kHz | Case A | 4517 – <1> – 4693 |
| n5 | 15 kHz | Case A | 2177 – <1> – 2230 |
|  | 30 kHz | Case B | 2183 – <1> – 2224 |
| n7 | 15 kHz | Case A | 6554 – <1> – 6718 |
| n8 | 15 kHz | Case A | 2318 – <1> – 2395 |
| n12 | 15 kHz | Case A | 1828 – <1> – 1858 |
| n13 | 15 kHz | Case A | 1871 – <1> – 1885 |
| n14 | 15 kHz | Case A | 1901 – <1> – 1915 |
| n18 | 15kHz | CaseA | 2156 – <1> – 2182 |
| n20 | 15 kHz | Case A | 1982 – <1> – 2047 |
| n24 | 15 kHz | Case A | 3818 – <1> – 3892 |
| 30 kHz | Case B | 3824 – <1> – 3886 |
| n25 | 15 kHz | Case A | 4829 – <1> – 4981 |
| n26 | 15 kHz | Case A | 2153 – <1> – 2230 |
| n28 | 15 kHz | Case A | 1901 – <1> – 2002 |
| n29 | 15 kHz | Case A | 1798 – <1> – 1813 |
| n30 | 15 kHz | Case A | 5879 – <1> – 5893 |
| n34 | 15 kHz | Case A | NOTE 3 |
|  | 30 kHz | Case C | 5036 – <1> – 5050 |
| n38 | 15 kHz | Case A | NOTE 2 |
|  | 30 kHz | Case C | 6437 – <1> – 6538 |
| n39 | 15 kHz | Case A | NOTE 4 |
|  | 30 kHz | Case C | 4712 – <1> – 4789 |
| n40 | 30 kHz | Case C | 5762 – <1> – 5989 |
| n41 | 15 kHz | Case A | 6246 – <3> – 6717 |
|  | 30 kHz | Case C | 6252 – <3> – 6714 |
| n465 | 30 kHz | Case C | 8993 – <1> – 9530 |
| n48 | 30 kHz | Case C | 7884 – <1> – 7982 |
| n50 | 30 kHz | Case C | 3590 – <1> – 3781 |
| n51 | 15 kHz | Case A | 3572 – <1> – 3574 |
| n53 | 15 kHz | Case A | 6215 – <1> – 6232 |
| n65 | 15 kHz | Case A | 5279 – <1> – 5494 |
| n66 | 15 kHz | Case A | 5279 – <1> – 5494 |
|  | 30 kHz | Case B | 5285 – <1> – 5488 |
| n67 | 15 kHz | Case A | 1850 – <1> – 1888 |
| n70 | 15 kHz | Case A | 4993 – <1> – 5044 |
| n71 | 15 kHz | Case A | 1547 – <1> – 1624 |
| n74 | 15 kHz | Case A | 3692 – <1> – 3790 |
| n75 | 15 kHz | Case A | 3584 – <1> – 3787 |
| n76 | 15 kHz | Case A | 3572 – <1> – 3574 |
| n77 | 30 kHz | Case C | 7711 – <1> – 8329 |
| n78 | 30 kHz | Case C | 7711 – <1> – 8051 |
| n79 | 30 kHz | Case C | 8480 – <16> – 88807 |
|  |  |  | 8475 – <1> – 88848 |
| n85 | 15 kHz | Case A | 1826 – <1> – 1858 |
| n90 | 15 kHz | Case A | 6246 – <1> – 6717 |
|  | 30 kHz | Case C | 6252 – <1> – 6714 |
| n91 | 15 kHz | Case A | 3572 – <1> – 3574 |
| n92 | 15 kHz | Case A | 3584 – <1> – 3787 |
| n93 | 15 kHz | Case A | 3572 – <1> – 3574 |
| n94 | 15 kHz | Case A | 3584 – <1> – 3787 |
| n96**6** | 30 kHz | Case C | 9531 – <1> – 10363 |
| n104 | 30 kHz | Case C | [9884 – <4> – 10360] |
| NOTE 1: SS Block pattern is defined in clause 4.1 in TS 38.213 [10].  NOTE 2: The applicable SS raster entries are GSCN = {6432, 6443, 6457, 6468, 6479, 6493, 6507, 6518, 6532, 6543}  NOTE 3: The applicable SS raster entries are GSCN = {5032, 5043, 5054}  NOTE 4: The applicable SS raster entries are GSCN = {4707, 4715, 4718, 4729, 4732, 4743, 4747, 4754, 4761, 4768, 4772, 4782, 4786, 4793}  NOTE 5: The following GSCN are allowed for operation in band n46:  GSCN = {8996, 9010, 9024, 9038, 9051, 9065, 9079, 9093, 9107, 9121, 9218, 9232, 9246, 9260, 9274, 9288, 9301, 9315, 9329, 9343, 9357, 9371, 9385, 9402, 9416, 9430, 9444, 9458, 9472, 9485, 9499, 9513}.  NOTE 6: The following GSCN are allowed for operation in band n96:  GSCN = { 9548, 9562, 9576, 9590, 9603, 9617, 9631, 9645, 9659, 9673, 9687, 9701, 9714, 9728, 9742, 9756, 9770, 9784, 9798, 9812, 9826, 9840, 9853, 9867, 9881, 9895, 9909, 9923, 9937, 9951, 9964, 9978, 9992, 10006, 10020, 10034, 10048, 10062, 10076, 10090, 10103, 10117, 10131, 10145, 10159, 10173, 10187, 10201, 10214, 10228, 10242, 10256, 10270, 10284, 10298, 10312, 10325, 10339, 10353}.  NOTE 7: The SS raster entries apply for channel bandwidths larger than or equal to 40 MHz.  NOTE 8: The SS raster entries apply for channel bandwidths smaller than 40 MHz. | | | |

#### < Next OF CHANGE>

## 6.6 Unwanted emissions

### 6.6.1 General

Unwanted emissions consist of out-of-band emissions and spurious emissions according to ITU definitions [2]. In ITU terminology, out of band emissions are unwanted emissions immediately outside the *BS channel bandwidth* resulting from the modulation process and non-linearity in the transmitter but excluding spurious emissions. Spurious emissions are emissions which are caused by unwanted transmitter effects such as harmonics emission, parasitic emission, intermodulation products and frequency conversion products, but exclude out of band emissions.

The out-of-band emissions requirement for the BS transmitter is specified both in terms of Adjacent Channel Leakage power Ratio (ACLR) and *operating band* unwanted emissions (OBUE).

The maximum offset of the *operating band* unwanted emissions mask from the *operating band* edge is ΔfOBUE. The Operating band unwanted emissions define all unwanted emissions in each supported downlink *operating band* plus the frequency ranges ΔfOBUE above and ΔfOBUE below each band. Unwanted emissions outside of this frequency range are limited by a spurious emissions requirement.

The values of ΔfOBUE are defined in table 6.6.1-1 for the NR *operating bands*.

Table 6.6.1-1: Maximum offset of OBUE outside the downlink *operating band*

|  |  |  |
| --- | --- | --- |
| BS type | *Operating band* characteristics | ΔfOBUE (MHz) |
| *BS type 1-H* | FDL,high – FDL,low < 100 MHz | 10 |
|  | 100 MHz ≤ FDL,high – FDL,low ≤ 900 MHz | 40 |
|  |  |  |
| *BS type 1-C* | FDL,high – FDL,low ≤ 200 MHz | 10 |
|  | 200 MHz < FDL,high – FDL,low ≤ 900 MHz | 40 |
|  |  |  |

For band n46 and n96, the values of ΔfOBUE are defined in table 6.6.1-1a.

Table 6.6.1-1a: Maximum offset of OBUE outside the downlink *operating band* for band n46 and band n96

|  |  |
| --- | --- |
| ***Operating band*** | **ΔfOBUE (MHz)** |
| n46 | 40 |
| n96 | 50 |

For band n104, the values of ΔfOBUE are defined in table 6.6.1-1b.

Table 6.6.1-1b: Maximum offset of OBUE outside the downlink *operating band* for band n104

|  |  |  |
| --- | --- | --- |
| **BS type** | ***Operating band*** | **ΔfOBUE (MHz)** |
| *BS type 1-H* | n104 | [100] |
| *BS type 1-C* | n104 | [40] |

For *BS type 1-H* the unwanted emission requirements are applied per the *TAB connector TX min cell groups* for all the configurations supported by the BS. The *basic limits* and corresponding emissions scaling are defined in each relevant clause.

There is in addition a requirement for occupied bandwidth.

### 6.6.2 Occupied bandwidth

#### 6.6.2.1 General

The occupied bandwidth is the width of a frequency band such that, below the lower and above the upper frequency limits, the mean powers emitted are each equal to a specified percentage /2 of the total mean transmitted power. See also Recommendation ITU-R SM.328 [3].

The value of /2 shall be taken as 0.5%.

The occupied bandwidth requirement shall apply during the *transmitter ON period* for a single transmitted carrier. The minimum requirement below may be applied regionally. There may also be regional requirements to declare the occupied bandwidth according to the definition in the present clause.

For *BS type 1-C* this requirement shall be applied at the *antenna connector* supporting transmission in the *operating band*.

For *BS type 1-H* this requirement shall be appliedat each *TAB connector* supporting transmission in the *operating band.*

#### 6.6.2.2 Minimum requirement for *BS type 1-C* and *BS type 1-H*

The occupied bandwidth for each NR carrier shall be less than the *BS channel bandwidth*. For intra-band contiguous CA, the occupied bandwidth shall be less than or equal the *Aggregated BS Channel Bandwidth*.

For NB.IoT operation in NR in-band, the occupied bandwidth for each NR carrier with NB-IoT shall be less than than the *BS channel bandwidth*.

### 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,  38 dB (Note 4) |
|  | 2 x BWChannel | NR of same BW (Note 2) | Square (BWConfig) | 45 dB,  38dB  (Note 4) |
|  | 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.  NOTE 4: For BS operating in band n104, ACLR requirement 38dB applies. | | | | |

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,  38 dB (Note 5) |
|  | Wgap ≥ 20 (Note 3)  Wgap ≥ 50 (Note 4) | 7.5 MHz | 5 MHz NR (Note 2) | Square (BWConfig) | 45 dB,  38 dB (Note 5) |
| 5, 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,  38 dB (Note 5) |
|  | Wgap ≥ 80 (Note 4)  Wgap ≥ 50 (Note 3) | 30 MHz | 20 MHz NR (Note 2) | Square (BWConfig) | 45 dB,  38 dB (Note 5) |
| 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.  NOTE 5: For BS operating in band n104, ACLR requirement 38dB applies. | | | | | |

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). | | | | | |

The Cumulative Adjacent Channel Leakage power Ratio (CACLR) in a *sub-block gap* or the *Inter RF Bandwidth gap* is the ratio of:

a) the sum of the filtered mean power centred on the assigned channel frequencies for the two carriers adjacent to each side of the *sub-block gap* or the *Inter RF Bandwidth gap*, and

b) the filtered mean power centred on a frequency channel adjacent to one of the respective *sub-block* edges or *Base Station RF Bandwidth edges*.

The assumed filter for the adjacent channel frequency is defined in table 6.6.3.2-3 and the filters on the assigned channels are defined in table 6.6.3.2-4.

For operation in *non-contiguous spectrum* or multiple bands, the CACLR for NR carriers located on either side of the *sub-block gap* or the *Inter RF Bandwidth gap* shall be higher than the value specified in table 6.6.3.2-3.

The CACLR requirements in Table 6.6.3.2-3 apply to BS that supports NR, in any operating band except for band n46 and n96. The CACLR requirements for band n46 and n96 are in Table 6.6.3.2-3aa.

Table 6.6.3.2-3: Base Station CACLR limit

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| *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 | CACLR limit |
| 5, 10, 15, 20 | 5 ≤Wgap< 15 (Note 3)  5 ≤Wgap< 45 (Note 4) | 2.5 MHz | 5 MHz NR (Note 2) | Square (BWConfig) | 45 dB,  38 dB (Note 5) |
|  | 10 < Wgap< 20 (Note 3)  10 ≤Wgap< 50 (Note 4) | 7.5 MHz | 5 MHz NR (Note 2) | Square (BWConfig) | 45 dB,  38 dB (Note 5) |
| 25, 30, 35, 40, 45, 50, 60, 70, 80,90, 100 | 20 ≤Wgap< 60 (Note 4)  20 ≤Wgap< 30 (Note 3) | 10 MHz | 20 MHz NR (Note 2) | Square (BWConfig) | 45 dB,  38 dB (Note 5) |
|  | 40 < Wgap< 80 (Note 4)  40 ≤Wgap< 50 (Note 3) | 30 MHz | 20 MHz NR (Note 2) | Square (BWConfig) | 45 dB,  38 dB (Note 5) |
| 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.  NOTE 5: For BS operating in band n104, ACLR requirement 38dB applies. | | | | | |

For operation in non-contiguous spectrum for band n46 and n96, the CACLR for NR carriers located on either side of the *sub-block gap* shall be higher than the value specified in Table 6.6.3.2-3aa.

Table 6.6.3.2-3aa: Base Station CACLR limit 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 | CACLR limit |
| 10, 20, 40, 60, 80 | 20 ≤Wgap< 60 | 10 MHz | 20 MHz NR (Note 2) | Square (BWConfig) | 35 dB |
|  | 40 < 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). | | | | | |

The CACLR absolute *basic limit* is specified in table 6.6.3.2‑3a.

Table 6.6.3.2-3a: Base station CACLR absolute *basic limit*

|  |  |
| --- | --- |
| BS category / BS class | CACLR 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 |

Table 6.6.3.2-4: Filter parameters for the assigned channel

|  |  |
| --- | --- |
| RAT of the carrier adjacent to the *sub-block* or *Inter RF Bandwidth gap* | Filter on the assigned channel frequency and corresponding filter bandwidth |
| NR | NR of same BW with SCS that provides largest *transmission bandwidth configuration* |

#### 6.6.3.3 Minimum requirement for *BS type 1-C*

The ACLR (CACLR) absolute *basic limits* in table 6.6.3.2-2, 6.6.3.2-3a or the ACLR (CACLR) *limits* in table 6.6.3.2-1, 6.6.3.2-2a or 6.6.3.2-3, whichever is less stringent, shall apply for each *antenna connector*.

For Band n41 and n90 operation in Japan, absolute ACLR limits shall be applied to the sum of the absolute ACLR power over all *antenna connectors* for *BS type 1-C*.

#### 6.6.3.4 Minimum requirement for *BS type 1-H*

The ACLR (CACLR) absolute *basic limits* in table 6.6.3.2-2 + X, 6.6.3.2-3a + X (where X = 10log10(NTXU,countedpercell)) or the ACLR (CACLR) *limits* in table 6.6.3.2-1, 6.6.3.2-2a or 6.6.3.2-3, whichever is less stringent, shall apply for each *TAB connector TX min cell group*.

NOTE: Conformance to the *BS type 1-H* ACLR requirement can be demonstrated by meeting at least one of the following criteria as determined by the manufacturer:

1) The ratio of the sum of the filtered mean power measured on each *TAB connector* in the *TAB connector TX min cell group* at the assigned channel frequency to the sum of the filtered mean power measured on each *TAB connector* in the *TAB connector TX min cell group* at the adjacent channel frequency shall be greater than or equal to the ACLR *basic limit* of the BS. This shall apply for each *TAB connector TX min cell group*.

Or

2) The ratio of the filtered mean power at the *TAB connector* centred on the assigned channel frequency to the filtered mean power at this *TAB connector* centred on the adjacent channel frequency shall be greater than or equal to the ACLR *basic limit* of the BS for every *TAB connector* in the *TAB connector TX min cell group*, for each *TAB connector TX min cell group*.

In case the ACLR (CACLR) absolute *basic limit* of *BS type 1-H* are applied, the conformance can be demonstrated by meeting at least one of the following criteria as determined by the manufacturer:

1) The sum of the filtered mean power measured on each *TAB connector* in the *TAB connector TX min cell group* at the adjacent channel frequency shall be less than or equal to the ACLR (CACLR) absolute ba*sic limit* + X of the BS. This shall apply to each *TAB* connector *TX min cell group.*

Or

2) The filtered mean power at each *TAB connector* centred on the adjacent channel frequency shall be less than or equal to the ACLR (CACLR) absolute *basic limit* of the BS scaled by X -10log10(*n*) for every *TAB connector* in the *TAB connector TX min cell group*, for each *TAB connector TX min cell group*, where *n* is the number of *TAB connectors* in the *TAB connector TX min cell group.*

#### < Next OF CHANGE>

### 6.6.4 Operating band unwanted emissions

#### 6.6.4.1 General

Unless otherwise stated, the operating band unwanted emission (OBUE) limits in FR1 are defined from ΔfOBUE below the lowest frequency of each supported downlink *operating band* up to ΔfOBUE above the highest frequency of each supported downlink *operating band*. The values of ΔfOBUE are defined in table 6.6.1‑1 for the NR *operating bands*.

The requirements shall apply whatever the type of transmitter considered and for all transmission modes foreseen by the manufacturer’s specification. In addition, for a BS operating in *non-contiguous spectrum*, the requirements apply inside any *sub-block gap*. In addition, for a BS operating in multiple bands, the requirements apply inside any *Inter RF Bandwidth gap*.

*Basic limits* are specified in the tables below, where:

- Δf is the separation between the *channel edge* frequency and the nominal -3dB point of the measuring filter closest to the carrier frequency.

- f\_offset is the separation between the *channel edge* frequency and the centre of the measuring filter.

- f\_offsetmax is the offset to the frequency ΔfOBUE outside the downlink *operating band*, where ΔfOBUE is defined in table 6.6.1-1.

- Δfmax is equal to f\_offsetmax minus half of the bandwidth of the measuring filter.

For a *multi-band connector* inside any *Inter RF Bandwidth gaps* with Wgap < 2\*ΔfOBUE, a combined *basic* limit shall be applied which is the cumulative sum of the *basic limit*s specified at the *Base Station RF Bandwidth edges* on each side of the *Inter RF Bandwidth gap*. The *basic limit* for *Base Station RF Bandwidth edge* is specified in clauses 6.6.4.2.1 to 6.6.4.2.4 below, where in this case:

- Δf is the separation between the *Base Station RF Bandwidth edge* frequency and the nominal -3 dB point of the measuring filter closest to the *Base Station RF Bandwidth edge*.

- f\_offset is the separation between the *Base Station RF Bandwidth edge* frequency and the centre of the measuring filter.

- f\_offsetmax is equal to the *Inter RF Bandwidth gap* minus half of the bandwidth of the measuring filter.

- Δfmax is equal to f\_offsetmax minus half of the bandwidth of the measuring filter.

For a multi-carrier *single-band connector* or a *single-band connector* configured for intra-band contiguous or non-contiguous *carrier aggregation* the definitions above apply to the lower edge of the carrier transmitted at the *lowest carrier* frequency and the upper edge of the carrier transmitted at the *highest carrier* frequency within a specified frequency band.

- In case the *inter-band gap* between a supported downlink *operating band* with carrier(s) transmitted and a supported downlink *operating band* without any carrier transmitted is less than 2\*ΔfOBUE, f\_offsetmax shall be the offset to the frequency ΔfOBUE MHz outside the outermost edges of the two supported downlink *operating bands* and the operating band unwanted emission *basic limits* of the band where there are carriers transmitted, as defined in the tables of the present clause, shall apply across both downlink bands.

- In other cases, the operating band unwanted emission *basic limits* of the band where there are carriers transmitted, as defined in the tables of the present clause for the largest frequency offset (Δfmax), shall apply from ΔfOBUE MHz below the lowest frequency, up to ΔfOBUE MHz above the highest frequency of the supported downlink *operating band* without any carrier transmitted.

For a multicarrier *single-band connector* or a *single-band connector* configured for intra-band contiguous or non-contiguous *carrier aggregation* the definitions above apply to the lower edge of the carrier transmitted at the *lowest carrier* frequency and the upper edge of the carrier transmitted at the *highest carrier* frequency within a specified frequency band.

In addition inside any *sub-block gap* for a *single-band connector* operating in *non-contiguous spectrum*, a combined *basic* limit shall be applied which is the cumulative sum of the *basic limit*s specified for the adjacent *sub-blocks* on each side of the *sub-block gap*. The *basic limit* for each *sub-block* is specified in clauses 6.6.4.2.1 to 6.6.4.2.4 below, where in this case:

- Δf is the separation between the *sub-block* edge frequency and the nominal -3 dB point of the measuring filter closest to the *sub-block* edge.

- f\_offset is the separation between the *sub-block* edge frequency and the centre of the measuring filter.

- f\_offsetmax is equal to the *sub-block gap* bandwidth minus half of the bandwidth of the measuring filter.

- Δfmax is equal to f\_offsetmax minus half of the bandwidth of the measuring filter.

For Wide Area BS, the requirements of either clause 6.6.4.2.1 (Category A limits) or clause 6.6.4.2.2 (Category B limits) shall apply.

For Medium Range BS, the requirements in clause 6.6.4.2.3 shall apply (Category A and B).

For Local Area BS, the requirements of clause 6.6.4.2.4 shall apply (Category A and B).

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

The application of either Category A or Category B *basic limits* shall be the same as for Transmitter spurious emissions in clause 6.6.5.

#### 6.6.4.2 *Basic limits*

##### 6.6.4.2.1 *Basic limits* for Wide Area BS (Category A)

For BS operating in Bands n5, n8, n12, n13, n14, n18, n26, n28, n29, n71, n85, *basic limits* are specified in table 6.6.4.2.1‑1.

Table 6.6.4.2.1-1: Wide Area BS operating band unwanted emission limits   
(NR bands below 1 GHz) for Category A

|  |  |  |  |
| --- | --- | --- | --- |
| Frequency offset of measurement filter ‑3dB point, Δf | Frequency offset of measurement filter centre frequency, f\_offset | *Basic limits* (Note 1, 2) | *Measurement bandwidth* |
| 0 MHz ≤ Δf < 5 MHz | 0.05 MHz ≤ f\_offset < 5.05 MHz |  | 100 kHz |
| 5 MHz ≤ Δf <  min(10 MHz, Δfmax) | 5.05 MHz ≤ f\_offset <  min(10.05 MHz, f\_offsetmax) | -14 dBm | 100 kHz |
| 10 MHz ≤ Δf ≤ Δfmax | 10.05 MHz ≤ f\_offset < f\_offsetmax | -13 dBm (Note 3) | 100 kHz |
| NOTE 1: For a BS supporting *non-contiguous spectrum* operation within any *operating band*, the emission limits 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 ≥ 10MHz from both adjacent *sub-blocks* on each side of the *sub-block gap*, where the emission limits within *sub-block gaps* shall be -13 dBm/100 kHz.  NOTE 2: For a *multi-band connector* with *Inter RF Bandwidth gap* < 2\*ΔfOBUE the emission limits within the *Inter RF Bandwidth gap*s is calculated as a cumulative sum of contributions from adjacent *sub-blocks* or RF Bandwidth on each side of the *Inter RF Bandwidth gap*.  NOTE 3: The requirement is not applicable when Δfmax < 10 MHz. | | | |

For BS operating in Bands n1, n2, n3, n7, n24, n25, n30, n34, n38, n39, n40, n41, n48, n50, n65, n66, n70, n74, n75, n77, n78, n79, n90, n92, n94, *basic limits* are specified in table 6.6.4.2.1-2:

Table 6.6.4.2.1-2: Wide Area BS *operating band* unwanted emission limits   
(NR bands above 1 GHz) for Category A

|  |  |  |  |
| --- | --- | --- | --- |
| Frequency offset of measurement filter ‑3dB point, Δf | Frequency offset of measurement filter centre frequency, f\_offset | *Basic limits* (Note 1, 2) | *Measurement bandwidth* |
| 0 MHz ≤ Δf < 5 MHz | 0.05 MHz ≤ f\_offset < 5.05 MHz |  | 100 kHz |
| 5 MHz ≤ Δf <  min(10 MHz, Δfmax) | 5.05 MHz ≤ f\_offset <  min(10.05 MHz, f\_offsetmax) | -14 dBm | 100 kHz |
| 10 MHz ≤ Δf ≤ Δfmax | 10.5 MHz ≤ f\_offset < f\_offsetmax | -13 dBm (Note 3) | 1MHz |
| NOTE 1: For a BS supporting *non-contiguous spectrum* operation within any *operating band*, the emission limits 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 emission limits within *sub-block gaps* shall be ‑13 dBm/1 MHz.  NOTE 2: For a *multi-band connector* with *Inter RF Bandwidth gap* < 2\*ΔfOBUE the emission limits 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. | | | |

For BS operating in Bands n104 *basic limits* are specified in table 6.6.4.2.1-3:

Table 6.6.4.2.1-3: Wide Area BS operating band unwanted emission limits for band n104 for Category A

|  |  |  |  |
| --- | --- | --- | --- |
| Frequency offset of measurement filter ‑3dB point, Δf | Frequency offset of measurement filter centre frequency, f\_offset | Basic limits | Measurement bandwidth |
| 0 MHz ≤ Δf < 50 MHz | 0.05 MHz ≤ f\_offset < 50.05 MHz |  | 100 kHz |
| 50 MHz ≤ Δf <  min(100 MHz, Δfmax) | 50.05 MHz ≤ f\_offset <  min(100.05 MHz, f\_offsetmax) | -14 dBm | 100 kHz |
| 100 MHz ≤ Δf ≤ Δfmax | 100.5 MHz ≤ f\_offset < f\_offsetmax | -13 dBm (Note 3) | 1MHz |
| NOTE 1: For a BS supporting *non-contiguous spectrum* operation within any *operating band* the emission limits 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 ≥ 100MHz from both adjacent *sub-blocks* on each side of the *sub-block gap*, where the emission limits within *sub-block gaps* shall be ‑13 dBm/1 MHz.  NOTE 2: For a *multi-band connector* with *Inter RF Bandwidth gap* < 2\*ΔfOBUE the emission limits 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*.  NOTE 3: The requirement is not applicable when Δfmax < 100 MHz. | | | |

##### 6.6.4.2.2 Basic limits for Wide Area BS (Category B)

For Category B Operating band unwanted emissions, there are two options for the *basic limits* that may be applied regionally. Either the *basic limits* in clause 6.6.4.2.2.1 or clause 6.6.4.2.2.2 shall be applied.

6.6.4.2.2.1 Category B requirements (Option 1)

For BS operating in Bands n5, n8, n12, n20, n26, n28, n29, n67, n71, n85, the *basic limits* are specified in table 6.6.4.2.2.1-1:

Table 6.6.4.2.2.1-1: Wide Area BS operating band unwanted emission limits   
(NR bands below 1 GHz) for Category B

|  |  |  |  |
| --- | --- | --- | --- |
| Frequency offset of measurement filter ‑3dB point, Δf | Frequency offset of measurement filter centre frequency, f\_offset | *Basic limits* (Note 1, 2) | *Measurement bandwidth* |
| 0 MHz ≤ Δf < 5 MHz | 0.05 MHz ≤ f\_offset < 5.05 MHz |  | 100 kHz |
| 5 MHz ≤ Δf <  min(10 MHz, Δfmax) | 5.05 MHz ≤ f\_offset <  min(10.05 MHz, f\_offsetmax) | -14 dBm | 100 kHz |
| 10 MHz ≤ Δf ≤ Δfmax | 10.05 MHz ≤ f\_offset < f\_offsetmax | -16 dBm (Note 3) | 100 kHz |
| NOTE 1: For a BS supporting *non-contiguous spectrum* operation within any *operating band*, the emission limits 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 ≥ 10MHz from both adjacent *sub-blocks* on each side of the *sub-block gap*, where the emission limits within *sub-block gaps* shall be ‑16 dBm/100 kHz.  NOTE 2: For a *multi-band connector* with *Inter RF Bandwidth gap* < 2\*ΔfOBUE the emission limits 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. | | | |

For BS operating in Bands n1, n2, n3, n7, n25, n34, n38, n39, n40, n41, n48, n50, n65, n66, n70, n75, n77, n78, n79, n90, n92, n94, *basic limits* are specified in tables 6.6.4.2.2.1-2:

Table 6.6.4.2.2.1-2: Wide Area BS operating band unwanted emission limits   
(NR bands above 1 GHz) for Category B

|  |  |  |  |
| --- | --- | --- | --- |
| Frequency offset of measurement filter ‑3dB point, Δf | Frequency offset of measurement filter centre frequency, f\_offset | *Basic limits* (Note 1, 2) | *Measurement bandwidth* |
| 0 MHz ≤ Δf < 5 MHz | 0.05 MHz ≤ f\_offset < 5.05 MHz |  | 100 kHz |
| 5 MHz ≤ Δf <  min(10 MHz, Δfmax) | 5.05 MHz ≤ f\_offset <  min(10.05 MHz, f\_offsetmax) | -14 dBm | 100 kHz |
| 10 MHz ≤ Δf ≤ Δfmax | 10.5 MHz ≤ f\_offset < f\_offsetmax | -15 dBm (Note 3) | 1MHz |
| NOTE 1: For a BS supporting *non-contiguous spectrum* operation within any *operating band*, the emission limits 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 emission limits within *sub-block gaps* shall be ‑15 dBm/1 MHz.  NOTE 2: For a *multi-band connector* with *Inter RF Bandwidth gap* < 2\*ΔfOBUE the emission limits 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. | | | |

For BS operating in Band n104 *basic limits* are specified in tables 6.6.4.2.2.1-3:

Table 6.6.4.2.2.1-3: Wide Area BS operating band unwanted emission limits for band n104 for Category B

|  |  |  |  |
| --- | --- | --- | --- |
| Frequency offset of measurement filter ‑3dB point, Δf | Frequency offset of measurement filter centre frequency, f\_offset | Basic limits | Measurement bandwidth |
| 0 MHz ≤ Δf < 50 MHz | 0.05 MHz ≤ f\_offset < 50.05 MHz |  | 100 kHz |
| 50 MHz ≤ Δf <  min(100 MHz, Δfmax) | 50.05 MHz ≤ f\_offset <  min(100.05 MHz, f\_offsetmax) | -14 dBm | 100 kHz |
| 100 MHz ≤ Δf ≤ Δfmax | 100.5 MHz ≤ f\_offset < f\_offsetmax | -15 dBm (Note 3) | 1MHz |
| NOTE 1: For a BS supporting *non-contiguous spectrum* operation within any *operating band* the emission limits 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 ≥ 100MHz from both adjacent *sub-blocks* on each side of the *sub-block gap*, where the emission limits within *sub-block gaps* shall be ‑15 dBm/1 MHz.  NOTE 2: For a *multi-band connector* with *Inter RF Bandwidth gap* < 2\*ΔfOBUE the emission limits 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*.  NOTE 3: The requirement is not applicable when Δfmax < 100 MHz. | | | |

6.6.4.2.2.2 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.

For a BS operating in bands n1, n3, n8, n65 or *BS type 1-C* operating in bands n7 or n38, *basic limits* are specified in Table 6.6.4.2.2.2-1:

Table 6.6.4.2.2.2-1: 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 limits* (Note 1, 2) | *Measurement bandwidth* |
| 0 MHz ≤ Δf < 0.2 MHz | 0.015 MHz ≤ f\_offset < 0.215 MHz | -14 dBm | 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 | -26 dBm | 30 kHz |
| 1 MHz ≤ Δf ≤  min( 10 MHz, Δfmax) | 1.5 MHz ≤ f\_offset <  min(10.5 MHz, f\_offsetmax) | -13 dBm | 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. | | | |

##### 6.6.4.2.3 *Basic limits* for Medium Range BS (Category A and B)

For Medium Range BS, *basic limits* are specified in table 6.6.4.2.3-1 and table 6.6.4.2.3-2 in any operating band except for band n46 ,n96 and n104.

For the tables in this clause for *BS type 1-C* Prated,x = Prated,c,AC, and for *BS type 1-H* Prated,x = Prated,c,cell – 10\*log10(NTXU,countedpercell), and for *BS type 1-O* Prated,x = Prated,c,TRP – 9 dB.

Table 6.6.4.2.3-1: Medium Range BS *operating band* unwanted emission limits, 31< Prated,x ≤ 38 dBm

|  |  |  |  |
| --- | --- | --- | --- |
| Frequency offset of measurement filter ‑3dB point, Δf | Frequency offset of measurement filter centre frequency, f\_offset | *Basic limits* (Note 1, 2) | *Measurement bandwidth* |
| 0 MHz ≤ Δf < 5 MHz | 0.05 MHz ≤ f\_offset < 5.05 MHz |  | 100 kHz |
| 5 MHz ≤ Δf < min(10 MHz, Δfmax) | 5.05 MHz ≤ f\_offset < min(10.05 MHz, f\_offsetmax) | Prated,x - 60dB | 100 kHz |
| 10 MHz ≤ Δf ≤ Δfmax | 10.05 MHz ≤ f\_offset < f\_offsetmax | Min(Prated,x - 60dB, -25dBm) (Note 3) | 100 kHz |
| NOTE 1: For a BS supporting *non-contiguous spectrum* operation within any *operating band* the emission limits 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 ≥ 10MHz from both adjacent *sub-blocks* on each side of the *sub-block gap*, where the emission limits within *sub-block gaps* shall be Min(Prated,x -60dB, ‑25dBm)/100kHz.  NOTE 2: For a *multi-band connector* with *Inter RF Bandwidth gap* < 2\*ΔfOBUE the emission limits 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*.  NOTE 3: The requirement is not applicable when Δfmax < 10 MHz. | | | |

For BS operating in Band n104 *basic limits* are specified in Table 6.6.4.2.3-1a and Table 6.6.4.2.3-2a:

Table 6.6.4.2.3-1a. Medium Range BS *operating band* unwanted emission limits for band n104, 31< Prated,x ≤ 38 dBm

|  |  |  |  |
| --- | --- | --- | --- |
| Frequency offset of measurement filter ‑3dB point, Δf | Frequency offset of measurement filter centre frequency, f\_offset | *Basic limits* | *Measurement bandwidth* |
| 0 MHz ≤ Δf < 50 MHz | 0.05 MHz ≤ f\_offset < 50.05 MHz |  | 100 kHz |
| 50 MHz ≤ Δf <  min(100 MHz, Δfmax) | 50.05 MHz ≤ f\_offset <  min(100.05 MHz, f\_offsetmax) | Prated,x - 60dB | 100 kHz |
| 100 MHz ≤ Δf ≤ Δfmax | 100.5 MHz ≤ f\_offset < f\_offsetmax | Min(Prated,x - 60dB, -25dBm) (Note 3) | 100 kHz |
| NOTE 1: For a BS supporting *non-contiguous spectrum* operation within any *operating band* the emission limits 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 ≥ 100MHz from both adjacent *sub-blocks* on each side of the *sub-block gap*, where the emission limits within *sub-block gaps* shall be Min(Prated,x -60dB, ‑25dBm)/100kHz.  NOTE 2: For a *multi-band connector* with *Inter RF Bandwidth gap* < 2\*ΔfOBUE the emission limits 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*.  NOTE 3: The requirement is not applicable when Δfmax < 100 MHz. | | | |

Table 6.6.4.2.3-2: Medium Range BS operating band unwanted emission limits, Prated,x ≤ 31 dBm

|  |  |  |  |
| --- | --- | --- | --- |
| Frequency offset of measurement filter ‑3dB point, Δf | Frequency offset of measurement filter centre frequency, f\_offset | *Basic limits* (Note 1, 2) | *Measurement bandwidth* |
| 0 MHz ≤ Δf < 5 MHz | 0.05 MHz ≤ f\_offset < 5.05 MHz |  | 100 kHz |
| 5 MHz ≤ Δf < min(10 MHz, Δfmax) | 5.05 MHz ≤ f\_offset < min(10.05 MHz, f\_offsetmax) | -29 dBm | 100 kHz |
| 10 MHz ≤ Δf ≤ Δfmax | 10.05 MHz ≤ f\_offset < f\_offsetmax | -29 dBm (Note 3) | 100 kHz |
| NOTE 1: For a BS supporting *non-contiguous spectrum* operation within any *operating band* the emission limits 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 ≥ 10MHz from both adjacent *sub-blocks* on each side of the *sub-block gap*, where the emission limits within *sub-block gaps* shall be -29dBm/100kHz.  NOTE 2: For a *multi-band connector* with *Inter RF Bandwidth gap* < 2\*ΔfOBUE the emission limits 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*.  NOTE 3: The requirement is not applicable when Δfmax < 10 MHz. | | | |

Table 6.6.4.2.3-2a. Medium Range BS operating band unwanted emission limits for band n104, Prated,x ≤ 31 dBm

|  |  |  |  |
| --- | --- | --- | --- |
| Frequency offset of measurement filter ‑3dB point, Δf | Frequency offset of measurement filter centre frequency, f\_offset | *Basic limits* | *Measurement bandwidth* |
| 0 MHz ≤ Δf < 50 MHz | 0.05 MHz ≤ f\_offset < 50.05 MHz |  | 100 kHz |
| 50 MHz ≤ Δf <  min(100 MHz, Δfmax) | 50.05 MHz ≤ f\_offset <  min(100.05 MHz, f\_offsetmax) | -29 dBm | 100 kHz |
| 100 MHz ≤ Δf ≤ Δfmax | 100.5 MHz ≤ f\_offset < f\_offsetmax | -29 dBm | 100 kHz |
| NOTE 1: For a BS supporting *non-contiguous spectrum* operation within any *operating band* the emission limits 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 ≥ 100MHz from both adjacent *sub-blocks* on each side of the *sub-block gap*, where the emission limits within *sub-block gaps* shall be -29 dBm/100kHz.  NOTE 2: For a *multi-band connector* with *Inter RF Bandwidth gap* < 2\*ΔfOBUE the emission limits 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*.  NOTE 3: The requirement is not applicable when Δfmax < 100 MHz. | | | |

##### 6.6.4.2.4 *Basic limits* for Local Area BS (Category A and B)

For Local Area BS, *basic limits* are specified in table 6.6.4.2.4-1 except for n46, n96 and n104.

Table 6.6.4.2.4-1: Local Area BS operating band unwanted emission limits

|  |  |  |  |
| --- | --- | --- | --- |
| Frequency offset of measurement filter ‑3dB point, Δf | Frequency offset of measurement filter centre frequency, f\_offset | *Basic limits* (Note 1, 2) | *Measurement bandwidth* |
| 0 MHz ≤ Δf < 5 MHz | 0.05 MHz ≤ f\_offset < 5.05 MHz |  | 100 kHz |
| 5 MHz ≤ Δf < min(10 MHz, Δfmax) | 5.05 MHz ≤ f\_offset < min(10.05 MHz, f\_offsetmax) | -37 dBm | 100 kHz |
| 10 MHz ≤ Δf ≤ Δfmax | 10.05 MHz ≤ f\_offset < f\_offsetmax | -37 dBm (Note 10) | 100 kHz |
| NOTE 1: For a BS supporting *non-contiguous spectrum* operation within any *operating band* the emission limits 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 ≥ 10MHz from both adjacent *sub-blocks* on each side of the *sub-block gap*, where the emission limits within *sub-block gaps* shall be -37dBm/100kHz.  NOTE 2: For a *multi-band connector* with *Inter RF Bandwidth gap* < 2\*ΔfOBUE the emission limits 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*  NOTE 3: The requirement is not applicable when Δfmax < 10 MHz. | | | |

For BS operating in Band n104 *basic limits* are specified in Table 6.6.4.2.4-1a:

Table 6.6.4.2.4-1a. Local Area BS operating band unwanted emission limits for band n104

|  |  |  |  |
| --- | --- | --- | --- |
| Frequency offset of measurement filter ‑3dB point, Δf | Frequency offset of measurement filter centre frequency, f\_offset | *Basic limits* (Note 1, 2) | *Measurement bandwidth* |
| 0 MHz ≤ Δf < 50 MHz | 0.05 MHz ≤ f\_offset < 50.05 MHz |  | 100 kHz |
| 50 MHz ≤ Δf <  min(100 MHz, Δfmax) | 50.05 MHz ≤ f\_offset <  min(100.05 MHz, f\_offsetmax) | -37 dBm | 100 kHz |
| 100 MHz ≤ Δf ≤ Δfmax | 100.5 MHz ≤ f\_offset < f\_offsetmax | -37 dBm | 100 kHz |
| NOTE 1: For a BS supporting *non-contiguous spectrum* operation within any *operating band* the emission limits 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 ≥ 10MHz from both adjacent *sub-blocks* on each side of the *sub-block gap*, where the emission limits within *sub-block gaps* shall be -37dBm/100kHz.  NOTE 2: For a *multi-band connector* with *Inter RF Bandwidth gap* < 2\*ΔfOBUE the emission limits 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*  NOTE 3: The requirement is not applicable when Δfmax < 100 MHz. | | | |

#### < Next OF CHANGE>

### 6.6.5 Transmitter spurious emissions

#### 6.6.5.1 General

The transmitter spurious emission limits shall apply from 9 kHz to 12.75 GHz, excluding the frequency range from ΔfOBUE below the lowest frequency of each supported downlink *operating band*, up to ΔfOBUE above the highest frequency of each supported downlink *operating band*, where the ΔfOBUE is defined in table 6.6.1-1. For some *operating bands*, the upper limit is higher than 12.75 GHz in order to comply with the 5th harmonic limit of the downlink *operating band*, as specified in ITU-R recommendation SM.329 [2].

For a *multi-band connector*, for each supported *operating band* together with ΔfOBUE around the band is excluded from the transmitter spurious emissions requirement.

The requirements shall apply whatever the type of transmitter considered (single carrier or multi-carrier). It applies 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.

Unless otherwise stated, all requirements are measured as mean power (RMS).

#### 6.6.5.2 *Basic limits*

##### 6.6.5.2.1 General transmitter spurious emissions requirements

The *basic limits* of either table 6.6.5.2.1-1 (Category A limits) or table 6.6.5. 2.1-2 (Category B limits) shall apply. The application of either Category A or Category B limits shall be the same as for operating band unwanted emissions in clause 6.6.4.

Table 6.6.5.2.1-1: General BS transmitter spurious emission limits in FR1, Category A

|  |  |  |  |
| --- | --- | --- | --- |
| Spurious frequency range | *Basic limit* | *Measurement bandwidth* | Notes |
| 9 kHz – 150 kHz |  | 1 kHz | Note 1, Note 4 |
| 150 kHz – 30 MHz |  | 10 kHz | Note 1, Note 4 |
| 30 MHz – 1 GHz |  | 100 kHz | Note 1 |
| 1 GHz 12.75 GHz | -13 dBm | 1 MHz | Note 1, Note 2 |
| 12.75 GHz – 5th harmonic of the upper frequency edge of the DL *operating band* in GHz |  | 1 MHz | Note 1, Note 2, Note 3 |
| 12.75 GHz - 26 GHz | -13 dBm | 1 MHz | Note 1, Note 2, Note 5 |
| NOTE 1: *Measurement bandwidth*s as in ITU-R SM.329 [2], s4.1.  NOTE 2: Upper frequency as in ITU-R SM.329 [2], s2.5 table 1.  NOTE 3: This spurious frequency range applies only for *operating bands* for which the 5th harmonic of the upper frequency edge of the DL *operating band* is reaching beyond 12.75 GHz.  NOTE 4: This spurious frequency range applies only to *BS type 1-C* and *BS type 1-H*.  NOTE 5: Applies only for band n46 and n96.  NOTE 6: It’s not applicable for n104. | | | |

Table 6.6.5.2.1-2: General BS transmitter spurious emission limits in FR1, Category B

|  |  |  |  |
| --- | --- | --- | --- |
| Spurious frequency range | *Basic limit* | *Measurement bandwidth* | Notes |
| 9 kHz – 150 kHz |  | 1 kHz | Note 1, Note 4 |
| 150 kHz – 30 MHz | -36 dBm | 10 kHz | Note 1, Note 4 |
| 30 MHz – 1 GHz |  | 100 kHz | Note 1 |
| 1 GHz – 12.75 GHz |  | 1 MHz | Note 1, Note 2 |
| 12.75 GHz – 5th harmonic of the upper frequency edge of the DL *operating band* in GHz | -30 dBm | 1 MHz | Note 1, Note 2, Note 3 |
| 12.75 GHz - 26 GHz | - 30 dBm | 1 MHz | Note 1, Note 2, Note 5 |
| NOTE 1: *Measurement bandwidth*s as in ITU-R SM.329 [2], s4.1.  NOTE 2: Upper frequency as in ITU-R SM.329 [2], s2.5 table 1.  NOTE 3: This spurious frequency range applies only for *operating bands* for which the 5th harmonic of the upper frequency edge of the DL *operating band* is reaching beyond 12.75 GHz.  NOTE 4: This spurious frequency range applies only to *BS type 1-C* and *BS type 1-H*.  NOTE 5: Applies only for band n46 and n104. | | | |

##### 6.6.5.2.2 Protection of the BS receiver of own or different BS

This requirement shall be applied for NR FDD operation in order to prevent the receivers of the BSs being desensitised by emissions from a BS transmitter. It is measured at the transmit *antenna connector* for *BS type 1-C* or at the *TAB connector* for *BS type 1-H* for any type of BS which has common or separate Tx/Rx *antenna* *connectors* / *TAB connectors*.

The spurious emission *basic limits* are provided in table 6.6.5.2.2-1.

Table 6.6.5.2.2-1: BS spurious emissions *basic limits* for protection of the BS receiver

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| BS class | Frequency range | *Basic limits* | *Measurement bandwidth* | Note |
| Wide Area BS | FUL,low – FUL,high | -96 dBm | 100 kHz |  |
| Medium Range BS | FUL,low – FUL,high | -91 dBm | 100 kHz |  |
| Local Area BS | FUL,low – FUL,high | -88 dBm | 100 kHz |  |
| NOTE 1: For BS operating in band n104, the basic limit shall be increased by 1dB. | | | | |

##### 6.6.5.2.3 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 4.5.

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 spurious emission *basic limits* are provided in table 6.6.5.2.3 -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 6.6.5.2.3 -1 apply for each supported *operating band*.

Table 6.6.5.2.3-1: BS spurious emissions *basic* *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 limits* | *Measurement bandwidth* | Note |
| --- | --- | --- | --- | --- |
|  | 921 – 960 MHz | -57 dBm | 100 kHz | This requirement does not apply to BS operating in band n8 |
| GSM900 | 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 6.6.5.2.2. |
|  | 1805 – 1880 MHz | -47 dBm | 100 kHz | This requirement does not apply to BS operating in band n3. |
| DCS1800 | 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 6.6.5.2.2. |
|  | 1930 – 1990 MHz | -47 dBm | 100 kHz | This requirement does not apply to BS operating in band n2, n25 or band n70. |
| PCS1900 | 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 6.6.5.2.2. |
|  | 869 – 894 MHz | -57 dBm | 100 kHz | This requirement does not apply to BS operating in band n5 or n26. |
| GSM850 or CDMA850 | 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 6.6.5.2.2. |
| 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 6.6.5.2.2. |
| 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 6.6.5.2.2. |
| 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 6.6.5.2.2. |
| 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 6.6.5.2.2. |
| 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 6.6.5.2.2. |
| 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 6.6.5.2.2. |
| UTRA FDD Band VIII or | 925 – 960 MHz | -52 dBm | 1 MHz | This requirement does not apply to BS operating in band n8. |
| 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 6.6.5.2.2. |
| 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 6.6.5.2.2. |
| 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 6.6.5.2.2. |
| 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 6.6.5.2.2.  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 6.6.5.2.2. |
| 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 6.6.5.2.2. |
|  | 734 – 746 MHz | -52 dBm | 1 MHz |  |
| E-UTRA Band 17 | 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 | 791 – 821 MHz | -52 dBm | 1 MHz | This requirement does not apply to BS operating in band n20 or n28. |
| E-UTRA Band 20 or NR Band n2 | 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 6.6.5.2.2. |
| UTRA FDD Band XXII | 3510 – 3590 MHz | -52 dBm | 1 MHz | This requirement does not apply to BS operating in band n48, n77 or n78. |
| or E-UTRA Band 22 | 3410 – 3490 MHz | -49 dBm | 1 MHz | This requirement does not apply to BS operating in band n77 or n78. |
|  | 1525 – 1559 MHz | -52 dBm | 1 MHz | This requirement does not apply to BS operating in band n24. |
| E-UTRA Band 24 or NR Band n24 | 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 6.6.5.2.2. |
| 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 6.6.5.2.2. For BS operating in Band n2, it applies for 1910 MHz to 1915 MHz, while the rest is covered in clause 6.6.5.2.2. |
| 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 6.6.5.2.2. For BS operating in Band n5, it applies for 814 MHz to 824 MHz, while the rest is covered in clause 6.6.5.2.2. |
|  | 852 – 869 MHz | -52 dBm | 1 MHz | This requirement does not apply to BS operating in Band n5. |
| E-UTRA Band 27 | 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 | 758 – 803 MHz | -52 dBm | 1 MHz | This requirement does not apply to BS operating in band n20, n67 or n28. |
| NR Band 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 6.6.5.2.2.  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 | 2350 – 2360 MHz | -52 dBm | 1 MHz | This requirement does not apply to BS operating in band n30 |
| NR 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 6.6.5.2.2. |
|  | 462.5 – 467.5 MHz | -52 dBm | 1 MHz |  |
| E-UTRA Band 31 | 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 Band n30 or n40. |
| E-UTRA Band 41 or NR Band n41, n90 | 2496 – 2690 MHz | -52 dBm | 1 MHz | This is not applicable to BS operating in Band n41, n53 or [n90]. |
| 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 is not applicable to BS operating in Band n48, n77 or 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 | 2110 – 2200 MHz | -52 dBm | 1 MHz | This requirement does not apply to BS operating in band n1 or n65. |
| NR Band 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 6.6.5.2.2.  This requirement does not apply to BS operating in band n65, since it is already covered by the requirement in clause 6.6.5.2.2. |
| E-UTRA Band 66 or | 2110 – 2200 MHz | -52 dBm | 1 MHz | This requirement does not apply to BS operating in band n66. |
| NR 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 6.6.5.2.2. |
| 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 6.6.5.2.2. |
| 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 | 1995 – 2020 MHz | -52 dBm | 1 MHz | This requirement does not apply to BS operating in band n2, n25 or n70 |
| NR Band 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 6.6.5.2.2. |
| E-UTRA Band 71 or | 617 – 652 MHz | -52 dBm | 1 MHz | This requirement does not apply to BS operating in band n71 |
| NR 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 6.6.5.2.2. |
|  | 461 – 466 MHz | -52 dBm | 1 MHz |  |
| E-UTRA Band 72 | 451 – 456 MHz | -49 dBm | 1 MHz |  |
| E-UTRA Band 74 | 1475 – 1518 MHz | -52 dBm | 1 MHz | This requirement does not apply to BS operating in band n50, n74, n75, n92 or n94. |
| or NR Band n74 | 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 6.6.5.2.2. |
| 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 6.6.5.2.2. |
| 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 6.6.5.2.2. |
| 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 6.6.5.2.2.  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 6.6.5.2.2. |
| 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.  For NR BS operating in n29, it applies 1 MHz below the Band n29 downlink operating band (Note 5). |
|  | 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 6.6.5.2.2. |
| 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 6.6.5.2.2. |
| 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 6.6.5.2.2. |
|  | 1427 – 1432 MHz | -52 dBm | 1 MHz | This requirement does not apply to BS operating in Band n50, n51, n75 or n76. |
| NR Band n91 | 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. |
|  | 1432 – 1517 MHz | -52 dBm | 1 MHz | This requirement does not apply to BS operating in Band n50, n51, n74, n75 or n76. |
| NR Band n92 | 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. |
|  | 1427 – 1432 MHz | -52 dBm | 1 MHz | This requirement does not apply to BS operating in Band n50, n51, n75 or n76. |
| NR Band n93 | 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. |
|  | 1432 – 1517 MHz | -52 dBm | 1 MHz | This requirement does not apply to BS operating in Band n50, n51, n74, n75 or n76. |
| NR Band n94 | 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 6.6.5.2.2. |
| NR Band n104 | 6425 – 7125 MHz | -52 dBm | 1 MHz | This requirement does not apply to BS operating in Band n96, n102 or n104 . |

##### 6.6.5.2.4 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 6.6.5.2.4-1 for a BS where requirements for co-location with a BS type listed in the first column apply, depending on the declared Base Station class. For a *multi-band connector*, the exclusions and conditions in the Note column of table 6.6.5.2.4-1 shall apply for each supported *operating band*.

Table 6.6.5.2.4-1: BS spurious emissions *basic* limits for BS co-located with another BS

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Type of co-located BS | Frequency range for | *Basic limits* | | | 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 or  E-UTRA Band 12 or NR Band n12 | 699 – 716 MHz | -96 dBm | -91 dBm | -88 dBm | 100 kHz |  |
| UTRA FDD Band XIII or  E-UTRA Band 13 or NR Band n13 | 777 – 787 MHz | -96 dBm | -91 dBm | -88 dBm | 100 kHz |  |
| UTRA FDD Band XIV or  E-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 or  E-UTRA Band 25 or NR Band n25 | 1850 – 1915 MHz | -96 dBm | -91 dBm | -88 dBm | 100 kHz |  |
| UTRA FDD Band XXVI or  E-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 Band n30 or n40. |
| E-UTRA Band 41 or NR Band n41, n90 | 2496 – 2690 MHz | -96 dBm | -91 dBm | -88 dBm | 100 kHz | This is not applicable to BS operating in Band n41, n53 or [n90] |
| 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 85 | 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 n104 | 6425 – 7125 MHz | -95 dBm | -90 dBm | -87 dBm | 100 kHz | This requirement does not apply to BS operating in Band n96,n102 or n104. |

NOTE 1: As defined in the scope for spurious emissions in this clause, the co-location requirements in table 6.6.5.2.4-1 do not apply for the frequency range extending ΔfOBUE immediately outside the BS transmit frequency range of a downlink *operating band* (see 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 [4].

NOTE 2: Table 6.6.5.2.4-1 assumes that two *operating bands*, where the corresponding BS transmit and receive frequency ranges in 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 OF CHANGE>

## 7.2 Reference sensitivity level

### 7.2.1 General

The reference sensitivity power level PREFSENS is the minimum mean power received at the *antenna connector* for *BS type 1-C* or *TAB connector* for *BS type 1-H* at which a throughput requirement shall be met for a specified reference measurement channel.

### 7.2.2 Minimum requirements for *BS type 1-C* and *BS type 1-H*

The throughput shall be ≥ 95% of the maximum throughput of the reference measurement channel as specified in annex A.1 with parameters specified in table 7.2.2-1 for Wide Area BS, in table 7.2.2-2 for Medium Range BS and in table 7.2.2-3 for Local Area BS in any operating band except for band n46 and n96.

The throughput shall be ≥ 95% of the maximum throughput of the reference measurement channel as specified in annex A.1 with parameters specified in table 7.2.2-2a for Medium Range BS and in table 7.2.2-3a for Local Area BS, for band n46.

The throughput shall be ≥ 95% of the maximum throughput of the reference measurement channel as specified in annex A.1 with parameters specified in table 7.2.2-2b for Medium Range BS and in table 7.2.2-3b for Local Area BS, for band n96.

The reference sensitivity level requirements for NB-IoT are specified in TS 36.104 [13] clause 7.2.

Table 7.2.2-1: NR Wide Area BS reference sensitivity levels

|  |  |  |  |
| --- | --- | --- | --- |
| *BS channel bandwidth* (MHz) | Sub-carrier spacing (kHz) | Reference measurement channel | Reference sensitivity power level, PREFSENS  (dBm) (Note 6) |
| 5, 10, 15 | 15 | G-FR1-A1-1 (Note 1) | -101.7 |
|  |  | G-FR1-A1-10 (Note 3) | -101.7 (Note 2) |
| 10, 15 | 30 | G-FR1-A1-2 (Note 1) | -101.8 |
| 10, 15 | 60 | G-FR1-A1-3 (Note 1) | -98.9 |
| 20, 25, 30, 35, 40, 45, 50 | 15 | G-FR1-A1-4 (Note 1) | -95.3 |
|  |  | G-FR1-A1-11 (Note 4) | -95.3 (Note 2) |
| 20, 25, 30, 35, 40, 45, 50, 60, 70, 80, 90, 100 | 30 | G-FR1-A1-5 (Note 1) | -95.6 |
| 20, 25, 30, 35, 40, 45, 50, 60, 70, 80, 90, 100 | 60 | G-FR1-A1-6 (Note 1) | -95.7 |
| NOTE 1: PREFSENS is the power level of a single instance of the reference measurement channel. This requirement shall be met for each consecutive application of a single instance of the reference measurement channel mapped to disjoint frequency ranges with a width corresponding to the number of resource blocks of the reference measurement channel each, except for one instance that might overlap one other instance to cover the full *BS channel bandwidth*.  NOTE 2: The requirements apply to BS that supports NB-IoT operation in NR in-band.  NOTE 3: PREFSENS is the power level of a single instance of the reference measurement channel. This requirement shall be met for a single instance of G-FR1-A1-10 mapped to the 24 NR resource blocks adjacent to the NB-IoT PRB, and for each consecutive application of a single instance of G-FR1-A1-1 mapped to disjoint frequency ranges with a width of 25 resource blocks each.  NOTE 4: PREFSENS is the power level of a single instance of the reference measurement channel. This requirement shall be met for a single instance of G-FR1-A1-11 mapped to the 105 NR resource blocks adjacent to the NB-IoT PRB, and for each consecutive application of a single instance of G-FR1-A1-4 mapped to disjoint frequency ranges with a width of 106 resource blocks each.  NOTE 5: Void.  NOTE 6: For BS operating in band n104, PREFSENS shall be allowed with 1dB relaxation. | | | |

Table 7.2.2-2: NR Medium Range BS reference sensitivity levels

|  |  |  |  |
| --- | --- | --- | --- |
| *BS channel bandwidth* (MHz) | Sub-carrier spacing (kHz) | Reference measurement channel  (Note 5) | Reference sensitivity power level, PREFSENS  (dBm) (Note 6) |
| 5, 10, 15 | 15 | G-FR1-A1-1 (Note 1) | -96.7 |
|  |  | G-FR1-A1-10 (Note 3) | -96.7 (Note 2) |
| 10, 15 | 30 | G-FR1-A1-2 (Note 1) | -96.8 |
| 10, 15 | 60 | G-FR1-A1-3 (Note 1) | -93.9 |
| 20, 25, 30, 35, 40, 45, 50 | 15 | G-FR1-A1-4 (Note 1) | -90.3 |
|  |  | G-FR1-A1-11 (Note 4) | -90.3 (Note 2) |
| 20, 25, 30, 35, 40, 45, 50, 60, 70, 80, 90, 100 | 30 | G-FR1-A1-5 (Note 1) | -90.6 |
| 20, 25, 30, 35, 40, 45, 50, 60, 70, 80, 90, 100 | 60 | G-FR1-A1-6 (Note 1) | -90.7 |
| Note 1: PREFSENS is the power level of a single instance of the reference measurement channel. This requirement shall be met for each consecutive application of a single instance of the reference measurement channel mapped to disjoint frequency ranges with a width corresponding to the number of resource blocks of the reference measurement channel each, except for one instance that might overlap one other instance to cover the full *BS channel bandwidth*.  Note 2: The requirements apply to BS that supports NB-IoT operation in NR in-band.  Note 3: PREFSENS is the power level of a single instance of the reference measurement channel. This requirement shall be met for a single instance of G-FR1-A1-10 mapped to the 24 NR resource blocks adjacent to the NB-IoT PRB, and for each consecutive application of a single instance of G-FR1-A1-1 mapped to disjoint frequency ranges with a width of 25 resource blocks each.  Note 4: PREFSENS is the power level of a single instance of the reference measurement channel. This requirement shall be met for a single instance of G-FR1-A1-11 mapped to the 105 NR resource blocks adjacent to the NB-IoT PRB, and for each consecutive application of a single instance of G-FR1-A1-4 mapped to disjoint frequency ranges with a width of 106 resource blocks each.  Note 5: These reference measurement channels are not applied for band n46 and n96.  NOTE 6: For BS operating in band n104, PREFSENS shall be allowed with 1dB relaxation. | | | |

**Table 7.2.2-2a: NR Medium Range BS reference sensitivity levels for band n46**

|  |  |  |  |
| --- | --- | --- | --- |
| *BS channel bandwidth* (MHz) | Sub-carrier spacing (kHz) | Reference measurement channel | **Reference sensitivity power level, PREFSENS**  (dBm) |
| 10 | 15 | G-FR1-A1-12 (Note 2) | -103.0 |
|  | 30 | G-FR1-A1-13 (Note 2) | -100.7 |
|  | 60 | G-FR1-A1-3 (Note 1) | -93.9 |
| 20 | 15 | G-FR1-A1-14 (Note 2) | -100.1 |
|  | 30 | G-FR1-A1-15 (Note 2) | -97.1 |
|  | 60 | G-FR1-A1-6 (Note 1) | -90.7 |
| 40 | 15 | G-FR1-A1-16 (Note 2) | -97.0 |
|  | 30 | G-FR1-A1-17 (Note 2) | -94.0 |
|  | 60 | G-FR1-A1-6 (Note 1) | -90.7 |
| 60 | 30 | G-FR1-A1-18 (Note 2) | -92.4 |
|  | 60 | G-FR1-A1-6 (Note 1) | -90.7 |
| 80 | 30 | G-FR1-A1-19 (Note 2) | -91.1 |
|  | 60 | G-FR1-A1-6 (Note 1) | -90.7 |
| Note 1: PREFSENS is the power level of a single instance of the reference measurement channel. This requirement shall be met for each consecutive application of a single instance of the reference measurement channel mapped to disjoint frequency ranges with a width corresponding to the number of resource blocks of the reference measurement channel each, except for one instance that might overlap one other instance to cover the full *BS channel bandwidth*.  Note 2: PREFSENS is the power level of a single instance of the reference measurement channel. This requirement shall be met for each interleaved application of a single instance of the reference measurement channel mapped to disjoint frequency ranges with a width corresponding to the number of resource blocks of the reference measurement channel each, except for one instance that might overlap one other instance to cover the full *BS channel bandwidth*.  Note 3: For 60kHz SCS reference measurement channel is reused from Table 7.2.2-2.PREFSENS is the power level of a single instance of the reference measurement channel. This requirement shall be met for each single interlace of FRC G-FR1-A1-12 and G-FR1-A1-19, except for one instance that might overlap one other instance to cover the full *BS channel bandwidth*. | | | |

**Table 7.2.2-2b: NR Medium Range BS reference sensitivity levels for band n96**

|  |  |  |  |
| --- | --- | --- | --- |
| *BS channel bandwidth* (MHz) | Sub-carrier spacing (kHz) | Reference measurement channel | **Reference sensitivity power level, PREFSENS**  (dBm) |
| 20 | 15 | G-FR1-A1-14 (Note 2) | -99.1 |
|  | 30 | G-FR1-A1-15 (Note 2) | -96.1 |
|  | 60 | G-FR1-A1-6 (Note 1) | -89.7 |
| 40 | 15 | G-FR1-A1-16 (Note 2) | -96.0 |
|  | 30 | G-FR1-A1-17 (Note 2) | -93.0 |
|  | 60 | G-FR1-A1-6 (Note 1) | -89.7 |
| 60 | 30 | G-FR1-A1-18 (Note 2) | -91.4 |
|  | 60 | G-FR1-A1-6 (Note 1) | -89.7 |
| 80 | 30 | G-FR1-A1-19 (Note 2) | -90.1 |
|  | 60 | G-FR1-A1-6 (Note 1) | -89.7 |
| Note 1: PREFSENS is the power level of a single instance of the reference measurement channel. This requirement shall be met for each consecutive application of a single instance of the reference measurement channel mapped to disjoint frequency ranges with a width corresponding to the number of resource blocks of the reference measurement channel each, except for one instance that might overlap one other instance to cover the full *BS channel bandwidth*.  Note 2: PREFSENS is the power level of a single instance of the reference measurement channel. This requirement shall be met for each interleaved application of a single instance of the reference measurement channel mapped to disjoint frequency ranges with a width corresponding to the number of resource blocks of the reference measurement channel each, except for one instance that might overlap one other instance to cover the full *BS channel bandwidth*.  Note 3: For 60kHz SCS reference measurement channel is reused from Table 7.2.2-2. | | | |

Table 7.2.2-3: NR Local Area BS reference sensitivity levels

|  |  |  |  |
| --- | --- | --- | --- |
| *BS channel bandwidth* (MHz) | Sub-carrier spacing (kHz) | Reference measurement channel  (Note 5) | Reference sensitivity power level, PREFSENS  (dBm) (Note 6) |
| 5, 10, 15 | 15 | G-FR1-A1-1 (Note 1) | -93.7 |
|  |  | G-FR1-A1-10 (Note 3) | -93.7 (Note 2) |
| 10, 15 | 30 | G-FR1-A1-2 (Note 1) | -93.8 |
| 10, 15 | 60 | G-FR1-A1-3 (Note 1) | -90.9 |
| 20, 25, 30, 35, 40, 45, 50 | 15 | G-FR1-A1-4 (Note 1) | -87.3 |
|  |  | G-FR1-A1-11 (Note 4) | -87.3 (Note 2) |
| 20, 25, 30, 35, 40, 45, 50, 60, 70, 80, 90, 100 | 30 | G-FR1-A1-5 (Note 1) | -87.6 |
| 20, 25, 30, 35, 40, 45, 50, 60, 70, 80, 90, 100 | 60 | G-FR1-A1-6 (Note 1) | -87.7 |
| Note 1: PREFSENS is the power level of a single instance of the reference measurement channel. This requirement shall be met for each consecutive application of a single instance of the reference measurement channel mapped to disjoint frequency ranges with a width corresponding to the number of resource blocks of the reference measurement channel each, except for one instance that might overlap one other instance to cover the full *BS channel bandwidth*.  Note 2: The requirements apply to BS that supports NB-IoT operation in NR in-band.  Note 3: PREFSENS is the power level of a single instance of the reference measurement channel. This requirement shall be met for a single instance of G-FR1-A1-10 mapped to the 24 NR resource blocks adjacent to the NB-IoT PRB, and for each consecutive application of a single instance of G-FR1-A1-1 mapped to disjoint frequency ranges with a width of 25 resource blocks each.  Note 4: PREFSENS is the power level of a single instance of the reference measurement channel. This requirement shall be met for a single instance of G-FR1-A1-11 mapped to the 105 NR resource blocks adjacent to the NB-IoT PRB, and for each consecutive application of a single instance of G-FR1-A1-4 mapped to disjoint frequency ranges with a width of 106 resource blocks each.  Note 5: These reference measurement channels are not applied for band n46 and n96.  NOTE 6: For BS operating in band n104, PREFSENS shall be allowed with 1dB relaxation. | | | |

Table 7.2.2-3a: NR Local Area BS reference sensitivity levels for band n46

|  |  |  |  |
| --- | --- | --- | --- |
| *BS channel bandwidth* (MHz) | Sub-carrier spacing (kHz) | Reference measurement channel | **Reference sensitivity power level, PREFSENS**  (dBm) |
| 10 | 15 | G-FR1-A1-12 (Note 2) | -100.0 |
|  | 30 | G-FR1-A1-13 (Note 2) | -97.7 |
|  | 60 | G-FR1-A1-3 (Note 1) | -90.9 |
| 20 | 15 | G-FR1-A1-14 (Note 2) | -97.1 |
|  | 30 | G-FR1-A1-15 (Note 2) | -94.1 |
|  | 60 | G-FR1-A1-6 (Note 1) | -87.7 |
| 40 | 15 | G-FR1-A1-16 (Note 2) | -94.0 |
|  | 30 | G-FR1-A1-17 (Note 2) | -91.0 |
|  | 60 | G-FR1-A1-6 (Note 1) | -87.7 |
| 60 | 30 | G-FR1-A1-18 (Note 2) | -89.4 |
|  | 60 | G-FR1-A1-6 (Note 1) | -87.7 |
| 80 | 30 | G-FR1-A1-19 (Note 2) | -88.1 |
|  | 60 | G-FR1-A1-6 (Note 1) | -87.7 |
| Note 1: PREFSENS is the power level of a single instance of the reference measurement channel. This requirement shall be met for each consecutive application of a single instance of the reference measurement channel mapped to disjoint frequency ranges with a width corresponding to the number of resource blocks of the reference measurement channel each, except for one instance that might overlap one other instance to cover the full BS channel bandwidth.  Note 2: PREFSENS is the power level of a single instance of the reference measurement channel. This requirement shall be met for each interleaved application of a single instance of the reference measurement channel mapped to disjoint frequency ranges with a width corresponding to the number of resource blocks of the reference measurement channel each, except for one instance that might overlap one other instance to cover the full *BS channel bandwidth*.  Note 3: For 60kHz SCS reference measurement channel is reused from Table 7.2.2-3. | | | |

Table 7.2.2-3b: NR Local Area BS reference sensitivity levels for band n96

|  |  |  |  |
| --- | --- | --- | --- |
| *BS channel bandwidth* (MHz) | Sub-carrier spacing (kHz) | Reference measurement channel | **Reference sensitivity power level, PREFSENS**  (dBm) |
| 20 | 15 | G-FR1-A1-14 (Note 2) | -96.1 |
|  | 30 | G-FR1-A1-15 (Note 2) | -93.1 |
|  | 60 | G-FR1-A1-6 (Note 1) | -86.7 |
| 40 | 15 | G-FR1-A1-16 (Note 2) | -93.0 |
|  | 30 | G-FR1-A1-17 (Note 2) | -90.0 |
|  | 60 | G-FR1-A1-6 (Note 1) | -86.7 |
| 60 | 30 | G-FR1-A1-18 (Note 2) | -88.4 |
|  | 60 | G-FR1-A1-6 (Note 1) | -86.7 |
| 80 | 30 | G-FR1-A1-19 (Note 2) | -87.1 |
|  | 60 | G-FR1-A1-6 (Note 1) | -86.7 |
| Note 1: PREFSENS is the power level of a single instance of the reference measurement channel. This requirement shall be met for each consecutive application of a single instance of the reference measurement channel mapped to disjoint frequency ranges with a width corresponding to the number of resource blocks of the reference measurement channel each, except for one instance that might overlap one other instance to cover the full *BS channel bandwidth*.  Note 2: PREFSENS is the power level of a single instance of the reference measurement channel. This requirement shall be met for each interleaved application of a single instance of the reference measurement channel mapped to disjoint frequency ranges with a width corresponding to the number of resource blocks of the reference measurement channel each, except for one instance that might overlap one other instance to cover the full *BS channel bandwidth*.  Note 3: For 60kHz SCS reference measurement channel is reused from Table 7.2.2-3. | | | |

#### < Next OF CHANGE>

## 7.3 Dynamic range

### 7.3.1 General

The dynamic range is specified as a measure of the capability of the receiver to receive a wanted signal in the presence of an interfering signal at the *antenna connector* for *BS type 1-C* or *TAB connector* for *BS type 1-H* inside the received *BS channel bandwidth*. In this condition, a throughput requirement shall be met for a specified reference measurement channel. The interfering signal for the dynamic range requirement is an AWGN signal.

### 7.3.2 Minimum requirement for *BS type 1-C* and *BS type 1-H*

The throughput shall be ≥ 95% of the maximum throughput of the reference measurement channel as specified in annex A.2 with parameters specified in table 7.3.2-1 for Wide Area BS, in table 7.3.2-2 for Medium Range BS and in table 7.3.2-3 for Local Area BS in any operating band except for band n46 and n96.

The throughput shall be ≥ 95% of the maximum throughput of the reference measurement channel as specified in annex A.2 with parameters specified in table 7.3.2-2b for Medium Range BS and in table 7.3.2-3b for Local Area BS, for band n46.

The throughput shall be ≥ 95% of the maximum throughput of the reference measurement channel as specified in annex A.2 with parameters specified in table 7.3.2-2c for Medium Range BS and in table 7.3.2-3c for Local Area BS, for band n96.

For NB-IoT operation in NR in-band, the throughput shall be ≥ 95% of the maximum throughput of the reference measurement channel as specified in Annex A of TS 36.104 [13] with parameters specified in table 7.3.2-1a for Wide Area BS, in table 7.3.2-2a for Medium Range BS and in table 7.3.2-3a for Local Area BS.

Table 7.3.2-1: Wide Area BS dynamic range

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| *BS channel bandwidth* (MHz) | Subcarrier spacing (kHz) | Reference measurement channel | Wanted signal mean power (dBm) (Note 2) | Interfering signal mean power (dBm) / BWConfig (Note 2) | Type of interfering signal |
| 5 | 15 | G-FR1-A2-1 | -70.7 | -82.5 | AWGN |
|  | 30 | G-FR1-A2-2 | -71.4 |  |  |
| 10 | 15 | G-FR1-A2-1 | -70.7 | -79.3 | AWGN |
|  | 30 | G-FR1-A2-2 | -71.4 |  |  |
|  | 60 | G-FR1-A2-3 | -68.4 |  |  |
| 15 | 15 | G-FR1-A2-1 | -70.7 | -77.5 | AWGN |
|  | 30 | G-FR1-A2-2 | -71.4 |  |  |
|  | 60 | G-FR1-A2-3 | -68.4 |  |  |
| 20 | 15 | G-FR1-A2-4 | -64.5 | -76.2 | AWGN |
|  | 30 | G-FR1-A2-5 | -64.5 |  |  |
|  | 60 | G-FR1-A2-6 | -64.8 |  |  |
| 25 | 15 | G-FR1-A2-4 | -64.5 | -75.2 | AWGN |
|  | 30 | G-FR1-A2-5 | -64.5 |  |  |
|  | 60 | G-FR1-A2-6 | -64.8 |  |  |
| 30 | 15 | G-FR1-A2-4 | -64.5 | -74.4 | AWGN |
|  | 30 | G-FR1-A2-5 | -64.5 |  |  |
|  | 60 | G-FR1-A2-6 | -64.8 |  |  |
| 35 | 15 | G-FR1-A2-4 | -64.5 | -73.7 | AWGN |
|  | 30 | G-FR1-A2-5 | -64.5 |  |  |
|  | 60 | G-FR1-A2-6 | -64.8 |  |  |
| 40 | 15 | G-FR1-A2-4 | -64.5 | -73.1 | AWGN |
|  | 30 | G-FR1-A2-5 | -64.5 |  |  |
|  | 60 | G-FR1-A2-6 | -64.8 |  |  |
| 45 | 15 | G-FR1-A2-4 | -64.5 | -72.6 | AWGN |
|  | 30 | G-FR1-A2-5 | -64.5 |  |  |
|  | 60 | G-FR1-A2-6 | -64.8 |  |  |
| 50 | 15 | G-FR1-A2-4 | -64.5 | -72.1 | AWGN |
|  | 30 | G-FR1-A2-5 | -64.5 |  |  |
|  | 60 | G-FR1-A2-6 | -64.8 |  |  |
| 60 | 30 | G-FR1-A2-5 | -64.5 | -71.3 | AWGN |
|  | 60 | G-FR1-A2-6 | -64.8 |  |  |
| 70 | 30 | G-FR1-A2-5 | -64.5 | -70.7 | AWGN |
|  | 60 | G-FR1-A2-6 | -64.8 |  |  |
| 80 | 30 | G-FR1-A2-5 | -64.5 | -70.1 | AWGN |
|  | 60 | G-FR1-A2-6 | -64.8 |  |  |
| 90 | 30 | G-FR1-A2-5 | -64.5 | -69.5 | AWGN |
|  | 60 | G-FR1-A2-6 | -64.8 |  |  |
| 100 | 30 | G-FR1-A2-5 | -64.5 | -69.1 | AWGN |
|  | 60 | G-FR1-A2-6 | -64.8 |  |  |
| NOTE 1: The wanted signal mean power is the power level of a single instance of the corresponding reference measurement channel. This requirement shall be met for each consecutive application of a single instance of the reference measurement channel mapped to disjoint frequency ranges with a width corresponding to the number of resource blocks of the reference measurement channel each, except for one instance that might overlap one other instance to cover the full *BS channel bandwidth*.  NOTE 2: For BS operating in band n104, both wanted signal mean power and interfering signal mean power shall be increased by 1dB. | | | | | |

Table 7.3.2-1a: Wide Area BS dynamic range for NB-IoT operation in NR in-band

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| *BS channel bandwidth* (MHz) | Reference measurement channel | Wanted signal mean power (dBm) | Interfering signal mean power (dBm) / BWConfig | Type of interfering signal |
| 5 |  |  | -82.5 |  |
| 10 |  |  | -79.3 |  |
| 15 |  |  | -77.5 |  |
| 20 | FRC A15-1 in |  | -76.2 |  |
| 25 | Annex A.15 in | -99.7 | -75.2 | AWGN |
| 30 | TS 36.104 [13] |  | -74.4 |  |
| 35 |  |  | -73.7 |  |
| 40 |  |  | -73.1 |  |
| 45 |  |  | -72.6 |  |
| 50 |  |  | -72.1 |  |
| 5 |  |  | -82.5 |  |
| 10 |  |  | -79.3 |  |
| 15 |  |  | -77.5 |  |
| 20 | FRC A15-2 in |  | -76.2 |  |
| 25 | Annex A.15 in | -105.6 | -75.2 | AWGN |
| 30 | TS 36.104 [13] |  | -74.4 |  |
| 35 |  |  | -73.7 |  |
| 40 |  |  | -73.1 |  |
| 45 |  |  | -72.6 |  |
| 50 |  |  | -72.1 |  |

Table 7.3.2-2: Medium Range BS dynamic range

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| *BS channel bandwidth* (MHz) | Subcarrier spacing (kHz) | Reference measurement channel  (Note 2) | Wanted signal mean power (dBm) (Note 3) | Interfering signal mean power (dBm) / BWConfig  (Note 3) | Type of interfering signal |
| 5 | 15 | G-FR1-A2-1 | -65.7 | -77.5 | AWGN |
|  | 30 | G-FR1-A2-2 | -66.4 |  |  |
| 10 | 15 | G-FR1-A2-1 | -65.7 | -74.3 | AWGN |
|  | 30 | G-FR1-A2-2 | -66.4 |  |  |
|  | 60 | G-FR1-A2-3 | -63.4 |  |  |
| 15 | 15 | G-FR1-A2-1 | -65.7 | -72.5 | AWGN |
|  | 30 | G-FR1-A2-2 | -66.4 |  |  |
|  | 60 | G-FR1-A2-3 | -63.4 |  |  |
| 20 | 15 | G-FR1-A2-4 | -59.5 | -71.2 | AWGN |
|  | 30 | G-FR1-A2-5 | -59.5 |  |  |
|  | 60 | G-FR1-A2-6 | -59.8 |  |  |
| 25 | 15 | G-FR1-A2-4 | -59.5 | -70.2 | AWGN |
|  | 30 | G-FR1-A2-5 | -59.5 |  |  |
|  | 60 | G-FR1-A2-6 | -59.8 |  |  |
| 30 | 15 | G-FR1-A2-4 | -59.5 | -69.4 | AWGN |
|  | 30 | G-FR1-A2-5 | -59.5 |  |  |
|  | 60 | G-FR1-A2-6 | -59.8 |  |  |
| 35 | 15 | G-FR1-A2-4 | -59.5 | -68.7 | AWGN |
|  | 30 | G-FR1-A2-5 | -59.5 |  |  |
|  | 60 | G-FR1-A2-6 | -59.8 |  |  |
| 40 | 15 | G-FR1-A2-4 | -59.5 | -68.1 | AWGN |
|  | 30 | G-FR1-A2-5 | -59.5 |  |  |
|  | 60 | G-FR1-A2-6 | -59.8 |  |  |
| 45 | 15 | G-FR1-A2-4 | -59.5 | -67.6 | AWGN |
|  | 30 | G-FR1-A2-5 | -59.5 |  |  |
|  | 60 | G-FR1-A2-6 | -59.8 |  |  |
| 50 | 15 | G-FR1-A2-4 | -59.5 | -67.1 | AWGN |
|  | 30 | G-FR1-A2-5 | -59.5 |  |  |
|  | 60 | G-FR1-A2-6 | -59.8 |  |  |
| 60 | 30 | G-FR1-A2-5 | -59.5 | -66.3 | AWGN |
|  | 60 | G-FR1-A2-6 | -59.8 |  |  |
| 70 | 30 | G-FR1-A2-5 | -59.5 | -65.7 | AWGN |
|  | 60 | G-FR1-A2-6 | -59.8 |  |  |
| 80 | 30 | G-FR1-A2-5 | -59.5 | -65.1 | AWGN |
|  | 60 | G-FR1-A2-6 | -59.8 |  |  |
| 90 | 30 | G-FR1-A2-5 | -59.5 | -64.5 | AWGN |
|  | 60 | G-FR1-A2-6 | -59.8 |  |  |
| 100 | 30 | G-FR1-A2-5 | -59.5 | -64.1 | AWGN |
|  | 60 | G-FR1-A2-6 | -59.8 |  |  |
| NOTE 1: The wanted signal mean power is the power level of a single instance of the corresponding reference measurement channel. This requirement shall be met for each consecutive application of a single instance of the reference measurement channel mapped to disjoint frequency ranges with a width corresponding to the number of resource blocks of the reference measurement channel each, except for one instance that might overlap one other instance to cover the full *BS channel bandwidth*.  NOTE 2: These reference measurement channels are not applied for band n46 and n96.  NOTE 3: For BS operating in band n104, both wanted signal mean power and interfering signal mean power shall be increased by 1dB. | | | | | |

Table 7.3.2-2a: Medium Range BS dynamic range for NB-IoT operation in NR in-band

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| *BS channel bandwidth* (MHz) | Reference measurement channel | Wanted signal mean power (dBm) | Interfering signal mean power (dBm) / BWConfig | Type of interfering signal |
| 5 |  |  | -77.5 |  |
| 10 |  |  | -74.3 |  |
| 15 | FRC A15-1 in |  | -72.5 |  |
| 20 | Annex A.15 in | -94.7 | -71.2 | AWGN |
| 25 | TS 36.104 [13] |  | -70.2 |  |
| 30 |  |  | -69.4 |  |
| 35 |  |  | -68.7 |  |
| 40 |  |  | -68.1 |  |
| 45 |  |  | -67.6 |  |
| 50 |  |  | -67.1 |  |
| 5 |  |  | -77.5 |  |
| 10 |  |  | -74.3 |  |
| 15 | FRC A15-2 in |  | -72.5 |  |
| 20 | Annex A.15 in | -100.6 | -71.2 | AWGN |
| 25 | TS 36.104 [13] |  | -70.2 |  |
| 30 |  |  | -69.4 |  |
| 35 |  |  | -68.7 |  |
| 40 |  |  | -68.1 |  |
| 45 |  |  | -67.6 |  |
| 50 |  |  | -67.1 |  |

Table 7.3.2-2b: Medium Range BS dynamic range for band n46

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| *BS channel bandwidth* (MHz) | Subcarrier spacing (kHz) | Reference measurement channel | Wanted signal mean power (dBm) | Interfering signal mean power (dBm) / BWConfig | Type of interfering signal |
| 10 | 15 | G-FR1-A2-7 (Note 2) | -72.8 | -74.3 | AWGN |
|  | 30 | G-FR1-A2-8  (Note 2) | -70.6 |  |  |
|  | 60 | G-FR1-A2-3  (Note 1, 3) | -63.4 |  |  |
| 20 | 15 | G-FR1-A2-9  (Note 2) | -69.8 | -71.2 | AWGN |
|  | 30 | G-FR1-A2-10  (Note 2) | -66.8 |  |  |
|  | 60 | G-FR1-A2-6  (Note 1, 3) | -59.8 |  |  |
| 40 | 15 | G-FR1-A2-11  (Note 2) | -66.7 | -68.1 | AWGN |
|  | 30 | G-FR1-A2-12  (Note 2) | -63.7 |  |  |
|  | 60 | G-FR1-A2-6  (Note 1, 3) | -59.8 |  |  |
| 60 | 30 | G-FR1-A2-13  (Note 2) | -61.9 | -66.3 | AWGN |
|  | 60 | G-FR1-A2-6  (Note 1, 3) | -59.8 |  |  |
| 80 | 30 | G-FR1-A2-14  (Note 2) | -60.7 | -65.1 | AWGN |
|  | 60 | G-FR1-A2-6  (Note 1, 3) | -59.8 |  |  |
| Note 1: The wanted signal mean power is the power level of a single instance of the corresponding reference measurement channel. This requirement shall be met for each consecutive application of a single instance of the reference measurement channel mapped to disjoint frequency ranges with a width corresponding to the number of resource blocks of the reference measurement channel each, except for one instance that might overlap one other instance to cover the full *BS channel bandwidth*.  Note 2: The wanted signal mean power is the power level of a single instance of the corresponding reference measurement channel. This requirement shall be met for each interleaved application of a single instance of the reference measurement channel mapped to disjoint frequency ranges with a width corresponding to the number of resource blocks of the reference measurement channel each, except for one instance that might overlap one other instance to cover the full *BS channel bandwidth*.  Note 3: For 60kHz SCS reference measurement channel is reused from Table 7.3.2-2. | | | | | |

**Table 7.3.2-2c: Medium Range BS dynamic range for band n96**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| ***BS channel bandwidth* (MHz)** | **Subcarrier spacing (kHz)** | **Reference measurement channel** | **Wanted signal mean power (dBm)** | **Interfering signal mean power (dBm) / BWConfig** | **Type of interfering signal** |
| 20 | 15 | G-FR1-A2-9  (Note 2) | -68.8 | -70.2 | AWGN |
|  | 30 | G-FR1-A2-10  (Note 2) | -65.8 |  |  |
|  | 60 | G-FR1-A2-6  (Note 1, 3) | -58.8 |  |  |
| 40 | 15 | G-FR1-A2-11  (Note 2) | -65.7 | -67.1 | AWGN |
|  | 30 | G-FR1-A2-12  (Note 2) | -62.7 |  |  |
|  | 60 | G-FR1-A2-6  (Note 1, 3) | -58.8 |  |  |
| 60 | 30 | G-FR1-A2-13  (Note 2) | -60.9 | -65.3 | AWGN |
|  | 60 | G-FR1-A2-6  (Note 1, 3) | -58.8 |  |  |
| 80 | 30 | G-FR1-A2-14  (Note 2) | -59.7 | -64.1 | AWGN |
|  | 60 | G-FR1-A2-6  (Note 1, 3) | -58.8 |  |  |
| Note 1: The wanted signal mean power is the power level of a single instance of the corresponding reference measurement channel. This requirement shall be met for each consecutive application of a single instance of the reference measurement channel mapped to disjoint frequency ranges with a width corresponding to the number of resource blocks of the reference measurement channel each, except for one instance that might overlap one other instance to cover the full *BS channel bandwidth*.  Note 2: The wanted signal mean power is the power level of a single instance of the corresponding reference measurement channel. This requirement shall be met for each interleaved application of a single instance of the reference measurement channel mapped to disjoint frequency ranges with a width corresponding to the number of resource blocks of the reference measurement channel each, except for one instance that might overlap one other instance to cover the full *BS channel bandwidth*.  Note 3: For 60kHz SCS reference measurement channel is reused from Table 7.3.2-2. | | | | | |

Table 7.3.2-3: Local Area BS dynamic range

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| *BS channel bandwidth* (MHz) | Subcarrier spacing (kHz) | Reference measurement channel | Wanted signal mean power (dBm)  ( Note 3) | Interfering signal mean power (dBm) / BWConfig  ( Note 3) | Type of interfering signal |
| 5 | 15 | G-FR1-A2-1 | -62.7 | -74.5 | AWGN |
|  | 30 | G-FR1-A2-2 | -63.4 |  |  |
| 10 | 15 | G-FR1-A2-1 | -62.7 | -71.3 | AWGN |
|  | 30 | G-FR1-A2-2 | -63.4 |  |  |
|  | 60 | G-FR1-A2-3 | -60.4 |  |  |
| 15 | 15 | G-FR1-A2-1 | -62.7 | -69.5 | AWGN |
|  | 30 | G-FR1-A2-2 | -63.4 |  |  |
|  | 60 | G-FR1-A2-3 | -60.4 |  |  |
| 20 | 15 | G-FR1-A2-4 | -56.5 | -68.2 | AWGN |
|  | 30 | G-FR1-A2-5 | -56.5 |  |  |
|  | 60 | G-FR1-A2-6 | -56.8 |  |  |
| 25 | 15 | G-FR1-A2-4 | -56.5 | -67.2 | AWGN |
|  | 30 | G-FR1-A2-5 | -56.5 |  |  |
|  | 60 | G-FR1-A2-6 | -56.8 |  |  |
| 30 | 15 | G-FR1-A2-4 | -56.5 | -66.4 | AWGN |
|  | 30 | G-FR1-A2-5 | -56.5 |  |  |
|  | 60 | G-FR1-A2-6 | -56.8 |  |  |
| 35 | 15 | G-FR1-A2-4 | -56.5 | -65.7 | AWGN |
|  | 30 | G-FR1-A2-5 | -56.5 |  |  |
|  | 60 | G-FR1-A2-6 | -56.8 |  |  |
| 40 | 15 | G-FR1-A2-4 | -56.5 | -65.1 | AWGN |
|  | 30 | G-FR1-A2-5 | -56.5 |  |  |
|  | 60 | G-FR1-A2-6 | -56.8 |  |  |
| 45 | 15 | G-FR1-A2-4 | -56.5 | -64.6 | AWGN |
|  | 30 | G-FR1-A2-5 | -56.5 |  |  |
|  | 60 | G-FR1-A2-6 | -56.8 |  |  |
| 50 | 15 | G-FR1-A2-4 | -56.5 | -64.1 | AWGN |
|  | 30 | G-FR1-A2-5 | -56.5 |  |  |
|  | 60 | G-FR1-A2-6 | -56.8 |  |  |
| 60 | 30 | G-FR1-A2-5 | -56.5 | -63.3 | AWGN |
|  | 60 | G-FR1-A2-6 | -56.8 |  |  |
| 70 | 30 | G-FR1-A2-5 | -56.5 | -62.7 | AWGN |
|  | 60 | G-FR1-A2-6 | -56.8 |  |  |
| 80 | 30 | G-FR1-A2-5 | -56.5 | -62.1 | AWGN |
|  | 60 | G-FR1-A2-6 | -56.8 |  |  |
| 90 | 30 | G-FR1-A2-5 | -56.5 | -61.5 | AWGN |
|  | 60 | G-FR1-A2-6 | -56.8 |  |  |
| 100 | 30 | G-FR1-A2-5 | -56.5 | -61.1 | AWGN |
|  | 60 | G-FR1-A2-6 | -56.8 |  |  |
| NOTE 1: The wanted signal mean power is the power level of a single instance of the corresponding reference measurement channel. This requirement shall be met for each consecutive application of a single instance of the reference measurement channel mapped to disjoint frequency ranges with a width corresponding to the number of resource blocks of the reference measurement channel each, except for one instance that might overlap one other instance to cover the full *BS channel bandwidth*.  NOTE 2: These reference measurement channels are not applied for band n46 and n96.  NOTE 3: For BS operating in band n104, both wanted signal mean power and interfering signal mean power shall be increased by 1dB. | | | | | |

Table 7.3.2-3a: Local Area BS dynamic range for NB-IoT operation in NR in-band

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| *BS channel bandwidth* (MHz) | Reference measurement channel | Wanted signal mean power (dBm) | Interfering signal mean power (dBm) / BWConfig | Type of interfering signal |
| 5 |  |  | -74.5 |  |
| 10 |  |  | -71.3 |  |
| 15 | FRC A15-1 in |  | -69.5 |  |
| 20 | Annex A.15 in | -91.7 | -68.2 | AWGN |
| 25 | TS 36.104 [13] |  | -67.2 |  |
| 30 |  |  | -66.4 |  |
| 35 |  |  | -65.7 |  |
| 40 |  |  | -65.1 |  |
| 45 |  |  | -64.6 |  |
| 50 |  |  | -64.1 |  |
| 5 |  |  | -74.5 |  |
| 10 |  |  | -71.3 |  |
| 15 | FRC A15-2 in |  | -69.5 |  |
| 20 | Annex A.15 in | -97.6 | -68.2 | AWGN |
| 25 | TS 36.104 [13] |  | -67.2 |  |
| 30 |  |  | -66.4 |  |
| 35 |  |  | -65.7 |  |
| 40 |  |  | -65.1 |  |
| 45 |  |  | -64.6 |  |
| 50 |  |  | -64.1 |  |

Table 7.3.2-3b: Local Area BS dynamic range for band n46

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| *BS channel bandwidth* (MHz) | Subcarrier spacing (kHz) | Reference measurement channel | Wanted signal mean power (dBm) | Interfering signal mean power (dBm) / BWConfig | Type of interfering signal |
| 10 | 15 | G-FR1-A2-7  (Note 2) | -69.8 | -71.3 | AWGN |
|  | 30 | G-FR1-A2-8  (Note 2) | -67.6 |  |  |
|  | 60 | G-FR1-A2-3  (Note 1, 3) | -60.4 |  |  |
| 20 | 15 | G-FR1-A2-9  (Note 2) | -66.8 | -68.2 | AWGN |
|  | 30 | G-FR1-A2-10  (Note 2) | -63.8 |  |  |
|  | 60 | G-FR1-A2-6  (Note 1, 3) | -56.8 |  |  |
| 40 | 15 | G-FR1-A2-11  (Note 2) | -63.7 | -65.1 | AWGN |
|  | 30 | G-FR1-A2-12 | -60.7 |  |  |
|  | 60 | G-FR1-A2-6  (Note 1, 3) | -56.8 |  |  |
| 60 | 30 | G-FR1-A2-13  (Note 2) | -58.9 | -63.3 | AWGN |
|  | 60 | G-FR1-A2-6  (Note 1, 3) | -56.8 |  |  |
| 80 | 30 | G-FR1-A2-14  (Note 2) | -57.7 | -62.1 | AWGN |
|  | 60 | G-FR1-A2-6  (Note 1, 3) | -56.8 |  |  |
| Note 1: The wanted signal mean power is the power level of a single instance of the corresponding reference measurement channel. This requirement shall be met for each consecutive application of a single instance of the reference measurement channel mapped to disjoint frequency ranges with a width corresponding to the number of resource blocks of the reference measurement channel each, except for one instance that might overlap one other instance to cover the full *BS channel bandwidth*.  Note 2: The wanted signal mean power is the power level of a single instance of the corresponding reference measurement channel. This requirement shall be met for each interleaved application of a single instance of the reference measurement channel mapped to disjoint frequency ranges with a width corresponding to the number of resource blocks of the reference measurement channel each, except for one instance that might overlap one other instance to cover the full *BS channel bandwidth*.  Note 3: For 60kHz SCS reference measurement channel is reused from Table 7.3.2-3. | | | | | |

Table 7.3.2-3c: Local area BS dynamic range for band n96

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| *BS channel bandwidth* (MHz) | Subcarrier spacing (kHz) | Reference measurement channel | Wanted signal mean power (dBm) | Interfering signal mean power (dBm) / BWConfig | Type of interfering signal |
| 20 | 15 | G-FR1-A2-9  (Note 2) | -65.8 | -67.2 | AWGN |
|  | 30 | G-FR1-A2-10  (Note 2) | -62.8 |  |  |
|  | 60 | G-FR1-A2-6  (Note 1, 3) | -55.8 |  |  |
| 40 | 15 | G-FR1-A2-11  (Note 2) | -62.7 | -64.1 | AWGN |
|  | 30 | G-FR1-A2-12  (Note 2) | -59.7 |  |  |
|  | 60 | G-FR1-A2-6  (Note 1, 3) | -55.8 |  |  |
| 60 | 30 | G-FR1-A2-13  (Note 2) | -57.9 | -62.3 | AWGN |
|  | 60 | G-FR1-A2-6  (Note 1, 3) | -55.8 |  |  |
| 80 | 30 | G-FR1-A2-14  (Note 2) | -56.7 | -61.1 | AWGN |
|  | 60 | G-FR1-A2-6  (Note 1, 3) | -55.8 |  |  |
| Note 1: The wanted signal mean power is the power level of a single instance of the corresponding reference measurement channel. This requirement shall be met for each consecutive application of a single instance of the reference measurement channel mapped to disjoint frequency ranges with a width corresponding to the number of resource blocks of the reference measurement channel each, except for one instance that might overlap one other instance to cover the full *BS channel bandwidth*.  Note 2: The wanted signal mean power is the power level of a single instance of the corresponding reference measurement channel. This requirement shall be met for each interleaved application of a single instance of the reference measurement channel mapped to disjoint frequency ranges with a width corresponding to the number of resource blocks of the reference measurement channel each, except for one instance that might overlap one other instance to cover the full *BS channel bandwidth*.  Note 3: For 60kHz SCS reference measurement channel is reused from Table 7.3.2-3. | | | | | |

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## 7.4 In-band selectivity and blocking

### 7.4.1 Adjacent Channel Selectivity (ACS)

#### 7.4.1.1 General

Adjacent channel selectivity (ACS) is a measure of the receiver's ability to receive a wanted signal at its assigned channel frequency at the *antenna connector* for *BS type 1-C* or *TAB connector* for *BS type 1-H* in the presence of an adjacent channel signal with a specified centre frequency offset of the interfering signal to the band edge of a victim system.

#### 7.4.1.2 Minimum requirement for *BS type 1-C* and *BS type 1-H*

The throughput shall be ≥ 95% of the maximum throughput of the reference measurement channel.

For BS, the wanted and the interfering signal coupled to the *BS* *type 1-C* *antenna connector* or *BS type 1-H* *TAB connector* are specified in table 7.4.1.2-1 and the frequency offset between the wanted and interfering signal in table 7.4.1.2-2 for ACS. The reference measurement channel for the wanted signal is identified in table 7.2.2-1, 7.2.2-2 and 7.2.2-3 for each *BS channel bandwidth* in any operating band except for band n46 and n96 and further specified in annex A.1. The characteristics of the interfering signal is further specified in annex D.

For BS operating in band n46 and n96, the wanted and the interfering signal coupled to the BS type 1-C antenna connector or BS type 1-H TAB connector are specified in table 7.4.1.2-1a and the frequency offset between the wanted and interfering signal in table 7.4.1.2-2a for ACS. The reference measurement channel for the wanted signal is identified in table 7.2.2-2a and 7.2.2-3a for each BS channel bandwidth and further specified in annex A.1a. The characteristics of the interfering signal is further specified in annex D.

For BS supporting NB-IoT operation in NR in-band, the wanted and the interfering signal coupled to the *BS* *type 1-C* *antenna connector* are specified in table 7.4.1.2-1 and the frequency offset between the wanted and interfering signal in table 7.4.1.2-2 for ACS. The reference measurement channel for the NB-IoT wanted signal is identified in clause 7.2.1 of TS 36.104 [13]. The characteristics of the interfering signal is further specified in annex D.

The ACS requirement is applicable outside the *Base Station RF Bandwidth* or *Radio Bandwidth*. The interfering signal offset is defined relative to the *Base station RF Bandwidth* edges or *Radio Bandwidth* edges.

For a BS operating in *non-contiguous spectrum* within any *operating band*, the ACS requirement shall apply in addition inside any *sub-block gap*, in case the *sub-block gap size* is at least as wide as the NR interfering signal in table 7.4.1.2-2. The interfering signal offset is defined relative to the *sub-block* edges inside the *sub-block gap*.

For a *multi-band connector*, the ACS requirement shall apply in addition inside any *Inter RF Bandwidth gap*, in case the *Inter RF Bandwidth gap* size is at least as wide as the NR interfering signal in table 7.4.1.2‑2. The interfering signal offset is defined relative to the *Base Station RF Bandwidth edges* inside the *Inter RF Bandwidth gap*.

Minimum conducted requirement is defined at the *antenna connector* for *BS type 1-C* and at the *TAB connector* for *BS type 1-H.*

Table 7.4.1.2-1: Base station ACS requirement

|  |  |  |
| --- | --- | --- |
| *BS channel bandwidth* of the lowest/*highest carrier* received (MHz) | Wanted signal mean power (dBm) | Interfering signal mean power (dBm) |
| 5, 10, 15, 20,  25, 30, 35, 40, 45, 50, 60, 70, 80, 90, 100  (Note 1) | PREFSENS + 6 dB | Wide Area BS: -52  Medium Range BS: -47  Local Area BS: -44 |
| NOTE 1: The SCS for the lowest/highest carrier received is the lowest SCS supported by the BS for that bandwidth.  NOTE 2: PREFSENS depends on the RAT. For NR, PREFSENS depends also on the *BS channel bandwidth* as specified in tables 7.2.2-1, 7.2.2-2, 7.2.2-3. For NB-IoT, PREFSENS depends also on the *sub-carrier spacing* as specified in tables 7.2.1-5, 7.2.1-5a and 7.2.1-5c of TS 36.104 [13].  NOTE 3: For BS operating in band n104, interfering signal mean power shall be allowed with 4dB relaxation. | | |

Table 7.4.1.2-1a: Base station ACS requirement for band n46 and n96

|  |  |  |
| --- | --- | --- |
| *BS channel bandwidth* of the lowest/*highest carrier* received (MHz) | Wanted signal mean power (dBm) | Interfering signal mean power (dBm) |
| 10, 20, 40, 60, 80 (Note 1) | PREFSENS + 6 dB | Medium Range BS: -47  Local Area BS: -44 |
| NOTE 1: The SCS for the lowest/highest carrier received is the lowest SCS supported by the BS for that bandwidth.  NOTE 2: PREFSENS depends on the RAT. For NR, PREFSENS depends also on the *BS channel bandwidth* as specified in tables 7.2.2-2a, 7.2.2-2b, 7.2.2-3a, 7.2.2-3b.  NOTE 3: Void. | | |

Table 7.4.1.2-2: Base Station ACS interferer frequency offset values

|  |  |  |
| --- | --- | --- |
| *BS channel bandwidth* of the *lowest/highest carrier* received (MHz) | Interfering signal centre frequency 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 | ±2.5025 |  |
| 10 | ±2.5075 | 5 MHz DFT-s-OFDM NR signal |
| 15 | ±2.5125 | 15 kHz SCS, 25 RBs |
| 20 | ±2.5025 |  |
| 25 | ±9.4675 |  |
| 30 | ±9.4725 |  |
| 35 | ±9.4625 |  |
| 40 | ±9.4675 |  |
| 45 | ±9.4725 |  |
| 50 | ±9.4625 | 20 MHz DFT-s-OFDM NR signal |
| 60 | ±9.4725 | 15 kHz SCS, 100 RBs |
| 70 | ±9.4675 |  |
| 80 | ±9.4625 |  |
| 90 | ±9.4725 |  |
| 100 | ±9.4675 |  |

Table 7.4.1.2-2: Base Station ACS interferer frequency offset values for band n46 and n96

|  |  |  |
| --- | --- | --- |
| *BS channel bandwidth* of the *lowest/highest carrier* received (MHz) | Interfering signal centre frequency offset from the lower/upper *Base Station RF Bandwidth edge* or *sub-block* edge inside a *sub-block gap* (MHz) | Type of interfering signal |
| 10 | ±9.4675 |  |
| 20 | ±9.4625 | 20 MHz DFT-s-OFDM NR signal |
| 40 | ±9.4675 | 15 kHz SCS, 100 RBs |
| 60 | ±9.4725 |  |
| 80 | ±9.4625 |  |

#### 7.4.1.3 Void

#### 7.4.1.4 Void

### 7.4.2 In-band blocking

#### 7.4.2.1 General

The in-band blocking characteristics is a measure of the receiver's ability to receive a wanted signal at its assigned channel at the *antenna connector* for *BS type 1-C* or *TAB connector* for *BS type 1-H* in the presence of an unwanted interferer, which is an NR signal for general blocking or an NR signal with one resource block for narrowband blocking.

#### 7.4.2.2 Minimum requirement for *BS type 1-C* and *BS type 1-H*

The throughput shall be ≥ 95% of the maximum throughput of the reference measurement channel, with a wanted and an interfering signal coupled to *BS type 1-C* *antenna connector* or *BS type 1‑H* *TAB connector* using the parameters in tables 7.4.2.2-1, 7.4.2.2-2 and 7.4.2.2-3 for general blocking and narrowband blocking requirements. Narrowband blocking requirements are not applied for band n46, n96 and n104. The reference measurement channel for the wanted signal is identified in clause 7.2.2 for each *BS channel bandwidth* and further specified in annex A.1. The characteristics of the interfering signal is further specified in annex D.

For NB-IoT operation in NR in-band, the throughput shall be ≥ 95% of the maximum throughput of the reference measurement channel, with a wanted and an interfering signal coupled to *BS type 1-C* *antenna connector* using the parameters in tables 7.4.2.2-1, 7.4.2.2-2a and 7.4.2.2-3 for general blocking and narrowband blocking requirements. The reference measurement channel for the NB-IoT wanted signal is identified in clause 7.2.1 of TS 36.104 [13]. The characteristics of the interfering signal is further specified in annex D.

The in-band blocking requirements apply outside the *Base Station RF Bandwidth* or *Radio Bandwidth*. The interfering signal offset is defined relative to the *Base Station RF Bandwidth edges* or *Radio Bandwidth* edges.

The in-band blocking requirement shall apply from FUL,low - ΔfOOB to FUL,high + ΔfOOB, excluding the downlink frequency range of the FDD *operating band*. The ΔfOOB for *BS type 1-C* and *BS type 1-H* is defined in table 7.4.2.2-0.

Minimum conducted requirement is defined at the *antenna connector* for *BS type 1-C* and at the *TAB connector* for *BS type 1-H.*

Table 7.4.2.2-0: ΔfOOB offset for NR *operating bands*

|  |  |  |
| --- | --- | --- |
| BS type | *Operating band* characteristics | ΔfOOB (MHz) |
|  | FUL,high – FUL,low ≤ 200 MHz | 20 |
| *BS type 1-C* | 200 MHz < FUL,high – FUL,low ≤ 900 MHz | 60 |
|  |  |  |
|  | FUL,high – FUL,low < 100 MHz | 20 |
| *BS type 1-H* | 100 MHz ≤ FUL,high – FUL,low ≤ 900 MHz | 60 |
|  |  |  |

For band n46 and n96, ΔfOOB for *BS type 1-C* and *BS type 1-H* is defined in table 7.4.2.2-0a.

Table 7.4.2.2-0a: ΔfOOB offset for NR *operating bands* for band n46 and n96

|  |  |
| --- | --- |
| ***Operating band*** | **ΔfOOB (MHz)** |
| n46 | 60 |
| n96 | 70 |

For band n104, ΔfOOB for *BS type 1-C* and *BS type 1-H* is defined in table 7.4.2.2-0b.

Table 7.4.2.2-0b: ΔfOOB offset for NR *operating bands* for band n104

|  |  |  |
| --- | --- | --- |
| **BS type** | ***Operating band*** | **ΔfOOB (MHz)** |
| *BS type 1-H* | n104 | [100] |
| *BS type 1-C* | n104 | [60] |

For a BS operating in *non-contiguous spectrum* within any *operating band*, the in-band blocking requirements apply in addition inside any *sub-block gap*, in case the *sub-block gap* size is at least as wide as twice the interfering signal minimum offset in tables 7.4.2.2-1. The interfering signal offset is defined relative to the *sub-block* edges inside the *sub-block gap*.

For a *multi-band connector*, the blocking requirements apply in the in-band blocking frequency ranges for each supported *operating band*. The requirement shall apply in addition inside any *Inter RF Bandwidth gap*, in case the *Inter RF Bandwidth gap* size is at least as wide as twice the interfering signal minimum offset in tables 7.4.2.2-1.

For a BS operating in *non-contiguous spectrum* within any *operating band*, the narrowband blocking requirement shall apply in addition inside any *sub-block gap*, in case the *sub-block gap size* is at least as wide as the *channel bandwidth* of the NR interfering signal in Table 7.4.2.2-3. The interfering signal offset is defined relative to the *sub-block* edges inside the *sub-block gap*.

For a *multi-band connector*, the narrowband blocking requirement shall apply in addition inside any *Inter RF Bandwidth gap*, in case the *Inter RF Bandwidth gap* size is at least as wide as the NR interfering signal in Table 7.4.2.2-3. The interfering signal offset is defined relative to the *Base Station RF Bandwidth* edges inside the *Inter RF Bandwidth gap*.

Table 7.4.2.2-1: Base station general blocking requirement

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| *BS channel bandwidth* of the *lowest/highest carrier* received (MHz) | Wanted signal mean power (dBm)  (Note 2) | 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, 15, 20 | PREFSENS + x dB | Wide Area BS: -43  Medium Range BS: -38  Local Area BS: -35 | ±7.5 | 5 MHz DFT-s-OFDM NR signal  15 kHz SCS, 25 RBs |
| 25, 30, 35, 40, 45, 50, 60, 70, 80, 90, 100 | PREFSENS + x dB | Wide Area BS: -43  Medium Range BS: -38  Local Area BS: -35 | ±30 | 20 MHz DFT-s-OFDM NR signal  15 kHz SCS, 100 RBs |
| NOTE 1: PREFSENS depends on the RAT. For NR, PREFSENS depends also on the *BS channel bandwidth* as specified in tables 7.2.2-1, 7.2.2-2 and 7.2.2-3. For NB-IoT, PREFSENS depends also on the *sub-carrier spacing* as specified in tables 7.2.1-5, 7.2.1-5a and 7.2.1-5c of TS 36.104 [13].  NOTE 2: For a BS capable of single band operation only, "x" is equal to 6 dB. For a BS capable of multi-band operation, "x" is equal to 6 dB in case of interfering signals that are in the in-band blocking frequency range of the operating band where the wanted signal is present or in the in-band blocking frequency range of an adjacent or overlapping operating band. For other in-band blocking frequency ranges of the interfering signal for the supported operating bands, "x" is equal to 1.4 dB. | | | | |

Table 7.4.2.2-1a: Base station general blocking requirement for n46

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| 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 |
| 10, 20, 40, 60, 80 | PREFSENS + 6 dB | Medium Range BS: -38  Local Area BS: -35 | ±30 | 20 MHz DFT-s-OFDM NR signal  15 kHz SCS, 100 RBs |
| NOTE: PREFSENS depends on the RAT. For NR, PREFSENS depends also on the *BS channel bandwidth* as specified in tables 7.2.2-2a and 7.2.2-3a. | | | | |

Table 7.4.2.2-1b: Base station general blocking requirement for n96

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| 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 |
| 20, 40, 60, 80 | PREFSENS + 6 dB | Medium Range BS: -38  Local Area BS: -35 | ±30 | 20 MHz DFT-s-OFDM NR signal  15 kHz SCS, 100 RBs |
| NOTE 1: PREFSENS depends on the RAT. For NR, PREFSENS depends also on the *BS channel bandwidth* as specified in tables 7.2.2-2b and 7.2.2-3b. | | | | |

Table 7.4.2.2-2: Base Station narrowband blocking requirement

|  |  |  |
| --- | --- | --- |
| *BS channel bandwidth* of the *lowest/highest carrier* received (MHz) | Wanted signal mean power (dBm) | Interfering signal mean power (dBm) |
| 5, 10, 15, 20, 25, 30, 35, 40, 45, 50, 60, 70, 80,90, 100 (Note 1) | PREFSENS + 6 dB | Wide Area BS: -49  Medium Range BS: -44  Local Area BS: -41 |
| NOTE 1: The SCS for the *lowest/highest carrier* received is the lowest SCS supported by the BS for that *BS channel bandwidth*  NOTE 2: PREFSENS depends on the *BS channel bandwidth* as specified in tables 7.2.2-1, 7.2.2-2 and 7.2.2-3.  NOTE 3: 7.5 kHz shift is not applied to the wanted signal. | | |

Table 7.4.2.2-2a: Base Station narrowband blocking requirement for NB-IoT operation in NR in-band

|  |  |  |
| --- | --- | --- |
| *BS channel bandwidth* (MHz) | Wanted signal mean power (dBm) | Interfering signal mean power (dBm) |
| 5, 10, 15, 20, 25, 30, 35, 40, 45, 50 | PREFSENS + x dB (Note 2) | Wide Area: -49  Medium Range: -44  Local Area: -41 |
| NOTE 1: PREFSENS depends on the *sub-carrier spacing* as specified in tables 7.2.1-5, 7.2.1-5a and 7.2.1-5c of TS 36.104 [13].  NOTE 2: “x” is equal to 8 in case of 5 MHz channel bandwidth and equal to 6 otherwise. | | |

Table 7.4.2.2-3: Base Station narrowband blocking interferer frequency offsets

|  |  |  |
| --- | --- | --- |
| *BS channel bandwidth* of the *lowest/highest carrier* received (MHz) | Interfering RB centre frequency offset to the lower/upper *Base Station RF Bandwidth edge* or *sub-block* edge inside a *sub-block gap* (kHz) (Note 2) | Type of interfering signal |
| 5 | ±(350+m\*180),  m=0, 1, 2, 3, 4, 9, 14, 19, 24 | 5 MHz DFT-s-OFDM NR signal, 15 kHz SCS, 1 RB |
| 10 | ±(355+m\*180),  m=0, 1, 2, 3, 4, 9, 14, 19, 24 |  |
| 15 | ±(360+m\*180),  m=0, 1, 2, 3, 4, 9, 14, 19, 24 |  |
| 20 | ±(350+m\*180),  m=0, 1, 2, 3, 4, 9, 14, 19, 24 |  |
| 25 | ±(565+m\*180),  m=0, 1, 2, 3, 4, 29, 54, 79, 99 | 20 MHz DFT-s-OFDM NR signal, 15 kHz SCS, 1 RB |
| 30 | ±(570+m\*180),  m=0, 1, 2, 3, 4, 29, 54, 79, 99 |  |
| 35 | ±(560+m\*180),  m=0, 1, 2, 3, 4, 29, 54, 79, 99 |  |
| 40 | ±(565+m\*180),  m=0, 1, 2, 3, 4, 29, 54, 79, 99 |  |
| 45 | ±(570+m\*180),  m=0, 1, 2, 3, 4, 29, 54, 79, 99 |  |
| 50 | ±(560+m\*180),  m=0, 1, 2, 3, 4, 29, 54, 79, 99 |  |
| 60 | ±(570+m\*180),  m=0, 1, 2, 3, 4, 29, 54, 79, 99 |  |
| 70 | ±(565+m\*180),  m=0, 1, 2, 3, 4, 29, 54, 79, 99 |  |
| 80 | ±(560+m\*180),  m=0, 1, 2, 3, 4, 29, 54, 79, 99 |  |
| 90 | ±(570+m\*180),  m=0, 1, 2, 3, 4, 29, 54, 79, 99 |  |
| 100 | ±(565+m\*180),  m=0, 1, 2, 3, 4, 29, 54, 79, 99 |  |
| NOTE 1: Interfering signal consisting of one resource block positioned at the stated offset, the *channel bandwidth* of the interfering signal is located adjacently to the lower/upper *Base Station RF Bandwidth edge* or *sub-block* edge inside a *sub-block gap*.  NOTE 2: The centre of the interfering RB refers to the frequency location between the two central subcarriers. | | |

#### 7.4.2.3 Void

#### 7.4.2.4 Void

## 7.5 Out-of-band blocking

### 7.5.1 General

The out-of-band blocking characteristics is a measure of the receiver ability to receive a wanted signal at its assigned channel at the *antenna connector* for *BS type 1-C* or *TAB connector* for *BS type 1-H* in the presence of an unwanted interferer out of the *operating band*, which is a CW signal for out-of-band blocking.

### 7.5.2 Minimum requirement for *BS type 1-C* and *BS type 1-H*

The throughput shall be ≥ 95% of the maximum throughput of the reference measurement channel, with a wanted and an interfering signal coupled to *BS type 1-C* *antenna connector* or *BS type 1-H* *TAB connector* using the parameters in table 7.5.2-1. For band n46 and n96, the throughput shall be ≥ 95% of the maximum throughput of the reference measurement channel, with a wanted and an interfering signal coupled to BS type 1-C antenna connector or BS type 1-H TAB connector using the parameters in table 7.5.2-1a. The reference measurement channel for the wanted signal is identified in clause 7.2.2 for each *BS channel bandwidth* and further specified in annex A.1. The characteristics of the interfering signal is further specified in annex D.

For NB-IoT operation in NR in-band, the throughput shall be ≥ 95% of the maximum throughput of the reference measurement channel, with a wanted and an interfering signal coupled to *BS type 1-C* *antenna connector* using the parameters in table 7.5.2-1. The reference measurement channel for the NB-IoT wanted signal is identified in clause 7.2.1 of TS 36.104 [13].

The out-of-band blocking requirement apply from 1 MHz to FUL,low - ΔfOOB and from FUL,high + ΔfOOB up to 12750 MHz, including the downlink frequency range of the FDD *operating band* for BS supporting FDD. The ΔfOOB for *BS type 1-C* and *BS type 1-H* is defined in table 7.4.2.2-0.

Minimum conducted requirement is defined at the *antenna connector* for *BS type 1-C* and at the *TAB connector* for *BS type 1-H.*

For a *multi-band connector*, the requirement in the out-of-band blocking frequency ranges apply for each *operating band*, with the exception that the in-band blocking frequency ranges of all supported *operating bands* according to clause 7.4.2.2 shall be excluded from the out-of-band blocking requirement.

Table 7.5.2-1: Out-of-band blocking performance requirement for NR

|  |  |  |
| --- | --- | --- |
| Wanted Signal mean power (dBm) | Interfering Signal mean power (dBm) | Type of Interfering Signal |
| PREFSENS +6 dB (Note) | -15 | CW carrier |
| NOTE 1: PREFSENS depends on the RAT. For NR, PREFSENS depends also on the *BS channel bandwidth* as specified in Table 7.2.2-1, 7.2.2-2, and 7.2.2-3. For NB-IoT, PREFSENS depends also on the *sub-carrier spacing* as specified in tables 7.2.1-5, 7.2.1-5a and 7.2.1-5c of TS 36.104 [13].  NOTE 2: For NB-IoT, up to 24 exceptions are allowed for spurious response frequencies in each wanted signal frequency when measured using a 1MHz step size. For these exceptions the above throughput requirement shall be met when the blocking signal is set to a level of -40 dBm for 15 kHz subcarrier spacing and -46 dBm for 3.75 kHz subcarrier spacing. In addition, each group of exceptions shall not exceed three contiguous measurements using a 1MHz step size.  NOTE 3: Void | | |

**Table 7.5.2-1a: Out-of-band blocking performance requirement for NR band n46 and n96**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Operating Band** | **Centre Frequency of Interfering Signal [MHz]** | | | **Wanted Signal mean power (dBm)** | **Interfering Signal mean power (dBm)** | **Type of Interfering Signal** |
| n46, n96 | (FUL\_low -500)  (FUL\_high +ΔfOOB) | to  to | (FUL\_low -ΔfOOB)  (FUL\_high +500) | PREFSENS +6dB | -35 | CW carrier |
| 1  (FUL\_high +500) | to  to | (FUL\_low -500)  12750 | PREFSENS +6dB | -15 | CW carrier |
| NOTE 1: PREFSENS depends on the *BS channel bandwidth* as specified in tables 7.2.2-2a, 7.2.2-2b, 7.2.2-3a, 7.2.2-3b. | | | | | | |

### 7.5.3 Co-location minimum requirements for *BS type 1-C* and *BS type 1-H*

This additional blocking requirement may be applied for the protection of NR BS receivers when GSM, CDMA, UTRA, E-UTRA or NR BS operating in a different frequency band are co-located with a NR BS. The requirement is applicable to all *BS channel bandwidths* supported by the NR BS.

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

The throughput shall be ≥ 95% of the maximum throughput of the reference measurement channel, with a wanted and an interfering signal coupled to *BS type 1-C* *antenna connector* or *BS type 1-H* *TAB connector* input using the parameters in table 7.5.3-1 for all the BS classes. The reference measurement channel for the wanted signal is identified in tables 7.2.2-1, 7.2.2-2 and 7.2.2-3 for each *BS channel bandwidth* and further specified in annex A.1.

The blocking requirement for co-location with BS in other bands is applied for all *operating bands* for which co-location protection is provided.

Minimum conducted requirement is defined at the *antenna connector* for *BS type 1-C* and at the *TAB connector* for *BS type 1-H.*

Table 7.5.3-1: Blocking performance requirement for NR BS when co-located with BS in other frequency bands.

| Frequency range of interfering signal | Wanted signal mean power (dBm) | Interfering signal mean power for WA BS (dBm) | Interfering signal mean power for MR BS (dBm) | Interfering signal mean power for LA BS (dBm) | Type of interfering signal |
| --- | --- | --- | --- | --- | --- |
| Frequency range of co-located downlink *operating band* | PREFSENS +6dB (Note 1) | +16 | +8 | x (Note 2) | CW carrier |
| NOTE 1: PREFSENS depends on the *BS channel bandwidth* as specified in Table 7.2.2-1, 7.2.2-2, and 7.2.2-3.  NOTE 2: x = -7 dBm for NR BS co-located with Pico GSM850 or Pico CDMA850 x = -4 dBm for NR BS co-located with Pico DCS1800 or Pico PCS1900 x = -6 dBm for NR BS co-located with UTRA bands or E-UTRA bands or NR bands  NOTE 3: The requirement does not apply when the interfering signal falls within any of the supported uplink *operating band(s)* or in ΔfOOB immediately outside any of the supported uplink *operating band(s)*.  NOTE 4: For unsynchronized base stations (except in band n46 and n96), special co-location requirements may apply that are not covered by the 3GPP specifications. | | | | | |

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## 7.6 Receiver spurious emissions

### 7.6.1 General

The receiver spurious emissions power is the power of emissions generated or amplified in a receiver unit that appear at the *antenna connector* (for *BS type 1-C*) or at the *TAB connector* (for *BS type 1-H*). The requirements apply to all BS with separate RX and TX *antenna connectors* / *TAB connectors*.

NOTE: In this case for FDD operation the test is performed when both TX and RX are ON, with the TX *antenna connectors* / *TAB connectors* terminated.

For a*ntenna connectors* / *TAB connectors* supporting both RX and TX in TDD, the requirements apply during the *transmitter OFF period*. For *antenna connectors* / *TAB connectors* supporting both RX and TX in FDD, the RX spurious emissions requirements are superseded by the TX spurious emissions requirements, as specified in clause 6.6.5.

For RX-only *multi-band* *connectors*, the spurious emissions requirements are subject to exclusion zones in each supported *operating band*. For *multi-band* *connectors* that both transmit and receive in *operating band* supporting TDD, RX spurious emissions requirements are applicable during the *TX OFF period*, and are subject to exclusion zones in each supported *operating band*.

For *BS type 1-H* manufacturer shall declare *TAB connector RX min cell groups*. Every *TAB connector* of *BS type 1‑H* supporting reception in an *operating band* shall map to one *TAB connector RX min cell group*, where mapping of *TAB connectors* to cells/beams is implementation dependent.

The number of active receiver units that are considered when calculating the conducted RX spurious emission limits (NRXU,counted) for *BS type 1-H* is calculated as follows:

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

NRXU,countedpercell is used for scaling of *basic limits* and is derived as NRXU,countedpercell = NRXU,counted / Ncells, where Ncells is defined in clause 6.1.

NOTE: NRXU,active is the number of actually active receiver units and is independent to the declaration of Ncells.

### 7.6.2 *Basic limits*

The receiver spurious emissions *basic limits* are provided in table 7.6.2-1.

Table 7.6.2-1: General BS receiver spurious emissions limits

| Spurious frequency range | *Basic limits* | *Measurement bandwidth* | Note |
| --- | --- | --- | --- |
| 30 MHz – 1 GHz | -57 dBm | 100 kHz | Note 1 |
| 1 GHz – 12.75 GHz | -47 dBm | 1 MHz | Note 1, Note 2 |
| 12.75 GHz – 5th harmonic of the upper frequency edge of the UL *operating band* in GHz | -47 dBm | 1 MHz | Note 1, Note 2, Note 3 |
| 12.75 GHz ‑ 26 GHz | -47 dBm | 1 MHz | Note 1, Note 2, Note 5 |
| NOTE 1: *Measurement bandwidth*s as in ITU-R SM.329 [2], s4.1.  NOTE 2: Upper frequency as in ITU-R SM.329 [2], s2.5 table 1.  NOTE 3: This spurious frequency range applies only for *operating bands* for which the 5th harmonic of the upper frequency edge of the UL *operating band* is reaching beyond 12.75 GHz.  NOTE 4: The frequency range from ΔfOBUE below the lowest frequency of the BS transmitter *operating band* to ΔfOBUE above the highest frequency of the BS transmitter *operating band* may be excluded from the requirement. ΔfOBUE is defined in clause 6.6.1. For *multi-band* *connectors*, the exclusion applies for all supported *operating bands*.  NOTE 5: Applies only for band n46, n96 and n104. | | | |

#### < Next OF CHANGE>

## 7.7 Receiver intermodulation

### 7.7.1 General

Third and higher order mixing of the two interfering RF signals can produce an interfering signal in the band of the desired channel. Intermodulation response rejection is a measure of the capability of the receiver to receive a wanted signal on its assigned channel frequency at the *antenna connector* for *BS type 1-C* or *TAB connector* for *BS type 1-H* in the presence of two interfering signals which have a specific frequency relationship to the wanted signal.

### 7.7.2 Minimum requirement for *BS type 1-C* and *BS type 1-H*

The throughputshall be ≥ 95% of the maximum throughput of the reference measurement channel, with a wanted signal at the assigned channel frequency and two interfering signals coupled to the *BS type 1-C antenna connector* or *BS type 1-H* *TAB connector*, with the conditions specified in tables 7.7.2-1 and 7.7.2-2 for intermodulation performance in any operating band except for band n46 and n96, and 7.7.2-2a for band n46 and n96 and in tables 7.7.2-3, and 7.7.2-4 for narrowband intermodulation performance. Narrowband intermodulation requirements are not applied for band n46, n96 and n104. The reference measurement channel for the wanted signal is identified in tables 7.2.2-1, 7.2.2-2 and 7.2.2-3 for each *BS channel bandwidth* and further specified in annex A.1. The characteristics of the interfering signal is further specified in annex D.

For NB-IoT operation in NR in-band, the throughputshall be ≥ 95% of the maximum throughput of the reference measurement channel, with a wanted signal at the assigned channel frequency and two interfering signals coupled to the *BS type 1-C antenna connector*, with the conditions specified in tables 7.7.2-1 and 7.7.2-2 for intermodulation performance and in tables 7.7.2-3, and 7.7.2-4 for narrowband intermodulation performance. The reference measurement channel for the NB-IoT wanted signal is identified in clause 7.2.1 of TS 36.104 [13]. The characteristics of the interfering signal is further specified in annex D.

The subcarrier spacing for the modulated interfering signal shall in general be the same as the subcarrier spacing for the wanted signal, except for the case of wanted signal subcarrier spacing 60 kHz and *BS channel bandwidth* <=20MHz, for which the subcarrier spacing of the interfering signal shall be 30 kHz.

The receiver intermodulation requirement is applicable outside the *Base Station RF Bandwidth* or *Radio Bandwidth edges*. The interfering signal offset is defined relative to the *Base Station RF Bandwidth edges* or *Radio Bandwidth* edges.

For a BS operating in *non-contiguous spectrum* within any *operating band*, the narrowband intermodulation requirement shall apply in addition inside any *sub-block gap* in case the *sub-block gap* is at least as wide as the *channel bandwidth* of the NR interfering signal in table 7.7.2-2 or 7.7.2-4. The interfering signal offset is defined relative to the *sub-block* edges inside the *sub-block gap*.

For a *multi-band connector*, the intermodulation requirement shall apply in addition inside any *Inter RF Bandwidth gap*, in case the gap size is at least twice as wide as the NR interfering signal centre frequency offset from the *Base Station RF Bandwidth edge*.

For a *multi-band connector*, the narrowband intermodulation requirement shall apply in addition inside any *Inter RF Bandwidth gap* in case the gap size is at least as wide as the NR interfering signal in tables 7.7.2-2 and 7.7.2-4. The interfering signal offset is defined relative to the Base Station RF Bandwidth edges inside the *Inter RF Bandwidth gap*.

Table 7.7.2-1: General intermodulation requirement

| Base Station Type | Wanted Signal mean power (dBm) | Mean power of interfering signals (dBm) | Type of interfering signals |
| --- | --- | --- | --- |
| Wide Area BS | PREFSENS +6 dB | -52 |  |
| Medium Range BS | PREFSENS +6 dB | -47 | See Table 7.7.2-2 |
| Local Area BS | PREFSENS +6 dB | -44 |  |
| NOTE 1: PREFSENS depends on the RAT and the BS class. For NR, PREFSENS depends also on the *BS channel bandwidth*, see clause 7.2. For NB-IoT, PREFSENS depends also on the *sub-carrier spacing* as specified in tables 7.2.1-5, 7.2.1-5a and 7.2.1-5c of TS 36.104 [13]. | | | |

Table 7.7.2-1a: General intermodulation requirement for band n46 and n96

| Base Station Type | Wanted Signal mean power (dBm) | Mean power of interfering signals (dBm) | Type of interfering signals |
| --- | --- | --- | --- |
| Medium Range BS | PREFSENS +6 dB | -47 | See Table 7.7.2-2a |
| Local Area BS | PREFSENS +6 dB | -44 |  |
| NOTE 1: PREFSENS depends on the RAT and the BS class. For NR, PREFSENS depends also on the *BS channel bandwidth*, see clause 7.2.5. | | | |

Table 7.7.2-2: Interfering signals for intermodulation requirement

|  |  |  |
| --- | --- | --- |
| *BS channel bandwidth* of the *lowest/highest carrier* received (MHz) | Interfering signal centre frequency offset from the lower/upper *Base Station RF Bandwidth* edge (MHz) | Type of interfering signal (Note 3) |
| 5 | ±7.5 | CW |
|  | ±17.5 | 5 MHz DFT-s-OFDM NR signal (Note 1) |
| 10 | ±7.465 | CW |
|  | ±17.5 | 5 MHz DFT-s-OFDM NR signal (Note 1) |
| 15 | ±7.43 | CW |
|  | ±17.5 | 5 MHz DFT-s-OFDM NR signal (Note 1) |
| 20 | ±7.395 | CW |
|  | ±17.5 | 5 MHz DFT-s-OFDM NR signal (Note 1) |
| 25 | ±7.465 | CW |
|  | ±25 | 20MHz DFT-s-OFDM NR signal (Note 2) |
| 30 | ±7.43 | CW |
|  | ±25 | 20 MHz DFT-s-OFDM NR signal (Note 2) |
| 35 | ±7.44 | CW |
|  | ±25 | 20 MHz DFT-s-OFDM NR signal (Note 2) |
| 40 | ±7.45 | CW |
|  | ±25 | 20 MHz DFT-s-OFDM NR signal (Note 2) |
| 45 | ±7.37 | CW |
|  | ±25 | 20 MHz DFT-s-OFDM NR signal (Note 2) |
| 50 | ±7.35 | CW |
|  | ±25 | 20 MHz DFT-s-OFDM NR signal (Note 2) |
| 60 | ±7.49 | CW |
|  | ±25 | 20 MHz DFT-s-OFDM NR signal (Note 2) |
| 70 | ±7.42 | CW |
|  | ±25 | 20 MHz DFT-s-OFDM NR signal (Note 2) |
| 80 | ±7.44 | CW |
|  | ±25 | 20 MHz DFT-s-OFDM NR signal (Note 2) |
| 90 | ±7.46 | CW |
|  | ±25 | 20 MHz DFT-s-OFDM NR signal (Note 2) |
| 100 | ±7.48 | CW |
|  | ±25 | 20 MHz DFT-s-OFDM NR signal (Note 2) |
| NOTE 1: Number of RBs is 25 for 15 kHz subcarrier spacing and 10 for 30 kHz subcarrier spacing.  NOTE 2: Number of RBs is 100 for 15 kHz subcarrier spacing, 50 for 30 kHz subcarrier spacing and 24 for 60 kHz subcarrier spacing.  NOTE 3: The RBs shall be placed adjacent to the transmission bandwidth configuration edge which is closer to the *Base Station RF Bandwidth* edge. | | |

Table 7.7.2-2a: Interfering signals for intermodulation requirement for band n46 and n96

|  |  |  |
| --- | --- | --- |
| *BS channel bandwidth of the lowest/highest carrier* received (MHz) | Interfering signal centre frequency offset from the lower/upper *Base Station RF Bandwidth* edge (MHz) | Type of interfering signal  (Note 2) |
| 10 | ±7.57 | CW (Note 3) |
|  | ±25 | 20 MHz DFT-s-OFDM NR signal (Note 1, 3) |
| 20 | ±7.50 | CW |
|  | ±25 | 20 MHz DFT-s-OFDM NR signal (Note 1) |
| 40 | ±7.45 | CW |
|  | ±25 | 20 MHz DFT-s-OFDM NR signal (Note 1) |
| 60 | ±7.49 | CW |
|  | ±25 | 20 MHz DFT-s-OFDM NR signal (Note 1) |
| 80 | ±7.44 | CW |
|  | ±25 | 20 MHz DFT-s-OFDM NR signal (Note 1) |
| NOTE 1: Number of RBs is 100 for 15 kHz subcarrier spacing and 50 for 30 kHz subcarrier spacing.  NOTE 2: The RBs shall be placed adjacent to the transmission bandwidth configuration edge which is closer to the *Base Station RF Bandwidth* edge.  NOTE 3: This type of interfering signal is only applied for band n46. | | |

Table 7.7.2-3: Narrowband intermodulation performance requirement in FR1

|  |  |  |  |
| --- | --- | --- | --- |
| BS type | Wanted signal mean power (dBm) | Interfering signal mean power (dBm) | Type of interfering signals |
| Wide Area BS | PREFSENS + 6dB  (Note 1) | -52 |  |
| Medium Range BS | PREFSENS + 6dB  (Note 2) | -47 | See Table 7.7.2-4 |
| Local Area BS | PREFSENS + 6dB  (Note 3) | -44 |  |
| NOTE 1: PREFSENS depends on the RAT.  For NR, PREFSENS depends also on the *BS channel bandwidth* as specified in table 7.2.2-1.  For NB-IoT, PREFSENS depends also on the *sub-carrier spacing* as specified in tables 7.2.1-5 of TS 36.104 [13].  NOTE 2: PREFSENS depends on the RAT.  For NR, PREFSENS depends also on the *BS channel bandwidth* as specified in table 7.2.2-2.  For NB-IoT, PREFSENS depends also on the *sub-carrier spacing* as specified in tables 7.2.1-5c of TS 36.104 [13].  NOTE 3: PREFSENS depends on the RAT.  For NR, PREFSENS depends also on the *BS channel bandwidth* as specified in table 7.2.2-3.  For NB-IoT, PREFSENS depends also on the *sub-carrier spacing* as specified in tables 7.2.1-5a of TS 36.104 [13].  NOTE 4: For NB-IoT, the requirement shall apply only for a FRC A1-3 of TS 36.104 [13] mapped to the frequency range at the channel edge adjacent to the interfering signals.  NOTE 5: For NB-IoT, the frequency offset shall be adjusted to accommodate the IMD product to fall in the NB-IoT RB for NB-IoT operation in NR in-band.  NOTE 6: For NB-IoT, if a BS RF receiver fails the test of the requirement, the test shall be performed with the CW interfering signal frequency shifted away from the wanted signal by 180 kHz and the NR interfering signal frequency shifted away from the wanted signal by 360 kHz. If the BS RF receiver still fails the test after the frequency shift, then the BS RF receiver shall be deemed to fail the requirement. | | | |

Table 7.7.2-4: Interfering signals for narrowband intermodulation requirement in FR1

|  |  |  |
| --- | --- | --- |
| *BS channel bandwidth* of the *lowest/highest carrier* received (MHz) | Interfering RB centre frequency offset from the lower/upper *Base Station RF Bandwidth edge* or *sub-block* edge inside a *sub-block gap* (kHz) (Note 3) | Type of interfering signal |
| 5 | ±360 | CW |
|  | ±1420 | 5 MHz DFT-s-OFDM NR signal, 1 RB (Note 1) |
| 10 | ±370 | CW |
|  | ±1960 | 5 MHz DFT-s-OFDM NR signal, 1 RB (Note 1) |
| 15 (Note 2) | ±380 | CW |
|  | ±1960 | 5 MHz DFT-s-OFDM NR signal, 1 RB (Note 1) |
| 20 (Note 2) | ±390 | CW |
|  | ±2320 | 5 MHz DFT-s-OFDM NR signal, 1 RB (Note 1) |
| 25 (Note 2) | ±325 | CW |
|  | ±2350 | 20 MHz DFT-s-OFDM NR signal, 1 RB (Note 1) |
| 30 (Note 2) | ±335 | CW |
|  | ±2350 | 20 MHz DFT-s-OFDM NR signal, 1 RB (Note 1) |
| 35 (Note 2) | ±345 | CW |
|  | ±2710 | 20 MHz DFT-s-OFDM NR signal, 1 RB (Note 1) |
| 40 (Note 2) | ±355 | CW |
|  | ±2710 | 20 MHz DFT-s-OFDM NR signal, 1 RB (Note 1) |
| 45 (Note 2) | ±365 | CW |
|  | ±2710 | 20 MHz DFT-s-OFDM NR signal, 1 RB (Note 1) |
| 50 (Note 2) | ±375 | CW |
|  | ±2710 | 20 MHz DFT-s-OFDM NR signal, 1 RB (Note 1) |
| 60 (Note 2) | ±395 | CW |
|  | ±2710 | 20 MHz DFT-s-OFDM NR signal, 1 RB (Note 1) |
| 70 (Note 2) | ±415 | CW |
|  | ±2710 | 20 MHz DFT-s-OFDM NR signal, 1 RB (Note 1) |
| 80 (Note 2) | ±435 | CW |
|  | ±2710 | 20 MHz DFT-s-OFDM NR signal, 1 RB (Note 1) |
| 90 (Note 2) | ±365 | CW |
|  | ±2530 | 20 MHz DFT-s-OFDM NR signal, 1 RB (Note 1) |
| 100 (Note 2) | ±385 | CW |
|  | ±2530 | 20 MHz DFT-s-OFDM NR signal, 1 RB (Note 1) |
| NOTE 1: Interfering signal consisting of one resource block positioned at the stated offset, the *BS channel bandwidth* of the interfering signal is located adjacently to the lower/upper *Base Station RF Bandwidth edge* or *sub-block* edge inside a *sub-block gap*.  NOTE 2: This requirement shall apply only for a G-FRC mapped to the frequency range at the *channel edge* adjacent to the interfering signals.  NOTE 3: The centre of the interfering RB refers to the frequency location between the two central subcarriers. | | |

#### < Next OF CHANGE>

## 7.8 In-channel selectivity

### 7.8.1 General

In-channel selectivity (ICS) is a measure of the receiver ability to receive a wanted signal at its assigned resource block locations at the *antenna connector* for *BS type 1-C* or *TAB connector* for *BS type 1-H* in the presence of an interfering signal received at a larger power spectral density. In this condition a throughput requirement shall be met for a specified reference measurement channel. The interfering signal shall be an NR signal which is time aligned with the wanted signal.

### 7.8.2 Minimum requirement for *BS type 1-C* and *BS type 1-H*

For *BS type 1-C* and *BS type* *1-H*, the throughput shall be ≥ 95% of the maximum throughput of the reference measurement channel as specified in annex A.1 with parameters specified in table 7.8.2-1 for Wide Area BS, in table 7.8.2-2 for Medium Range BS, in table 7.8.2-2b for Medium Range BS for band n46, in table 7.8.2-2c for Medium Range BS for band n96, in table 7.8.2-3 for Local Area BS, in table 7.8.2-3b for Local Area BS for band n46, and in table 7.8.2-3c for Local Area BS for band n96. The characteristics of the interfering signal is further specified in annex D.

For NB-IoT operation in NR in-band, the throughput shall be ≥ 95% of the maximum throughput of the NB-IoT reference measurement channel as specified in Annex A of TS 36.104 [13] with parameters specified in table 7.8.2-1a for Wide Area BS, in table 7.8.2-2a for Medium Range BS and in table 7.8.2-3a for Local Area BS.

Table 7.8.2-1: Wide Area BS in-channel selectivity

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| *BS channel bandwidth* (MHz) | Subcarrier spacing (kHz) | Reference measurement channel | Wanted signal mean power (dBm) (Note 2) | Interfering signal mean power (dBm) (Note 2) | Type of interfering signal |
| 5 | 15 | G-FR1-A1-7 | -100.6 | -81.4 | DFT-s-OFDM NR signal, 15 kHz SCS,  10 RBs |
| 10, 15, 20, 25, 30, 35 | 15 | G-FR1-A1-1 | -98.7 | -77.4 | DFT-s-OFDM NR signal, 15 kHz SCS,  25 RBs |
| 40, 45, 50 | 15 | G-FR1-A1-4 | -92.3 | -71.4 | DFT-s-OFDM NR signal, 15 kHz SCS,  100 RBs |
| 5 | 30 | G-FR1-A1-8 | -101.3 | -81.4 | DFT-s-OFDM NR signal, 30 kHz SCS,  5 RBs |
| 10, 15, 20, 25, 30, 35 | 30 | G-FR1-A1-2 | -98.8 | -78.4 | DFT-s-OFDM NR signal, 30 kHz SCS,  10 RBs |
| 40, 45, 50, 60, 70, 80, 90, 100 | 30 | G-FR1-A1-5 | -92.6 | -71.4 | DFT-s-OFDM NR signal, 30 kHz SCS,  50 RBs |
| 10, 15, 20, 25, 30, 35 | 60 | G-FR1-A1-9 | -98.2 | -78.4 | DFT-s-OFDM NR signal, 60 kHz SCS,  5 RBs |
| 40, 45, 50, 60, 70, 80, 90, 100 | 60 | G-FR1-A1-6 | -92.7 | -71.6 | DFT-s-OFDM NR signal, 60 kHz SCS,  24 RBs |
| NOTE 1: Wanted and interfering signal are placed adjacently around Fc, where the Fc is defined for *BS channel bandwidth* ofthe wanted signalaccording to the table 5.4.2.2-1. The aggregated wanted and interferer signal shall be centred in the *BS channel bandwidth* of the wanted signal.  NOTE 2: For BS operating in band n104, both wanted signal mean power and interfering signal mean power shall be increased by 1dB. | | | | | |

Table 7.8.2-1a: Wide Area BS in-channel selectivity for NB-IoT operation in NR in-band

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| *BS channel bandwidth* (MHz) | Reference measurement channel | Wanted signal mean power (dBm) | Interfering signal mean power (dBm) / BWConfig | Type of interfering signal |
| 5 |  |  | -81.4 | DFT-s-OFDM NR signal, 15 kHz SCS,  10 RBs |
| 10, 15, 20, 25, 30, 35 | FRC A14-1 in Annex A.14 in TS 36.104 [13] | -124.3 | -77.4 | DFT-s-OFDM NR signal, 15 kHz SCS,  25 RBs |
| 40, 45, 50 |  |  | -71.4 | DFT-s-OFDM NR signal, 15 kHz SCS,  100 RBs |
| 5 |  |  | -81.4 | DFT-s-OFDM NR signal, 15 kHz SCS,  10 RBs |
| 10, 15, 20, 25, 30, 35 | FRC A14-2 in Annex A.14 in TS 36.104 [13] | -130.2 | -77.4 | DFT-s-OFDM NR signal, 15 kHz SCS,  25 RBs |
| 40, 45, 50 |  |  | -71.4 | DFT-s-OFDM NR signal, 15 kHz SCS,  100 RBs |
| NOTE: Interfering signal is placed in one side of the Fc, while the NB-IoT PRB is placed on the other side. Both interfering signal and NB-IoT PRB are placed at the middle of the available PRB locations. The wanted NB-IoT tone is placed at the centre of this NB-IoT PRB. | | | | |

Table 7.8.2-2: Medium Range BS in-channel selectivity

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| *BS channel bandwidth* (MHz) | Subcarrier spacing (kHz) | Reference measurement channel | Wanted signal mean power (dBm) (Note 2) | Interfering signal mean power (dBm) (Note 2) | Type of interfering signal |
| 5 | 15 | G-FR1-A1-7 | -95.6 | -76.4 | DFT-s-OFDM NR signal, 15 kHz SCS,  10 RBs |
| 10, 15, 20, 25, 30, 35 | 15 | G-FR1-A1-1 | -93.7 | -72.4 | DFT-s-OFDM NR signal, 15 kHz SCS,  25 RBs |
| 40, 45, 50 | 15 | G-FR1-A1-4 | -87.3 | -66.4 | DFT-s-OFDM NR signal, 15 kHz SCS, 100 RBs |
| 5 | 30 | G-FR1-A1-8 | -96.3 | -76.4 | DFT-s-OFDM NR signal, 30 kHz SCS,  5 RBs |
| 10, 15, 20, 25, 30, 35 | 30 | G-FR1-A1-2 | -93.8 | -73.4 | DFT-s-OFDM NR signal, 30 kHz SCS,  10 RBs |
| 40, 45, 50, 60, 70, 80, 90, 100 | 30 | G-FR1-A1-5 | -87.6 | -66.4 | DFT-s-OFDM NR signal, 30 kHz SCS,  50 RBs |
| 10, 15, 20, 25, 30, 35 | 60 | G-FR1-A1-9 | -93.2 | -73.4 | DFT-s-OFDM NR signal, 60 kHz SCS,  5 RBs |
| 40, 45, 50, 60, 70, 80, 90, 100 | 60 | G-FR1-A1-6 | -87.7 | -66.6 | DFT-s-OFDM NR signal, 60 kHz SCS,  24 RBs |
| NOTE 1: Wanted and interfering signal are placed adjacently around Fc, where the Fc is defined for *BS channel bandwidth* of the wanted signalaccording to the table 5.4.2.2-1. The aggregated wanted and interferer signal shall be centred in the *BS channel bandwidth* of the wanted signal.  NOTE 2: For BS operating in band n104, both wanted signal mean power and interfering signal mean power shall be increased by 1dB. | | | | | |

Table 7.8.2-2a: Medium Range BS in-channel selectivity for NB-IoT operation in NR in-band

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| *BS channel bandwidth* (MHz) | Reference measurement channel | Wanted signal mean power (dBm) | Interfering signal mean power (dBm) / BWConfig | Type of interfering signal |
| 5 |  |  | -76.4 | DFT-s-OFDM NR signal, 15 kHz SCS,  10 RBs |
| 10, 15, 20, 25, 30, 35 | FRC A14-1 in Annex A.14 in TS 36.104 [13] | -119.3 | -72.4 | DFT-s-OFDM NR signal, 15 kHz SCS,  25 RBs |
| 40, 45, 50 |  |  | -66.4 | DFT-s-OFDM NR signal, 15 kHz SCS,  100 RBs |
| 5 |  |  | -76.4 | DFT-s-OFDM NR signal, 15 kHz SCS,  10 RBs |
| 10, 15, 20, 25, 30, 35 | FRC A14-2 in Annex A.14 in TS 36.104 [13] | -125.2 | -72.4 | DFT-s-OFDM NR signal, 15 kHz SCS,  25 RBs |
| 40, 45, 50 |  |  | -66.4 | DFT-s-OFDM NR signal, 15 kHz SCS,  100 RBs |
| NOTE: Interfering signal is placed in one side of the Fc, while the NB-IoT PRB is placed on the other side. Both interfering signal and NB-IoT PRB are placed at the middle of the available PRB locations. The wanted NB-IoT tone is placed at the centre of this NB-IoT PRB. | | | | |

Table 7.8.2-2b: Medium Range BS in-channel selectivity for band n46

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| *BS channel bandwidth* (MHz) | Subcarrier spacing (kHz) | Reference measurement channel | Wanted signal mean power (dBm) | Interfering signal mean power (dBm) | Type of interfering signal |
| 10 | 15 | G-FR1-A1-12 | -100.0 | -79.5 | CP-OFDM NR signal, 15 kHz SCS,  10 RBs |
|  | 30 | G-FR1-A1-13 | -97.7 | -77.4 | CP-OFDM NR signal, 30 kHz SCS,  10 RBs |
|  | 60 | G-FR1-A1-9 | -93.2 | -73.4 | DFT-s-OFDM NR signal, 60 kHz SCS,  5 RBs |
| 20 | 15 | G-FR1-A1-14 | -97.1 | -76.4 | CP-OFDM NR signal, 15 kHz SCS,  10 RBs |
|  | 30 | G-FR1-A1-15 | -94.1 | -73.4 | CP-OFDM NR signal, 30 kHz SCS,  10 RBs |
|  | 60 | G-FR1-A1-9 | -93.2 | -73.4 | DFT-s-OFDM NR signal, 60 kHz SCS,  5 RBs |
| 40 | 15 | G-FR1-A1-16 | -94.0 | -73.2 | CP-OFDM NR signal, 15 kHz SCS,  20 RBs |
|  | 30 | G-FR1-A1-17 | -91.0 | -70.2 | CP-OFDM NR signal, 30 kHz SCS,  10 RBs |
|  | 60 | G-FR1-A1-6 | -87.7 | -66.6 | DFT-s-OFDM NR signal, 60 kHz SCS,  24 RBs |
| 60 | 30 | G-FR1-A1-18 | -89.4 | -68.4 | CP-OFDM NR signal, 30 kHz SCS,  20 RBs |
|  | 60 | G-FR1-A1-6 | -87.7 | -66.6 | DFT-s-OFDM NR signal, 60 kHz SCS,  24 RBs |
| 80 | 30 | G-FR1-A1-19 | -88.1 | -67.1 | CP-OFDM NR signal, 30 kHz SCS,  20 RBs |
|  | 60 | G-FR1-A1-6 | -87.7 | -66.6 | DFT-s-OFDM NR signal, 60 kHz SCS,  24 RBs |
| NOTE: Wanted and interfering signal are placed adjacently around Fc, where the Fc is defined for *BS channel bandwidth* of the wanted signalaccording to the table 5.4.2.2-1. The aggregated wanted and interferer signal shall be centred in the BS channel bandwidth of the wanted signal. | | | | | |

Table 7.8.2-2c: Medium Range BS in-channel selectivity for band n96

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| *BS channel bandwidth* (MHz) | Subcarrier spacing (kHz) | Reference measurement channel | Wanted signal mean power (dBm) | Interfering signal mean power (dBm) | Type of interfering signal |
| 20 | 15 | G-FR1-A1-14 | -96.1 | -75.4 | CP-OFDM NR signal, 15 kHz SCS,  10 RBs |
|  | 30 | G-FR1-A1-15 | -93.1 | -72.4 | CP-OFDM NR signal, 30 kHz SCS,  10 RBs |
|  | 60 | G-FR1-A1-9 | -92.2 | -72.4 | DFT-s-OFDM NR signal, 60 kHz SCS,  5 RBs |
| 40 | 15 | G-FR1-A1-16 | -93.0 | -72.2 | CP-OFDM NR signal, 15 kHz SCS,  20 RBs |
|  | 30 | G-FR1-A1-17 | -90.0 | -69.2 | CP-OFDM NR signal, 30 kHz SCS,  10 RBs |
|  | 60 | G-FR1-A1-6 | -86.7 | -65.6 | DFT-s-OFDM NR signal, 60 kHz SCS,  24 RBs |
| 60 | 30 | G-FR1-A1-18 | -88.4 | -67.4 | CP-OFDM NR signal, 30 kHz SCS,  20 RBs |
|  | 60 | G-FR1-A1-6 | -86.7 | -65.6 | DFT-s-OFDM NR signal, 60 kHz SCS,  24 RBs |
| 80 | 30 | G-FR1-A1-19 | -87.1 | -66.1 | CP-OFDM NR signal, 30 kHz SCS,  20 RBs |
|  | 60 | G-FR1-A1-6 | -86.7 | -65.6 | DFT-s-OFDM NR signal, 60 kHz SCS,  24 RBs |
| NOTE: Wanted and interfering signal are placed adjacently around Fc, where the Fc is defined for *BS channel bandwidth* of the wanted signalaccording to the table 5.4.2.2-1. The aggregated wanted and interferer signal shall be centred in the BS channel bandwidth of the wanted signal. | | | | | |

Table 7.8.2-3: Local area BS in-channel selectivity

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| *BS channel bandwidth* (MHz) | Subcarrier spacing (kHz) | Reference measurement channel | Wanted signal mean power (dBm)  (Note 2) | Interfering signal mean power (dBm)  (Note 2) | Type of interfering signal |
| 5 | 15 | G-FR1-A1-7 | -92.6 | -73.4 | DFT-s-OFDM NR signal, 15 kHz SCS,  10 RBs |
| 10, 15, 20, 25, 30, 35 | 15 | G-FR1-A1-1 | -90.7 | -69.4 | DFT-s-OFDM NR signal, 15 kHz SCS,  25 RBs |
| 40, 45, 50 | 15 | G-FR1-A1-4 | -84.3 | -63.4 | DFT-s-OFDM NR signal, 15 kHz SCS,  100 RBs |
| 5 | 30 | G-FR1-A1-8 | -93.3 | -73.4 | DFT-s-OFDM NR signal, 30 kHz SCS,  5 RBs |
| 10, 15, 20, 25, 30, 35 | 30 | G-FR1-A1-2 | -90.8 | -70.4 | DFT-s-OFDM NR signal, 30 kHz SCS,  10 RBs |
| 40, 45, 50, 60, 70, 80, 90, 100 | 30 | G-FR1-A1-5 | -84.6 | -63.4 | DFT-s-OFDM NR signal, 30 kHz SCS,  50 RBs |
| 10, 15, 20, 25, 30, 35 | 60 | G-FR1-A1-9 | -90.2 | -70.4 | DFT-s-OFDM NR signal, 60 kHz SCS,  5 RBs |
| 40, 45, 50, 60, 70, 80, 90, 100 | 60 | G-FR1-A1-6 | -84.7 | -63.6 | DFT-s-OFDM NR signal, 60 kHz SCS,  24 RBs |
| NOTE 1: Wanted and interfering signal are placed adjacently around Fc, where the Fc is defined for *BS channel bandwidth* of the wanted signal according to the table 5.4.2.2-1. The aggregated wanted and interferer signal shall be centred in the *BS channel bandwidth* of the wanted signal.  NOTE 2: For BS operating in band n104, both wanted signal mean power and interfering signal mean power shall be increased by 1dB. | | | | | |

Table 7.8.2-3a: Local Area BS in-channel selectivity for NB-IoT operation in NR in-band

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| *BS channel bandwidth* (MHz) | Reference measurement channel | Wanted signal mean power (dBm) | Interfering signal mean power (dBm) / BWConfig | Type of interfering signal |
| 5 |  |  | -73.4 | DFT-s-OFDM NR signal, 15 kHz SCS,  10 RBs |
| 10, 15, 20, 25, 30, 35 | FRC A14-1 in Annex A.14 in TS 36.104 [13] | -116.3 | -69.4 | DFT-s-OFDM NR signal, 15 kHz SCS,  25 RBs |
| 40, 45, 50 |  |  | -63.4 | DFT-s-OFDM NR signal, 15 kHz SCS,  100 RBs |
| 5 |  |  | -73.4 | DFT-s-OFDM NR signal, 15 kHz SCS,  10 RBs |
| 10, 15, 20, 25, 30, 35 | FRC A14-2 in Annex A.14 in TS 36.104 [13] | -122.2 | -69.4 | DFT-s-OFDM NR signal, 15 kHz SCS,  25 RBs |
| 40, 45, 50 |  |  | -63.4 | DFT-s-OFDM NR signal, 15 kHz SCS,  100 RBs |
| NOTE: Interfering signal is placed in one side of the Fc, while the NB-IoT PRB is placed on the other side. Both interfering signal and NB-IoT PRB are placed at the middle of the available PRB locations. The wanted NB-IoT tone is placed at the centre of this NB-IoT PRB. | | | | |

Table 7.8.2-3b: Local Area BS in-channel selectivity for band n46

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| *BS channel bandwidth* (MHz) | Subcarrier spacing (kHz) | Reference measurement channel | Wanted signal mean power (dBm) | Interfering signal mean power (dBm) | Type of interfering signal |
| 10 | 15 | G-FR1-A1-12 | -97.0 | -76.5 | CP-OFDM NR signal, 15 kHz SCS,  10 RBs |
|  | 30 | G-FR1-A1-13 | -94.7 | -74.4 | CP-OFDM NR signal, 30 kHz SCS,  10 RBs |
|  | 60 | G-FR1-A1-9 | -90.2 | -70.4 | DFT-s-OFDM NR signal, 60 kHz SCS,  5 RBs |
| 20 | 15 | G-FR1-A1-14 | -94.1 | -73.4 | CP-OFDM NR signal, 15 kHz SCS,  10 RBs |
|  | 30 | G-FR1-A1-15 | -91.1 | -70.4 | CP-OFDM NR signal, 30 kHz SCS,  10 RBs |
|  | 60 | G-FR1-A1-9 | -90.2 | -70.4 | DFT-s-OFDM NR signal, 60 kHz SCS,  5 RBs |
| 40 | 15 | G-FR1-A1-16 | -91.0 | -70.2 | CP-OFDM NR signal, 15 kHz SCS,  20 RBs |
|  | 30 | G-FR1-A1-17 | -88.0 | -67.2 | CP-OFDM NR signal, 30 kHz SCS,  10 RBs |
|  | 60 | G-FR1-A1-6 | -84.7 | -63.6 | DFT-s-OFDM NR signal, 60 kHz SCS,  24 RBs |
| 60 | 30 | G-FR1-A1-18 | -86.4 | -65.4 | CP-OFDM NR signal, 30 kHz SCS,  20 RBs |
|  | 60 | G-FR1-A1-6 | -84.7 | -63.6 | DFT-s-OFDM NR signal, 60 kHz SCS,  24 RBs |
| 80 | 30 | G-FR1-A1-19 | -85.1 | -64.1 | CP-OFDM NR signal, 30 kHz SCS,  20 RBs |
|  | 60 | G-FR1-A1-6 | -84.7 | -63.6 | DFT-s-OFDM NR signal, 60 kHz SCS,  24 RBs |
| NOTE: Wanted and interfering signal are placed adjacently around Fc, where the Fc is defined for *BS channel bandwidth* of the wanted signalaccording to the table 5.4.2.2-1. The aggregated wanted and interferer signal shall be centred in the BS channel bandwidth of the wanted signal. | | | | | |

Table 7.8.2-3c: Local Area BS in-channel selectivity for band n96

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| *BS channel bandwidth* (MHz) | Subcarrier spacing (kHz) | Reference measurement channel | Wanted signal mean power (dBm) | Interfering signal mean power (dBm) | Type of interfering signal |
| 20 | 15 | G-FR1-A1-14 | -93.1 | -72.4 | CP-OFDM NR signal, 15 kHz SCS,  10 RBs |
|  | 30 | G-FR1-A1-15 | -90.1 | -69.4 | CP-OFDM NR signal, 30 kHz SCS,  10 RBs |
|  | 60 | G-FR1-A1-9 | -89.2 | -69.4 | DFT-s-OFDM NR signal, 60 kHz SCS,  5 RBs |
| 40 | 15 | G-FR1-A1-16 | -90.0 | -69.2 | CP-OFDM NR signal, 15 kHz SCS,  20 RBs |
|  | 30 | G-FR1-A1-17 | -87.0 | -66.2 | CP-OFDM NR signal, 30 kHz SCS,  10 RBs |
|  | 60 | G-FR1-A1-6 | -83.7 | -62.6 | DFT-s-OFDM NR signal, 60 kHz SCS,  24 RBs |
| 60 | 30 | G-FR1-A1-18 | -85.4 | -64.4 | CP-OFDM NR signal, 30 kHz SCS,  20 RBs |
|  | 60 | G-FR1-A1-6 | -83.7 | -62.6 | DFT-s-OFDM NR signal, 60 kHz SCS,  24 RBs |
| 80 | 30 | G-FR1-A1-19 | -84.1 | -63.1 | CP-OFDM NR signal, 30 kHz SCS,  20 RBs |
|  | 60 | G-FR1-A1-6 | -83.7 | -62.6 | DFT-s-OFDM NR signal, 60 kHz SCS,  24 RBs |
| NOTE: Wanted and interfering signal are placed adjacently around Fc, where the Fc is defined for *BS channel bandwidth* of the wanted signalaccording to the table 5.4.2.2-1. The aggregated wanted and interferer signal shall be centred in the BS channel bandwidth of the wanted signal. | | | | | |

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## 9.7 OTA unwanted emissions

### 9.7.1 General

Unwanted emissions consist of so-called out-of-band emissions and spurious emissions according to ITU definitions ITU-R SM.329 [2]. In ITU terminology, out of band emissions are unwanted emissions immediately outside the *BS channel bandwidth* resulting from the modulation process and non-linearity in the transmitter but excluding spurious emissions. Spurious emissions are emissions which are caused by unwanted transmitter effects such as harmonics emission, parasitic emission, intermodulation products and frequency conversion products, but exclude out of band emissions.

The OTA out-of-band emissions requirement for the *BS type 1-O* and *BS type 2-O* transmitter is specified both in terms of Adjacent Channel Leakage power Ratio (ACLR) and operating band unwanted emissions (OBUE). The OTA Operating band unwanted emissions define all unwanted emissions in each supported downlink *operating band* plus the frequency ranges ΔfOBUE above and ΔfOBUE below each band. OTA Unwanted emissions outside of this frequency range are limited by an OTA spurious emissions requirement.

The maximum offset of the operating band unwanted emissions mask from the *operating band* edge is ΔfOBUE. The value of ΔfOBUE is defined in table 9.7.1-1 for *BS type 1-O* and *BS type 2-O* for the NR *operating bands*.

Table 9.7.1-1: Maximum offset ΔfOBUE outside the downlink *operating band*

|  |  |  |
| --- | --- | --- |
| BS type | *Operating band* characteristics | ΔfOBUE (MHz) |
| *BS type 1-O* | FDL,high – FDL,low < 100 MHz | 10 |
|  | 100 MHz ≤ FDL,high – FDL,low ≤ 900 MHz | 40 |
| *BS type 2-O* | FDL,high – FDL,low ≤ 4000 MHz | 1500 |

For band n104, the values of ΔfOBUE are defined in table 6.6.1-1b.

Table 6.6.1-1b: Maximum offset of OBUE outside the downlink *operating band* for band n104

|  |  |  |
| --- | --- | --- |
| BS type | ***Operating band*** | **ΔfOBUE (MHz)** |
| *BS type 1-O* | n104 | [100] |

The unwanted emission requirements are applied per cell for all the configurations. Requirements for OTA unwanted emissions are captured using TRP, *directional requirements* or co-location requirements as described per requirement.

There is in addition a requirement for occupied bandwidth.

#### < Next OF CHANGE>

## 10.3 OTA reference sensitivity level

### 10.3.1 General

The OTA REFSENS requirement is a *directional requirement* and is intended to ensure the minimum OTA reference sensitivity level for a declared *OTA REFSENS RoAoA*. The OTA reference sensitivity power level EISREFSENS is the minimum mean power received at the RIB at which a reference performance requirement shall be met for a specified reference measurement channel.

The OTA REFSENS requirement shall apply to each supported polarization, under the assumption of *polarization match*.

### 10.3.2 Minimum requirement for *BS type 1-O*

The throughput shall be ≥ 95% of the maximum throughput of the reference measurement channel as specified in the corresponding table and annex A.1 when the OTA test signal is at the corresponding EISREFSENS level and arrives from any direction within the *OTA REFSENS RoAoA.*

Table 10.3.2-1: Wide Area BS reference sensitivity levels

|  |  |  |  |
| --- | --- | --- | --- |
| *BS channel bandwidth* (MHz) | Sub-carrier spacing (kHz) | Reference measurement channel | OTA reference sensitivity level, EISREFSENS  (dBm) (Note 2) |
| 5, 10, 15 | 15 | G-FR1-A1-1 | -101.7 - ΔOTAREFSENS |
| 10, 15 | 30 | G-FR1-A1-2 | -101.8 - ΔOTAREFSENS |
| 10, 15 | 60 | G-FR1-A1-3 | -98.9 - ΔOTAREFSENS |
| 20, 25, 30, 35, 40, 45, 50 | 15 | G-FR1-A1-4 | -95.3 - ΔOTAREFSENS |
| 20, 25, 30, 35, 40, 45, 50, 60, 70, 80, 90, 100 | 30 | G-FR1-A1-5 | -95.6 - ΔOTAREFSENS |
| 20, 25, 30, 35, 40, 45, 50, 60, 70, 80, 90, 100 | 60 | G-FR1-A1-6 | -95.7 - ΔOTAREFSENS |
| NOTE 1: EISREFSENS is the power level of a single instance of the reference measurement channel. This requirement shall be met for each consecutive application of a single instance of the reference measurement channel mapped to disjoint frequency ranges with a width corresponding to the number of resource blocks of the reference measurement channel each, except for one instance that might overlap one other instance to cover the full *BS channel bandwidth*.  NOTE 2: For BS operating in band n104, EISREFSENS shall be allowed with 1dB relaxation. | | | |

Table 10.3.2-2: Medium Range BS reference sensitivity levels

|  |  |  |  |
| --- | --- | --- | --- |
| *BS channel bandwidth* (MHz) | Sub-carrier spacing (kHz) | Reference measurement channel | OTA reference sensitivity level, EISREFSENS  (dBm) (Note 2) |
| 5, 10, 15 | 15 | G-FR1-A1-1 | -96.7 - ΔOTAREFSENS |
| 10, 15 | 30 | G-FR1-A1-2 | -96.8 - ΔOTAREFSENS |
| 10, 15 | 60 | G-FR1-A1-3 | -93.9 - ΔOTAREFSENS |
| 20, 25, 30, 35, 40, 45, 50 | 15 | G-FR1-A1-4 | -90.3 - ΔOTAREFSENS |
| 20, 25, 30, 35, 40, 45, 50, 60, 70, 80, 90, 100 | 30 | G-FR1-A1-5 | -90.6 - ΔOTAREFSENS |
| 20, 25, 30, 35, 40, 45, 50, 60, 70, 80, 90, 100 | 60 | G-FR1-A1-6 | -90.7 - ΔOTAREFSENS |
| NOTE 1: EISREFSENS is the power level of a single instance of the reference measurement channel. This requirement shall be met for each consecutive application of a single instance of the reference measurement channel mapped to disjoint frequency ranges with a width corresponding to the number of resource blocks of the reference measurement channel each, except for one instance that might overlap one other instance to cover the full *BS channel bandwidth*.  NOTE 2: For BS operating in band n104, EISREFSENS shall be allowed with 1dB relaxation. | | | |

Table 10.3.2-3: Local Area BS reference sensitivity levels

|  |  |  |  |
| --- | --- | --- | --- |
| *BS channel bandwidth* (MHz) | Sub-carrier spacing (kHz) | Reference measurement channel | OTA reference sensitivity level, EISREFSENS  (dBm) (Note 2) |
| 5, 10, 15 | 15 | G-FR1-A1-1 | -93.7 - ΔOTAREFSENS |
| 10, 15 | 30 | G-FR1-A1-2 | -93.8 - ΔOTAREFSENS |
| 10, 15 | 60 | G-FR1-A1-3 | -90.9 - ΔOTAREFSENS |
| 20, 25, 30, 35, 40, 45, 50 | 15 | G-FR1-A1-4 | -87.3 - ΔOTAREFSENS |
| 20, 25, 30, 35, 40, 45, 50, 60, 70, 80, 90, 100 | 30 | G-FR1-A1-5 | -87.6 - ΔOTAREFSENS |
| 20, 25, 30, 35, 40, 45, 50, 60, 70, 80, 90, 100 | 60 | G-FR1-A1-6 | -87.7 - ΔOTAREFSENS |
| NOTE 1: EISREFSENS is the power level of a single instance of the reference measurement channel. This requirement shall be met for each consecutive application of a single instance of the reference measurement channel mapped to disjoint frequency ranges with a width corresponding to the number of resource blocks of the reference measurement channel each, except for one instance that might overlap one other instance to cover the full *BS channel bandwidth*.  NOTE 2: For BS operating in band n104, EISREFSENS shall be allowed with 1dB relaxation. | | | |

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## 10.4 OTA dynamic range

### 10.4.1 General

The OTA dynamic range is a measure of the capability of the receiver unit to receive a wanted signal in the presence of an interfering signal inside the received *BS channel bandwidth*.

The requirement shall apply at the RIB when the AoA of the incident wave of a received signal and the interfering signal are from the same direction and are within the *OTA REFSENS RoAoA.*

The wanted and interfering signals apply to each supported polarization, under the assumption of *polarization match*.

### 10.4.2 Minimum requirement for *BS type 1-O*

For NR, the throughput shall be ≥ 95% of the maximum throughput of the reference measurement channel.

Table 10.4.2-1: Wide Area BS OTA dynamic range for NR carrier

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| *BS channel bandwidth* (MHz) | Subcarrier spacing (kHz) | Reference measurement channel | Wanted signal mean power (dBm)  (Note 2) | Interfering signal mean power (dBm) / BWConfig  (Note 2) | Type of interfering signal |
| 5 | 15 | G-FR1-A2-1 | -70.7- ΔOTAREFSENS | -82.5- ΔOTAREFSENS | AWGN |
|  | 30 | G-FR1-A2-2 | -71.4- ΔOTAREFSENS |  |  |
| 10 | 15 | G-FR1-A2-1 | -70.7- ΔOTAREFSENS | -79.3- ΔOTAREFSENS | AWGN |
|  | 30 | G-FR1-A2-2 | -71.4- ΔOTAREFSENS |  |  |
|  | 60 | G-FR1-A2-3 | -68.4- ΔOTAREFSENS |  |  |
| 15 | 15 | G-FR1-A2-1 | -70.7- ΔOTAREFSENS | -77.5- ΔOTAREFSENS | AWGN |
|  | 30 | G-FR1-A2-2 | -71.4- ΔOTAREFSENS |  |  |
|  | 60 | G-FR1-A2-3 | -68.4- ΔOTAREFSENS |  |  |
| 20 | 15 | G-FR1-A2-4 | -64.5- ΔOTAREFSENS | -76.2- ΔOTAREFSENS | AWGN |
|  | 30 | G-FR1-A2-5 | -64.5- ΔOTAREFSENS |  |  |
|  | 60 | G-FR1-A2-6 | -64.8- ΔOTAREFSENS |  |  |
| 25 | 15 | G-FR1-A2-4 | -64.5- ΔOTAREFSENS | -75.2- ΔOTAREFSENS | AWGN |
|  | 30 | G-FR1-A2-5 | -64.5- ΔOTAREFSENS |  |  |
|  | 60 | G-FR1-A2-6 | -64.8- ΔOTAREFSENS |  |  |
| 30 | 15 | G-FR1-A2-4 | -64.5- ΔOTAREFSENS | -74.4- ΔOTAREFSENS | AWGN |
|  | 30 | G-FR1-A2-5 | -64.5- ΔOTAREFSENS |  |  |
|  | 60 | G-FR1-A2-6 | -64.8- ΔOTAREFSENS |  |  |
| 35 | 15 | G-FR1-A2-4 | -64.5- ΔOTAREFSENS | -73.7- ΔOTAREFSENS | AWGN |
|  | 30 | G-FR1-A2-5 | -64.5- ΔOTAREFSENS |  |  |
|  | 60 | G-FR1-A2-6 | -64.8- ΔOTAREFSENS |  |  |
| 40 | 15 | G-FR1-A2-4 | -64.5- ΔOTAREFSENS | -73.1- ΔOTAREFSENS | AWGN |
|  | 30 | G-FR1-A2-5 | -64.5- ΔOTAREFSENS |  |  |
|  | 60 | G-FR1-A2-6 | -64.8- ΔOTAREFSENS |  |  |
| 45 | 15 | G-FR1-A2-4 | -64.5- ΔOTAREFSENS | -72.6- ΔOTAREFSENS | AWGN |
|  | 30 | G-FR1-A2-5 | -64.5- ΔOTAREFSENS |  |  |
|  | 60 | G-FR1-A2-6 | -64.8- ΔOTAREFSENS |  |  |
| 50 | 15 | G-FR1-A2-4 | -64.5- ΔOTAREFSENS | -72.1- ΔOTAREFSENS | AWGN |
|  | 30 | G-FR1-A2-5 | -64.5- ΔOTAREFSENS |  |  |
|  | 60 | G-FR1-A2-6 | -64.8- ΔOTAREFSENS |  |  |
| 60 | 30 | G-FR1-A2-5 | -64.5- ΔOTAREFSENS | -71.3- ΔOTAREFSENS | AWGN |
|  | 60 | G-FR1-A2-6 | -64.8- ΔOTAREFSENS |  |  |
| 70 | 30 | G-FR1-A2-5 | -64.5- ΔOTAREFSENS | -70.7- ΔOTAREFSENS | AWGN |
|  | 60 | G-FR1-A2-6 | -64.8- ΔOTAREFSENS |  |  |
| 80 | 30 | G-FR1-A2-5 | -64.5- ΔOTAREFSENS | -70.1- ΔOTAREFSENS | AWGN |
|  | 60 | G-FR1-A2-6 | -64.8- ΔOTAREFSENS |  |  |
| 90 | 30 | G-FR1-A2-5 | -64.5- ΔOTAREFSENS | -69.5- ΔOTAREFSENS | AWGN |
|  | 60 | G-FR1-A2-6 | -64.8- ΔOTAREFSENS |  |  |
| 100 | 30 | G-FR1-A2-5 | -64.5- ΔOTAREFSENS | -69.1- ΔOTAREFSENS | AWGN |
|  | 60 | G-FR1-A2-6 | -64.8- ΔOTAREFSENS |  |  |
| NOTE 1: The wanted signal mean power is the power level of a single instance of the corresponding reference measurement channel. This requirement shall be met for each consecutive application of a single instance of the reference measurement channel mapped to disjoint frequency ranges with a width corresponding to the number of resource blocks of the reference measurement channel each, except for one instance that might overlap one other instance to cover the full *BS channel bandwidth*.  NOTE 2: For BS operating in band n104, both wanted signal mean power and interfering signal mean power shall be increased by 1dB. | | | | | |

Table 10.4.2-2: Medium Range BS OTA dynamic range for NR carrier

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| *BS channel bandwidth* (MHz) | Subcarrier spacing (kHz) | Reference measurement channel | Wanted signal mean power (dBm)  (Note 2) | Interfering signal mean power (dBm) / BWConfig  (Note 2) | Type of interfering signal |
| 5 | 15 | G-FR1-A2-1 | -65.7- ΔOTAREFSENS | -77.5- ΔOTAREFSENS | AWGN |
|  | 30 | G-FR1-A2-2 | -66.4- ΔOTAREFSENS |  |  |
| 10 | 15 | G-FR1-A2-1 | -65.7- ΔOTAREFSENS | -74.3- ΔOTAREFSENS | AWGN |
|  | 30 | G-FR1-A2-2 | -66.4- ΔOTAREFSENS |  |  |
|  | 60 | G-FR1-A2-3 | -63.4- ΔOTAREFSENS |  |  |
| 15 | 15 | G-FR1-A2-1 | -65.7- ΔOTAREFSENS | -72.5- ΔOTAREFSENS | AWGN |
|  | 30 | G-FR1-A2-2 | -66.4- ΔOTAREFSENS |  |  |
|  | 60 | G-FR1-A2-3 | -63.4- ΔOTAREFSENS |  |  |
| 20 | 15 | G-FR1-A2-4 | -59.5- ΔOTAREFSENS | -71.2- ΔOTAREFSENS | AWGN |
|  | 30 | G-FR1-A2-5 | -59.5- ΔOTAREFSENS |  |  |
|  | 60 | G-FR1-A2-6 | -59.8- ΔOTAREFSENS |  |  |
| 25 | 15 | G-FR1-A2-4 | -59.5- ΔOTAREFSENS | -70.2- ΔOTAREFSENS | AWGN |
|  | 30 | G-FR1-A2-5 | -59.5- ΔOTAREFSENS |  |  |
|  | 60 | G-FR1-A2-6 | -59.8- ΔOTAREFSENS |  |  |
| 30 | 15 | G-FR1-A2-4 | -59.5- ΔOTAREFSENS | -69.4- ΔOTAREFSENS | AWGN |
|  | 30 | G-FR1-A2-5 | -59.5- ΔOTAREFSENS |  |  |
|  | 60 | G-FR1-A2-6 | -59.8- ΔOTAREFSENS |  |  |
| 35 | 15 | G-FR1-A2-4 | -59.5- ΔOTAREFSENS | -68.7- ΔOTAREFSENS | AWGN |
|  | 30 | G-FR1-A2-5 | -59.5- ΔOTAREFSENS |  |  |
|  | 60 | G-FR1-A2-6 | -59.8- ΔOTAREFSENS |  |  |
| 40 | 15 | G-FR1-A2-4 | -59.5- ΔOTAREFSENS | -68.1- ΔOTAREFSENS | AWGN |
|  | 30 | G-FR1-A2-5 | -59.5- ΔOTAREFSENS |  |  |
|  | 60 | G-FR1-A2-6 | -59.8- ΔOTAREFSENS |  |  |
| 45 | 15 | G-FR1-A2-4 | -59.5- ΔOTAREFSENS | -67.6- ΔOTAREFSENS | AWGN |
|  | 30 | G-FR1-A2-5 | -59.5- ΔOTAREFSENS |  |  |
|  | 60 | G-FR1-A2-6 | -59.8- ΔOTAREFSENS |  |  |
| 50 | 15 | G-FR1-A2-4 | -59.5- ΔOTAREFSENS | -67.1- ΔOTAREFSENS | AWGN |
|  | 30 | G-FR1-A2-5 | -59.5- ΔOTAREFSENS |  |  |
|  | 60 | G-FR1-A2-6 | -59.8- ΔOTAREFSENS |  |  |
| 60 | 30 | G-FR1-A2-5 | -59.5- ΔOTAREFSENS | -66.3- ΔOTAREFSENS | AWGN |
|  | 60 | G-FR1-A2-6 | -59.8- ΔOTAREFSENS |  |  |
| 70 | 30 | G-FR1-A2-5 | -59.5- ΔOTAREFSENS | -65.7- ΔOTAREFSENS | AWGN |
|  | 60 | G-FR1-A2-6 | -59.8- ΔOTAREFSENS |  |  |
| 80 | 30 | G-FR1-A2-5 | -59.5- ΔOTAREFSENS | -65.1- ΔOTAREFSENS | AWGN |
|  | 60 | G-FR1-A2-6 | -59.8- ΔOTAREFSENS |  |  |
| 90 | 30 | G-FR1-A2-5 | -59.5- ΔOTAREFSENS | -64.5- ΔOTAREFSENS | AWGN |
|  | 60 | G-FR1-A2-6 | -59.8- ΔOTAREFSENS |  |  |
| 100 | 30 | G-FR1-A2-5 | -59.5- ΔOTAREFSENS | -64.1- ΔOTAREFSENS | AWGN |
|  | 60 | G-FR1-A2-6 | -59.8- ΔOTAREFSENS |  |  |
| NOTE 1: The wanted signal mean power is the power level of a single instance of the corresponding reference measurement channel. This requirement shall be met for each consecutive application of a single instance of the reference measurement channel mapped to disjoint frequency ranges with a width corresponding to the number of resource blocks of the reference measurement channel each, except for one instance that might overlap one other instance to cover the full *BS channel bandwidth*.  NOTE 2: For BS operating in band n104, both wanted signal mean power and interfering signal mean power shall be increased by 1dB. | | | | | |

Table 10.4.2-3: Local Area BS OTA dynamic range for NR carrier

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| *BS channel bandwidth* (MHz) | Subcarrier spacing (kHz) | Reference measurement channel | Wanted signal mean power (dBm)  (Note 2) | Interfering signal mean power (dBm) / BWConfig  (Note 2) | Type of interfering signal |
| 5 | 15 | G-FR1-A2-1 | -62.7- ΔOTAREFSENS | -74.5- ΔOTAREFSENS | AWGN |
|  | 30 | G-FR1-A2-2 | -64.4- ΔOTAREFSENS |  |  |
| 10 | 15 | G-FR1-A2-1 | -62.7- ΔOTAREFSENS | -71.3- ΔOTAREFSENS | AWGN |
|  | 30 | G-FR1-A2-2 | -64.4- ΔOTAREFSENS |  |  |
|  | 60 | G-FR1-A2-3 | -60.4- ΔOTAREFSENS |  |  |
| 15 | 15 | G-FR1-A2-1 | -62.7- ΔOTAREFSENS | -69.5- ΔOTAREFSENS | AWGN |
|  | 30 | G-FR1-A2-2 | -64.4- ΔOTAREFSENS |  |  |
|  | 60 | G-FR1-A2-3 | -60.4- ΔOTAREFSENS |  |  |
| 20 | 15 | G-FR1-A2-4 | -56.5- ΔOTAREFSENS | -68.2- ΔOTAREFSENS | AWGN |
|  | 30 | G-FR1-A2-5 | -56.5- ΔOTAREFSENS |  |  |
|  | 60 | G-FR1-A2-6 | -56.8- ΔOTAREFSENS |  |  |
| 25 | 15 | G-FR1-A2-4 | -56.5- ΔOTAREFSENS | -67.2- ΔOTAREFSENS | AWGN |
|  | 30 | G-FR1-A2-5 | -56.5- ΔOTAREFSENS |  |  |
|  | 60 | G-FR1-A2-6 | -56.8- ΔOTAREFSENS |  |  |
| 30 | 15 | G-FR1-A2-4 | -56.5- ΔOTAREFSENS | -66.4- ΔOTAREFSENS | AWGN |
|  | 30 | G-FR1-A2-5 | -56.5- ΔOTAREFSENS |  |  |
|  | 60 | G-FR1-A2-6 | -56.8- ΔOTAREFSENS |  |  |
| 35 | 15 | G-FR1-A2-4 | -56.5- ΔOTAREFSENS | -65.7- ΔOTAREFSENS | AWGN |
|  | 30 | G-FR1-A2-5 | -56.5- ΔOTAREFSENS |  |  |
|  | 60 | G-FR1-A2-6 | -56.8- ΔOTAREFSENS |  |  |
| 40 | 15 | G-FR1-A2-4 | -56.5- ΔOTAREFSENS | -65.1- ΔOTAREFSENS | AWGN |
|  | 30 | G-FR1-A2-5 | -56.5- ΔOTAREFSENS |  |  |
|  | 60 | G-FR1-A2-6 | -56.8- ΔOTAREFSENS |  |  |
| 45 | 15 | G-FR1-A2-4 | -56.5- ΔOTAREFSENS | -64.6- ΔOTAREFSENS | AWGN |
|  | 30 | G-FR1-A2-5 | -56.5- ΔOTAREFSENS |  |  |
|  | 60 | G-FR1-A2-6 | -56.8- ΔOTAREFSENS |  |  |
| 50 | 15 | G-FR1-A2-4 | -56.5- ΔOTAREFSENS | -64.1- ΔOTAREFSENS | AWGN |
|  | 30 | G-FR1-A2-5 | -56.5- ΔOTAREFSENS |  |  |
|  | 60 | G-FR1-A2-6 | -56.8- ΔOTAREFSENS |  |  |
| 60 | 30 | G-FR1-A2-5 | -56.5- ΔOTAREFSENS | -63.3- ΔOTAREFSENS | AWGN |
|  | 60 | G-FR1-A2-6 | -56.8- ΔOTAREFSENS |  |  |
| 70 | 30 | G-FR1-A2-5 | -56.5- ΔOTAREFSENS | -62.7- ΔOTAREFSENS | AWGN |
|  | 60 | G-FR1-A2-6 | -56.8- ΔOTAREFSENS |  |  |
| 80 | 30 | G-FR1-A2-5 | -56.5- ΔOTAREFSENS | -62.1- ΔOTAREFSENS | AWGN |
|  | 60 | G-FR1-A2-6 | -56.8- ΔOTAREFSENS |  |  |
| 90 | 30 | G-FR1-A2-5 | -56.5- ΔOTAREFSENS | -61.5- ΔOTAREFSENS | AWGN |
|  | 60 | G-FR1-A2-6 | -56.8- ΔOTAREFSENS |  |  |
| 100 | 30 | G-FR1-A2-5 | -56.5- ΔOTAREFSENS | -61.1- ΔOTAREFSENS | AWGN |
|  | 60 | G-FR1-A2-6 | -56.8- ΔOTAREFSENS |  |  |
| NOTE 1: The wanted signal mean power is the power level of a single instance of the corresponding reference measurement channel. This requirement shall be met for each consecutive application of a single instance of the reference measurement channel mapped to disjoint frequency ranges with a width corresponding to the number of resource blocks of the reference measurement channel each, except for one instance that might overlap one other instance to cover the full *BS channel bandwidth*.  NOTE 2: For BS operating in band n104, both wanted signal mean power and interfering signal mean power shall be increased by 1dB. | | | | | |

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## 10.5 OTA in-band selectivity and blocking

### 10.5.1 OTA adjacent channel selectivity

#### 10.5.1.1 General

OTA Adjacent channel selectivity (ACS) is a measure of the receiver's ability to receive an OTA wanted signal at its assigned channel frequency in the presence of an OTA adjacent channel signal with a specified centre frequency offset of the interfering signal to the band edge of a victim system.

#### 10.5.1.2 Minimum requirement for *BS type 1-O*

The requirement shall apply at the RIB when the AoA of the incident wave of a received signal and the interfering signal are from the same direction and are within the *minSENS RoAoA*.

The wanted and interfering signals apply to each supported polarization, under the assumption o*f polarization match*.

The throughput shall be ≥ 95% of the maximum throughput of the reference measurement channel.

For FR1, the OTA wanted and the interfering signal are specified in table 10.5.1.2-1 and table 10.5.1.2-2 for OTA ACS. The reference measurement channel for the OTA wanted signal is further specified in annex A.1. The characteristics of the interfering signal is further specified in annex D.

The OTA ACS requirement is applicable outside the *Base Station RF Bandwidth* or *Radio Bandwidth*. The OTA interfering signal offset is defined relative to the *Base station RF Bandwidth edges* or *Radio Bandwidth edges*.

For RIBs supporting operation in *non-contiguous spectrum* within any *operating band*, the OTA ACS requirement shall apply in addition inside any *sub-block gap*, in case the *sub-block gap* size is at least as wide as the NR interfering signal in table 10.5.1.2-2. The OTA interfering signal offset is defined relative to the *sub-block* edges inside the *sub-block gap*.

For *multi-band RIBs*, the OTA ACS requirement shall apply in addition inside any *Inter RF Bandwidth gap*, in case the *Inter RF Bandwidth gap* size is at least as wide as the NR interfering signal in table 10.5.1.2-2. The interfering signal offset is defined relative to the *Base Station RF Bandwidth* edges inside the *Inter RF Bandwidth gap*.

Table 10.5.1.2-1: OTA ACS requirement for *BS type 1-O*

|  |  |  |
| --- | --- | --- |
| *BS channel bandwidth* of the *lowest/highest carrier* received (MHz) | Wanted signal mean power (dBm)  (Note 2) | Interfering signal mean power (dBm) |
| 5, 10, 15, 20, 25, 30, 35, 40, 45, 50, 60, 70, 80,90, 100 (Note 1) | EISminSENS + 6 dB | Wide Area BS: -52 – ΔminSENS  Medium Range BS: -47– ΔminSENS  Local Area BS: -44– ΔminSENS |
| NOTE 1: The SCS for the *lowest/highest carrier* received is the lowest SCS supported by the BS for that bandwidth  NOTE 2: EISminSENS depends on the *BS channel bandwidth*  NOTE 3: For BS operating in band n104, interfering signal mean power shall be allowed with 4dB relaxation. | | |

Table 10.5.1.2-2: OTA ACS interferer frequency offset for *BS type 1-O*

|  |  |  |
| --- | --- | --- |
| *BS channel bandwidth* of the *lowest/highest carrier* received (MHz) | Interfering signal centre frequency 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 | ±2.5025 |  |
| 10 | ±2.5075 | 5 MHz DFT-s-OFDM NR signal, |
| 15 | ±2.5125 | 15 kHz SCS, 25 RBs |
| 20 | ±2.5025 |  |
| 25 | ±9.4675 |  |
| 30 | ±9.4725 |  |
| 35 | ±9.4625 |  |
| 40 | ±9.4675 |  |
| 45 | ±9.4725 |  |
| 50 | ±9.4625 | 20 MHz DFT-s-OFDM NR signal, |
| 60 | ±9.4725 | 15 kHz SCS, 100 RBs |
| 70 | ±9.4675 |  |
| 80 | ±9.4625 |  |
| 90 | ±9.4725 |  |
| 100 | ±9.4675 |  |

#### < Next OF CHANGE>

### 10.5.2 OTA in-band blocking

#### 10.5.2.1 General

The OTA in-band blocking characteristics is a measure of the receiver's ability to receive a OTA wanted signal at its assigned channel in the presence of an unwanted OTA interferer, which is an NR signal for general blocking or an NR signal with one RB for narrowband blocking.

#### 10.5.2.2 Minimum requirement for *BS type 1-O*

The requirement shall apply at the RIB when the AoA of the incident wave of a received signal and the interfering signal are from the same direction, and:

- when the wanted signal is based on EISREFSENS: the AoA of the incident wave of a received signal and the interfering signal are within the *OTA REFSENS RoAoA.*

- when the wanted signal is based on EISminSENS: the AoA of the incident wave of a received signal and the interfering signal are within the *minSENS RoAoA*.

The wanted and interfering signals apply to each supported polarization, under the assumption of *polarization match*.

The throughput shall be ≥ 95% of the maximum throughput of the reference measurement channel, with OTA wanted and OTA interfering signal specified in tables 10.5.2.2-1, table 10.5.2.2-2 and table 10.5.2.2-3 for general OTA and narrowband OTA blocking requirements. Narrowband blocking requirements are not applied for band n104. The reference measurement channel for the OTA wanted signal is identified in clause 10.3.2 and are further specified in annex A.1. The characteristics of the interfering signal is further specified in annex D.

The OTA in-band blocking requirements apply outside the *Base Station RF Bandwidth* or *Radio Bandwidth*. The interfering signal offset is defined relative to the *Base Station RF Bandwidth edges* or *Radio Bandwidth* edges.

For *BS type 1-O* the OTA in-band blocking requirement shall apply in the in-band blocking frequency range, which is from FUL,low - ΔfOOB to FUL,high + ΔfOOB, excluding the downlink frequency range of the FDD *operating band.* The ΔfOOB for *BS type 1-O* is defined in table 10.5.2.2-0.

Table 10.5.2.2-0: ΔfOOB offset for NR *operating bands* in FR1

|  |  |  |
| --- | --- | --- |
| BS type | *Operating band* characteristics | ΔfOOB (MHz) |
| *BS type 1-O* | FUL,high – FUL,low < 100 MHz | 20 |
|  | 100 MHz ≤ FUL,high – FUL,low ≤ 900 MHz | 60 |

For band n104, ΔfOOB for *BS type 1-O*  is defined in table 10.5.2.2-0a.

Table 10.5.2.2-0a: ΔfOOB offset for NR *operating bands* for band n104

|  |  |  |
| --- | --- | --- |
| **BS type** | ***Operating band*** | **ΔfOOB (MHz)** |
| *BS type 1-O* | n104 | [100] |

For RIBs supporting operation in *non-contiguous spectrum* within any *operating band*, the OTA in-band blocking requirements apply in addition inside any *sub-block gap*, in case the *sub-block gap* size is at least as wide as twice the interfering signal minimum offset in table 10.5.2.2-1. The interfering signal offset is defined relative to the *sub-block* edges inside the *sub-block gap*.

For *multi-band RIBs*, the OTA in-band blocking requirements apply in the in-band blocking frequency ranges for each supported *operating band*. The requirement shall apply in addition inside any *Inter RF Bandwidth gap*, in case the *Inter RF Bandwidth gap* size is at least as wide as twice the interfering signal minimum offset in tables 10.5.2.2-1 and 10.5.2.2-3.

For a RIBs supporting operation in *non-contiguous spectrum* within any *operating band*, the OTA narrowband blocking requirements apply in addition inside any *sub-block gap*, in case the *sub-block gap* size is at least as wide as the interfering signal minimum offset in table 10.5.2.2-3. The interfering signal offset is defined relative to the *sub-block* edges inside the *sub-block gap*.

For a *multi-band RIBs*, the OTA narrowband blocking requirements apply in the narrowband blocking frequency ranges for each supported *operating band*. The requirement shall apply in addition inside any *Inter RF Bandwidth gap*, in case the *Inter RF Bandwidth gap* size is at least as wide as the interfering signal minimum offset in table 10.5.2.2-3.

Table 10.5.2.2-1: General OTA blocking requirement for *BS type 1-O*

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| *BS channel bandwidth* of the *lowest/highest carrier* received (MHz) | Wanted signal mean power (dBm)  (Note 1) | 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 |
|  | EISREFSENS + x dB | Wide Area BS: -43 - ΔOTAREFSENS  Medium Range BS: -38 - ΔOTAREFSENS  Local Area BS: -35 - ΔOTAREFSENS | ±7.5 |  |
| 5, 10, 15, 20 | EISminSENS + x dB | Wide Area BS: -43 – ΔminSENS  Medium Range BS: -38 – ΔminSENS  Local Area BS: -35 – ΔminSENS | ±7.5 | 5 MHz DFT-s-OFDM NR signal, 15 kHz SCS, 25 RBs |
|  | EISREFSENS + x dB | Wide Area BS: -43 - ΔOTAREFSENS  Medium Range BS: -38 - ΔOTAREFSENS  Local Area BS: -35 - ΔOTAREFSENS | ±30 |  |
| 25 ,30, 35, 40, 45, 50, 60, 70, 80, 90, 100 | EISminSENS + x dB | Wide Area BS: -43 – ΔminSENS  Medium Range BS: -38 – ΔminSENS  Local Area BS: -35 – ΔminSENS | ±30 | 20 MHz DFT-s-OFDM NR signal, 15 kHz SCS, 100 RBs |
| NOTE 1: For a BS capable of single band operation only, "x" is equal to 6 dB. For a BS capable of multi-band operation, "x" is equal to 6 dB in case of interfering signals that are in the in-band blocking frequency range of the operating band where the wanted signal is present or in the in-band blocking frequency range of an adjacent or overlapping operating band. For other in-band blocking frequency ranges of the interfering signal for the supported operating bands, "x" is equal to 1.4 dB. | | | | |

Table 10.5.2.2-2: OTA narrowband blocking requirement for *BS type 1-O*

|  |  |  |
| --- | --- | --- |
| *BS channel bandwidth* of the *lowest/highest carrier* received (MHz) | OTA Wanted signal mean power (dBm) | OTA Interfering signal mean power (dBm) |
| 5, 10, 15, 20 | EISREFSENS + 6 dB | Wide Area BS: -49 - ΔOTAREFSENS  Medium Range BS: -44 - ΔOTAREFSENS  Local Area BS: -41 - ΔOTAREFSENS |
|  | EISminSENS + 6 dB | Wide Area BS: -49 – ΔminSENS  Medium Range BS: -44 – ΔminSENS  Local Area BS: -41 – ΔminSENS |
| 25, 30, 35, 40, 45, 50, 60, 70, 80, 90, 100 | EISREFSENS + 6 dB | Wide Area BS: -49 - ΔOTAREFSENS  Medium Range BS: -44 - ΔOTAREFSENS  Local Area BS: -41 - ΔOTAREFSENS |
|  | EISminSENS + 6 dB | Wide Area BS: -49 – ΔminSENS  Medium Range BS: -44 – ΔminSENS  Local Area BS: -41 – ΔminSENS |
| NOTE 1: The SCS for the *lowest/highest carrier* received is the lowest SCS supported by the BS for that bandwidth.  NOTE 2: 7.5 kHz shift is not applied to the wanted signal. | | |

Table 10.5.2.2-3: OTA narrowband blocking interferer frequency offsets for *BS type 1-O*

|  |  |  |
| --- | --- | --- |
| *BS channel bandwidth* of the *lowest/highest carrier* received (MHz) | Interfering RB centre frequency offset to the lower/upper *Base Station RF Bandwidth edge* or *sub-block edge* inside a *sub-block gap* (kHz) (Note 2) | Type of interfering signal |
| 5 | ±(350 + m\*180),  m=0, 1, 2, 3, 4, 9, 14, 19, 24 | 5 MHz DFT-s-OFDM NR signal, 15 kHz SCS, 1 RB |
| 10 | ±(355 + m\*180),  m=0, 1, 2, 3, 4, 9, 14, 19, 24 |  |
| 15 | ±(360 + m\*180),  m=0, 1, 2, 3, 4, 9, 14, 19, 24 |  |
| 20 | ±(350 + m\*180),  m=0, 1, 2, 3, 4, 9, 14, 19, 24 |  |
| 25 | ±(565 + m\*180),  m=0, 1, 2, 3, 4, 29, 54, 79, 99 | 20 MHz DFT-s-OFDM NR signal, 15 kHz SCS, 1 RB |
| 30 | ±(570 + m\*180),  m=0, 1, 2, 3, 4, 29, 54, 79, 99 |  |
| 35 | ±(560+m\*180),  m=0, 1, 2, 3, 4, 29, 54, 79, 99 |  |
| 40 | ±(565 + m\*180),  m=0, 1, 2, 3, 4, 29, 54, 79, 99 |  |
| 45 | ±(570+m\*180),  m=0, 1, 2, 3, 4, 29, 54, 79, 99 |  |
| 50 | ±(560 + m\*180),  m=0, 1, 2, 3, 4, 29, 54, 79, 99 |  |
| 60 | ±(570 + m\*180),  m=0, 1, 2, 3, 4, 29, 54, 79, 99 |  |
| 70 | ±(565 + m\*180),  m=0, 1, 2, 3, 4, 29, 54, 79, 99 |  |
| 80 | ±(560 + m\*180),  m=0, 1, 2, 3, 4, 29, 54, 79, 99 |  |
| 90 | ±(570 + m\*180),  m=0, 1, 2, 3, 4, 29, 54, 79, 99 |  |
| 100 | ±(565 + m\*180),  m=0, 1, 2, 3, 4, 29, 54, 79, 99 |  |
| NOTE 1: Interfering signal consisting of one resource block is positioned at the stated offset, the channel bandwidthof the interfering signal is located adjacently to the lower/upper *Base Station RF Bandwidth* edge or *sub-block* edge inside a *sub-block gap*.  NOTE 2: The centre of the interfering RB refers to the frequency location between the two central subcarriers. | | |

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## 10.6 OTA out-of-band blocking

### 10.6.1 General

The OTA out-of-band blocking characteristics are a measure of the receiver unit ability to receive a wanted signal at the *RIB* at its assigned channel in the presence of an unwanted interferer.

### 10.6.2 Minimum requirement for *BS type 1-O*

#### 10.6.2.1 General minimum requirement

The requirement shall apply at the RIBwhen the AoA of the incident wave of the received signal and the interfering signal are from the same direction and are within the *minSENS RoAoA*.

The wanted signal applies to each supported polarization, under the assumption of *polarization match.* The interferer shall be *polarization matched* in-band and the polarization maintained for out-of-band frequencies.

For OTA wanted and OTA interfering signals provided at the RIB using the parameters in table 10.6.2.1-1, the following requirements shall be met:

- The throughput shall be ≥ 95% of the maximum throughput of the reference measurement channel. The reference measurement channel for the OTA wanted signal is identified in clause 10.3.2 for each *BS channel bandwidth* and further specified in annex A.1.

For a *multi-band RIB*, the OTA out-of-band requirement shall apply for each supported *operating band*, with the exception that the in-band blocking frequency ranges of all supported *operating bands* according to clause 7.4.2.2 shall be excluded from the OTA out‑of‑band blocking requirement.

For *BS type 1-O* the OTA out-of-band blocking requirement apply from 30 MHz to FUL,low - ΔfOOB and from FUL,high + ΔfOOB up to 12750 MHz, including the downlink frequency range of the FDD *operating band* for BS supporting FDD. The ΔfOOB for *BS type 1-O* is defined in table 10.5.2.2-0.

Table 10.6.2.1-1: OTA out-of-band blocking performance requirement

|  |  |  |
| --- | --- | --- |
| Wanted signal mean power (dBm) | Interfering signal RMS field-strength (V/m) | Type of interfering Signal |
| EISminSENS + 6 dB  (Note 1) | 0.36 | CW carrier |
| NOTE 1: EISminSENS depends on the *channel bandwidth* as specified in clause 10.2.  NOTE 2: The RMS field-strength level in V/m is related to the interferer EIRP level at a distance described as , where EIRP is in W and r is in m; for example, 0.36 V/m is equivalent to 36 dBm at fixed distance of 30 m. | | |

#### 10.6.2.2 Co-location minimum requirement

This additional OTA out-of-band blocking requirement may be applied for the protection of BS receivers when NR, E‑UTRA BS, UTRA BS, CDMA BS or GSM/EDGE BS operating in a different frequency band are co-located with a BS.

The requirement is a co-location requirement. The interferer power levels are specified at the *co-location reference antenna* conducted input. The interfering signal power is specified per supported polarization.

The requirement is valid over the *minSENS RoAoA*.

For OTA wanted and OTA interfering signal provided at the RIB using the parameters in table 10.6.2.1-1, the following requirements shall be met:

- The throughput shall be ≥ 95% of the maximum throughput of the reference measurement channel. The reference measurement channel for the OTA wanted signal is identified in clause 10.3.2 for each *BS channel bandwidth* and further specified in annex A.1.

For *BS type 1-O* the OTA blocking requirement for co-location with BS in other frequency bands is applied for all *operating bands* for which co-location protection is provided.

Table 10.6.2.2-1: OTA blocking requirement for co-location with BS in other frequency bands

| Frequency range of interfering signal | Wanted signal mean power (dBm) | Interfering signal mean power for WA BS (dBm) | Interfering signal mean power for MR BS (dBm) | Interfering signal mean power for LA BS (dBm) | Type of interfering signal |
| --- | --- | --- | --- | --- | --- |
| Frequency range of co-located downlink *operating band* | EISminSENS + 6 dB  (Note 1) | +46 | +38 | +24 | CW carrier |
| NOTE 1: EISminSENS depends on the BS class and on the *BS channel bandwidth*, see clause 10.2.  NOTE 2: The requirement does not apply when the interfering signal falls within any of the supported uplink *operating band(s)* or in ΔfOOB immediately outside any of the supported uplink *operating band(s)*. | | | | | |

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## 10.7 OTA receiver spurious emissions

### 10.7.1 General

The OTA RX spurious emission is the power of the emissions radiated from the antenna array from a receiver unit.

The metric used to capture OTA receiver spurious emissions for *BS type 1-O* and *BS type 2-O* is *total radiated power* (TRP), with the requirement defined at the RIB.

### 10.7.2 Minimum requirement for *BS type 1-O*

For a BS operating in FDD, OTA RX spurious emissions requirement do not apply as they are superseded by the OTA TX spurious emissions requirement. This is due to the fact that TX and RX spurious emissions cannot be distinguished in OTA domain.

For a BS operating in TDD, the OTA RX spurious emissions requirement shall apply during the *transmitter OFF period* only.

For RX only *multi-band RIB*, the OTA RX spurious emissions requirements are subject to exclusion zones in each supported *operating band*.

The OTA RX spurious emissions requirement for *BS type 1-O* is that for each *basic limit* specified in table 10.7.2‑1*,* the power sum of emissions at the RIB shall not exceed limits specified as the *basic limit* + X, where X = 9 dB, unless stated differently in regional regulation.

Table 10.7.2-1: General BS receiver spurious emission basic limits for *BS type 1-O*

|  |  |  |  |
| --- | --- | --- | --- |
| Spurious frequency range | *Basic limit* (Note 4) | Measurement bandwidth | Notes |
| 30 MHz – 1 GHz | -36 dBm | 100 kHz | Note 1 |
| 1 GHz – 12.75 GHz |  | 1 MHz | Note 1, Note 2 |
| 12.75 GHz – 5th harmonic of the upper frequency edge of the UL *operating band* in GHz | -30 dBm | 1 MHz | Note 1, Note 2, Note 3 |
| 12.75 GHz - 26 GHz | -30 dBm | 1 MHz | Note 1, Note 2, Note 3, Note 6 |
| NOTE 1: Measurement bandwidths as in ITU-R SM.329 [2], s4.1.  NOTE 2: Upper frequency as in ITU-R SM.329 [2], s2.5 table 1.  NOTE 3: This spurious frequency range applies only for *operating bands* for which the 5th harmonic of the upper frequency edge of the UL *operating band* is reaching beyond 12.75 GHz.  NOTE 4: Additional limits may apply regionally.  NOTE 5: The frequency range from ΔfOBUE below the lowest frequency of the BS transmitter *operating band* to ΔfOBUE above the highest frequency of the BS transmitter *operating band* may be excluded from the requirement. ΔfOBUE is defined in clause 9.7.1. For *multi-band* *RIB*, the exclusion applies for all supported *operating bands*.  NOTE 6: Applies only for band n104. | | | |

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## 10.8 OTA receiver intermodulation

### 10.8.1 General

Third and higher order mixing of the two interfering RF signals can produce an interfering signal in the band of the desired channel. Intermodulation response rejection is a measure of the capability of the receiver unit to receive a wanted signal on its assigned channel frequency in the presence of two interfering signals which have a specific frequency relationship to the wanted signal. The requirement is defined as a *directional requirement* at the *RIB*.

### 10.8.2 Minimum requirement for *BS type 1-O*

The requirement shall apply at the RIB when the AoA of the incident wave of a received signal and the interfering signal are from the same direction, and:

- when the wanted signal is based on EISREFSENS: the AoA of the incident wave of a received signal and the interfering signal are within the *OTA REFSENS RoAoA.*

- when the wanted signal is based on EISminSENS: the AoA of the incident wave of a received signal and the interfering signal are within the *minSENS RoAoA*.

The wanted and interfering signals apply to each supported polarization, under the assumption of *polarization match*.

The throughputshall be ≥ 95% of the maximum throughput of the reference measurement channel, with a wanted signal at the assigned channel frequency and two interfering signals at the RIB with the conditions specified in tables 10.8.2-1 and 10.8.2-2 for intermodulation performance and in tables 10.8.2-3 and 10.8.2-4 for narrowband intermodulation performance. Narrowband intermodulation requirements are not applied for band n104.

The reference measurement channel for the wanted signal is identified in table 10.3.2-1, table 10.3.2-2 and table 10.3.2-3 for each *BS channel bandwidth* and further specified in annex A.1. The characteristics of the interfering signal is further specified in annex D.

The subcarrier spacing for the modulated interfering signal shall be the same as the subcarrier spacing for the wanted signal, except for the case of wanted signal subcarrier spacing 60kHz and *BS channel bandwidth* <=20MHz, for which the subcarrier spacing of the interfering signal shall be 30kHz.

The receiver intermodulation requirement is applicable outside the *Base Station RF Bandwidth* or *Radio Bandwidth edges*. The interfering signal offset is defined relative to the *Base Station RF Bandwidth edges* or *Radio Bandwidth edges*.

For a RIBs supporting operation in non-contiguous spectrum within any *operating band*, the narrowband intermodulation requirement shall apply in addition inside any *sub-block gap* in case the *sub-block gap* is at least as wide as the *BS channel bandwidth* of the NR interfering signal in tables 10.8.2-2 and 10.8.2-4. The interfering signal offset is defined relative to the *sub-block* edges inside the *sub-block gap*.

For *multi-band RIBs*, the intermodulation requirement shall apply in addition inside any *Inter RF Bandwidth gap*, in case the gap size is at least twice as wide as the NR interfering signal centre frequency offset from the *Base Station RF Bandwidth edge*.

For *multi-band RIBs*, the narrowband intermodulation requirement shall apply in addition inside any *Inter RF Bandwidth gap* in case the gap size is at least as wide as the NR interfering signal in tables 10.8.2-2 and 10.8.2-4. The interfering signal offset is defined relative to the *Base Station RF Bandwidth edges* inside the *Inter RF Bandwidth gap*.

Table 10.8.2-1: General intermodulation requirement

|  |  |  |  |
| --- | --- | --- | --- |
| BS class | Wanted Signal mean power (dBm) | Mean power of the interfering signals (dBm) | Type of interfering signals |
| Wide Area BS | EISREFSENS + 6 dB | -52 - ΔOTAREFSENS |  |
|  | EISminSENS + 6 dB | -52 - ΔminSENS |  |
| Medium Range | EISREFSENS + 6 dB | -47 - ΔOTAREFSENS | See Table 10.8.2-2 |
| BS | EISminSENS + 6 dB | -47 - ΔminSENS |  |
| Local Area BS | EISREFSENS + 6 dB | -44 - ΔOTAREFSENS |  |
|  | EISminSENS + 6 dB | -44 - ΔminSENS |  |
| NOTE 1: EISREFSENS and EISminSENS depend on the BS class and on the *BS channel bandwidth*, see clause 10.3 and 10.2. | | | |

Table 10.8.2-2: Interfering signals for intermodulation requirement

|  |  |  |
| --- | --- | --- |
| *BS channel bandwidth* of the *lowest/highest carrier* received (MHz) | Interfering signal centre frequency offset from the lower/upper *base station RF Bandwidth edge* (MHz) | Type of interfering signal (Note 3) |
| 5 | ±7.5 | CW |
|  | ±17.5 | 5 MHz DFT-s-OFDM NR signal (Note 1) |
| 10 | ±7.465 | CW |
|  | ±17.5 | 5 MHz DFT-s-OFDM NR signal (Note 1) |
| 15 | ±7.43 | CW |
|  | ±17.5 | 5 MHz DFT-s-OFDM NR signal (Note 1) |
| 20 | ±7.395 | CW |
|  | ±17.5 | 5 MHz DFT-s-OFDM NR signal (Note 1) |
| 25 | ±7.465 | CW |
|  | ±25 | 20 MHz DFT-s-OFDM NR signal (Note 2) |
| 30 | ±7.43 | CW |
|  | ±25 | 20 MHz DFT-s-OFDM NR signal (Note 2) |
| 35 | ±7.44 | CW |
|  | ±25 | 20 MHz DFT-s-OFDM NR signal (Note 2) |
| 40 | ±7.45 | CW |
|  | ±25 | 20 MHz DFT-s-OFDM NR signal (Note 2) |
| 45 | ±7.37 | CW |
|  | ±25 | 20 MHz DFT-s-OFDM NR signal (Note 2) |
| 50 | ±7.35 | CW |
|  | ±25 | 20 MHz DFT-s-OFDM NR signal (Note 2) |
| 60 | ±7.49 | CW |
|  | ±25 | 20 MHz DFT-s-OFDM NR signal (Note 2) |
| 70 | ±7.42 | CW |
|  | ±25 | 20 MHz DFT-s-OFDM NR signal (Note 2) |
| 80 | ±7.44 | CW |
|  | ±25 | 20 MHz DFT-s-OFDM NR signal (Note 2) |
| 90 | ±7.46 | CW |
|  | ±25 | 20 MHz DFT-s-OFDM NR signal (Note 2) |
| 100 | ±7.48 | CW |
|  | ±25 | 20 MHz DFT-s-OFDM NR signal (Note 2) |
| NOTE 1: Number of RBs is 25 for 15 kHz subcarrier spacing and 10 for 30 kHz subcarrier spacing.  NOTE 2: Number of RBs is 100 for 15 kHz subcarrier spacing, 50 for 30 kHz subcarrier spacing and 24 for 60 kHz subcarrier spacing.  NOTE 3: The RBs shall be placed adjacent to the transmission bandwidth configuration edge which is closer to the *Base Station RF Bandwidth* edge. | | |

Table 10.8.2-3: Narrowband intermodulation performance requirement in FR1

|  |  |  |  |
| --- | --- | --- | --- |
| BS class | Wanted signal mean power (dBm) | Interfering signal mean power (dBm) | Type of interfering signals |
| Wide Area BS | EISREFSENS + 6 dB (Note 1) | -52 - ΔOTAREFSENS |  |
|  | EISminSENS + 6 dB (Note 1) | -52 - ΔminSENS |  |
| Medium Range BS | EISREFSENS + 6 dB (Note 1) | -47 - ΔOTAREFSENS | See Table 10.8.2-4 |
|  | EISminSENS + 6 dB (Note 1) | -47 - ΔminSENS |  |
| Local Area BS | EISREFSENS + 6 dB (Note 1) | -44 - ΔOTAREFSENS |  |
|  | EISminSENS + 6 dB (Note 1) | -44 - ΔminSENS |  |
| NOTE 1: EISREFSENS / EISminSENS depends on the *BS* *channel bandwidth*, see clause 10.3 and 10.2. | | | |

Table 10.8.2-4: Interfering signals for narrowband intermodulation requirement in FR1

|  |  |  |
| --- | --- | --- |
| *BS channel bandwidth* of the *lowest/highest carrier* received (MHz) | Interfering RB centre frequency offset from the lower/upper *Base Station RF Bandwidth edge* or *sub-block* edge inside a *sub-block gap* (kHz) (Note 3) | Type of interfering signal |
| 5 | ±360 | CW |
|  | ±1420 | 5 MHz DFT-s-OFDM NR signal, 1 RB (NOTE 1) |
| 10 | ±370 | CW |
|  | ±1960 | 5 MHz DFT-s-OFDM NR signal, 1 RB (NOTE 1) |
| 15 (NOTE 2) | ±380 | CW |
|  | ±1960 | 5 MHz DFT-s-OFDM NR signal, 1 RB (NOTE 1) |
| 20 (NOTE 2) | ±390 | CW |
|  | ±2320 | 5 MHz DFT-s-OFDM NR signal, 1 RB (NOTE 1) |
| 25 (NOTE 2) | ±325 | CW |
|  | ±2350 | 20 MHz DFT-s-OFDM NR signal, 1 RB (NOTE 1) |
| 30 (NOTE 2) | ±335 | CW |
|  | ±2350 | 20 MHz DFT-s-OFDM NR signal, 1 RB (NOTE 1) |
| 35 (NOTE 2) | ±345 | CW |
|  | ±2710 | 20 MHz DFT-s-OFDM NR signal, 1 RB (NOTE 1) |
| 40 (NOTE 2) | ±355 | CW |
|  | ±2710 | 20 MHz DFT-s-OFDM NR signal, 1 RB (NOTE 1) |
| 45 (NOTE 2) | ±365 | CW |
|  | ±2710 | 20 MHz DFT-s-OFDM NR signal, 1 RB (NOTE 1) |
| 50 (NOTE 2) | ±375 | CW |
|  | ±2710 | 20 MHz DFT-s-OFDM NR signal, 1 RB (NOTE 1) |
| 60 (NOTE 2) | ±395 | CW |
|  | ±2710 | 20 MHz DFT-s-OFDM NR signal, 1 RB (NOTE 1) |
| 70 (NOTE 2) | ±415 | CW |
|  | ±2710 | 20 MHz DFT-s-OFDM NR signal, 1 RB (NOTE 1) |
| 80 (NOTE 2) | ±435 | CW |
|  | ±2710 | 20 MHz DFT-s-OFDM NR signal, 1 RB (NOTE 1) |
| 90 (NOTE 2) | ±365 | CW |
|  | ±2530 | 20 MHz DFT-s-OFDM NR signal, 1 RB (NOTE 1) |
| 100 (NOTE 2) | ±385 | CW |
|  | ±2530 | 20 MHz DFT-s-OFDM NR signal, 1 RB (NOTE 1) |
| NOTE 1: Interfering signal consisting of one resource block positioned at the stated offset, the *BS channel bandwidth* of the interfering signal is located adjacently to the lower/upper *Base Station RF Bandwidth* edge or *sub-block* edge inside a *sub-block gap*.  NOTE 2: This requirement shall apply only for a G-FRC mapped to the frequency range at the *channel edge* adjacent to the interfering signals.  NOTE 3: The centre of the interfering RB refers to the frequency location between the two central subcarriers. | | |

#### < Next OF CHANGE>

## 10.9 OTA in-channel selectivity

### 10.9.1 General

In-channel selectivity (ICS) is a measure of the receiver ability to receive a wanted signal at its assigned resource block locations in the presence of an interfering signal received at a larger power spectral density. In this condition a throughput requirement shall be met for a specified reference measurement channel. The interfering signal shall be an NR signal as specified in annex A.1 and shall be time aligned with the wanted signal.

### 10.9.2 Minimum requirement for *BS type 1-O*

The requirement shall apply at the RIBwhen the AoA of the incident wave of the received signal and the interfering signal are the same direction and are within the *minSENS RoAoA*

The wanted and interfering signals applies to each supported polarization, under the assumption of *polarization match.*

For a wanted and an interfering signal coupled to the RIB, the following requirements shall be met:

- For *BS type 1-O*, the throughput shall be ≥ 95% of the maximum throughput of the reference measurement channel as specified in annex A.1 with parameters specified in table 10.9.2-1 for Wide Area BS, in table 10.9.2-2 for Medium Range BS and in table 10.9.2-3 for Local Area BS. The characteristics of the interfering signal is further specified in annex D.

Table 10.9.2-1: Wide Area BS in-channel selectivity

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| *BS channel bandwidth* (MHz) | Subcarrier spacing (kHz) | Reference measurement channel | Wanted signal mean power (dBm)  (Note 2) | Interfering signal mean power (dBm)  (Note 2) | Type of interfering signal |
| 5 | 15 | G-FR1-A1-7 | -100.6-ΔminSENS | -81.4 - ΔminSENS | DFT-s-OFDM NR signal, 15 kHz SCS,  10 RBs |
| 10, 15, 20, 25, 30, 35 | 15 | G-FR1-A1-1 | -98.7-ΔminSENS | -77.4 - ΔminSENS | DFT-s-OFDM NR signal, 15 kHz SCS,  25 RBs |
| 40, 45, 50 | 15 | G-FR1-A1-4 | -92.3-ΔminSENS | -71.4 - ΔminSENS | DFT-s-OFDM NR signal, 15 kHz SCS,  100 RBs |
| 5 | 30 | G-FR1-A1-8 | -101.3-ΔminSENS | -81.4 - ΔminSENS | DFT-s-OFDM NR signal, 30 kHz SCS,  5 RBs |
| 10, 15, 20, 25, 30, 35 | 30 | G-FR1-A1-2 | -98.8-ΔminSENS | -78.4 - ΔminSENS | DFT-s-OFDM NR signal, 30 kHz SCS,  10 RBs |
| 40, 45, 50, 60, 70, 80, 90, 100 | 30 | G-FR1-A1-5 | -92.6-ΔminSENS | -71.4 - ΔminSENS | DFT-s-OFDM NR signal, 30 kHz SCS,  50 RBs |
| 10, 15, 20, 25, 30, 35 | 60 | G-FR1-A1-9 | -98.2-ΔminSENS | -78.4 - ΔminSENS | DFT-s-OFDM NR signal, 60 kHz SCS,  5 RBs |
| 40, 45, 50, 60, 70, 80, 90, 100 | 60 | G-FR1-A1-6 | -92.7-ΔminSENS | -71.6 - ΔminSENS | DFT-s-OFDM NR signal, 60 kHz SCS,  24 RBs |
| NOTE 1: Wanted and interfering signal are placed adjacently around Fc, where the Fc is defined for *BS channel bandwidth* of the wanted signal according to the table 5.4.2.2-1 . The aggregated wanted and interferer signal shall be centred in the *BS channel bandwidth* of the wanted signal.  NOTE 2: For BS operating in band n104, both wanted signal mean power and interfering signal mean power shall be increased by 1dB. | | | | | |

Table 10.9.2-2: Medium Range BS in-channel selectivity

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| *BS channel bandwidth* (MHz) | Subcarrier spacing (kHz) | Reference measurement channel | Wanted signal mean power (dBm)  (Note 2) | Interfering signal mean power (dBm)  (Note 2) | Type of interfering signal |
| 5 | 15 | G-FR1-A1-7 | -95.6-ΔminSENS | -76.4 - ΔminSENS | DFT-s-OFDM NR signal, 15 kHz SCS,  10 RBs |
| 10, 15, 20, 25, 30, 35 | 15 | G-FR1-A1-1 | -93.7-ΔminSENS | -72.4 - ΔminSENS | DFT-s-OFDM NR signal, 15 kHz SCS,  25 RBs |
| 40, 45, 50 | 15 | G-FR1-A1-4 | -87.3-ΔminSENS | -66.4 - ΔminSENS | DFT-s-OFDM NR signal, 15 kHz SCS,  100 RBs |
| 5 | 30 | G-FR1-A1-8 | -96.3-ΔminSENS | -76.4 - ΔminSENS | DFT-s-OFDM NR signal, 30 kHz SCS,  5 RBs |
| 10, 15, 20, 25, 30, 35 | 30 | G-FR1-A1-2 | -93.8-ΔminSENS | -73.4 - ΔminSENS | DFT-s-OFDM NR signal, 30 kHz SCS,  10 RBs |
| 40, 45, 50, 60, 70, 80, 90, 100 | 30 | G-FR1-A1-5 | -87.6-ΔminSENS | -66.4 - ΔminSENS | DFT-s-OFDM NR signal, 30 kHz SCS,  50 RBs |
| 10, 15, 20, 25, 30, 35 | 60 | G-FR1-A1-9 | -93.2-ΔminSENS | -73.4 - ΔminSENS | DFT-s-OFDM NR signal, 60 kHz SCS,  5 RBs |
| 40, 45, 50, 60, 70, 80, 90, 100 | 60 | G-FR1-A1-6 | -87.7-ΔminSENS | -66.6 - ΔminSENS | DFT-s-OFDM NR signal, 60 kHz SCS,  24 RBs |
| NOTE 1: Wanted and interfering signal are placed adjacently around Fc, where the Fc is defined for *BS channel bandwidth* of the wanted signal according to the table 5.4.2.2-1. The aggregated wanted and interferer signal shall be centred in the *BS channel bandwidth* of the wanted signal.  NOTE 2: For BS operating in band n104, both wanted signal mean power and interfering signal mean power shall be increased by 1dB. | | | | | |

Table 10.9.2-3: Local area BS in-channel selectivity

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| *BS channel bandwidth* (MHz) | Subcarrier spacing (kHz) | Reference measurement channel | Wanted signal mean power (dBm)  (Note 2) | Interfering signal mean power (dBm)  (Note 2) | Type of interfering signal |
| 5 | 15 | G-FR1-A1-7 | -92.6-ΔminSENS | -73.4 - ΔminSENS | DFT-s-OFDM NR signal, 15 kHz SCS,  10 RBs |
| 10, 15, 20, 25, 30, 35 | 15 | G-FR1-A1-1 | -90.7-ΔminSENS | -69.4 - ΔminSENS | DFT-s-OFDM NR signal, 15 kHz SCS,  25 RBs |
| 40, 45, 50 | 15 | G-FR1-A1-4 | -84.3-ΔminSENS | -63.4 - ΔminSENS | DFT-s-OFDM NR signal, 15 kHz SCS,  100 RBs |
| 5 | 30 | G-FR1-A1-8 | -93.3-ΔminSENS | -73.4 - ΔminSENS | DFT-s-OFDM NR signal, 30 kHz SCS,  5 RBs |
| 10, 15, 20, 25, 30, 35 | 30 | G-FR1-A1-2 | -90.8-ΔminSENS | -70.4 - ΔminSENS | DFT-s-OFDM NR signal, 30 kHz SCS,  10 RBs |
| 40, 45, 50, 60, 70, 80, 90, 100 | 30 | G-FR1-A1-5 | -84.6-ΔminSENS | -63.4 - ΔminSENS | DFT-s-OFDM NR signal, 30 kHz SCS,  50 RBs |
| 10, 15, 20, 25, 30, 35 | 60 | G-FR1-A1-9 | -90.2-ΔminSENS | -70.4 - ΔminSENS | DFT-s-OFDM NR signal, 60 kHz SCS,  5 RBs |
| 40, 45, 50, 60, 70, 80, 90, 100 | 60 | G-FR1-A1-6 | -84.7-ΔminSENS | -63.6 - ΔminSENS | DFT-s-OFDM NR signal, 60 kHz SCS,  24 RBs |
| NOTE 1: Wanted and interfering signal are placed adjacently around Fc, where the Fc is defined for *BS channel bandwidth* of the wanted signal according to the table 5.4.2.2-1. The aggregated wanted and interferer signal shall be centred in the *BS channel bandwidth* of the wanted signal.  NOTE 2: For BS operating in band n104, both wanted signal mean power and interfering signal mean power shall be increased by 1dB. | | | | | |

#### < End OF CHANGE>