**3GPP TSG-RAN WG4 Meeting # 97-e R4-2015682**

Electronic Meeting, 2-13 Nov., 2020

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| *CR-Form-v12.0* | | | | | | | | |
| **CHANGE REQUEST** | | | | | | | | |
|  | | | | | | | | |
|  | **38.101-1** | **CR** | 0543 | **rev** | **1** | **Current version:** | **16.5.0** |  |
|  | | | | | | | | |
| *For* [***HE******LP***](http://www.3gpp.org/3G_Specs/CRs.htm#_blank)*on using this form: comprehensive instructions can be found at* [*http://www.3gpp.org/Change-Requests*](http://www.3gpp.org/Change-Requests)*.* | | | | | | | | |
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| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| ***Proposed change affects:*** | UICC apps |  | ME | **X** | Radio Access Network |  | Core Network |  |

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|  | | | | | | | | | | |
| ***Title:*** | CR to TS 38.101-1: introduction of NR band n13 | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Source to WG:*** | Huawei, HiSilicon | | | | | | | | | |
| ***Source to TSG:*** | R4 | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Work item code:*** | NR\_n13-Core | | | | |  | ***Date:*** | | | 2020-11-10 |
|  |  | | | |  | |  | | |  |
| ***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-12 (Release 12)* *Rel-13 (Release 13) Rel-14 (Release 14) Rel-15 (Release 15) Rel-16 (Release 16)* | |
|  |  | | | | | | | | | |
| ***Reason for change:*** | | Introduction of NR band n13 in TS 38.101-1. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Summary of change:*** | | The requirements for n13 are added in relevant clauses. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Consequences if not approved:*** | | NR band n13 would not be supported. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Clauses affected:*** | | 5.2, 5.3.5, 5.4.2.3, 5.4.3.3, 5.4.4, 6.2.1, 6.2.3.1, 6.2.3.29, 6.5.2.3.4, 6.5.3.2, 6.5.3.3.25, 7.3.2, 7.6.2, 7.6.3, 7.6.4 | | | | | | | | |
|  | |  | | | | | | | | |
|  | | **Y** | **N** |  | | | |  | | |
| ***Other specs*** | |  | **X** | Other core specifications | | | | TS/TR ... CR ... | | |
| ***affected:*** | | **X** |  | Test specifications | | | | TS 38.521-1 | | |
| ***(show related CRs)*** | |  | **X** | O&M Specifications | | | | TS/TR ... CR ... | | |
|  | |  | | | | | | | | |
| ***Other comments:*** | |  | | | | | | | | |
|  | |  | | | | | | | | |
| ***This CR's revision history:*** | |  | | | | | | | | |

###### *------------------------------ Modified section ------------------------------*

## 5.2 Operating bands

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

Table 5.2-1: NR operating bands in FR1

|  |  |  |  |
| --- | --- | --- | --- |
| NR operating band | Uplink (UL) *operating band* BS receive / UE transmit  FUL\_low  – FUL\_high | Downlink (DL) *operating band* BS transmit / UE receive  FDL\_low – FDL\_high | Duplex Mode |
| n1 | 1920 MHz – 1980 MHz | 2110 MHz – 2170 MHz | FDD |
| n2 | 1850 MHz – 1910 MHz | 1930 MHz – 1990 MHz | FDD |
| n3 | 1710 MHz – 1785 MHz | 1805 MHz – 1880 MHz | FDD |
| n5 | 824 MHz – 849 MHz | 869 MHz – 894 MHz | FDD |
| n7 | 2500 MHz – 2570 MHz | 2620 MHz – 2690 MHz | FDD |
| n8 | 880 MHz – 915 MHz | 925 MHz – 960 MHz | FDD |
| n12 | 699 MHz – 716 MHz | 729 MHz – 746 MHz | FDD |
| n13 | 777 MHz – 787 MHz | 746 MHz – 756 MHz | FDD |
| n14 | 788 MHz – 798 MHz | 758 MHz – 768 MHz | FDD |
| n18 | 815 MHz – 830 MHz | 860 MHz – 875 MHz | FDD |
| n20 | 832 MHz – 862 MHz | 791 MHz – 821 MHz | FDD |
| n25 | 1850 MHz – 1915 MHz | 1930 MHz – 1995 MHz | FDD |
| n26 | 814 MHz – 849 MHz | 859 MHz – 894 MHz | FDD |
| n28 | 703 MHz – 748 MHz | 758 MHz – 803 MHz | FDD |
| n29 | N/A | 717 MHz – 728 MHz | SDL |
| n303 | 2305 Mhz – 2315 MHz | 2350 MHz – 2360 MHz | FDD |
| n34 | 2010 MHz – 2025 MHz | 2010 MHz – 2025 MHz | TDD |
| n3810 | 2570 MHz – 2620 MHz | 2570 MHz – 2620 MHz | TDD |
| n39 | 1880 MHz – 1920 MHz | 1880 MHz – 1920 MHz | TDD |
| n40 | 2300 MHz – 2400 MHz | 2300 MHz – 2400 MHz | TDD |
| n41 | 2496 MHz – 2690 MHz | 2496 MHz – 2690 MHz | TDD |
| n46 | 5150 MHz – 5925 MHz | 5150 MHz – 5925 MHz | TDD13 |
| n4711 | 5855 MHz – 5925 MHz | 5855 MHz – 5925 MHz | TDD |
| n48 | 3550 MHz – 3700 MHz | 3550 MHz – 3700 MHz | TDD |
| n50 | 1432 MHz – 1517 MHz | 1432 MHz – 1517 MHz | TDD1 |
| n51 | 1427 MHz – 1432 MHz | 1427 MHz – 1432 MHz | TDD |
| n53 | 2483.5 MHz – 2495 MHz | 2483.5 MHz – 2495 MHz | TDD |
| n65 | 1920 MHz – 2010 MHz | 2110 MHz – 2200 MHz | FDD4 |
| n66 | 1710 MHz – 1780 MHz | 2110 MHz – 2200 MHz | FDD |
| n70 | 1695 MHz – 1710 MHz | 1995 MHz – 2020 MHz | FDD |
| n71 | 663 MHz – 698 MHz | 617 MHz – 652 MHz | FDD |
| n74 | 1427 MHz – 1470 MHz | 1475 MHz – 1518 MHz | FDD |
| n75 | N/A | 1432 MHz – 1517 MHz | SDL |
| n76 | N/A | 1427 MHz – 1432 MHz | SDL |
| n7712 | 3300 MHz – 4200 MHz | 3300 MHz – 4200 MHz | TDD |
| n78 | 3300 MHz – 3800 MHz | 3300 MHz – 3800 MHz | TDD |
| n79 | 4400 MHz – 5000 MHz | 4400 MHz – 5000 MHz | TDD |
| n80 | 1710 MHz – 1785 MHz | N/A | SUL |
| n81 | 880 MHz – 915 MHz | N/A | SUL |
| n82 | 832 MHz – 862 MHz | N/A | SUL |
| n83 | 703 MHz – 748 MHz | N/A | SUL |
| n84 | 1920 MHz – 1980 MHz | N/A | SUL |
| n86 | 1710 MHz – 1780 MHz | N/A | SUL |
| n89 | 824 MHz – 849 MHz | N/A | SUL |
| n90 | 2496 MHz – 2690 MHz | 2496 MHz – 2690 MHz | TDD5 |
| n91 | 832 MHz – 862 MHz | 1427 MHz – 1432 MHz | FDD9 |
| n92 | 832 MHz – 862 MHz | 1432 MHz – 1517 MHz | FDD9 |
| n93 | 880 MHz – 915 MHz | 1427 MHz – 1432 MHz | FDD9 |
| n94 | 880 MHz – 915 MHz | 1432 MHz – 1517 MHz | FDD9 |
| n958 | 2010 MHz – 2025 MHz | N/A | SUL |
| n9614 | 5925 MHz – 7125 MHz | 5925 MHz – 7125 MHz | TDD13 |
| NOTE 1: UE that complies with the NR Band n50 minimum requirements in this specification shall also comply with the NR Band n51 minimum requirements.  NOTE 2: UE that complies with the NR Band n75 minimum requirements in this specification shall also comply with the NR Band n76 minimum requirements.  NOTE 3: Uplink transmission is not allowed at this band for UE with external vehicle-mounted antennas.  NOTE 4: A UE that complies with the NR Band n65 minimum requirements in this specification shall also comply with the NR Band n1 minimum requirements.  NOTE 5: Unless otherwise stated, the applicability of requirements for Band n90 is in accordance with that for Band n41; a UE supporting Band n90 shall meet the requirements for Band n41. A UE supporting Band n90 shall also support band n41.  NOTE 6: A UE that supports NR Band n66 shall receive in the entire DL operating band.  NOTE 7: A UE that supports NR Band n66 and CA operation in any CA band shall also comply with the minimum requirements specified for the DL CA configurations CA\_n66B and CA\_n66(2A) in the current version of the specification.  NOTE 8: This band is applicable in China only.  NOTE 9: Variable duplex operation does not enable dynamic variable duplex configuration by the network, and is used such that DL and UL frequency ranges are supported independently in any valid frequency range for the band.  NOTE 10: When this band is used for V2X SL service, the band is exclusively used for NR V2X in particular regions.  NOTE 11: This band is unlicensed band used for V2X service. There is no expected network deployment in this band.  NOTE 12: In the USA this band is restricted to 3700 – 3980 MHz.  NOTE 13: This band is restricted to operation with shared spectrum channel access as defined in [37.213].  NOTE 14: This band is applicable in the USA only subject to FCC Report and Order [FCC 20-51] | | | |

###### *------------------------------ Modified section ------------------------------*

### 5.3.5 UE channel bandwidth per operating band

The requirements in this specification apply to the combination of channel bandwidths, SCS and operating bands shown in Table 5.3.5-1. The transmission bandwidth configuration in Table 5.3.2-1 shall be supported for each of the specified channel bandwidths. The channel bandwidths are specified for both the TX and RX path.

Table 5.3.5-1 Channel bandwidths for each NR band

| NR band / SCS / UE Channel bandwidth | | | | | | | | | | | | | | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| NR Band | SCS  kHz | 5 MHz | 10 MHz | 15 MHz | 20MHz | 25 MHz | 30 MHz | 40 MHz | 50 MHz | 60 MHz | 70 MHz | 80 MHz | 90 MHz | 100 MHz |
| n1 | 15 | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |  |  |  |  |  |
| 30 |  | Yes | Yes | Yes | Yes | Yes | Yes | Yes |  |  |  |  |  |
| 60 |  | Yes | Yes | Yes | Yes | Yes | Yes | Yes |  |  |  |  |  |
| n2 | 15 | Yes | Yes | Yes | Yes |  |  |  |  |  |  |  |  |  |
| 30 |  | Yes | Yes | Yes |  |  |  |  |  |  |  |  |  |
| 60 |  | Yes | Yes | Yes |  |  |  |  |  |  |  |  |  |
| n3 | 15 | Yes | Yes | Yes | Yes | Yes | Yes | Yes |  |  |  |  |  |  |
| 30 |  | Yes | Yes | Yes | Yes | Yes | Yes |  |  |  |  |  |  |
| 60 |  | Yes | Yes | Yes | Yes | Yes | Yes |  |  |  |  |  |  |
| n5 | 15 | Yes | Yes | Yes | Yes |  |  |  |  |  |  |  |  |  |
| 30 |  | Yes | Yes | Yes |  |  |  |  |  |  |  |  |  |
| 60 |  |  |  |  |  |  |  |  |  |  |  |  |  |
| n7 | 15 | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |  |  |  |  |  |
| 30 |  | Yes | Yes | Yes | Yes | Yes | Yes | Yes |  |  |  |  |  |
| 60 |  | Yes | Yes | Yes | Yes | Yes | Yes | Yes |  |  |  |  |  |
| n8 | 15 | Yes | Yes | Yes | Yes |  |  |  |  |  |  |  |  |  |
| 30 |  | Yes | Yes | Yes |  |  |  |  |  |  |  |  |  |
| 60 |  |  |  |  |  |  |  |  |  |  |  |  |  |
| n12 | 15 | Yes | Yes | Yes |  |  |  |  |  |  |  |  |  |  |
| 30 |  | Yes | Yes |  |  |  |  |  |  |  |  |  |  |
| 60 |  |  |  |  |  |  |  |  |  |  |  |  |  |
| n13 | 15 | Yes | Yes |  |  |  |  |  |  |  |  |  |  |  |
| 30 |  | Yes |  |  |  |  |  |  |  |  |  |  |  |
| 60 |  |  |  |  |  |  |  |  |  |  |  |  |  |
| n14 | 15 | Yes | Yes |  |  |  |  |  |  |  |  |  |  |  |
| 30 |  | Yes |  |  |  |  |  |  |  |  |  |  |  |
| 60 |  |  |  |  |  |  |  |  |  |  |  |  |  |
| n18 | 15 | Yes | Yes | Yes |  |  |  |  |  |  |  |  |  |  |
| 30 |  | Yes | Yes |  |  |  |  |  |  |  |  |  |  |
| 60 |  |  |  |  |  |  |  |  |  |  |  |  |  |
| n20 | 15 | Yes | Yes | Yes | Yes |  |  |  |  |  |  |  |  |  |
| 30 |  | Yes | Yes | Yes |  |  |  |  |  |  |  |  |  |
| 60 |  |  |  |  |  |  |  |  |  |  |  |  |  |
| n25 | 15 | Yes | Yes | Yes | Yes | Yes | Yes | Yes |  |  |  |  |  |  |
| 30 |  | Yes | Yes | Yes | Yes | Yes | Yes |  |  |  |  |  |  |
| 60 |  | Yes | Yes | Yes | Yes | Yes | Yes |  |  |  |  |  |  |
| n26 | 15 | Yes | Yes | Yes | Yes |  |  |  |  |  |  |  |  |  |
| 30 |  | Yes | Yes | Yes |  |  |  |  |  |  |  |  |  |
| n28 | 15 | Yes | Yes | Yes | Yes7 |  | Yes7 |  |  |  |  |  |  |  |
| 30 |  | Yes | Yes | Yes7 |  | Yes7 |  |  |  |  |  |  |  |
| 60 |  |  |  |  |  |  |  |  |  |  |  |  |  |
| n29 | 15 | Yes | Yes |  |  |  |  |  |  |  |  |  |  |  |
| 30 |  | Yes |  |  |  |  |  |  |  |  |  |  |  |
| 60 |  |  |  |  |  |  |  |  |  |  |  |  |  |
| n30 | 15 | Yes | Yes |  |  |  |  |  |  |  |  |  |  |  |
| 30 |  | Yes |  |  |  |  |  |  |  |  |  |  |  |
| 60 |  |  |  |  |  |  |  |  |  |  |  |  |  |
| n34 | 15 | Yes | Yes | Yes |  |  |  |  |  |  |  |  |  |  |
| 30 |  | Yes | Yes |  |  |  |  |  |  |  |  |  |  |
| 60 |  | Yes | Yes |  |  |  |  |  |  |  |  |  |  |
| n38 | 15 | Yes | Yes10 | Yes | Yes10 | Yes | Yes10 | Yes10 |  |  |  |  |  |  |
| 30 |  | Yes10 | Yes | Yes10 | Yes | Yes10 | Yes10 |  |  |  |  |  |  |
| 60 |  | Yes10 | Yes | Yes10 | Yes | Yes10 | Yes10 |  |  |  |  |  |  |
| n39 | 15 | Yes | Yes | Yes | Yes | Yes | Yes | Yes |  |  |  |  |  |  |
| 30 |  | Yes | Yes | Yes | Yes | Yes | Yes |  |  |  |  |  |  |
| 60 |  | Yes | Yes | Yes | Yes | Yes | Yes |  |  |  |  |  |  |
| n40 | 15 | Yes9 | Yes | Yes | Yes | Yes | Yes | Yes | Yes |  |  |  |  |  |
| 30 |  | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |  | Yes |  |  |
| 60 |  | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |  | Yes |  |  |
| n41 | 15 |  | Yes | Yes | Yes |  | Yes | Yes | Yes |  |  |  |  |  |
| 30 |  | Yes | Yes | Yes |  | Yes | Yes | Yes | Yes |  | Yes | Yes | Yes |
| 60 |  | Yes | Yes | Yes |  | Yes | Yes | Yes | Yes |  | Yes | Yes | Yes |
| n46 | 15 |  | Yes5 |  | Yes |  |  | Yes |  |  |  |  |  |  |
| 30 |  | Yes5 |  | Yes |  |  | Yes |  | Yes |  | Yes |  |  |
| n48 | 15 | Yes5 | Yes | Yes | Yes |  |  | Yes | Yes6 |  |  |  |  |  |
| 30 |  | Yes | Yes | Yes |  |  | Yes | Yes6 | Yes6 |  | Yes6 | Yes6,4 | Yes6 |
| 60 |  | Yes | Yes | Yes |  |  | Yes | Yes6 | Yes6 |  | Yes6 | Yes6,4 | Yes6 |
| n47 | 15 |  | Yes10 |  | Yes10 |  | Yes10 | Yes10 |  |  |  |  |  |  |
| 30 |  | Yes10 |  | Yes10 |  | Yes10 | Yes10 |  |  |  |  |  |  |
| 60 |  | Yes10 |  | Yes10 |  | Yes10 | Yes10 |  |  |  |  |  |  |
| n50 | 15 | Yes9 | Yes | Yes | Yes |  | Yes | Yes | Yes |  |  |  |  |  |
| 30 |  | Yes | Yes | Yes |  | Yes | Yes | Yes | Yes |  | Yes3 |  |  |
| 60 |  | Yes | Yes | Yes |  | Yes | Yes | Yes | Yes |  | Yes3 |  |  |
| n51 | 15 | Yes |  |  |  |  |  |  |  |  |  |  |  |  |
| 30 |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 60 |  |  |  |  |  |  |  |  |  |  |  |  |  |
| n53 | 15 | Yes | Yes |  |  |  |  |  |  |  |  |  |  |  |
| 30 |  | Yes |  |  |  |  |  |  |  |  |  |  |  |
| 60 |  | Yes |  |  |  |  |  |  |  |  |  |  |  |
| n65 | 15 | Yes | Yes | Yes | Yes |  |  |  | Yes |  |  |  |  |  |
| 30 |  | Yes | Yes | Yes |  |  |  | Yes |  |  |  |  |  |
| 60 |  | Yes | Yes | Yes |  |  |  | Yes |  |  |  |  |  |
| n66 | 15 | Yes | Yes | Yes | Yes | Yes | Yes | Yes |  |  |  |  |  |  |
| 30 |  | Yes | Yes | Yes | Yes | Yes | Yes |  |  |  |  |  |  |
| 60 |  | Yes | Yes | Yes | Yes | Yes | Yes |  |  |  |  |  |  |
| n70 | 15 | Yes | Yes | Yes | Yes3 | Yes3 |  |  |  |  |  |  |  |  |
| 30 |  | Yes | Yes | Yes3 | Yes3 |  |  |  |  |  |  |  |  |
| 60 |  | Yes | Yes | Yes3 | Yes3 |  |  |  |  |  |  |  |  |
| n71 | 15 | Yes | Yes | Yes | Yes |  |  |  |  |  |  |  |  |  |
| 30 |  | Yes | Yes | Yes |  |  |  |  |  |  |  |  |  |
| 60 |  |  |  |  |  |  |  |  |  |  |  |  |  |
| n74 | 15 | Yes | Yes | Yes | Yes |  |  |  |  |  |  |  |  |  |
| 30 |  | Yes | Yes | Yes |  |  |  |  |  |  |  |  |  |
| 60 |  | Yes | Yes | Yes |  |  |  |  |  |  |  |  |  |
| n75 | 15 | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |  |  |  |  |  |
| 30 |  | Yes | Yes | Yes | Yes | Yes | Yes | Yes |  |  |  |  |  |
| 60 |  | Yes | Yes | Yes | Yes | Yes | Yes | Yes |  |  |  |  |  |
| n76 | 15 | Yes |  |  |  |  |  |  |  |  |  |  |  |  |
| 30 |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 60 |  |  |  |  |  |  |  |  |  |  |  |  |  |
| n77 | 15 |  | Yes | Yes | Yes | Yes | Yes | Yes | Yes |  |  |  |  |  |
| 30 |  | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes4 | Yes | Yes4 | Yes |
| 60 |  | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes4 | Yes | Yes4 | Yes |
| n78 | 15 |  | Yes | Yes | Yes | Yes | Yes | Yes | Yes |  |  |  |  |  |
| 30 |  | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes4 | Yes | Yes | Yes |
| 60 |  | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes4 | Yes | Yes | Yes |
| n79 | 15 |  |  |  |  |  |  | Yes | Yes |  |  |  |  |  |
| 30 |  |  |  |  |  |  | Yes | Yes | Yes |  | Yes |  | Yes |
| 60 |  |  |  |  |  |  | Yes | Yes | Yes |  | Yes |  | Yes |
| n80 | 15 | Yes | Yes | Yes | Yes | Yes | Yes |  |  |  |  |  |  |  |
| 30 |  | Yes | Yes | Yes | Yes | Yes |  |  |  |  |  |  |  |
| 60 |  | Yes | Yes | Yes | Yes | Yes |  |  |  |  |  |  |  |
| n81 | 15 | Yes | Yes | Yes | Yes |  |  |  |  |  |  |  |  |  |
| 30 |  | Yes | Yes | Yes |  |  |  |  |  |  |  |  |  |
| 60 |  |  |  |  |  |  |  |  |  |  |  |  |  |
| n82 | 15 | Yes | Yes | Yes | Yes |  |  |  |  |  |  |  |  |  |
| 30 |  | Yes | Yes | Yes |  |  |  |  |  |  |  |  |  |
| 60 |  |  |  |  |  |  |  |  |  |  |  |  |  |
| n83 | 15 | Yes | Yes | Yes | Yes |  |  |  |  |  |  |  |  |  |
| 30 |  | Yes | Yes | Yes |  |  |  |  |  |  |  |  |  |
| 60 |  |  |  |  |  |  |  |  |  |  |  |  |  |
| n84 | 15 | Yes | Yes | Yes | Yes |  |  |  |  |  |  |  |  |  |
| 30 |  | Yes | Yes | Yes |  |  |  |  |  |  |  |  |  |
| 60 |  | Yes | Yes | Yes |  |  |  |  |  |  |  |  |  |
| n86 | 15 | Yes | Yes | Yes | Yes |  |  | Yes |  |  |  |  |  |  |
| 30 |  | Yes | Yes | Yes |  |  | Yes |  |  |  |  |  |  |
| 60 |  | Yes | Yes | Yes |  |  | Yes |  |  |  |  |  |  |
| n89 | 15 | Yes | Yes | Yes | Yes |  |  |  |  |  |  |  |  |  |
| 30 |  | Yes | Yes | Yes |  |  |  |  |  |  |  |  |  |
| 60 |  |  |  |  |  |  |  |  |  |  |  |  |  |
| n90 | 15 |  | Yes | Yes | Yes |  | Yes | Yes | Yes |  |  |  |  |  |
| 30 |  | Yes | Yes | Yes |  | Yes | Yes | Yes | Yes |  | Yes | Yes | Yes |
| 60 |  | Yes | Yes | Yes |  | Yes | Yes | Yes | Yes |  | Yes | Yes | Yes |
| n91 | 15 | Yes | Yes8 |  |  |  |  |  |  |  |  |  |  |  |
| 30 |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 60 |  |  |  |  |  |  |  |  |  |  |  |  |  |
| n92 | 15 | Yes | Yes | Yes | Yes |  |  |  |  |  |  |  |  |  |
| 30 |  | Yes | Yes | Yes |  |  |  |  |  |  |  |  |  |
| 60 |  |  |  |  |  |  |  |  |  |  |  |  |  |
| n93 | 15 | Yes | Yes8 |  |  |  |  |  |  |  |  |  |  |  |
| 30 |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 60 |  |  |  |  |  |  |  |  |  |  |  |  |  |
| n94 | 15 | Yes | Yes | Yes | Yes |  |  |  |  |  |  |  |  |  |
| 30 |  | Yes | Yes | Yes |  |  |  |  |  |  |  |  |  |
| 60 |  |  |  |  |  |  |  |  |  |  |  |  |  |
| n95 | 15 | Yes | Yes | Yes |  |  |  |  |  |  |  |  |  |  |
| 30 |  | Yes | Yes |  |  |  |  |  |  |  |  |  |  |
| 60 |  | Yes | Yes |  |  |  |  |  |  |  |  |  |  |
| n96 | 15 |  |  |  | Yes |  |  | Yes |  |  |  |  |  |  |
| 30 |  |  |  | Yes |  |  | Yes |  | Yes |  | Yes |  |  |
| NOTE 1: Void.  NOTE 2: Void.  NOTE 3: This UE channel bandwidth is applicable only to downlink.  NOTE 4: This UE channel bandwidth is optional in this release of the specification.  NOTE 5: For this bandwidth, the minimum requirements are restricted to operation when carrier is configured as an SCell part of DC or CA configuration.  NOTE 6: For this bandwidth, the minimum requirements are restricted to operation when carrier is configured as an downlink SCell part of CA configuration.  NOTE 7: For the 20 MHz bandwidth, the minimum requirements are specified for NR UL carrier frequencies confined to either 713-723 MHz or 728-738 MHz. For the 30MHz bandwidth, the minimum requirements are specified for NR UL transmission bandwidth configuration confined to either 703-733 or 718-748 MHz.  NOTE 8: This UE channel bandwidth is applicable only to uplink.  NOTE 9: For this bandwidth, the minimum requirements are restricted to operation when carrier is configured as an SCell part of DC or CA configuration.  NOTE 10: These UE channel bandwidths are applicable to sidelink operation. | | | | | | | | | | | | | | |

###### *------------------------------ Modified section ------------------------------*

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

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

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

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

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

In frequency bands with two ΔFRaster, 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 ∆FRaster .

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

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

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

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

###### *------------------------------ Modified section ------------------------------*

### 5.4.3 Synchronization raster

#### 5.4.3.1 Synchronization raster and numbering

The synchronization raster indicates the frequency positions of the synchronization block that can be used by the UE for system acquisition when explicit signalling of the synchronization block position is not present.

A global synchronization raster is defined for all frequencies. The frequency position of the SS block is defined as SSREF with corresponding number GSCN. The parameters defining the SSREF and GSCN for all the frequency ranges are in Table 5.4.3.1-1.

The resource element corresponding to the SS block reference freqeuncy SSREF is given in clause 5.4.3.2. The synchronization raster and the subcarrier spacing of the synchronization block is defined separately for each band.

Table 5.4.3.1-1: GSCN parameters for the global frequency raster

|  |  |  |  |
| --- | --- | --- | --- |
| Frequency range | SS Block frequency position SSREF | GSCN | Range of GSCN |
| 0 – 3000 MHz | N \* 1200kHz + M \* 50 kHz,  N=1:2499, M ϵ {1,3,5} (Note 1) | 3N + (M-3)/2 | 2 – 7498 |
| 3000 – 24250 MHz | 3000 MHz + N \* 1.44 MHz  N = 0:14756 | 7499 + N | 7499 – 22255 |
| NOTE 1: The default value for operating bands with which only support SCS spaced channel raster(s) is M=3. | | | |

5.4.3.2 Synchronization raster to synchronization block resource element mapping

The mapping between the synchronization raster and the corresponding resource element of the SS block is given in Table 5.4.3.2-1.

Table 5.4.3.2-1: Synchronization raster to SS block resource element mapping

|  |  |
| --- | --- |
| Resource element index | 120 |
|  |  |

 is the subcarrier number of SS/PBCH block defined in TS 38.211 clause 7.4.3.1 [6].

#### 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.

Table 5.4.3.3-1: Applicable SS raster entries per operating band

|  |  |  |  |
| --- | --- | --- | --- |
| NR operating band | SS Block SCS | SS Block pattern1 | 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 | 15 kHz | Case A | 2156 – <1> – 2182 |
| n20 | 15 kHz | Case A | 1982 – <1> – 2047 |
| 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 5 |
| 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 6 |
| 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 |
| n46**3** | 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 |
| 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> – 8880 |
| 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**4** | 30 kHz | Case C | 9531 – <1> – 10363 |
| NOTE 1: SS Block pattern is defined in clause 4.1 in TS 38.213 [8].  NOTE 2: The applicable SS raster entries are GSCN = {6432, 6443, 6457, 6468, 6479, 6493, 6507, 6518, 6532, 6543}.  NOTE 3: 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 4: The following GSCN are allowed for operation in band n96:  GSCN = [9548, 9562, 9576, 9590, 9603, 9617,9631, 9645, 9659, 9673, 9687, 9701, 9715, 9728, 9742, 9756, 9770, 9784, 9798, 9812, 9826, 9840, 9853, 9867, 9881, 9895, 9909, 9923, 9937, 9951, 9965, 9978, 9992, 10006, 10020, 10034, 10048, 10062, 10076, 10090, 10103, 10117, 10131, 10145, 10159, 10173, 10187, 10201, 10215, 10228, 10242, 10256, 10270, 10284, 10298, 10312, 10326, 10340, 10353.]  NOTE 5: The applicable SS raster entries are GSCN = {5032, 5043, 5054}  NOTE 6: The applicable SS raster entries are GSCN = {4707, 4715, 4718, 4729, 4732, 4743, 4747, 4754, 4761, 4768, 4772, 4782, 4786, 4793} | | | |

###### *------------------------------ Modified section ------------------------------*

5.4.4 TX–RX frequency separation

The default TX channel (carrier centre frequency) to RX channel (carrier centre frequency) separation for operating bands is specified in Table 5.4.4-1.

Table 5.4.4-1: UE TX-RX frequency separation

| **NR Operating Band** | **TX – RX  carrier centre frequency separation** |
| --- | --- |
| n1 | 190 MHz |
| n2 | 80 MHz |
| n3 | 95 MHz |
| n5 | 45 MHz |
| n7 | 120 MHz |
| n8 | 45 MHz |
| n12 | 30 MHz |
| n13 | -31 MHz |
| n14 | -30 MHz |
| n18 | 45 MHz |
| n20 | -41 MHz |
| n25 | 80 MHz |
| n26 | 45 MHz |
| n28 | 55 MHz |
| n30 | 45 MHz |
| n65 | 190 MHz |
| n66 | 400 MHz |
| n70 | 295,3001 MHz |
| n71 | -46 MHz |
| n74 | 48 MHz |
| n91 | 570 MHz – 595 MHz  (NOTE 2) |
| n92 | 575 MHz – 680 MHz (*μ* = 0)  580 MHz – 675 MHz (*μ* = 1)  (NOTE 2) |
| n93 | 517 MHz – 547 MHz  (NOTE 2) |
| n94 | 522 MHz – 632 MHz (*μ* = 0)  527 MHz – 627 MHz (*μ* = 1)  (NOTE 2) |
| NOTE 1: Default TX-RX carrier centre frequency separation. NOTE 2: The range of TX-RX frequency separation given paired UL and DL channel bandwidths BWUL and BWDL is given by the respective lower and upper limit FDL\_low – FUL\_high + 0.5(BWDL + BWUL) and FDL\_high – FUL\_low – 0.5(BWDL + BWUL). The UL and DL channel bandwidth combinations specified in Table 5.3.5-1 and 5.3.6-1 depend on the subcarrier spacing configuration *μ* [6]. | |

###### *------------------------------ Modified section ------------------------------*

### 6.2.1 UE maximum output power

The following UE Power Classes define the maximum output power for any transmission bandwidth within the channel bandwidth of NR carrier unless otherwise stated. The period of measurement shall be at least one sub frame (1ms).

Table 6.2.1-1: UE Power Class

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| NR  band | Class 1 (dBm) | Tolerance (dB) | Class 1.5 (dBm) | Tolerance (dB) | Class 2 (dBm) | Tolerance (dB) | Class 3 (dBm) | Tolerance (dB) |
| n1 |  |  |  |  |  |  | 23 | ±2 |
| n2 |  |  |  |  |  |  | 23 | ±23 |
| n3 |  |  |  |  |  |  | 23 | ±23 |
| n5 |  |  |  |  |  |  | 23 | ±2 |
| n7 |  |  |  |  |  |  | 23 | ±23 |
| n8 |  |  |  |  |  |  | 23 | ±23 |
| n12 |  |  |  |  |  |  | 23 | ±23 |
| n13 |  |  |  |  |  |  | 23 | ±2 |
| n14 | 31 | +2/-3 |  |  |  |  | 23 | ±23 |
| n18 |  |  |  |  |  |  | 23 | ±2 |
| n20 |  |  |  |  |  |  | 23 | ±23 |
| n25 |  |  |  |  |  |  | 23 | ±23 |
| n26 |  |  |  |  |  |  | 23 | ±23 |
| n28 |  |  |  |  |  |  | 23 | +2/-2.5 |
| n30 |  |  |  |  |  |  | 23 | ±2 |
| n34 |  |  |  |  |  |  | 23 | ±2 |
| n38 |  |  |  |  |  |  | 23 | ±2 |
| n39 |  |  |  |  |  |  | 23 | ±2 |
| n40 |  |  |  |  | 26 | +2/-33 | 23 | ±2 |
| n41 |  |  | 295 | \_2/-33 | 26 | +2/-33 | 23 | ±23 |
| n47 |  |  |  |  |  |  | 23 | ±2 |
| n48 |  |  |  |  |  |  | 23 | +2/-3 |
| n50 |  |  |  |  |  |  | 23 | ±2 |
| n51 |  |  |  |  |  |  | 23 | ±2 |
| n53 |  |  |  |  |  |  | 23 | ±2 |
| n65 |  |  |  |  |  |  | 23 | ±2 |
| n66 |  |  |  |  |  |  | 23 | ±2 |
| n70 |  |  |  |  |  |  | 23 | ±2 |
| n71 |  |  |  |  |  |  | 23 | +2/-2.5 |
| n74 |  |  |  |  |  |  | 23 | ±2 |
| n77 |  |  |  |  | 26 | +2/-3 | 23 | +2/-3 |
| n78 |  |  |  |  | 26 | +2/-3 | 23 | +2/-3 |
| n79 |  |  |  |  | 26 | +2/-3 | 23 | +2/-3 |
| n80 |  |  |  |  |  |  | 23 | ±2 |
| n81 |  |  |  |  |  |  | 23 | ±2 |
| n82 |  |  |  |  |  |  | 23 | ±2 |
| n83 |  |  |  |  |  |  | 23 | ±2/-2.5 |
| n84 |  |  |  |  |  |  | 23 | ±2 |
| n86 |  |  |  |  |  |  | 23 | ±2 |
| n89 |  |  |  |  |  |  | 23 | ±2 |
| n91 |  |  |  |  |  |  | 23 | ±23, 4 |
| n92 |  |  |  |  |  |  | 23 | ±23, 4 |
| n93 |  |  |  |  |  |  | 23 | ±23, 4 |
| n94 |  |  |  |  |  |  | 23 | ±23, 4 |
| n95 |  |  |  |  |  |  | 23 | ±2 |
| NOTE 1: PPowerClass is the maximum UE power specified without taking into account the tolerance  NOTE 2: Powerclass 3 is default power class unless otherwise stated  NOTE 3: Refers to the transmission bandwidths confined within FUL\_low and FUL\_low + 4 MHz or FUL\_high – 4 MHz and FUL\_high, the maximum output power requirement is relaxed by reducing the lower tolerance limit by 1.5 dB.  NOTE 4: The maximum output power requirement is relaxed by reducing the lower tolerance limit by 0.3 dB  NOTE 5: Achieved via dual Tx | | | | | | | | |

If a UE supports a different power class than the default UE power class for the band and the supported power class enables the higher maximum output power than that of the default power class:

- if the field of UE capability *maxUplinkDutyCycle-PC2-FR1* is absent and the percentage of uplink symbols transmitted in a certain evaluation period is larger than 50% (The exact evaluation period is no less than one radio frame); or

- if the field of UE capability *maxUplinkDutyCycle-PC2-FR1* is not absent and the percentage of uplink symbols transmitted in a certain evaluation period is larger than *maxUplinkDutyCycle-PC2-FR1* as defined in TS 38.331 (The exact evaluation period is no less than one radio frame); or

- if the IE P-Max as defined in TS 38.331 [7] is provided and set to the maximum output power of the default power class or lower;

- shall apply all requirements for the default power class to the supported power class and set the configured transmitted power as specified in clause 6.2.4;

- else if the UE does not support a power class with higher maximum output power than PC2; or

- if the field of UE capability maxUplinkDutyCycle is absent and the percentage of uplink symbols transmitted in a certain evaluation period is larger than 25% (The exact evaluation period is no less than one radio frame); or

- if the field of UE capability maxUplinkDutyCycle is not absent and the percentage of uplink symbols transmitted in a certain evaluation period is larger than maxUplinkDutyCycle/2 (The exact evaluation period is no less than one radio frame); or  
if the IE P-Max as defined in TS 38.331 [7] is provided and set to the maximum output power of the power class 2 or lower;  
shall apply all requirements for power class 2 to the supported power class and set the configured transmitted power as specified in clause 6.2.4;

- else shall apply all requirements for the supported power class and set the configured transmitted power as specified in clause 6.2.4.

###### *------------------------------ Modified section ------------------------------*

#### 6.2.3.1 General

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

To meet the additional requirements, additional maximum power reduction (A-MPR) is allowed for the maximum output power as specified in Table 6.2.1-1. Unless stated otherwise, the total reduction to UE maximum output power is max(MPR, A-MPR) where MPR is defined in clause 6.2.2. Outer and inner allocation notation used in clause 6.2.3 is defined in clause 6.2.2 In absense of modulation and waveform types the A-MPR applies to all modulation and waveform types.

Table 6.2.3.1-1 specifies the additional requirements with their associated network signalling values and the allowed A-MPR and applicable operating band(s) for each NS value. In case of a power class 3 UE, when IE *powerBoostPi2BPSK* is set to 1, power class 2 A-MPR values apply. The mapping of NR frequency band numbers and values of the *additionalSpectrumEmission* to network signalling labels is specified in Table 6.2.3.1-1A.

For almost contiguous allocations in CP-OFDM waveforms in power class 3, the allowed A-MPR defined in clause 6.2.3 is increased by CEIL{ 10 log10(1 + NRB\_gap / NRB\_alloc), 0.5 } dB, where NRB\_gap is the total number of unallocated RBs between allocated RBs and NRB\_alloc is the total number of allocated RBs, and the parameter LCRB is replaced by NRB\_alloc + NRB\_gap in specifying the RB allocation regions.

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

Table 6.2.3.1-1: Additional maximum power reduction (A-MPR)

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Network signalling label | Requirements (clause) | NR Band | Channel bandwidth (MHz) | Resources blocks (*N*RB) | A-MPR (dB) |
| NS\_01 |  | Table 5.2-1 | 5, 10, 15, 20, 25, 30, 40, 50, 60, 70, 80, 90, 100 | Table 5.3.2-1 | N/A |
| NS\_03 | 6.5.2.3.3 | n2, n25, n66,  n70, n86 |  |  | Clause 6.2.3.7 |
| NS\_03U | 6.5.2.3.3, 6.5.2.4.2 | n2, n25, n66, n86 |  |  | Clause 6.2.3.7 |
| NS\_04 | 6.5.2.3.2, 6.5.3.3.1 | n41 | 10, 15, 20, 30, 40, 50, 60 80, 90, 100 |  | Clause 6.2.3.2 |
| NS\_05 | 6.5.3.3.4 | n1, n65, n84 | 5, 10, 15, 20(NOTE 2) |  | Clause 6.2.3.4 |
| NS\_05U | 6.5.3.3.4, 6.5.2.4.2 | n1, n65, n84 | 5, 10, 15, 20 |  | Clause 6.2.3.4 |
| NS\_06 | 6.5.2.3.4 | n12 | 5, 10, 15 |  | N/A |
| n13, n14 | 5,10 |
| NS\_07 | 6.5.3.3.25 | n13 | 5,10 | Table 6.2.3.29-1 | Table  6.2.3.29-2 |
| NS\_10 |  | n20 | 15, 20 | Table 6.2.3.3-1 | Table  6.2.3.3-1 |
| NS\_12 | 6.5.3.3.17 | n26 |  |  |  |
| NS\_13 | 6.5.3.3.18 | n26 |  |  |  |
| NS\_14 | 6.5.3.3.19 | n26 |  |  |  |
| NS\_15 | 6.5.3.3.20 | n26 |  |  |  |
| NS\_17 | 6.5.3.3.2 | n28, n83 | 5,10 | Table 5.3.2-1 | N/A |
| NS\_18 | 6.5.3.3.3 | n28, n83 | 5 |  | Table 6.2.3.13-1, A1 |
| 10, 15, 20 |  | Table 6.2.3.13-1, A2 |
| 30 |  | Table 6.2.3.13-1, A3, A4, A5 |
| NS\_21 | 6.5.3.3.12 | n30 | 5, 10 |  | Clause 6.2.3.14 |
| NS\_24 | 6.5.3.3.13 | n65 (NOTE 4) | 5, 10, 15, 20 | Table 6.2.3.15-1 | Clause 6.2.3.15 |
| NS\_27 | 6.5.2.3.8  6.5.3.3.14 | n48 | 5, 10, 15, 20, 40 | Table 6.2.3.16-1 | Table 6.2.3.16-2 |
| NS\_35 | 6.5.2.3.1 | n71 | 5, 10, 15, 20 | Table 5.3.2-1 | N/A |
| NS\_37 | 6.5.3.3.6 | n74  (NOTE 3) | 10, 15 | Table 6.2.3.8-1 | Table  6.2.3.8-1 |
| NS\_38 | 6.5.3.3.7 | n74 | 5, 10, 15, 20 | Table 6.2.3.9-1 | Table  6.2.3.9-1 |
| NS\_39 | 6.5.3.3.8 | n74 | 10, 15, 20 | Table 6.2.3.10-1 | Table 6.2.3.10-1 |
| NS\_40 | 6.5.3.3.9 | n51 | 5 |  | Table  6.2.3.5-1 |
| NS\_41 | 6.5.3.3.10 | n50 | 5, 10, 15, 20, 30, 40, 50, 60 |  | Table 6.2.3.11-1 |
| NS\_42 | 6.5.3.3.11 | n50 | 5, 10, 15, 20, 30, 40, 50, 60 |  | Table 6.2.3.12-1 |
| NS\_43 | 6.5.3.3.5 | n8, n81 | 5, 10, 15 |  | Clause 6.2.3.6 |
| NS\_43U | 6.5.3.3.5, 6.5.2.4.2 | n8, n81 | 5, 10, 15 |  | Clause 6.2.3.6 |
| NS\_44 | 6.5.3.3.24 | n38 | 25, 30, 40 | Table 6.2.3.20-1 | Table 6.2.3.20-1 |
| NS\_45 | 6.5.3.3.21 | n53 | 5, 10 |  | Clause 6.2.3.25 |
| NS\_46 | 6.5.3.2 | n7 | 25, 30, 40, 50 | Table 6.2.3.17-1 | Table 6.2.3.17-2 |
| NS\_47 | 6.5.3.3.15 | n41 (Note 5) | 30 | Table 6.2.3.18-1 | Table 6.2.3.18-2 |
| NS\_48 | 6.5.3.3.22 | n1 | 25, 30, 40, 50 | Table 6.2.3.26-1 | Table 6.2.3.26-1 |
| NS\_49 | 6.5.3.3.23 | n1 | 25, 30, 40, 50 | Table 6.2.3.27-1 | Table 6.2.3.27-1 |
| NS\_50 | 6.5.3.3.16 | n39 | 25, 30, 40 |  | Clause 6.2.3.19 |
| NS\_51 | 6.5.3.3.22 | n65 | 50 | Table 6.2.3.28-1 | Table 6.2.3.28-2 |
| NS\_100 | 6.5.2.4.2 | n1, n2, n3, n5, n8, n18, n25, n26, n65, n66, n80, n81, n84, n86, n89  (NOTE 1) |  |  | Table  6.2.3.1-2 |
| NOTE 1: This NS can be signalled for NR bands that have UTRA services deployed  NOTE 2: No A-MPR is applied for 5 MHz BWChannel where the lower channel edge is ≥ 1930 MHz,10 MHz BWChannel where the lower channel edge is ≥ 1950 MHz and 15 MHz BWChannel where the lower channel edge is ≥ 1955 MHz.NOTE 3: Applicable when the NR carrier is within 1447.9 – 1462.9 MHz  NOTE 4: Applicable when the upper edge of the channel bandwidth frequency is greater than 1980 MHz.  NOTE 5: Applicable when the NR carrier is within 2545 – 2575 MHz | | | | | |

[The NS\_01 label with the field *additionalPmax* [7] absent is default for all NR bands.]

Table 6.2.3.1-1A: Mapping of network signaling label

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| NR band | Value of additionalSpectrumEmission | | | | | | | |
| **0** | **1** | **2** | **3** | **4** | **5** | **6** | **7** |
| n1 | NS\_01 | NS\_100 | NS\_05 | NS\_05U | NS\_48 | NS\_49 |  |  |
| n2 | NS\_01 | NS\_100 | NS\_03 | NS\_03U |  |  |  |  |
| n3 | NS\_01 | NS\_100 |  |  |  |  |  |  |
| n5 | NS\_01 | NS\_100 |  |  |  |  |  |  |
| n7 | NS\_01 | NS\_46 |  |  |  |  |  |  |
| n8 | NS\_01 | NS\_100 | NS\_43 | NS\_43U |  |  |  |  |
| n12 | NS\_01 | NS\_06 |  |  |  |  |  |  |
| n13 | NS\_01 | NS\_06 | NS\_07 |  |  |  |  |  |
| n14 | NS\_01 | NS\_06 |  |  |  |  |  |  |
| n18 | NS\_01 | NS\_100 |  |  |  |  |  |  |
| n20 | NS\_01 | Void | NS\_10 |  |  |  |  |  |
| n25 | NS\_01 | NS\_100 | NS\_03 | NS\_03U |  |  |  |  |
| n26 | NS\_01 | NS\_100 | NS\_12 | NS\_13 | NS\_14 | NS\_15 |  |  |
| n28 | NS\_01 | NS\_17 | NS\_18 |  |  |  |  |  |
| n30 | NS\_01 | NS\_21 |  |  |  |  |  |  |
| n34 | NS\_01 |  |  |  |  |  |  |  |
| n38 | NS\_01 | NS\_44 |  |  |  |  |  |  |
| n39 | NS\_01 | NS\_50 |  |  |  |  |  |  |
| n40 | NS\_01 |  |  |  |  |  |  |  |
| n41 | NS\_01 | NS\_04 | NS\_47 |  |  |  |  |  |
| n48 | NS\_01 | NS\_27 |  |  |  |  |  |  |
| n50 | NS\_01 | NS\_41 | NS\_42 |  |  |  |  |  |
| n51 | NS\_01 | NS\_40 |  |  |  |  |  |  |
| n53 | NS\_01 | NS\_45 |  |  |  |  |  |  |
| n65 | NS\_01 | NS\_24 | NS\_100 | NS\_05 | NS\_05U | NS\_51 |  |  |
| n66 | NS\_01 | NS\_100 | NS\_03 | NS\_03U |  |  |  |  |
| n70 | NS\_01 | NS\_03 |  |  |  |  |  |  |
| n71 | NS\_01 | NS\_35 |  |  |  |  |  |  |
| n74 | NS\_01 | NS\_37 | NS\_38 | NS\_39 |  |  |  |  |
| n77 | NS\_01 |  |  |  |  |  |  |  |
| n78 | NS\_01 |  |  |  |  |  |  |  |
| n79 | NS\_01 |  |  |  |  |  |  |  |
| n80 | NS\_01 | NS\_100 |  |  |  |  |  |  |
| n81 | NS\_01 | NS\_100 | NS\_43 | NS\_43U |  |  |  |  |
| n82 | NS\_01 | Void |  |  |  |  |  |  |
| n83 | NS\_01 | NS\_17 | NS\_18 |  |  |  |  |  |
| n84 | NS\_01 | NS\_100 | NS\_05 | NS\_05U |  |  |  |  |
| n86 | NS\_01 | NS\_100 | NS\_03 | NS\_03U |  |  |  |  |
| n89 | NS\_01 | NS\_100 |  |  |  |  |  |  |
| n91 | NS\_01 |  |  |  |  |  |  |  |
| n92 | NS\_01 |  |  |  |  |  |  |  |
| n93 | NS\_01 |  |  |  |  |  |  |  |
| n94 | NS\_01 |  |  |  |  |  |  |  |
| n95 | NS\_01 |  |  |  |  |  |  |  |
| NOTE: *additionalSpectrumEmission* corresponds to an information element of the same name defined in clause 6.3.2 of TS 38.331 [7]. | | | | | | | | |

Table 6.2.3.1-2: A-MPR for NS\_100 (UTRA protection)

|  |  |  |
| --- | --- | --- |
| Modulation/Waveform | | Outer (dB) |
| DFT-s-OFDM | Pi/2 BPSK | ≤ 2 |
| QPSK | ≤ 2 |
| 16 QAM | ≤ 2.5 |
| 64 QAM | ≤ 3 |
| 256 QAM | ≤ 4.5 |
| CP-OFDM | QPSK | ≤ 4 |
| 16 QAM | ≤ 4 |
| 64 QAM | ≤ 4 |
| 256 QAM | ≤ 6.5 |
| NOTE 1: Void  NOTE 2: Void | | |

###### *------------------------------ Modified section ------------------------------*

#### 6.2.3.29 A-MPR for NS\_07

Table 6.2.3.29-1: A-MPR regions for NS\_07

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Channel Bandwidth, MHz | Carrier Frequency, MHz | Regions | | A-MPR |
| RBstart\*12\*SCS  MHz | LCRB\*12\*SCS  MHz |
| 5 MHz | 782 ≤ Fc ≤ 784.5 | >0 | ≥ 1.8 | A3 |
| 5 MHz | 779.5 ≤ Fc < 782 | ≤ 0.9 | ≥ 0 | A1 |
| > 0.9, ≤ 1.26 | ≥1.26 | A2 |
| > 1.26, ≤ 3.42 | ≥ 1.8 | A3 |
| >3.42 | ≤ 0.36 | A4 |
| 10 MHz | Fc = 782 | ≤ 2.34 | ≥ 0 | A1 |
| >2.34, ≤ 3.24 | ≥ 1.44 | A2 |
| > 3.24, ≤ 6.48 | ≥ 3.24 | A3 |
| > 6.48 | ≤ 0.36 | A4 |

Table 6.2.3.29-2: A-MPR for NS\_07

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Modulation/Waveform | A1 | A2 | A3 | A4 |
| Outer/Inner | Outer/Inner | Outer/Inner | Outer/Inner |
| DFT-s-OFDM PI/2 BPSK | 12 | 9 | 6 | 3 |
| DFT-s-OFDM QPSK | 12 | 9 | 6 | 3 |
| DFT-s-OFDM 16 QAM | 12 | 9 | 6 | 3 |
| DFT-s-OFDM 64 QAM | 12 | 9 | 6 | 3 |
| DFT-s-OFDM 256 QAM | 12 | 9 | 6 | 3 |
| CP-OFDM QPSK | 14 | 10 | 7 | 3 |
| CP-OFDM 16 QAM | 14 | 10 | 7 | 3 |
| CP-OFDM 64 QAM | 14 | 10 | 7 | 3 |
| CP-OFDM 256 QAM | 14 | 10 | 7 | 3 |

###### *------------------------------ Modified section ------------------------------*

##### 6.5.2.3.4 Requirements for network signalling value "NS\_06" or “NS\_07”

Additional spectrum emission requirements are signalled by the network to indicate that the UE shall meet an additional requirement for a specific deployment scenario as part of the cell handover/broadcast message.

When "NS\_06" or “NS\_07” is indicated in the cell, the power of any UE emission shall not exceed the levels specified in Table 6.5.2.3.4-1.

Table 6.5.2.3.4-1: Additional requirements for "NS\_06" or “NS\_07”

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| ΔfOOB (MHz) | Channel bandwidth (MHz) / Spectrum emission limit (dBm) | | | Measurement bandwidth |
| 5 | 10 | 15 |
| ± 0 – 0.1 | -15 | -18 | -20 | 30 kHz |
| ± 0.1 – 1 | -13 | -13 | -13 | 100 kHz |
| ± 1 – 6 | -13 | -13 | -13 | 1 MHz |
| ± 6 – 10 | -25 |
| ± 10 – 15 |  | -25 |
| ± 15 – 20 |  |  | -25 |

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

###### *------------------------------ Modified section ------------------------------*

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

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

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

| NR Band | Spurious emission for UE co-existence | | | | | | |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Protected band | Frequency range (MHz) | | | Maximum Level (dBm) | MBW (MHz) | NOTE |
| n1, n84 | E-UTRA Band 1, 5, 7, 8, 11, 18, 19, 20, 21, 22, 26, 27, 28, 31, 32, 38, 40, 41, 42, 43, 44, 45, 50, 51, 52, 65, 67, 68, 69, 72, 73, 74, 75, 76,  NR Band n78, n79 | FDL\_low | - | FDL\_high | -50 | 1 |  |
| NR Band n77 | FDL\_low | - | FDL\_high | -50 | 1 | 2 |
| E-UTRA Band 3, 34 | FDL\_low | - | FDL\_high | -50 | 1 | 15 |
| Frequency range | 1880 | - | 1895 | -40 | 1 | 15, 27 |
| Frequency range | 1895 | - | 1915 | -15.5 | 5 | 15, 26, 27 |
| Frequency range | 1915 | - | 1920 | +1.6 | 5 | 15, 26, 27 |
| n2 | E-UTRA Band 4, 5, 10, 12, 13, 14, 17, 24, 26, 27, 28, 29, 30, 41, 42, 48, 50, 51, 53, 66, 70, 71, 74, 85 | FDL\_low | - | FDL\_high | -50 | 1 |  |
| E-UTRA Band 2, 25 | FDL\_low | - | FDL\_high | -50 | 1 | 15 |
| E-UTRA Band 43,  NR Band n77 | FDL\_low | - | FDL\_high | -50 | 1 | 2 |
| n3, n80 | E-UTRA Band 1, 5, 7, 8, 20, 26, 27, 28, 31, 32, 33, 34, 38, 39, 40, 41, 43, 44, 45, 50, 51, 65, 67, 68, 69, 72, 73,74, 75, 76.  NR Band n79 | FDL\_low | - | FDL\_high | -50 | 1 |  |
| E-UTRA Band 3 | FDL\_low | - | FDL\_high | -50 | 1 | 15 |
| E-UTRA Band 11, 18, 19, 21 | FDL\_low | - | FDL\_high | -50 | 1 |  |
| E-UTRA Band 22, 42, 52,  NR Band n77, n78 | FDL\_low | - | FDL\_high | -50 | 1 | 2 |
| Frequency range | 1884.5 | - | 1915.7 | -41 | 0.3 | 8 |
| n5, n89 | E-UTRA Band 1, 2, 3, 4, 5, 7, 8, 10, 12, 13, 14, 17, 18, 19, 24, 25, 26, 28, 29, 30, 31, 34, 38, 40, 42, 43, 45, 48, 50, 51, 53, 65, 66, 70, 71, 73, 74, 85  NR Band n79 | FDL\_low | - | FDL\_high | -50 | 1 |  |
| E-UTRA Band 41, 52,  NR Band n77, n78 | FDL\_low | - | FDL\_high | -50 | 1 | 2 |
| E-UTRA Band 11, 21 | FDL\_low | - | FDL\_high | -50 | 1 |  |
| Frequency range | 1884.5 | - | 1915.7 | -41 | 0.3 | 8 |
| n7 | E-UTRA Band 1, 2, 3, 4, 5, 7, 8, 10, 12, 13, 14, 17, 20, 22, 26, 27, 28, 29, 30, 31, 32, 33, 34, 40, 42, 43, 50, 51, 52, 65, 66, 67, 68, 72, 74, 75, 76, 85,  NR Band n77, n78 | FDL\_low | - | FDL\_high | -50 | 1 |  |
| Frequency range | 2570 | - | 2575 | +1.6 | 5 | 15, 21, 26 |
| Frequency range | 2575 | - | 2595 | -15.5 | 5 | 15, 21, 26 |
| Frequency range | 2595 | - | 2620 | -40 | 1 | 15, 21 |
| n8, n81 | E-UTRA Band 1, 20, 28, 31, 32, 33, 34, 38, 39, 40, 45, 50, 51, 65, 67, 68, 69, 72, 73, 74, 75, 76 | FDL\_low | - | FDL\_high | -50 | 1 |  |
| E-UTRA band 3, 7, 22, 41, 42, 43, 52,  NR Band n77, n78, n79 | FDL\_low | - | FDL\_high | -50 | 1 | 2 |
| E-UTRA 8 | FDL\_low | - | FDL\_high | -50 | 1 | 15 |
| E-UTRA Band 11, 21 | FDL\_low | - | FDL\_high | -50 | 1 |  |
| Frequency range | 1884.5 | - | 1915.7 | -41 | 0.3 | 8 |
| n12 | E-UTRA Band 2, 5, 13, 14, 17, 24, 25, 26, 27, 30, 41, 48, 50, 51, 53, 71, 74 | FDL\_low | - | FDL\_high | -50 | 1 |  |
| E-UTRA Band 4, 10, 66, 70,  NR Band n77 | FDL\_low | - | FDL\_high | -50 | 1 | 2 |
| E-UTRA Band 12, 85 | FDL\_low | - | FDL\_high | -50 | 1 | 15 |
| n13 | E-UTRA Band 2, 4, 5,12, 13, 17, 25, 26, 27, 29, 41, 48, 50, 51, 53, 66, 70, 71, 74, 85 | FDL\_low | - | FDL\_high | -50 | 1 |  |
| E-UTRA Band 14 | FDL\_low | - | FDL\_high | -50 | 1 | 15 |
| E-UTRA Band 24, 30  NR Band n77 | FDL\_low | - | FDL\_high | -50 | 1 | 2 |
| Frequency range | 769 | - | 775 | -35 | 0.00625 | 15 |
| Frequency range | 799 | - | 805 | -35 | 0.00625 | 11, 15 |
| n14 | E-UTRA Band 2, 4, 5, 10, 12, 13, 14, 17, 23, 24, 25, 26, 27, 29, 30, 41, 48, 53, 66, 70, 71, 85 | FDL\_low | - | FDL\_high | -50 | 1 |  |
| NR Band n77 | FDL\_low | - | FDL\_high | -50 | 1 | 2 |
| Frequency range | 769 | - | 775 | -35 | 0.00625 | 12, 15 |
| Frequency range | 799 | - | 805 | -35 | 0.00625 | 11, 12, 15 |
| n18 | E-UTRA Band 1, 3, 11, 21, 34, 42, 65  NR Band n79 | FDL\_low | - | FDL\_high | -50 | 1 |  |
| NR Band n77, n78 | FDL\_low | - | FDL\_high | -50 | 1 | 2 |
| Frequency range | 758 | - | 799 | -50 | 1 |  |
| Frequency range | 799 | - | 803 | -40 | 1 |  |
| Frequency range | 860 | - | 890 | -40 | 1 |  |
| Frequency range | 945 | - | 960 | -50 | 1 |  |
| Frequency range | 1884.5 | - | 1915.7 | -41 | 0.3 | 8 |
| Frequency range | 2545 | - | 2575 | -50 | 1 |  |
| Frequency range | 2595 | - | 2645 | -50 | 1 |  |
| n20, n82 | E-UTRA Band 1, 3, 7, 8, 22, 31, 32, 33, 34, 40, 43, 50, 51, 65, 67, 68, 72, 74, 75, 76 | FDL\_low | - | FDL\_high | -50 | 1 |  |
| E-UTRA Band 20 | FDL\_low | - | FDL\_high | -50 | 1 | 15 |
| E-UTRA Band 38, 42, 52, 69,  NR Band n77, n78 | FDL\_low | - | FDL\_high | -50 | 1 | 2 |
| Frequency range | 758 | - | 788 | -50 | 1 |  |
| n25 | E-UTRA Band 4, 5, 10,12, 13, 14, 17, 24, 26, 27, 28, 29, 30, 41, 42, 48, 53, 66, 70, 71, 85 | FDL\_low | - | FDL\_high | -50 | 1 |  |
| E-UTRA Band 2 | FDL\_low | - | FDL\_high | -50 | 1 | 15 |
| E-UTRA Band 25 | FDL\_low | - | FDL\_high | -50 | 1 | 15 |
| E-UTRA Band 43,  NR Band n77 | FDL\_low | - | FDL\_high | -50 | 1 | 2 |
| n26 | E-UTRA Band 1, 2, 3, 4, 5, 10, 11, 12, 13, 14, 17, 18,19, 21, 24, 25, 26, 29, 30, 31, 34, 39, 40, 42, 43, 48, 50, 51, 53, 65, 66, 70, 71, 73,74, 85 | FDL\_low | - | FDL\_high | -50 | 1 |  |
| E-UTRA Band 41, NR Band n77, n78, n79 | FDL\_low | - | FDL\_high | -50 | 1 | 2 |
| Frequency range | 703 | - | 799 | -50 | 1 |  |
| Frequency range | 799 | - | 803 | -40 | 1 | 15 |
| Frequency range | 945 | - | 960 | -50 | 1 |  |
| Frequency range | 1884.5 | - | 1915.7 | -41 | 0.3 | 8 |
| n28, n83 | E-UTRA Band 1, 4, 10, 22, 32, 42, 43, 50, 51, 52, 65, 66, 73, 74, 75, 76,  NR Band n77, n78 | FDL\_low | - | FDL\_high | -50 | 1 | 2 |
| E-UTRA Band 1 | FDL\_low | - | FDL\_high | -50 | 1 | 19, 25 |
| E-UTRA Band 2, 3, 5, 7, 8, 18, 19, 20, 25, 26, 27, 31, 34, 38, 39, 40, 41, 72,  NR Band n79 | FDL\_low | - | FDL\_high | -50 | 1 |  |
| E-UTRA Band 11, 21 | FDL\_low | - | FDL\_high | -50 | 1 | 19, 24 |
| Frequency range | 470 | - | 694 | -42 | 8 | 15, 35 |
| Frequency range | 470 | - | 710 | -26.2 | 6 | 34 |
| Frequency range | 662 | - | 694 | -26.2 | 6 | 15 |
| Frequency range | 758 | - | 773 | -32 | 1 | 15 |
| Frequency range | 773 | - | 803 | -50 | 1 |  |
| Frequency range | 1884.5 | - | 1915.7 | -41 | 0.3 | 8, 19 |
| n30 | E-UTRA Band 2, 4, 5, 7, 10, 12, 13, 14, 17, 24, 25, 26, 27, 29, 30, 38, 41, 48, 53, 66, 70, 71, 85,  NR Band n77 | FDL\_low | - | FDL\_high | -50 | 1 |  |
| n34 | E-UTRA Band 1, 3, 7, 8, 11, 18, 19, 20, 21, 22, 26, 28, 31, 32, 33, 38,39, 40, 41, 42, 43, 44, 45, 50, 51, 52, 65, 67, 69, 72, 74, 75, 76,  NR Band n78, n79 | FDL\_low | - | FDL\_high | -50 | 1 | 5 |
| NR Band n77 | FDL\_low | - | FDL\_high | -50 | 1 | 2 |
| Frequency range | 1884.5 | - | 1915.7 | -41 | 0.3 | 8 |
| n38 | E-UTRA Band 1, 2, 3, 4, 5, 8, 10, 12, 13, 14, 17, 20, 22, 27, 28, 29, 30, 31, 32, 33, 34, 40, 42, 43, 50, 51, 52, 65, 66, 67, 68, 72, 74, 75, 76, 85 | FDL\_low | - | FDL\_high | -50 | 1 |  |
| Frequency range | 2620 | - | 2645 | -15.5 | 5 | 15, 22, 26 |
| Frequency range | 2645 | - | 2690 | -40 | 1 | 15, 22 |
| n39 | E-UTRA Band 1, 8, 22, 26, 28, 34, 40, 41, 42, 44, 45, 50, 51, 52, 74,  NR Band n79 | FDL\_low | - | FDL\_high | -50 | 1 |  |
| NR Band n77, n78 | FDL\_low | - | FDL\_high | -50 | 1 | 2 |
| Frequency range | 1805 | - | 1855 | -40 | 1 | 33 |
| Frequency range | 1855 | - | 1880 | -15.5 | 5 | 15, 26, 33 |
| n40 | E-UTRA Band 1, 3, 5, 7, 8, 20, 22, 26, 27, 28, 31, 32, 33, 34, 38, 39, 42, 43, 44, 45, 50, 51, 52, 65, 67, 68, 69, 72, 74, 75, 76,  NR Band n77, n78 | FDL\_low | - | FDL\_high | -50 | 1 |  |
| NR Band n79 | FDL\_low | - | FDL\_high | -50 | 1 | 2 |
| n41 | E-UTRA Band 1, 2, 3, 4, 5, 8, 10, 12, 13, 14, 17, 24, 25, 26, 27, 28, 29, 30, 34, 39, 42, 44, 45, 48, 50, 51, 52, 65, 66, 70, 71, 73, 74, 85,  NR Band n77, n78 | FDL\_low | - | FDL\_high | -50 | 1 |  |
| NR Band n79 | FDL\_low | - | FDL\_high | -50 | 1 | 2 |
| E-UTRA Band 11, 18, 19, 21 | FDL\_low | - | FDL\_high | -50 | 1 |  |
| Frequency range | 1884.5 |  | 1915.7 | -41 | 0.3 | 8 |
| n47 | E-UTRA Band 1, 3, 5, 7, 8, 22, 26, 28, 34, 39, 40, 41, 42, 44, 45, 65, 68, 72, 73 | FDL\_low | - | FDL\_high | -50 | 1 |  |
| NR Band n47, n77, n78, n79 | FDL\_low | - | FDL\_high | -50 | 1 |  |
| n48 | E-UTRA Band 2, 4, 5, 12, 13, 14, 17, 24, 25, 26, 29, 30, 41, 50, 51, 66, 70, 71, 74, 85 | FDL\_low | - | FDL\_high | -50 | 1 |  |
| n50 | E-UTRA Band 1, 2, 3, 4, 5, 7, 8, 12, 13, 17, 20, 26, 28, 29, 31, 34, 38, 39, 40, 41, 42, 43, 48, 65, 66, 67, 68 | FDL\_low | - | FDL\_high | -50 | 1 |  |
| n51 | E-UTRA Band 1, 2, 3, 4, 5, 7, 8, 12, 13, 17, 20, 26, 28, 29, 31, 34, 38, 39, 40, 41, 42, 43, 48, 52, 65, 66, 67, 68, 85 | FDL\_low | - | FDL\_high | -50 | 1 |  |
| n53 | E-UTRA Band 2, 4, 5, 12, 13, 14, 17, 24, 25, 26, 29, 30, 48, 66, 70, 71, 85,  NR Band n77 | FDL\_low | - | FDL\_high | -50 | 1 |  |
| n65 | E-UTRA Band 1, 3, 5, 7, 8, 11, 18, 19, 20, 21, 22, 26, 27, 28, 31, 32, 38, 40, 41, 42, 43, 50, 51, 65, 68, 69, 72, 74, 75, 76,  NR Band n78, n79 | FDL\_low | - | FDL\_high | -50 | 1 |  |
| NR Band n77 | FDL\_low | - | FDL\_high | -50 | 1 | 2 |
| E-UTRA Band 34 | FDL\_low | - | FDL\_high | -50 | 1 | 43 |
| Frequency range | 1900 | - | 1915 | -15.5 | 5 | 15, 26, 27 |
| Frequency range | 1915 | - | 1920 | +1.6 | 5 | 15, 26, 27 |
| n66, n86 | E-UTRA Band 2, 4, 5, 7, 10, 12, 13, 14, 17, 25, 26, 27, 28, 29, 30, 38, 41, 43, 50, 51, 53, 66, 70, 71, 74, 85 | FDL\_low | - | FDL\_high | -50 | 1 |  |
| E-UTRA Band 42, 48,  NR Band n77 | FDL\_low | - | FDL\_high | -50 | 1 | 2 |
| n70 | E-UTRA Band 2, 4, 5, 10, 12, 13, 14, 17, 24, 25, 26, 29, 30, 41, 48, 66, 70, 71, 85 | FDL\_low | - | FDL\_high | -50 | 1 |  |
| NR Band n77 | FDL\_low | - | FDL\_high | -50 | 1 | 2 |
| n71 | E-UTRA Band 4, 5, 12, 13, 14, 17, 24, 26, 30, 48, 53, 66, 85 | FDL\_low | - | FDL\_high | -50 | 1 |  |
| E-UTRA Band 2, 25, 41, 70,  NR Band n77 | FDL\_low | - | FDL\_high | -50 | 1 | 2 |
| E-UTRA Band 29 | FDL\_low | - | FDL\_high | -38 | 1 | 15 |
| E-UTRA Band 71 | FDL\_low | - | FDL\_high | -50 | 1 | 15 |
| n74 | E-UTRA Band 1, 2, 3, 4, 5, 7, 8, 12, 13, 17, 18, 19, 20, 26, 28, 29, 31, 34, 38, 39, 40, 41, 42, 43, 48, 52, 65, 66, 67, 68, 85  NR Band n77, n78 | FDL\_low | - | FDL\_high | -50 | 1 |  |
| NR Band n79 | FDL\_low | - | FDL\_high | -50 | 1 | 2 |
| Frequency range | 1884.5 | - | 1915.7 | -41 | 0.3 | 8 |
| Frequency range | 1400 | - | 1427 | -32 | 27 | 15, 41 |
| Frequency range | 1475 | - | 1488 | -50 | 1 | 42 |
| Frequency range | 1488 | - | 1518 | -50 | 1 | 15 |
| n77 | E-UTRA Band 1, 2, 3, 4, 5, 7, 8, 10, 11, 12, 13, 14, 17, 18, 19, 20, 21, 24, 25, 26, 27, 28, 29, 30, 34, 39, 40, 41, 53, 65, 66, 70, 71, 74, 85 | FDL\_low | - | FDL\_high | -50 | 1 |  |
| Frequency range | 1884.5 | - | 1915.7 | -41 | 0.3 | 8 |
| n78 | E-UTRA Band 1, 3, 5, 7, 8, 11, 18, 19, 20, 21, 26, 28, 34, 39, 40, 41, 65 | FDL\_low | - | FDL\_high | -50 | 1 |  |
| Frequency range | 1884.5 | - | 1915.7 | -41 | 0.3 | 8 |
| n79 | E-UTRA Band 1, 3, 5, 8, 11, 18, 19, 21, 28, 34, 39, 40, 41, 42, 65, 74 | FDL\_low | - | FDL\_high | -50 | 1 |  |
| Frequency range | 1884.5 | - | 1915.7 | -41 | 0.3 | 8 |
| n95 | E-UTRA Band 1, 3 , 5, 8, 28, 39, 40, 41,  NR Band n78, n79 | FDL\_low | - | FDL\_high | -50 | 1 | 5 |
| NR Band n77 | FDL\_low | - | FDL\_high | -50 | 1 | 2 |
| Frequency range | 1884.5 | - | 1915.7 | -41 | 0.3 | 8 |
| NOTE 1: FDL\_low and FDL\_high refer to each frequency band specified in Table 5.2-1 in TS 38.101-1 or Table 5.5-1 in TS 36.101  NOTE 2: As exceptions, measurements with a level up to the applicable requirements defined in Table 6.5.3.1-2 are permitted for each assigned NR carrier used in the measurement due to 2nd, 3rd, 4th or 5th harmonic spurious emissions. Due to spreading of the harmonic emission the exception is also allowed for the first 1 MHz frequency range immediately outside the harmonic emission on both sides of the harmonic emission. This results in an overall exception interval centred at the harmonic emission of (2 MHz + N x LCRB x RBsize kHz), where N is 2, 3, 4, 5 for the 2nd, 3rd, 4th or 5th harmonic respectively. The exception is allowed if the measurement bandwidth (MBW) totally or partially overlaps the overall exception interval.  NOTE 3: 15 kHz SCS is assumed when RB is mentioned in the note when channel bandwidth is less than or equal to 50 MHz, lowest SCS is assumed when channel bandwidth is larger than 50 MHz. The transmission bandwidth in terms of RB position and range is not limited to 15 kHz SCS and shall scale with SCS accordingly.  NOTE 4: Void  NOTE 5: For non-synchronised TDD operation to meet these requirements some restriction will be needed for either the operating band or protected band  NOTE 6: N/A  NOTE 7: Void  NOTE 8: Applicable when co-existence with PHS system operating in 1884.5 - 1915.7 MHz.  NOTE 9: Void  NOTE 10: Void  NOTE 11: Void  NOTE 12: The emissions measurement shall be sufficiently power averaged to ensure a standard deviation < 0.5 dB  NOTE 13: Void  NOTE 14: Void  NOTE 15: These requirements also apply for the frequency ranges that are less than FOOB (MHz) in Table 6.5.3.1-1 from the edge of the channel bandwidth.  NOTE 16: Void  NOTE 17: Void  NOTE 18: Void  NOTE 19: Applicable when the assigned NR carrier is confined within 718 MHz and 748 MHz and when the channel bandwidth used is 5 or 10 MHz.  NOTE 20: Void  NOTE 21: This requirement is applicable for any channel bandwidths within the range 2500 - 2570 MHz with the following restriction: for carriers of 15 MHz bandwidth when carrier centre frequency is within the range 2560.5 - 2562.5 MHz and for carriers of 20 MHz bandwidth when carrier centre frequency is within the range 2552 - 2560 MHz the requirement is applicable only for an uplink transmission bandwidth less than or equal to 54 RB.  NOTE 22: This requirement is applicable for power class 3 UE for any channel bandwidths up to 20 MHz. For channel bandwidth within the range 2570 - 2615 MHz with the following restriction: for carriers of 15 MHz bandwidth when the carrier centre frequency is within the range 2605.5 - 2607.5 MHz and for carriers of 20 MHz bandwidth when the carrier centre frequency is within the range 2597 - 2605 MHz the requirement is applicable only for an uplink transmission bandwidth less than or equal to 54 RB. . For carriers overlapping the frequency range 2615 - 2620 MHz the requirement applies with the maximum output power configured to +19 dBm in the IE P-Max.  NOTE 23: Void  NOTE 24: As exceptions, measurements with a level up to the applicable requirement of -38 dBm/MHz is permitted for each assigned NR carrier used in the measurement due to 2nd harmonic spurious emissions. An exception is allowed if there is at least one individual RB within the transmission bandwidth (see Figure 5.3.1-1) for which the 2nd harmonic totally or partially overlaps the measurement bandwidth (MBW).  NOTE 25: As exceptions, measurements with a level up to the applicable requirement of -36 dBm/MHz is permitted for each assigned NR carrier used in the measurement due to 3rd harmonic spurious emissions. An exception is allowed if there is at least one individual RB within the transmission bandwidth (see Figure 5.3.1-1) for which the 3rd harmonic totally or partially overlaps the measurement bandwidth (MBW).  NOTE 26: For these adjacent bands, the emission limit could imply risk of harmful interference to UE(s) operating in the protected operating band.  NOTE 27: This requirement is applicable for channel bandwidths up to 20 MHz within the range 1920 - 1980 MHz with the following restriction: for carriers of 15 MHz bandwidth when the carrier centre frequency is within the range 1927.5 - 1929.5 MHz and for carriers of 20 MHz bandwidth when the carrier centre frequency is within the range 1930 - 1938 MHz the requirement is applicable only for an uplink transmission bandwidth less than or equal to 54 RB.  NOTE 28: Void  NOTE 29: Void  NOTE 30: Void  NOTE 31: Void  NOTE 32: Void  NOTE 33: This requirement is only applicable for carriers with bandwidth up to 20MHz and confined within 1885-1920 MHz (requirement for carriers with at least 1RB confined within 1880 - 1885 MHz is not specified). This requirement applies for an uplink transmission bandwidth less than or equal to 54 RB for carriers of 15 MHz bandwidth when carrier center frequency is within the range 1892.5 - 1894.5 MHz and for carriers of 20 MHz bandwidth when carrier center frequency is within the range 1895 - 1903 MHz.  NOTE 34: This requirement is applicable for 5 and 10 MHz NR channel bandwidth allocated within 718-728 MHz. For carriers of 10 MHz bandwidth, this requirement applies for an uplink transmission bandwidth less than or equal to 30 RB with RBstart > 1 and RBstart < 48.  NOTE 35: This requirement is applicable in the case of a 10 MHz NR carrier confined within 703 MHz and 733 MHz, otherwise the requirement of -25 dBm with a measurement bandwidth of 8 MHz applies.  NOTE 36: Void  NOTE 37: Void  NOTE 38: Void  NOTE 39: Void  NOTE 40: Void  NOTE 41: Applicable for cases and when the lower edge of the assigned NR UL channel bandwidth frequency is greater than or equal to 1427 MHz + the channel BW assigned for 5 and 10 MHz bandwidth, and when the lower edge of the assigned NR UL channel bandwidth frequency is greater than or equal to 1440 MHz for 15 and 20 MHz bandwidth.  NOTE 42: Applicable for 5 MHz bandwidth, and when the upper edge of the assigned NR UL channel bandwidth frequency is less than or equal to 1467 MHz assigned for 10 MHz bandwidth, and when the upper edge of the assigned NR UL channel bandwidth frequency is less than or equal to 1463.8 MHz for 15 MHz bandwidth, and when the upper edge of the assigned NR UL channel bandwidth frequency is less than or equal to 1460.8 MHz for 20 MHz bandwidth.  NOTE 43: This requirement is applicable for NR channel bandwidth allocated within 1920-1980 MHz. | | | | | | | |

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

###### *------------------------------ Modified section ------------------------------*

##### 6.5.3.3.25 Requirement for network signalled value "NS\_07"

When "NS\_07" is indicated in the cell, the power of any UE emission shall not exceed the levels specified in Table 6.5.3.3.25-1. This requirement also applies for the frequency ranges that are less than FOOB (MHz) in Table 6.5.3.1-1 from the edge of the channel bandwidth.

**Table** **6.5.3.3.25-1: Additional requirements**

|  |  |  |
| --- | --- | --- |
| **Frequency band**  **(MHz)** | **Channel bandwidth / Spectrum emission limit (dBm)** | **Measurement bandwidth** |
| **10 MHz** |
| 769 ≤ f ≤ 775 | -57 | 6.25 kHz |
| NOTE: The emissions measurement shall be sufficiently power averaged to ensure standard standard deviation < 0.5 dB. | | |

###### *------------------------------ Modified section ------------------------------*

### 7.3.2 Reference sensitivity power level

The throughput shall be ≥ 95 % of the maximum throughput of the reference measurement channels as specified in Annexes A.2.2.2, A.2.3.2, A3.2 and A.3.3 (with one sided dynamic OCNG Pattern OP.1 FDD/TDD for the DL-signal as described in Annex A.5.1.1/A.5.2.1) with parameters specified in Table 7.3.2-1 and Table 7.3.2-2.

Table 7.3.2-1: Two antenna port reference sensitivity QPSK PREFSENS

| Operating band / SCS / Channel bandwidth / Duplex-mode | | | | | | | | | | | | | | | | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Operating Band | SCS kHz | 5  MHz (dBm) | 10  MHz (dBm) | 15  MHz (dBm) | 20  MHz (dBm) | 25  MHz (dBm) | 30 MHz (dBm) | 40  MHz (dBm) | 50  MHz (dBm) | 60  MHz (dBm) | 70  MHz (dBm) | 80  MHz (dBm) | 90  MHz (dBm) | 100 MHz (dBm) | Duplex Mode | |
| n1 | 15 | -100.0 | -96.8 | -95.0 | -93.8 | -92.7 | -91.9 | -90.6 | -89.6 |  |  |  |  |  | FDD | |
| 30 |  | -97.1 | -95.1 | -94.0 | -92.8 | -92.0 | -90.7 | -89.7 |  |  |  |  |  |
| 60 |  | -97.5 | -95.4 | -94.2 | -93.0 | -92.1 | -90.9 | -89.7 |  |  |  |  |  |
| n2 | 15 | -98.0 | -94.8 | -93.0 | -91.8 |  |  |  |  |  |  |  |  |  | FDD | |
| 30 |  | -95.1 | -93.1 | -92.0 |  |  |  |  |  |  |  |  |  |
| 60 |  | -95.5 | -93.4 | -92.2 |  |  |  |  |  |  |  |  |  |
| n3 | 15 | -97.0 | -93.8 | -92.0 | -90.8 | -89.7 | -88.9 | -82.3 |  |  |  |  |  |  | FDD | |
| 30 |  | -94.1 | -92.1 | -91.0 | -89.8 | -89.0 | -82.4 |  |  |  |  |  |  |
| 60 |  | -94.5 | -92.4 | -91.2 | -90.0 | -89.1 | -82.6 |  |  |  |  |  |  |
| n5 | 15 | -98.0 | -94.8 | -93.0 | -86.8 |  |  |  |  |  |  |  |  |  | FDD | |
| 30 |  | -95.1 | -93.1 | -88.6 |  |  |  |  |  |  |  |  |  |
| 60 |  |  |  |  |  |  |  |  |  |  |  |  |  |
| n71 | 15 | -98.0 | -94.8 | -93.0 | -91.8 | -90.7 | -89.9 | -88.6 | -81.5 |  |  |  |  |  | FDD | |
| 30 |  | -95.1 | -93.1 | -92.0 | -90.8 | -90.0 | -88.7 | -81.5 |  |  |  |  |  |
| 60 |  | -95.5 | -93.4 | -92.2 | -91.0 | -90.1 | -88.9 | -81.5 |  |  |  |  |  |
| n8 | 15 | -97.0 | -93.8 | -91.4 | -85.8 |  |  |  |  |  |  |  |  |  | FDD | |
| 30 |  | -94.1 | -91.7 | -87.2 |  |  |  |  |  |  |  |  |  |
| 60 |  |  |  |  |  |  |  |  |  |  |  |  |  |
| n12 | 15 | -97.0 | -93.8 | -84.0 |  |  |  |  |  |  |  |  |  |  | FDD | |
| 30 |  | -94.1 | -84.1 |  |  |  |  |  |  |  |  |  |  |
| 60 |  |  |  |  |  |  |  |  |  |  |  |  |  |
| n13 | 15 | -97.0 | -93.8 |  |  |  |  |  |  |  |  |  |  |  | FDD | |
| 30 |  | -94.1 |  |  |  |  |  |  |  |  |  |  |  |
| 60 |  |  |  |  |  |  |  |  |  |  |  |  |  |
| n14 | 15 | -97.0 | -93.8 |  |  |  |  |  |  |  |  |  |  |  | FDD | |
| 30 |  | -94.1 |  |  |  |  |  |  |  |  |  |  |  |
| 60 |  |  |  |  |  |  |  |  |  |  |  |  |  |
| n18 | 15 | -100.0 | -96.8 | -95.0 |  |  |  |  |  |  |  |  |  |  | FDD | |
| 30 |  | -97.1 | -95.1 |  |  |  |  |  |  |  |  |  |  |
| 60 |  |  |  |  |  |  |  |  |  |  |  |  |  |
| n20 | 15 | -97.0 | -93.8 | -91.0 | -89.8 |  |  |  |  |  |  |  |  |  | FDD | |
| 30 |  | -94.1 | -91.1 | -90.0 |  |  |  |  |  |  |  |  |  |
| 60 |  |  |  |  |  |  |  |  |  |  |  |  |  |
| n25 | 15 | -96.5 | -93.3 | -91.5 | -90.3 | -89.3 | -82.2 | -79.5 |  |  |  |  |  |  | FDD | |
| 30 |  | -93.6 | -91.6 | -90.5 | -89.4 | -82.3 | -79.6 |  |  |  |  |  |  |
| 60 |  | -94.0 | -91.9 | -90.7 | -89.6 | -82.4 | -79.7 |  |  |  |  |  |  |
| n26 | 15 | -97.56 | -94.56 | -92.76 | -87.6 |  |  |  |  |  |  |  |  |  | FDD |
| 30 |  | -94.86 | -92.76 | -87.7 |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| n28 | 15 | -98.5 | -95.5 | -93.5 | -90.8 |  | -78.5 |  |  |  |  |  |  |  | FDD | |
| 30 |  | -95.6 | -93.6 | -91.0 |  | -78.6 |  |  |  |  |  |  |  |
| 60 |  |  |  |  |  |  |  |  |  |  |  |  |  |
| n30 | 15 | -99.0 | -95.8 |  |  |  |  |  |  |  |  |  |  |  | FDD | |
| 30 |  | -96.1 |  |  |  |  |  |  |  |  |  |  |  |
| 60 |  |  |  |  |  |  |  |  |  |  |  |  |  |
| n34 | 15 | -100.0 | -96.8 | -95.0 |  |  |  |  |  |  |  |  |  |  | TDD | |
| 30 |  | -97.1 | -95.1 |  |  |  |  |  |  |  |  |  |  |
| 60 |  | -97.5 | -95.4 |  |  |  |  |  |  |  |  |  |  |
| n381 | 15 | -100.0 | -96.8 | -95.0 | -93.8 | -92.7 | -91.9 | -90.6 |  |  |  |  |  |  | TDD | |
| 30 |  | -97.1 | -95.1 | -94.0 | -92.8 | -92.0 | -90.7 |  |  |  |  |  |  |
| 60 |  | -97.5 | -95.4 | -94.2 | -93.0 | -92.1 | -90.9 |  |  |  |  |  |  |
| n39 | 15 | -100.0 | -96.8 | -95.0 | -93.8 | -92.7 | -91.9 | -90.6 |  |  |  |  |  |  | TDD | |
| 30 |  | -97.1 | -95.1 | -94.0 | -92.8 | -92.0 | -90.7 |  |  |  |  |  |  |
| 60 |  | -97.5 | -95.4 | -94.2 | -93.0 | -92.1 | -90.9 |  |  |  |  |  |  |
| n40 | 15 | -100.0 | -96.8 | -95.0 | -93.8 | -92.7 | -91.9 | -90.6 | -89.6 |  |  |  |  |  | TDD | |
| 30 |  | -97.1 | -95.1 | -94.0 | -92.8 | -92.0 | -90.7 | -89.7 | -88.9 |  | -87.6 |  |  |
| 60 |  | -97.5 | -95.4 | -94.2 | -93.0 | -92.1 | -90.9 | -89.8 | -89.1 |  | -87.6 |  |  |
| n411 | 15 |  | -94.8 | -93.0 | -91.8 |  | -89.9 | -88.6 | -87.6 |  |  |  |  |  | TDD | |
| 30 |  | -95.1 | -93.1 | -92.0 |  | -90.0 | -88.7 | -87.7 | -86.9 |  | -85.6 | -85.1 | -84.7 |
| 60 |  | -95.5 | -93.4 | -92.2 |  | -90.1 | -88.9 | -87.8 | -87.1 |  | -85.6 | -85.1 | -84.7 |
| n481 | 15 | -99 | -95.8 | -94.0 | -92.7 |  |  | -89.6 | -88.65 |  |  |  |  |  | TDD | |
| 30 |  | -96.1 | -94.1 | -92.9 |  |  | -89.7 | -88.75 | -87.95 |  | -86.65 | -86.15 | -85.65 |
| 60 |  | -96.5 | -94.4 | -93.1 |  |  | -89.9 | -88.85 | -88.05 |  | -86.75 | -86.25 | -85.75 |
| n50 | 15 | -100.0 | -96.8 | -95.0 | -93.8 |  | -91.9 | -90.6 | -89.6 |  |  |  |  |  | TDD | |
| 30 |  | -97.1 | -95.1 | -94.0 |  | -92.0 | -90.7 | -89.7 | -88.9 |  | -87.6 |  |  |
| 60 |  | -97.5 | -95.4 | -94.2 |  | -92.1 | -90.9 | -89.8 | -89.1 |  | -87.6 |  |  |
| n51 | 15 | -100.0 |  |  |  |  |  |  |  |  |  |  |  |  | TDD | |
| 30 |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 60 |  |  |  |  |  |  |  |  |  |  |  |  |  |
| n53 | 15 | -100.0 | -96.8 |  |  |  |  |  |  |  |  |  |  |  | TDD | |
| 30 |  | -97.1 |  |  |  |  |  |  |  |  |  |  |  |
| 60 |  | -97.5 |  |  |  |  |  |  |  |  |  |  |  |
| n65 | 15 | -99.5 | -96.3 | -94.5 | -93.3 |  |  |  | -89.2 |  |  |  |  |  | FDD | |
| 30 |  | -96.6 | -94.6 | -93.5 |  |  |  | -89.3 |  |  |  |  |  |
| 60 |  | -97.0 | -94.9 | -93.7 |  |  |  | -89.4 |  |  |  |  |  |
| n66 | 15 | -99.5 | -96.3 | -94.5 | -93.3 | -92.2 | -91.4 | -90.1 |  |  |  |  |  |  | FDD | |
| 30 |  | -96.6 | -94.6 | -93.5 | -92.3 | -91.5 | -90.2 |  |  |  |  |  |  |
| 60 |  | -97.0 | -94.9 | -93.7 | -92.5 | -91.6 | -90.4 |  |  |  |  |  |  |
| n70 | 15 | -100.0 | -96.8 | -95.0 | -93.8 | -92.7 |  |  |  |  |  |  |  |  | FDD | |
| 30 |  | -97.1 | -95.1 | -94.0 | -92.8 |  |  |  |  |  |  |  |  |
| 60 |  | -97.5 | -95.4 | -94.2 | -93.0 |  |  |  |  |  |  |  |  |
| n71 | 15 | -97.2 | -94.0 | -91.6 | -86.0 |  |  |  |  |  |  |  |  |  | FDD | |
| 30 |  | -94.3 | -91.9 | -87.4 |  |  |  |  |  |  |  |  |  |
| 60 |  |  |  |  |  |  |  |  |  |  |  |  |  |
| n74 | 15 | -99.53 | -96.33 | -94.53 | -89.33 |  |  |  |  |  |  |  |  |  | FDD | |
| 30 |  | -96.63 | -94.63 | -89.53 |  |  |  |  |  |  |  |  |  |
| 60 |  | -97.03 | -94.93 | -89.63 |  |  |  |  |  |  |  |  |  |
| n771,4 | 15 |  | -95.3 | -93.5 | -92.2 | -91.2 | -90.4 | -89.1 | -88.1 |  |  |  |  |  | TDD | |
| 30 |  | -95.6 | -93.6 | -92.4 | -91.3 | -90.5 | -89.2 | -88.2 | -87.4 | -86.7 | -86.1 | -85.6 | -85.1 |
| 60 |  | -96.0 | -93.9 | -92.6 | -91.5 | -90.6 | -89.4 | -88.3 | -87.5 | -86.8 | -86.2 | -85.7 | -85.2 |
| n781 | 15 |  | -95.8 | -94.0 | -92.7 | -91.7 | -90.9 | -89.6 | -88.6 |  |  |  |  |  | TDD | |
| 30 |  | -96.1 | -94.1 | -92.9 | -91.8 | -91 | -89.7 | -88.7 | -87.9 | -87.2 | -86.6 | -86.1 | -85.6 |
| 60 |  | -96.5 | -94.4 | -93.1 | -92 | -91.1 | -89.9 | -88.8 | -88.0 | -87.3 | -86.7 | -86.2 | -85.7 |
| n791 | 15 |  |  |  |  |  |  | -89.6 | -88.6 |  |  |  |  |  | TDD | |
| 30 |  |  |  |  |  |  | -89.7 | -88.7 | -87.9 |  | -86.6 |  | -85.6 |
| 60 |  |  |  |  |  |  | -89.9 | -88.8 | -88.0 |  | -86.7 |  | -85.7 |
| n91 | 15 | -100 |  |  |  |  |  |  |  |  |  |  |  |  | FDD | |
| 30 |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 60 |  |  |  |  |  |  |  |  |  |  |  |  |  |
| n92 | 15 | -100 | -96.8 | -95.0 | -93.8 |  |  |  |  |  |  |  |  |  | FDD | |
| 30 |  | -97.1 | -95.1 | -94.0 |  |  |  |  |  |  |  |  |  |
| 60 |  |  |  |  |  |  |  |  |  |  |  |  |  |
| n93 | 15 | -100 |  |  |  |  |  |  |  |  |  |  |  |  | FDD | |
| 30 |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 60 |  |  |  |  |  |  |  |  |  |  |  |  |  |
| n94 | 15 | -100 | -96.8 | -95.0 | -93.8 |  |  |  |  |  |  |  |  |  | FDD | |
| 30 |  | -97.1 | -95.1 | -94.0 |  |  |  |  |  |  |  |  |  |
| 60 |  |  |  |  |  |  |  |  |  |  |  |  |  |
| NOTE 1: Four Rx antenna ports shall be the baseline for this operating band except for two Rx vehicular UE.  NOTE 2: The transmitter shall be set to PUMAX as defined in clause 6.2.4  NOTE 3: The requirement is modified by -0.5 dB when the assigned NR channel bandwidth is confined within 1475.9 - 1510.9 MHz.  NOTE 4: The requirement is modified by -0.5 dB when the assigned UE channel bandwidth is confined within 3300 - 3800 MHz.  NOTE 5: For these bandwidths, the minimum requirements are restricted to operation when carrier is configured as a downlink carrier part of CA configuration.  NOTE 6: Values are modified by -0.5dB when carrier channel BW is between 865MHz and 894MHz. | | | | | | | | | | | | | | | | |

For UE(s) equipped with 4 Rx antenna ports, reference sensitivity for 2Rx antenna ports in Table 7.3.2-1 shall be modified by the amount given in ΔRIB,4R in Table 7.3.2-2 for the applicable operating bands.

Table 7.3.2-2: Four antenna port reference sensitivity allowance ΔRIB,4R

|  |  |
| --- | --- |
| Operating band | ΔRIB,4R (dB) |
| n28, n71 | -2.71 |
| n1, n2, n3, n30, n40, n7, n34, n38, n39, n41, n66, n70 | -2.7 |
| n48, n77, n78, n79 | -2.2 |
| NOTE 1: 4 Rx operation is targeted for FWA form factor | |

The reference receive sensitivity (REFSENS) requirement specified in Table 7.3.2-1 and Table 7.3.2-2 shall be met with uplink transmission bandwidth less than or equal to that specified in Table 7.3.2-3.

Table 7.3.2-3: Uplink configuration for reference sensitivity

|  | Operating band / SCS / Channel bandwidth / Duplex mode | | | | | | | | | | | | | | | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Operating Band | | SCS kHz | 5  MHz | 10  MHz | 15  MHz | 20  MHz | 25 MHz | 30 MHz | 40  MHz | 50  MHz | 60  MHz | 70  MHz | 80  MHz | 90  MHz | 100 MHz | Duplex Mode |
| n1 | | 15 | 25 | 501 | 751 | 1001 | 1281 | 1281 | 1281 | 1281 |  |  |  |  |  | FDD |
| 30 |  | 24 | 361 | 501 | 641 | 641 | 641 | 641 |  |  |  |  |  |
| 60 |  | 101 | 18 | 24 | 301 | 301 | 301 | 301 |  |  |  |  |  |
| n2 | | 15 | 25 | 501 | 501 | 501 |  |  |  |  |  |  |  |  |  | FDD |
| 30 | 101 | 24 | 241 | 241 |  |  |  |  |  |  |  |  |  |
| 60 |  | 101 | 101 | 101 |  |  |  |  |  |  |  |  |  |
| n3 | | 15 | 25 | 501 | 501 | 501 | 501 | 501 | 501 |  |  |  |  |  |  | FDD |
| 30 |  | 24 | 241 | 241 | 241 | 241 | 241 |  |  |  |  |  |  |
| 60 |  | 101 | 101 | 101 | 101 | 101 | 101 |  |  |  |  |  |  |
| n5 | | 15 | 25 | 251 | 201 | 201 |  |  |  |  |  |  |  |  |  | FDD |
| 30 |  | 121 | 101 | 101 |  |  |  |  |  |  |  |  |  |
| 60 |  |  |  |  |  |  |  |  |  |  |  |  |  |
| n7 | | 15 | 25 | 501 | 751 | 751 | 721 | 641 | 451 | 451 |  |  |  |  |  | FDD |
| 30 |  | 24 | 361 | 361 | 361 | 321 | 201 | 201 |  |  |  |  |  |
| 60 |  | 101 | 18 | 181 | 181 | 161 | 101 | 101 |  |  |  |  |  |
| n8 | | 15 | 25 | 251 | 201 | 201 |  |  |  |  |  |  |  |  |  | FDD |
| 30 |  | 121 | 101 | 101 |  |  |  |  |  |  |  |  |  |
| 60 |  |  |  |  |  |  |  |  |  |  |  |  |  |
| n12 | | 15 | 201 | 201 | 201 |  |  |  |  |  |  |  |  |  |  | FDD |
| 30 |  | 101 | 101 |  |  |  |  |  |  |  |  |  |  |
| 60 |  |  |  |  |  |  |  |  |  |  |  |  |  |
| n13 | | 15 | 201 | 201 |  |  |  |  |  |  |  |  |  |  |  | FDD |
| 30 |  | 101 |  |  |  |  |  |  |  |  |  |  |  |
| 60 |  |  |  |  |  |  |  |  |  |  |  |  |  |
| n14 | | 15 | 201 | 201 |  |  |  |  |  |  |  |  |  |  |  | FDD |
| 30 |  | 101 |  |  |  |  |  |  |  |  |  |  |  |
| 60 |  |  |  |  |  |  |  |  |  |  |  |  |  |
| n18 | | 15 | 25 | 251 | 251 |  |  |  |  |  |  |  |  |  |  | FDD |
| 30 |  | 101 | 101 |  |  |  |  |  |  |  |  |  |  |
| 60 |  |  |  |  |  |  |  |  |  |  |  |  |  |
| n20 | | 15 | 25 | 201 | 202 | 202 |  |  |  |  |  |  |  |  |  | FDD |
| 30 |  | 101 | 102 | 102 |  |  |  |  |  |  |  |  |  |
| 60 |  |  |  |  |  |  |  |  |  |  |  |  |  |
| n25 | | 15 | 25 | 501 | 501 | 501 | 501 | 481 | 401 |  |  |  |  |  |  | FDD |
| 30 |  | 24 | 241 | 241 | 241 | 241 | 201 |  |  |  |  |  |  |
| 60 |  | 101 | 101 | 101 | 101 | 101 | 101 |  |  |  |  |  |  |
| n26 | | 15 | 25 | 251 | 251 | 251 |  |  |  |  |  |  |  |  |  | FDD |
| 30 |  | 121 | 121 | 121 |  |  |  |  |  |  |  |  |  |
| n28 | | 15 | 25 | 251 | 251 | 251 |  | 251 |  |  |  |  |  |  |  | FDD |
| 30 |  | 101 | 101 | 101 |  | 101 |  |  |  |  |  |  |  |
| 60 |  |  |  |  |  |  |  |  |  |  |  |  |  |
| n30 | | 15 | 201 | 201 |  |  |  |  |  |  |  |  |  |  |  | FDD |
| 30 |  | 101 |  |  |  |  |  |  |  |  |  |  |  |
| 60 |  |  |  |  |  |  |  |  |  |  |  |  |  |
| n34 | | 15 | 25 | 50 | 75 |  |  |  |  |  |  |  |  |  |  | TDD |
| 30 |  | 24 | 36 |  |  |  |  |  |  |  |  |  |  |
| 60 |  | 10 | 18 |  |  |  |  |  |  |  |  |  |  |
| n38 | | 15 | 25 | 50 | 75 | 100 | 128 | 160 | 216 |  |  |  |  |  |  | TDD |
| 30 |  | 24 | 36 | 50 | 64 | 75 | 100 |  |  |  |  |  |  |
| 60 |  | 10 | 18 | 24 | 30 | 36 | 50 |  |  |  |  |  |  |
| n39 | | 15 | 25 | 50 | 75 | 100 | 128 | 160 | 216 |  |  |  |  |  |  | TDD |
| 30 |  | 24 | 36 | 50 | 64 | 75 | 100 |  |  |  |  |  |  |
| 60 |  | 10 | 18 | 24 | 30 | 36 | 50 |  |  |  |  |  |  |
| n40 | | 15 | 25 | 50 | 75 | 100 | 128 | 160 | 216 | 270 |  |  |  |  |  | TDD |
| 30 |  | 24 | 36 | 50 | 64 | 75 | 100 | 128 | 162 |  | 216 |  |  |
| 60 |  | 10 | 18 | 24 | 30 | 36 | 50 | 64 | 75 |  | 100 |  |  |
| n41 | | 15 |  | 50 | 75 | 100 |  | 160 | 216 | 270 |  |  |  |  |  | TDD |
| 30 |  | 24 | 36 | 50 |  | 75 | 100 | 128 | 162 |  | 216 | 243 | 270 |
| 60 |  | 10 | 18 | 24 |  | 36 | 50 | 64 | 75 |  | 100 | 120 | 135 |
| n48 | | 15 | 25 | 50 | 75 | 100 |  |  | 216 |  |  |  |  |  |  | TDD |
| 30 |  | 24 | 36 | 50 |  |  | 100 |  |  |  |  |  |  |
| 60 |  | 10 | 18 | 24 |  |  | 50 |  |  |  |  |  |  |
| n50 | | 15 | 25 | 50 | 75 | 100 |  | 160 | 216 | 270 |  |  |  |  |  | TDD |
| 30 |  | 24 | 36 | 50 |  | 75 | 100 | 128 | 162 |  | NOTE 3 |  |  |
| 60 |  | 10 | 18 | 24 |  | 36 | 50 | 64 | 75 |  | NOTE 3 |  |  |
| n51 | | 15 | 25 |  |  |  |  |  |  |  |  |  |  |  |  | TDD |
| 30 |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 60 |  |  |  |  |  |  |  |  |  |  |  |  |  |
| n53 | | 15 | 25 | 50 |  |  |  |  |  |  |  |  |  |  |  | TDD |
| 30 |  | 24 |  |  |  |  |  |  |  |  |  |  |  |
| 60 |  | 10 |  |  |  |  |  |  |  |  |  |  |  |
| n65 | | 15 | 25 | 501 | 751 | 1001 |  |  |  | 1281 |  |  |  |  |  | FDD |
| 30 |  | 24 | 361 | 501 |  |  |  | 641 |  |  |  |  |  |
| 60 |  | 101 | 18 | 24 |  |  |  | 301 |  |  |  |  |  |
| n66 | | 15 | 25 | 501 | 751 | 1001 | 1281 | 160 | 216 |  |  |  |  |  |  | FDD |
| 30 |  | 24 | 361 | 501 | 641 | 751 | 1001 |  |  |  |  |  |  |
| 60 |  | 101 | 18 | 24 | 301 | 361 | 501 |  |  |  |  |  |  |
| n70 | | 15 | 25 | 501 | 751 | NOTE 3 | NOTE 3 |  |  |  |  |  |  |  |  | FDD |
| 30 |  | 24 | 361 | NOTE 3 | NOTE 3 |  |  |  |  |  |  |  |  |
| 60 |  | 101 | 18 | NOTE 3 | NOTE 3 |  |  |  |  |  |  |  |  |
| n71 | | 15 | 25 | 251 | 201 | 201 |  |  |  |  |  |  |  |  |  | FDD |
| 30 |  | 121 | 101 | 101 |  |  |  |  |  |  |  |  |  |
| 60 |  |  |  |  |  |  |  |  |  |  |  |  |  |
| n74 | | 15 | 25 | 251 | 251 | 251 |  |  |  |  |  |  |  |  |  | FDD |
| 30 |  | 101 | 101 | 101 |  |  |  |  |  |  |  |  |  |
| 60 |  | 51 | 51 | 51 |  |  |  |  |  |  |  |  |  |
| n77 | | 15 |  | 50 | 75 | 100 | 128 | 160 | 216 | 270 |  |  |  |  |  | TDD |
| 30 |  | 24 | 36 | 50 | 64 | 75 | 100 | 128 | 162 | 180 | 216 | 243 | 270 |
| 60 |  | 10 | 18 | 24 | 30 | 36 | 50 | 64 | 75 | 90 | 100 | 120 | 135 |
| n78 | | 15 |  | 50 | 75 | 100 | 128 | 160 | 216 | 270 |  |  |  |  |  | TDD |
| 30 |  | 24 | 36 | 50 | 64 | 75 | 100 | 128 | 162 | 180 | 216 | 243 | 270 |
| 60 |  | 10 | 18 | 24 | 30 | 36 | 50 | 64 | 75 | 90 | 100 | 120 | 135 |
| n79 | | 15 |  |  |  |  |  |  | 216 | 270 |  |  |  |  |  | TDD |
| 30 |  |  |  |  |  |  | 100 | 128 | 162 |  | 216 |  | 270 |
| 60 |  |  |  |  |  |  | 50 | 64 | 75 |  | 100 |  | 135 |
| n91 | | 15 | 254 | 201,4 |  |  |  |  |  |  |  |  |  |  |  | FDD |
| 30 |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 60 |  |  |  |  |  |  |  |  |  |  |  |  |  |
| n92 | | 15 | 25 | 201 | 201 | 201 |  |  |  |  |  |  |  |  |  | FDD |
| 30 |  | 101 | 101 | 101 |  |  |  |  |  |  |  |  |  |
| 60 |  |  |  |  |  |  |  |  |  |  |  |  |  |
| n93 | | 15 | 254 | 251,4 |  |  |  |  |  |  |  |  |  |  |  | FDD |
| 30 |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 60 |  |  |  |  |  |  |  |  |  |  |  |  |  |
| n94 | | 15 | 25 | 251 | 201 | 201 |  |  |  |  |  |  |  |  |  | FDD |
| 30 |  | 121 | 101 | 101 |  |  |  |  |  |  |  |  |  |
| 60 |  |  |  |  |  |  |  |  |  |  |  |  |  |
| NOTE 1: UL resource blocks shall be located as close as possible to the downlink operating band but confined within the transmission bandwidth configuration for the channel bandwidth (Table 5.3.2-1).  NOTE 2: For Band 20; for 15 kHz SCS, in the case of 15 MHz channel bandwidth, the UL resource blocks shall be located at RBstart 11 and in the case of 20 MHz channel bandwidth, the UL resource blocks shall be located at RBstart 16; for 30 kHz SCS, in the case of 15 MHz channel bandwidth, the UL resource blocks shall be located at RBstart 6 and in the case of 20 MHz channel bandwidth, the UL resource blocks shall be located at RBstart 8; for 60 kHz SCS, in the case of 15 MHz channel bandwidth, the UL resource blocks shall be located at RBstart 3 and in the case of 20 MHz channel bandwidth, the UL resource blocks shall be located at RBstart 4;  NOTE 3: For DL channel bandwidths that do not have symmetric UL channel bandwidth, highest valid UL configuration with lowest TX-RX separation (Table 5.4.4-1) shall be used.  NOTE 4: For band n91 and n93, largest supported UL bandwidth configuration shall be used. | | | | | | | | | | | | | | | | |

Unless given by Table 7.3.2-4, the minimum requirements specified in Tables 7.3.2-1 and 7.3.2-2 shall be verified with the network signalling value NS\_01 (Table 6.2.3-1) configured.

Table 7.3.2-4: Network signaling value for reference sensitivity

|  |  |
| --- | --- |
| Operating band | Network Signalling value |
| n2 | NS\_03 |
| n12 | NS\_06 |
| n13 | NS\_06 |
| n14 | NS\_06 |
| n25 | NS\_03 |
| n30 | NS\_21 |
| n48 | NS\_27 |
| n53 | NS\_45 |
| n66 | NS\_03 |
| n70 | NS\_03 |
| n71 | NS\_35 |

###### *------------------------------ Modified section ------------------------------*

### 7.6.2 In-band blocking

For NR bands with FDL\_high < 2700 MHz and FUL\_high < 2700 MHz in-band blocking (IBB) is defined for an unwanted interfering signal falling into the UE receive band or into the first 15 MHz below or above the UE receive band. The throughput of the wanted signal shall be ≥ 95 % of the maximum throughput of the reference measurement channels as specified in Annexes A.2.2, A.2.3, A.3.2 and A.3.3 (with one sided dynamic OCNG Pattern OP.1 FDD/TDD for the DL-signal as described in Annex A.5.1.1/A.5.2.1) with parameters specified in Table 7.6.2-1 and Table 7.6.2-2. The relative throughput requirement shall be met for any SCS specified for the channel bandwidth of the wanted signal. For operating bands with an unpaired DL part (as noted in Table 5.2-1), the requirements only apply for carriers assigned in the paired part.

Table 7.6.2-1: In-band blocking parameters for NR bands with FDL\_high < 2700 MHz and FUL\_high < 2700 MHz

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| RX parameter | Units | Channel bandwidth | | | | |
| 5 MHz | 10 MHz | 15 MHz | 20 MHz | 25 MHz |
| Power in transmission bandwidth configuration | dBm | REFSENS + channel bandwidth specific value below | | | | |
| dB | 6 | 6 | 7 | 9 | 10 |
| BWinterferer | MHz | 5 | | | | |
| FIoffset, case 1 | MHz | 7.5 | | | | |
| FIoffset, case 2 | MHz | 12.5 | | | | |
| RX parameter | Units | Channel bandwidth | | | | |
| 30 MHz | 40 MHz | 50 MHz | 60 MHz | 80 MHz |
| Power in transmission bandwidth configuration | dBm | REFSENS + channel bandwidth specific value below | | | | |
| dB | 11 | 12 | 13 | 14 | 15 |
| BWinterferer | MHz | 5 | | | | |
| FIoffset, case 1 | MHz | 7.5 | | | | |
| FIoffset, case 2 | MHz | 12.5 | | | | |
| RX parameter | Units | Channel bandwidth | | | | |
| 90 MHz | 100 MHz |  |  |  |
| Power in transmission bandwidth configuration | dBm | REFSENS + channel bandwidth specific value below | |  |  |  |
|  | dB | 15.5 | 16 |  |  |  |
| BWinterferer | MHz | 5 | |  |  |  |
| FIoffset, case 1 | MHz | 7.5 | |  |  |  |
| FIoffset, case 2 | MHz | 12.5 | |  |  |  |
| NOTE 1: The transmitter shall be set to 4 dB below PCMAX\_L,f,c at the minimum UL configuration specified in Table 7.3.2-3 with PCMAX\_L,f,c defined in clause 6.2.4.  NOTE 2: The interferer consists of the RMC specified in Annexes A.3.2.2 and A.3.3.2 with one sided dynamic OCNG Pattern OP.1 FDD/TDD for the DL-signal as described in Annex A.5.1.1/A.5.2.1 and 15 kHz SCS. | | | | | | |

Table 7.6.2-2: In-band blocking for NR bands with FDL\_high < 2700 MHz and FUL\_high < 2700 MHz

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| NR band | Parameter | Unit | Case 1 | Case 2 | Case 3 | Case 4 |
| Pinterferer | dBm | -56 | -44 | -15 | -38 |
| Finterferer (offset) | MHz | -BWChannel/2 –  FIoffset, case 1  and  BWChannel/2 +  FIoffset, case 1 | ≤ -BWChannel/2 –  FIoffset, case 2  and  ≥ BWChannel/2 +  FIoffset, case 2 |  | -BWChannel/2-11 |
| n1, n2, n3, n5, n7, n8, n12, n13, n14, n18, n20, n25, n26, n28,n34, n38,n39, n40, n41, n483, n50, n51, n53, n65, n66, n70, n74, n75, n76, n91, n92, n93, n94 | Finterferer | MHz | NOTE 2 | FDL\_low – 15  to  FDL\_high + 15 |  |  |
| n30 | Finterferer | MHz | NOTE 2 | FDL\_low – 15  to  FDL\_high + 15 |  | FDL\_low – 11 |
| n71 | Finterferer | MHz | NOTE 2 | FDL\_low – 12 to FDL\_high + 15 | FDL\_low – 12 |  |
| NOTE 1: The absolute value of the interferer offset Finterferer (offset) shall be further adjusted to MHz with SCS the sub-carrier spacing of the wanted signal in MHz. The interferer is an NR signal with 15 kHz SCS.  NOTE 2: For each carrier frequency, the requirement applies for two interferer carrier frequencies: a: -BWChannel/2 – FIoffset, case 1; b: BWChannel/2 + FIoffset, case 1  NOTE 3: n48 follows the requirement in this frequency range according to the general requirement defined in Clause 7.1. | | | | | | |

For NR bands with FDL\_low ≥ 3300 MHz and FUL\_low ≥ 3300 MHz in-band blocking (IBB) is defined for an unwanted interfering signal falling into the UE receive band or into an immediately adjacent frequency range up to 3\*BWChannel below or above the UE receive band where BWChannel is the bandwidth of the wanted signal. The throughput of the wanted signal shall be ≥ 95% of the maximum throughput of the reference measurement channels as specified in Annexes A.2.2, A.2.3, A.3.2 and A.3.3 (with one sided dynamic OCNG Pattern OP.1 FDD/TDD for the DL-signal as described in Annex A.5.1.1/A.5.2.1)] with parameters specified in Table 7.6.2-3 and Table 7.6.2-4. The relative throughput requirement shall be met for any SCS specified for the channel bandwidth of the wanted signal.

Table 7.6.2-3: In-band blocking parameters for NR bands with FDL\_low ≥ 3300 MHz and FUL\_low ≥ 3300 MHz

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| RX parameter | Units | Channel bandwidth | | | | |
| 10 MHz | 15 MHz | 20 MHz | 25 MHz | 30 MHz |
| Power in transmission bandwidth configuration | dBm | REFSENS + channel bandwidth specific value below | | | | |
| dB | 6 | | | | |
| BWinterferer | MHz | 10 | 15 | 20 | 25 | 30 |
| FIoffset, case 1 | MHz | 15 | 22.5 | 30 | 37.5 | 45 |
| FIoffset, case 2 | MHz | 25 | 37.5 | 50 | 62.5 | 75 |
| RX parameter | Units | Channel bandwidth | | | | |
| 40 MHz | 50 MHz | 60 MHz | 70 MHz | 80 MHz |
| Power in transmission bandwidth configuration | dBm | REFSENS + channel bandwidth specific value below | | | | |
| dB | 6 | | | | |
| BWinterferer | MHz | 40 | 50 | 60 | 70 | 80 |
| FIoffset, case 1 | MHz | 60 | 75 | 90 | 105 | 120 |
| FIoffset, case 2 | MHz | 100 | 125 | 150 | 175 | 200 |
| RX parameter | Units | Channel bandwidth | | | | |
| 90 MHz | 100 MHz |  |  |  |
| Power in transmission bandwidth configuration | dBm | REFSENS + channel bandwidth specific value below | |  |  |  |
| dB | 6 | |  |  |  |
| BWinterferer | MHz | 90 | 100 |  |  |  |
| FIoffset, case 1 | MHz | 135 | 150 |  |  |  |
| FIoffset, case 2 | MHz | 225 | 250 |  |  |  |
| NOTE 1: The transmitter shall be set to 4 dB below PCMAX\_L,f,c at the minimum UL configuration specified in Table 7.3.2-3 with PCMAX\_L,f,c defined in clause 6.2.4.  NOTE 2: The interferer consists of the RMC specified in Annexes A.3.2.2 and A.3.3.2 with one sided dynamic OCNG Pattern OP.1 FDD/TDD for the DL-signal as described in Annex A.5.1.1/A.5.2.1 | | | | | | |

Table 7.6.2-4: In-band blocking for NR bands with FDL\_low ≥ 3300 MHz and FUL\_low ≥ 3300 MHz

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| NR band | Parameter | Unit | Case 1 | Case 2 |
| Pinterferer | dBm | -56 | -44 |
| n77, n78, n79 | Finterferer (offset) | MHz | -BWChannel/2 –  FIoffset, case 1  and  BWChannel/2 +  FIoffset, case 1 | ≤ -BWChannel/2 –  FIoffset, case 2  and  ≥ BWChannel/2 +  FIoffset, case 2 |
| Finterferer |  | NOTE 2 | FDL\_low – 3\*BWChannel  to  FDL\_high + 3\*BWChannel |
| NOTE 1: The absolute value of the interferer offset Finterferer (offset) shall be further adjusted to MHz with SCS the sub-carrier spacing of the wanted signal in MHz. The interferer is an NR signal with an SCS equal to that of the wanted signal.  NOTE 2: For each carrier frequency, the requirement applies for two interferer carrier frequencies: a: -BWChannel/2 – FIoffset, case 1; b: BWChannel/2 + FIoffset, case 1  NOTE 3: BWChannel denotes the channel bandwidth of the wanted signal | | | | |

### 7.6.3 Out-of-band blocking

For NR bands with FDL\_high < 2700 MHz and FUL\_high < 2700 MHz out-of-band band blocking is defined for an unwanted CW interfering signal falling outside a frequency range 15 MHz below or above the UE receive band. The throughput of the wanted signal shall be ≥ 95% of the maximum throughput of the reference measurement channels as specified in Annexes A.2.2, A.2.3, A.3.2 and A.3.3 (with one sided dynamic OCNG Pattern OP.1 FDD/TDD for the DL-signal as described in Annex A.5.1.1/A.5.2.1) with parameters specified in Table 7.6.3-1 and Table 7.6.3-2. The relative throughput requirement shall be met for any SCS specified for the channel bandwidth of the wanted signal. For operating bands with an unpaired DL part (as noted in Table 5.2-1), the requirements only apply for carriers assigned in the paired part.

Table 7.6.3-1: Out-of-band blocking parameters for NR bands with FDL\_high < 2700 MHz and FUL\_high < 2700 MHz

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| RX parameter | Units | Channel bandwidth | | | | |
| 5 MHz | 10 MHz | 15 MHz | 20 MHz | 25 MHz |
| Power in transmission bandwidth configuration | dBm | REFSENS + channel specific value below | | | | |
| dB | 6 | 6 | 7 | 9 | 10 |
| RX parameter | Units | Channel bandwidth | | | | |
| 30 MHz | 40 MHz | 50 MHz | 60 MHz | 80 MHz |
| Power in transmission bandwidth configuration | dBm | REFSENS + channel bandwidth specific value below | | | | |
| dB | 11 | 12 | 13 | 14 | 15 |
| RX parameter | Units | Channel bandwidth | | | | |
| 90 MHz | 100 MHz |  |  |  |
| Power in transmission bandwidth configuration | dBm | REFSENS + channel bandwidth specific value below | |  |  |  |
| dB | 15.5 | 16 |  |  |  |
| NOTE: The transmitter shall be set to 4 dB below PCMAX\_L,f,c at the minimum UL configuration specified in Table 7.3.2-3 with PCMAX\_L,f,c defined in clause 6.2.4. | | | | | | |

Table 7.6.3-2: Out of-band blocking for NR bands with FDL\_high < 2700 MHz and FUL\_high < 2700 MHz

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| NR band | Parameter | Unit | Range 1 | Range 2 | Range 3 |
| n1, n2, n3, n5, n7, n8, n12, n13, n14, n18, n20, n25, n26, n28, n30,  n34, n38,  n39, n40, n41, n485, n50, n51, n536, n65, n66, n70, n71, n74, n75, n76, n91, n92, n93, n94 | Pinterferer | dBm | -44 | -30 | -15 |
| Finterferer (CW) | MHz | -60 < f – FDL\_low < -15  or  15 < f – FDL\_high < 60 | -85 < f – FDL\_low ≤ -60  or  60 ≤ f – FDL\_high < 85 | 1 ≤ f ≤ FDL\_low – 85  or  FDL\_high + 85 ≤ f  ≤ 12750 |
| NOTE 1: The power level of the interferer (PInterferer) for Range 3 shall be modified to -20 dBm for FInterferer > 6000 MHz.  NOTE 2: For band 51 the FDL\_high of band 50 is applied as FDL\_high for band 51. For band 50, the FDL\_low of band 51 is applied as FDL\_low for band 50.  NOTE 3: For band 76 the FDL\_high of band 75 is applied as FDL\_high for band 76. For band 75, the FDL\_low of band 76 is applied as FDL\_low for band 75.  NOTE 4: For UEs supporting both bands 38 and 41, the FDL\_high and FDL\_low of band 41 is applied as FDL\_high and FDL\_low for band 38.  NOTE 5: n48 follows the requirement in this frequency range according to the general requirement defined in Clause 7.1. The power level of the interferer (PInterferer) for Range 3 shall be modified to -20 dBm for FInterferer > 2700 MHz and FInterferer < 4800 MHz.  NOTE 6: The power level of the interferer (PInterferer) for Range 3 shall be modified to [-20 dBm] for FInterferer > [2580 MHz] and FInterferer < [2775 MHz].  NOTE 7 For UE supporting both bands 25 and 70, the FDL\_high of band 70 is applied as FDL\_high for band 25, and the FDL\_low of band 25 is applied as FDL\_low for band 70.  NOTE8: For bands 91 and 93 the FDL\_high of bands 92 and 94 are applied as FDL\_high for bands 91 and 93. For bands 92 and 94, the FDL\_low of bands 91 and 93 are applied as FDL\_low for bands 92 and 94 | | | | | |

For interferer frequencies across ranges 1, 2 and 3 in Table 7.6.3-2, a maximum of



exceptions are allowed for spurious response frequencies in each assigned frequency channel when measured using a step size of MHz withthe number of resource blocks in the downlink transmission bandwidth configuration, BWChannelthe bandwidth of the frequency channel in MHz and *n* = 1, 2, 3 for SCS = 15, 30, 60 kHz, respectively. For these exceptions, the requirements in clause 7.7 apply.

For NR bands with FDL\_low ≥ 3300 MHz and FUL\_low ≥ 3300 MHz out-of-band band blocking is defined for an unwanted CW interfering signal falling outside a frequency range up to 3\*BWChannel below or from 3\*BWChannel above the UE receive band, where BWChannel is the channel bandwidth. The throughput of the wanted signal shall be ≥ 95 % of the maximum throughput of the reference measurement channels as specified in Annexes A.2.2, A.2.3, A.3.2 and A.3.3 (with one sided dynamic OCNG Pattern OP.1 FDD/TDD for the DL-signal as described in Annex A.5.1.1/A.5.2.1) with parameters specified in Table 7.6.3-3 and Table 7.6.3-4. The relative throughput requirement shall be met for any SCS specified for the channel bandwidth of the wanted signal.

Table 7.6.3-3: Out-of-band blocking parameters for NR bands with FDL\_low ≥ 3300 MHz and FUL\_low ≥ 3300 MHz

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| RX parameter | Units | Channel bandwidth | | | | |
| 10 MHz | 15 MHz | 20 MHz | 25 MHz | 30 MHz |
| Power in transmission bandwidth configuration | dBm | REFSENS + channel bandwidth specific value below | | | | |
| dB | 6 | 7 | 9 | 9 | 9 |
| RX parameter | Units | Channel bandwidth | | | | |
| 40 MHz | 50 MHz | 60 MHz | 70 MHz | 80 MHz |
| Power in transmission bandwidth configuration | dBm | REFSENS + channel bandwidth specific value below | | | | |
| dB | 9 | 9 | 9 | 9 | 9 |
| RX parameter | Units | Channel bandwidth | | | | |
| 90 MHz | 100 MHz |  |  |  |
| Power in transmission bandwidth configuration | dBm | REFSENS + channel bandwidth specific value below | |  |  |  |
| dB | 9 | 9 |  |  |  |
| NOTE: The transmitter shall be set to 4 dB below PCMAX\_L,f,c at the minimum UL configuration specified in Table 7.3.2-3 with PCMAX\_L,f,c defined in clause 6.2.4. | | | | | | |

Table 7.6.3-4: Out of-band blocking for NR bands with FDL\_low ≥ 3300 MHz and FUL\_low ≥ 3300 MHz

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| NR band | Parameter | Unit | Range1 | Range 2 | Range 3 |
| n77, n78  (NOTE 3) | Pinterferer | dBm | -44 | -30 | -15 |
| Finterferer (CW) | MHz | -60 < f – FDL\_low ≤ -3\*BWChannel  or  3\*BWChannel ≤ f – FDL\_high < 60 | -200 < f – FDL\_low ≤ -MAX(60,3\*BWChannel)  or  MAX(60,3\*BWChannel) ≤ f – FDL\_high < 200 | 1 ≤ f ≤ FDL\_low – MAX(200,3\*BWChannel)  or  FDL\_high + MAX(200,3\*BWChannel)  ≤ f ≤ 12750 |
| n79  (NOTE 4) | Finterferer (CW) | MHz | N/A | -150 < f – FDL\_low ≤ -MAX(60,3\*BWChannel)  or  MAX(60,3\*BWChannel) ≤ f – FDL\_high < 150 | 1 ≤ f ≤ FDL\_low – MAX(150,3\*BWChannel)  or  FDL\_high + MAX(150,3\*BWChannel)  ≤ f ≤ 12750 |
| NOTE 1: The power level of the interferer (PInterferer) for Range 3 shall be modified to -20 dBm for FInterferer > 6000 MHz.  NOTE 2: BWChannel denotes the channel bandwidth of the wanted signal  NOTE 3: The power level of the interferer (PInterferer) for Range 3 shall be modified to -20 dBm, for FInterferer > 2700 MHz and FInterferer < 4800 MHz. For BWChannel > 15 MHz, the requirement for Range 1 is not applicable and Range 2 applies from the frequency offset of 3\*BWChannel from the band edge. For BWChannel larger than 60 MHz, the requirement for Range 2 is not applicable and Range 3 applies from the frequency offset of 3\*BWChannel from the band edge.  NOTE 4: The power level of the interferer (PInterferer) for Range 3 shall be modified to -20 dBm, for FInterferer > 3650 MHz and FInterferer < 5750 MHz. For BWChannel ≥ 40 MHz, the requirement for Range 2 is not applicable and Range 3 applies from the frequency offset of 3\*BWChannel from the band edge. | | | | | |

For interferer frequencies across ranges 1, 2 and 3 in Table 7.6.3-4, a maximum of



exceptions are allowed for spurious response frequencies in each assigned frequency channel when measured using a step size of MHz withthe number of resource blocks in the downlink transmission bandwidth configuration, BWChannel the bandwidth of the frequency channel in MHz and *n* = 1, 2, 3 for SCS = 15, 30, 60 kHz, respectively. For these exceptions, the requirements in clause 7.7 apply.

### 7.6.4 Narrow band blocking

This requirement is measure of a receiver's ability to receive a NR signal at its assigned channel frequency in the presence of an unwanted narrow band CW interferer at a frequency, which is less than the nominal channel spacing.

The relative throughput shall be ≥ 95 % of the maximum throughput of the reference measurement channels as specified in Annexes A.2.2, A.2.3, A.3.2 and A.3.3 (with one sided dynamic OCNG Pattern OP.1 FDD/TDD for the DL-signal as described in Annex A.5.1.1/A.5.2.1) with parameters specified in Table 7.6.4-1. For operating bands with an unpaired DL part (as noted in Table 5.2-1), the requirements only apply for carriers assigned in the paired part.

Table 7.6.4-1: Narrow Band Blocking

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| NR band | Parameter | Unit | Channel Bandwidth | | | | | | | | | | | |
| 5 MHz | 10 MHz | 15 MHz | 20 MHz | 25 MHz | 30 MHz | 40 MHz | 50 MHz | 60 MHz | 80 MHz | 90 MHz | 100 MHz |
| n1, n2, n3, n5, n7, n8, n12, n13, n14, n18, n20, n25, n26, n28, n30, n34, n38, n39, n40, n41, n48, n50, n51, n53, n65, n66, n70, n71, n74, n75, n76 | Pw | dBm |  | PREFSENS + channel-bandwidth specific value below | | | | | | | | | | |
| 16 | 13 | 14 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 |
| Puw (CW) | dBm | -55 | -55 | -55 | -55 | -55 | -55 | -55 | -55 | -55 | -55 | -55 | -55 |
| Fuw (offset SCS= 15 kHz) | MHz | 2.7075 | 5.2125 | 7.7025 | 10.2075 | 13.0275 | 15.6075 | 20.5575 | 25.7025 | NA | NA | NA | NA |
| Fuw (offset SCS= 30 kHz) | MHz | NA | NA | NA | NA | NA | NA | NA | NA | 30.855 | 40.935 | 45.915 | 50.865 |
| NOTE 1: The transmitter shall be set a 4 dB below PCMAX\_L,f,c at the minimum UL configuration specified in Table 7.3.2-3 with PCMAX\_L,f,c defined in clause 6.2.4  NOTE 2: Reference measurement channel is specified in Annexes A.3.2 and A.3.3 with one sided dynamic OCNG Pattern OP.1 FDD/TDD as described in Annex A.5.1.1/A.5.2.1.  NOTE 3: The PREFSENS power level is specified in Table 7.3.2-1 and Table 7.3.2-2 for two and four antenna ports, respectively. | | | | | | | | | | | | | | |

###### *------------------------------ End of modified section ------------------------------*