**3GPP TSG-RAN WG4 Meeting#100-e *R4-21XXXXX***

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

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| *CR-Form-v12.1* |
| **CHANGE REQUEST** |
|  |
|  | **38.101-1** | **CR** | **CRNum** | **rev** | **-** | **Current version:** | **17.2.0** |  |
|  |
| *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:***  | Introduction of a new band (indicator) for n77 operation in 3450-3550 MHz range |
|  |  |
| ***Source to WG:*** | Ericsson |
| ***Source to TSG:*** | R4 |
|  |  |
| ***Work item code:*** | [TEI16] |  | ***Date:*** | 2021-08-16 |
|  |  |  |  |  |
| ***Category:*** | **B** |  | ***Release:*** | Rel-17 |
|  | *Use one of the following categories:****F*** *(correction)****A*** *(mirror corresponding to a change in an earlier release)****B*** *(addition of feature),* ***C*** *(functional modification of feature)****D*** *(editorial modification)*Detailed explanations of the above categories canbe found in 3GPP [TR 21.900](http://www.3gpp.org/ftp/Specs/html-info/21900.htm). | *Use one of the following releases:Rel-8 (Release 8)Rel-9 (Release 9)Rel-10 (Release 10)Rel-11 (Release 11)…Rel-15 (Release 15)Rel-16 (Release 16)Rel-17 (Release 17)Rel-18 (Release 18)* |
|  |  |
| ***Reason for change:*** | Introduce a new operating band to prevent n77-capable UEs that are FCC certified for use in the ‘C-band’ 3700-3980 MHz but not certified for operation in the band 3450-3550 MHz recently made available by the FCC to use the band 3450-3550 MHz. |
|  |  |
| ***Summary of change:*** | A new band n101 is introduced as a “copy” of n77 with identical radio requirements and range to n77. CA and NR-DC configurations are not specified for n101 to avoid creating copies of the band combinations. Instead the band combinations defined for n77 are applicable also for n101. UEs supporting the new band n101 must also support n77. UEs supporting the new band n101 do not report band combinations with n101 in their *supportedBandCombinationList*. All band combinations that these UEs report (support) with n77 can also be configured with n101 serving cells instead of n77 serving cells and this must be supported by the UE. This avoids increased size of UE capabilities and market fragmentation. The network does not enquire band combinations for n101. The resulting behaviour: if a cell in the new frequency range 3450-3550 MHz broadcasts only the band number n101 legacy UEs that do not support (nor comprehend) this band number would not access this cell. Furthermore, the network (gNB and eNB) would refrain from handing over legacy UEs to those cells and refrain from configuring them as SCells (CA) or PSCell (DC or EN-DC). If a cell in the existing C-band broadcasts both n77 and n101, legacy UEs (supporting only n77) as well as new UEs (supporting n77 and n101) may access the cell and may be configured with this cell (HO, CA, EN-DC). Note that UEs cannot be configured with inter-band CA combinations of n77 and n101 since these combinations are not specified . Instead for UEs supporting n101 the network would enquire supported intra-band CA configurations of n77 but configure these with n101 serving cells instead of n77 serving cells. Note also that legacy n77 UEs not subject to FCC authorization are not limited to the C-band. But since the network has no means to differentiate these from other legacy UEs they would also be prevented from accessing/using cells in the new frequency range (3450-3550 MHz). New UEs that support n77 can also indicate support for n101 even if they are not subject to FCC certification (FCC Part 27.51). It is remarked that all n77 compliant UEs meet the unwanted emissions for operations in both the C-band and 3450-3550 MHz (FCC Part 27.53).Rel-15 compliant UEs can implement the new band by release independence.Changes to the specification:Clause 5.2: introduction of n101 with identical frequency range to n77 and with the following (normative) note:NOTE 17: This band is intended for operations in the USA in the ranges 3450-3550 MHz and 3700-3980 MHz. The minimum requirements for n101 are those applicable for Band n77 except requirements with suffixes A and B [CA and NR-DC]. A UE supporting Band n101 shall also support band n77.Band n101 is indicated in both the 3450-3550 MHz and 3700-3980 MHz ranges. The note for n77 is amended as follows (the second sentence)NOTE 12: In the USA this band is restricted to 3700 – 3980 MHz. For UEs supporting n101 operation in the band is also allowed in 3450-3550 MHz.in order to allow reported n77 band combinations in 3450-3550 MHz for UEs supporting n101 (and n77).Clause 5.3.5: the bandwidth for n101 as those applicable for n77.Clause 5.5A.0: CA configuations are not specifed for n101. UEs supporting n101 also indicate support for n77 for which the configurations for CA operating band including Band n77 are available. All band combinations that the UE supports with Band n77 can be configured with n101 serving cells instead of n77 serving cells.Clause 5.5B: the corresponding change for DC.Clause 5.4.2.3 and 5.4.3.3: the channel and synchronisation raster are identical to those of n77.Clauses 6.1 and 7.1: requirements for n77 apply for n101 (but not the requirements for n77 in clauses with a suffixes A and B). |
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| ***Consequences if not approved:*** | For operations in n77 in the US, the eNB and gNB are not aware of any possible UE limitations for operation in the 3450-3550 MHz range in the US for UEs subject FCC authorization but only certified for the C-band. This would impact initial access and camping on cells in 3450-3550 MHz, mobility within NR, mobility from LTE to NR, SCell addition configuring an SCell in 3450-3550 MHz possibly not supported by the UE and inter-frequency handover e.g. PCell change from the C-band to the 3450-3550 MHz. |
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| ***Clauses affected:*** | 5.2, 5.3.5, 5.4.2.3, 5.4.3.3, 5.5A.0, 5.5B, 6.1, 7.1 |
|  |  |
|  | **Y** | **N** |  |  |
| ***Other specs*** |  | **X** |  Other core specifications  |  |
| ***affected:*** |  | **X** |  Test specifications |   |
| ***(show related CRs)*** |  | **X** |  O&M Specifications |   |
|  |  |
| ***Other comments:*** |  |
|  |  |
| ***This CR's revision history:*** |  |

*< start of changes >*

## 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 transmitFUL\_low  – FUL\_high | Downlink (DL) *operating band*BS transmit / UE receiveFDL\_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 |
| n2416 | 1626.5 MHz – 1660.5 MHz | 1525 MHz – 1559 MHz | FDD |
| n25 | 1850 MHz – 1915 MHz | 1930 MHz – 1995 MHz | FDD |
| n26 | 814 MHz – 849 MHz | 859 MHz – 894 MHz | FDD |
| n28 | 703 MHz – 748 MHz | 758 MHz – 803 MHz | FDD |
| n29 | N/A | 717 MHz – 728 MHz | SDL |
| 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 |
| n67 | N/A | 738 MHz – 758 MHz | SDL |
| n70 | 1695 MHz – 1710 MHz | 1995 MHz – 2020 MHz | FDD |
| n71 | 663 MHz – 698 MHz | 617 MHz – 652 MHz | FDD |
| n74 | 1427 MHz – 1470 MHz | 1475 MHz – 1518 MHz | FDD |
| n75 | N/A | 1432 MHz – 1517 MHz | SDL |
| n76 | N/A | 1427 MHz – 1432 MHz | SDL |
| 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 |
| n85 | 698 MHz – 716 MHz  | 728 MHz – 746 MHz | FDD |
| n86 | 1710 MHz – 1780 MHz | N/A | SUL |
| n89 | 824 MHz – 849 MHz | N/A | SUL |
| n90 | 2496 MHz – 2690 MHz | 2496 MHz – 2690 MHz | 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 |
| n9715 | 2300 MHz – 2400 MHz | N/A | SUL |
| n9815 | 1880 MHz – 1920 MHz | N/A | SUL |
| n9916 | 1626.5 MHz – 1660.5 MHz | N/A | SUL |
| n10117 | 3300 MHz – 4200 MHz | 3300 MHz – 4200 MHz | TDD |
| 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. For UEs supporting Band n101 operation in n77 is also allowed in 3450-3550 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 20-51NOTE 15: The requirements for this band are applicable only where no other NR or E-UTRA TDD operating band(s) are used within the frequency range of this band in the same geographical area. For scenarios where other NR or E-UTRA TDD operating band(s) are used within the frequency range of this band in the same geographical area, special co-existence requirements may apply that are not covered by the 3GPP specifications.NOTE 16: DL operation in this band is restricted to 1526 – 1536 MHz and UL operation is restricted to 1627.5 – 1637.5 MHz and 1646.5 – 1656.5 MHz.NOTE 17: This band is intended for operations in the USA in the ranges 3450-3550 MHz and 3700-3980 MHz. The minimum requirements for n101 are those applicable for Band n77 except requirements with suffixes A and B. A UE supporting Band n101 shall also support band n77. |

*< text omitted >*

### 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 (kHz) | UE Channel bandwidth (MHz) |
| --- | --- | --- |
| 5 | 10 | 15 | 20 | 25 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 |
| n1 | 15 | 5 | 10 | 15 | 20 | 25 | 30 | 40 | 50 |  |  |  |  |  |
|  | 30 |  | 10 | 15 | 20 | 25 | 30 | 40 | 50 |  |  |  |  |  |
|  | 60 |  | 10 | 15 | 20 | 25 | 30 | 40 | 50 |  |  |  |  |  |
| n2 | 15 | 5 | 10 | 15 | 20 |  |  |  |  |  |  |  |  |  |
|  | 30 |  | 10 | 15 | 20 |  |  |  |  |  |  |  |  |  |
|  | 60 |  | 10 | 15 | 20 |  |  |  |  |  |  |  |  |  |
| n3 | 15 | 5 | 10 | 15 | 20 | 25 | 30 | 40 | 50 |  |  |  |  |  |
|  | 30 |  | 10 | 15 | 20 | 25 | 30 | 40 | 50 |  |  |  |  |  |
|  | 60 |  | 10 | 15 | 20 | 25 | 30 | 40 | 50 |  |  |  |  |  |
| n5 | 15 | 5 | 10 | 15 | 20 |  |  |  |  |  |  |  |  |  |
|  | 30 |  | 10 | 15 | 20 |  |  |  |  |  |  |  |  |  |
|  | 60 |  |  |  |  |  |  |  |  |  |  |  |  |  |
| n7 | 15 | 5 | 10 | 15 | 20 | 25 | 30 | 40 | 50 |  |  |  |  |  |
|  | 30 |  | 10 | 15 | 20 | 25 | 30 | 40 | 50 |  |  |  |  |  |
|  | 60 |  | 10 | 15 | 20 | 25 | 30 | 40 | 50 |  |  |  |  |  |
| n8 | 15 | 5 | 10 | 15 | 20 |  |  |  |  |  |  |  |  |  |
|  | 30 |  | 10 | 15 | 20 |  |  |  |  |  |  |  |  |  |
|  | 60 |  |  |  |  |  |  |  |  |  |  |  |  |  |
| n12 | 15 | 5 | 10 | 15 |  |  |  |  |  |  |  |  |  |  |
|  | 30 |  | 10 | 15 |  |  |  |  |  |  |  |  |  |  |
|  | 60 |  |  |  |  |  |  |  |  |  |  |  |  |  |
| n13 | 15 | 5 | 10 |  |  |  |  |  |  |  |  |  |  |  |
|  | 30 |  | 10 |  |  |  |  |  |  |  |  |  |  |  |
|  | 60 |  |  |  |  |  |  |  |  |  |  |  |  |  |
| n14 | 15 | 5 | 10 |  |  |  |  |  |  |  |  |  |  |  |
|  | 30 |  | 10 |  |  |  |  |  |  |  |  |  |  |  |
|  | 60 |  |  |  |  |  |  |  |  |  |  |  |  |  |
| n18 | 15 | 5 | 10 | 15 |  |  |  |  |  |  |  |  |  |  |
|  | 30 |  | 10 | 15 |  |  |  |  |  |  |  |  |  |  |
|  | 60 |  |  |  |  |  |  |  |  |  |  |  |  |  |
| n20 | 15 | 5 | 10 | 15 | 20 |  |  |  |  |  |  |  |  |  |
|  | 30 |  | 10 | 15 | 20 |  |  |  |  |  |  |  |  |  |
|  | 60 |  |  |  |  |  |  |  |  |  |  |  |  |  |
| n24 | 15 | 5 | 10 |  |  |  |  |  |  |  |  |  |  |  |
|  | 30 |  | 10 |  |  |  |  |  |  |  |  |  |  |  |
|  | 60 |  | 10 |  |  |  |  |  |  |  |  |  |  |  |
| n25 | 15 | 5 | 10 | 15 | 20 | 25 | 30 | 40 |  |  |  |  |  |  |
|  | 30 |  | 10 | 15 | 20 | 25 | 30 | 40 |  |  |  |  |  |  |
|  | 60 |  | 10 | 15 | 20 | 25 | 30 | 40 |  |  |  |  |  |  |
| n26 | 15 | 5 | 10 | 15 | 20 |  |  |  |  |  |  |  |  |  |
|  | 30 |  | 10 | 15 | 20 |  |  |  |  |  |  |  |  |  |
| n28 | 15 | 5 | 10 | 15 | 207 |  | 307 |  |  |  |  |  |  |  |
|  | 30 |  | 10 | 15 | 207 |  | 307 |  |  |  |  |  |  |  |
|  | 60 |  |  |  |  |  |  |  |  |  |  |  |  |  |
| n29 | 15 | 5 | 10 |  |  |  |  |  |  |  |  |  |  |  |
|  | 30 |  | 10 |  |  |  |  |  |  |  |  |  |  |  |
|  | 60 |  |  |  |  |  |  |  |  |  |  |  |  |  |
| n30 | 15 | 5 | 10 |  |  |  |  |  |  |  |  |  |  |  |
|  | 30 |  | 10 |  |  |  |  |  |  |  |  |  |  |  |
|  | 60 |  |  |  |  |  |  |  |  |  |  |  |  |  |
| n34 | 15 | 5 | 10 | 15 |  |  |  |  |  |  |  |  |  |  |
|  | 30 |  | 10 | 15 |  |  |  |  |  |  |  |  |  |  |
|  | 60 |  | 10 | 15 |  |  |  |  |  |  |  |  |  |  |
| n38 | 15 | 5 | 1010 | 15 | 2010 | 25 | 3010 | 4010 |  |  |  |  |  |  |
|  | 30 |  | 1010 | 15 | 2010 | 25 | 3010 | 4010 |  |  |  |  |  |  |
|  | 60 |  | 1010 | 15 | 2010 | 25 | 3010 | 4010 |  |  |  |  |  |  |
| n39 | 15 | 5 | 10 | 15 | 20 | 25 | 30 | 40 |  |  |  |  |  |  |
|  | 30 |  | 10 | 15 | 20 | 25 | 30 | 40 |  |  |  |  |  |  |
|  | 60 |  | 10 | 15 | 20 | 25 | 30 | 40 |  |  |  |  |  |  |
| n40 | 15 | 59 | 10 | 15 | 20 | 25 | 30 | 40 | 50 |  |  |  |  |  |
|  | 30 |  | 10 | 15 | 20 | 25 | 30 | 40 | 50 | 60 |  | 80 | 90 | 100 |
|  | 60 |  | 10 | 15 | 20 | 25 | 30 | 40 | 50 | 60 |  | 80 | 90 | 100 |
| n41 | 15 |  | 10 | 15 | 20 |  | 30 | 40 | 50 |  |  |  |  |  |
|  | 30 |  | 10 | 15 | 20 |  | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 |
|  | 60 |  | 10 | 15 | 20 |  | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 |
| n46 | 15 |  | 105 |  | 20 |  |  | 40 |  |  |  |  |  |  |
|  | 30 |  | 105 |  | 20 |  |  | 40 |  | 60 |  | 80 |  |  |
|  | 60 |  | 105 |  | 20 |  |  | 40 |  | 60 |  | 80 |  |  |
| n47 | 15 |  | 1010 |  | 2010 |  | 3010 | 4010 |  |  |  |  |  |  |
|  | 30 |  | 1010 |  | 2010 |  | 3010 | 4010 |  |  |  |  |  |  |
|  | 60 |  | 1010 |  | 2010 |  | 3010 | 4010 |  |  |  |  |  |  |
| n48 | 15 | 55 | 10 | 15 | 20 |  | 30 | 40 | 506 |  |  |  |  |  |
|  | 30 |  | 10 | 15 | 20 |  | 30 | 40 | 506 | 606 | 706 | 806 | 906,4 | 1006 |
|  | 60 |  | 10 | 15 | 20 |  | 30 | 40 | 506 | 606 | 706 | 806 | 906,4 | 1006 |
| n50 | 15 | 59 | 10 | 15 | 20 |  | 30 | 40 | 50 |  |  |  |  |  |
|  | 30 |  | 10 | 15 | 20 |  | 30 | 40 | 50 | 60 |  | 803 |  |  |
|  | 60 |  | 10 | 15 | 20 |  | 30 | 40 | 50 | 60 |  | 803 |  |  |
| n51 | 15 | 5 |  |  |  |  |  |  |  |  |  |  |  |  |
|  | 30 |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  | 60 |  |  |  |  |  |  |  |  |  |  |  |  |  |
| n53 | 15 | 5 | 10 |  |  |  |  |  |  |  |  |  |  |  |
|  | 30 |  | 10 |  |  |  |  |  |  |  |  |  |  |  |
|  | 60 |  | 10 |  |  |  |  |  |  |  |  |  |  |  |
| n65 | 15 | 5 | 10 | 15 | 20 |  |  |  | 50 |  |  |  |  |  |
|  | 30 |  | 10 | 15 | 20 |  |  |  | 50 |  |  |  |  |  |
|  | 60 |  | 10 | 15 | 20 |  |  |  | 50 |  |  |  |  |  |
| n66 | 15 | 5 | 10 | 15 | 20 | 25 | 30 | 40 |  |  |  |  |  |  |
|  | 30 |  | 10 | 15 | 20 | 25 | 30 | 40 |  |  |  |  |  |  |
|  | 60 |  | 10 | 15 | 20 | 25 | 30 | 40 |  |  |  |  |  |  |
| n67 | 15 | 5 | 10 | 15 | 20 |  |  |  |  |  |  |  |  |  |
|  | 30 |  | 10 | 15 | 20 |  |  |  |  |  |  |  |  |  |
|  | 60 |  |  |  |  |  |  |  |  |  |  |  |  |  |
| n70 | 15 | 5 | 10 | 15 | 203 | 253 |  |  |  |  |  |  |  |  |
|  | 30 |  | 10 | 15 | 203 | 253 |  |  |  |  |  |  |  |  |
|  | 60 |  | 10 | 15 | 203 | 253 |  |  |  |  |  |  |  |  |
| n71 | 15 | 5 | 10 | 15 | 20 |  |  |  |  |  |  |  |  |  |
|  | 30 |  | 10 | 15 | 20 |  |  |  |  |  |  |  |  |  |
|  | 60 |  |  |  |  |  |  |  |  |  |  |  |  |  |
| n74 | 15 | 5 | 10 | 15 | 20 |  |  |  |  |  |  |  |  |  |
|  | 30 |  | 10 | 15 | 20 |  |  |  |  |  |  |  |  |  |
|  | 60 |  | 10 | 15 | 20 |  |  |  |  |  |  |  |  |  |
| n75 | 15 | 5 | 10 | 15 | 20 | 25 | 30 | 40 | 50 |  |  |  |  |  |
|  | 30 |  | 10 | 15 | 20 | 25 | 30 | 40 | 50 |  |  |  |  |  |
|  | 60 |  | 10 | 15 | 20 | 25 | 30 | 40 | 50 |  |  |  |  |  |
| n76 | 15 | 5 |  |  |  |  |  |  |  |  |  |  |  |  |
|  | 30 |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  | 60 |  |  |  |  |  |  |  |  |  |  |  |  |  |
| n77 | 15 |  | 10 | 15 | 20 | 25 | 30 | 40 | 50 |  |  |  |  |  |
|  | 30 |  | 10 | 15 | 20 | 25 | 30 | 40 | 50 | 60 | 704 | 80 | 904 | 100 |
|  | 60 |  | 10 | 15 | 20 | 25 | 30 | 40 | 50 | 60 | 704 | 80 | 904 | 100 |
| n78 | 15 |  | 10 | 15 | 20 | 25 | 30 | 40 | 50 |  |  |  |  |  |
|  | 30 |  | 10 | 15 | 20 | 25 | 30 | 40 | 50 | 60 | 704 | 80 | 90 | 100 |
|  | 60 |  | 10 | 15 | 20 | 25 | 30 | 40 | 50 | 60 | 704 | 80 | 90 | 100 |
| n79 | 15 |  |  |  |  |  |  | 40 | 50 |  |  |  |  |  |
|  | 30 |  |  |  |  |  |  | 40 | 50 | 60 |  | 80 |  | 100 |
|  | 60 |  |  |  |  |  |  | 40 | 50 | 60 |  | 80 |  | 100 |
| n80 | 15 | 5 | 10 | 15 | 20 | 25 | 30 | 40 |  |  |  |  |  |  |
|  | 30 |  | 10 | 15 | 20 | 25 | 30 | 40 |  |  |  |  |  |  |
|  | 60 |  | 10 | 15 | 20 | 25 | 30 | 40 |  |  |  |  |  |  |
| n81 | 15 | 5 | 10 | 15 | 20 |  |  |  |  |  |  |  |  |  |
|  | 30 |  | 10 | 15 | 20 |  |  |  |  |  |  |  |  |  |
|  | 60 |  |  |  |  |  |  |  |  |  |  |  |  |  |
| n82 | 15 | 5 | 10 | 15 | 20 |  |  |  |  |  |  |  |  |  |
|  | 30 |  | 10 | 15 | 20 |  |  |  |  |  |  |  |  |  |
|  | 60 |  |  |  |  |  |  |  |  |  |  |  |  |  |
| n83 | 15 | 5 | 10 | 15 | 20 |  | 307 |  |  |  |  |  |  |  |
|  | 30 |  | 10 | 15 | 20 |  | 307 |  |  |  |  |  |  |  |
|  | 60 |  |  |  |  |  |  |  |  |  |  |  |  |  |
| n84 | 15 | 5 | 10 | 15 | 20 | 25 | 30 | 40 | 50 |  |  |  |  |  |
|  | 30 |  | 10 | 15 | 20 | 25 | 30 | 40 | 50 |  |  |  |  |  |
|  | 60 |  | 10 | 15 | 20 | 25 | 30 | 40 | 50 |  |  |  |  |  |
| n85 | 15 | 5 | 10 | 15 |  |  |  |  |  |  |  |  |  |  |
|  | 30 |  | 10 | 15 |  |  |  |  |  |  |  |  |  |  |
|  | 60 |  |  |  |  |  |  |  |  |  |  |  |  |  |
| n86 | 15 | 5 | 10 | 15 | 20 |  |  | 40 |  |  |  |  |  |  |
|  | 30 |  | 10 | 15 | 20 |  |  | 40 |  |  |  |  |  |  |
|  | 60 |  | 10 | 15 | 20 |  |  | 40 |  |  |  |  |  |  |
| n89 | 15 | 5 | 10 | 15 | 20 |  |  |  |  |  |  |  |  |  |
|  | 30 |  | 10 | 15 | 20 |  |  |  |  |  |  |  |  |  |
|  | 60 |  |  |  |  |  |  |  |  |  |  |  |  |  |
| n90 | 15 |  | 10 | 15 | 20 |  | 30 | 40 | 50 |  |  |  |  |  |
|  | 30 |  | 10 | 15 | 20 |  | 30 | 40 | 50 | 60 |  | 80 | 90 | 100 |
|  | 60 |  | 10 | 15 | 20 |  | 30 | 40 | 50 | 60 |  | 80 | 90 | 100 |
| n91 | 15 | 5 | 108 |  |  |  |  |  |  |  |  |  |  |  |
|  | 30 |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  | 60 |  |  |  |  |  |  |  |  |  |  |  |  |  |
| n92 | 15 | 5 | 10 | 15 | 20 |  |  |  |  |  |  |  |  |  |
|  | 30 |  | 10 | 15 | 20 |  |  |  |  |  |  |  |  |  |
|  | 60 |  |  |  |  |  |  |  |  |  |  |  |  |  |
| n93 | 15 | 5 | 108 |  |  |  |  |  |  |  |  |  |  |  |
|  | 30 |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  | 60 |  |  |  |  |  |  |  |  |  |  |  |  |  |
| n94 | 15 | 5 | 10 | 15 | 20 |  |  |  |  |  |  |  |  |  |
|  | 30 |  | 10 | 15 | 20 |  |  |  |  |  |  |  |  |  |
|  | 60 |  |  |  |  |  |  |  |  |  |  |  |  |  |
| n95 | 15 | 5 | 10 | 15 |  |  |  |  |  |  |  |  |  |  |
|  | 30 |  | 10 | 15 |  |  |  |  |  |  |  |  |  |  |
|  | 60 |  | 10 | 15 |  |  |  |  |  |  |  |  |  |  |
| n96 | 15 |  |  |  | 20 |  |  | 40 |  |  |  |  |  |  |
|  | 30 |  |  |  | 20 |  |  | 40 |  | 60 |  | 80 |  |  |
|  | 60 |  |  |  | 20 |  |  | 40 |  | 60 |  | 80 |  |  |
| n97 | 15 | 5 | 10 | 15 | 20 | 25 | 30 | 40 | 50 |  |  |  |  |  |
|  | 30 |  | 10 | 15 | 20 | 25 | 30 | 40 | 50 | 60 |  | 80 |  |  |
|  | 60 |  | 10 | 15 | 20 | 25 | 30 | 40 | 50 | 60 |  | 80 |  |  |
| n98 | 15 | 5 | 10 | 15 | 20 | 25 | 30 | 40 |  |  |  |  |  |  |
|  | 30 |  | 10 | 15 | 20 | 25 | 30 | 40 |  |  |  |  |  |  |
|  | 60 |  | 10 | 15 | 20 | 25 | 30 | 40 |  |  |  |  |  |  |
|  | 15 | 5 | 10 |  |  |  |  |  |  |  |  |  |  |  |
| n99 | 30 |  | 10 |  |  |  |  |  |  |  |  |  |  |  |
|  | 60 |  | 10 |  |  |  |  |  |  |  |  |  |  |  |
| n101 | 15 | NOTE 11 |
| 30 | NOTE 11 |
| 60 | NOTE 11 |
| 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 a 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.NOTE 11: The channel bandwidths applicable for Band n77. |

*< text omitted >*

#### 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) | UplinkRange of NREF(First – <Step size> – Last) | DownlinkRange of NREF(First – <Step size> – Last) |
| n1 | 100 | 384000 – <20> – 396000 | 422000 – <20> – 434000 |
| n2 | 100 | 370000 – <20> – 382000 | 386000 – <20> – 398000 |
| n3 | 100 | 342000 – <20> – 357000 | 361000 – <20> – 376000 |
| n5 | 100 | 164800 – <20> – 169800 | 173800 – <20> – 178800 |
| n7 | 100 | 500000 – <20> – 514000 | 524000 – <20> – 538000 |
| n8 | 100 | 176000 – <20> – 183000 | 185000 – <20> – 192000 |
| n12 | 100 | 139800 – <20> – 143200 | 145800 – <20> – 149200 |
| n13 | 100 | 155400 – <20> – 157400 | 149200 – <20> – 151200 |
| n14 | 100 | 157600 – <20> – 159600 | 151600 – <20> – 153600 |
| n18 | 100 | 163000 – <20> – 166000 | 172000 – <20> – 175000 |
| n20 | 100 | 166400 – <20> – 172400 | 158200 – <20> – 164200 |
| n24 | 100 | 325300 – <20> – 332100 | 305000 – <20> – 311800 |
| 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 |
| n67 | 100 | N/A | 147600 – <20> – 151600 |
| n70 | 100 | 339000 – <20> – 342000 | 399000 – <20> – 404000 |
| n71 | 100 | 132600 – <20> – 139600 | 123400 – <20> – 130400 |
| n74 | 100 | 285400 – <20> – 294000 | 295000 – <20> – 303600 |
| n75 | 100 | N/A | 286400 – <20> – 303400 |
| n76 | 100 | N/A | 285400 – <20> – 286400 |
| n77 | 15 | 620000 – <1> – 680000 | 620000 – <1> – 680000 |
|  | 30 | 620000 – <2> – 680000 | 620000 – <2> – 680000 |
| n78 | 15 | 620000 – <1> – 653333 | 620000 – <1> – 653333 |
|  | 30 | 620000 – <2> – 653332 | 620000 – <2> – 653332 |
| n79 | 15 | 693334 – <1> – 733333 | 693334 – <1> – 733333 |
|  | 30 | 693334 – <2> – 733332 | 693334 – <2> – 733332 |
| n80 | 100 | 342000 – <20> – 357000 | N/A |
| n81 | 100 | 176000 – <20> – 183000 | N/A |
| n82 | 100 | 166400 – <20> – 172400  | N/A |
| n83 | 100 | 140600 – <20> –149600 | N/A |
| n84 | 100 | 384000 – <20> – 396000 | N/A |
| n85 | 100 | 139600 – <20> – 143200 | 145600 – <20> – 149200 |
| n86 | 100 | 342000 – <20> – 356000 | N/A |
| n89 | 100 | 164800 – <20> – 169800 | N/A |
| 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 |
| n97 | 100 | 460000 – <20> – 480000 | N/A |
| n98 | 100 | 376000 – <20> – 384000 | N/A |
| n99 | 100 | 325300 – <20> – 332100 | N/A |
| n101 | 15 | 620000 – <1> – 680000 | 620000 – <1> – 680000 |
| 30 | 620000 – <2> – 680000 | 620000 – <2> – 680000 |
| 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. |

*< text omitted >*

#### 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 |
| n24 | 15 kHz | Case A | 3818 – <1> – 3892 |
|  | 30 kHz | Case B | 3824 – <1> – 3886 |
| n25 | 15 kHz | Case A | 4829 – <1> – 4981 |
| n26 | 15 kHz | Case A | 2153 – <1> – 2230 |
| n28 | 15 kHz | Case A | 1901 – <1> – 2002 |
| n29 | 15 kHz | Case A | 1798 – <1> – 1813 |
| n30 | 15 kHz | Case A | 5879 – <1> – 5893 |
| n34 | 15 kHz | Case A | NOTE 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 |
| n67 | 15 kHz | Case A | 1850 – <1> – 1888 |
| n70 | 15 kHz | Case A | 4993 – <1> – 5044 |
| n71 | 15 kHz | Case A | 1547 – <1> – 1624 |
| n74 | 15 kHz | Case A | 3692 – <1> – 3790 |
| n75 | 15 kHz | Case A | 3584 – <1> – 3787 |
| n76 | 15 kHz | Case A | 3572 – <1> – 3574 |
| n77 | 30 kHz | Case C | 7711 – <1> – 8329 |
| n78 | 30 kHz | Case C | 7711 – <1> – 8051 |
| n79 | 30 kHz | Case C | 8480 – <16> – 8880 |
| n85 | 15 kHz | Case A | 1826 – <1> – 1858 |
| n90 | 15 kHz | Case A | 6246 – <1> – 6717 |
|  | 30 kHz | Case C | 6252 – <1> – 6714 |
| n91 | 15 kHz | Case A | 3572 – <1> – 3574 |
| n92 | 15 kHz | Case A | 3584 – <1> – 3787 |
| n93 | 15 kHz | Case A | 3572 – <1> – 3574 |
| n94 | 15 kHz | Case A | 3584 – <1> – 3787 |
| n96**4** | 30 kHz | Case C | 9531 – <1> – 10363 |
| n101 | 30 kHz | Case C | 7711 – <1> – 8329 |
| 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, 9714, 9728, 9742, 9756, 9770, 9784, 9798, 9812, 9826, 9840, 9853, 9867, 9881, 9895, 9909, 9923, 9937, 9951, 9964, 9978, 9992, 10006, 10020, 10034, 10048, 10062, 10076, 10090, 10103, 10117, 10131, 10145, 10159, 10173, 10187, 10201, 10214, 10228, 10242, 10256, 10270, 10284, 10298, 10312, 10325, 10339, 10353{.NOTE 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} |

### 5.4.4 TX–RX frequency separation

*< text omitted >*

### 5.5A.0 General

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

CA configurations are not specified for Band n101. A UE supporting Band n101 does not include any CA band combinations with n101 in its UE capability. All band combinations that the UE supports with Band n77 can be configured with n101 serving cells instead of n77 serving cells.

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

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

*< text omitted >*

## 5.5B Configurations for DC

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

NR-DC configurations are not specified for Band n101. A UE supporting Band n101 does not include any NR-DC band combinations with n101 in its UE capability. All band combinations that the UE supports with Band n77 can be configured with n101 serving cells instead of n77 serving cells.

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

*< text omitted >*

## 6.1 General

Unless otherwise stated, the transmitter characteristics are specified at the antenna connector of the UE with a single or multiple transmit antenna(s). For UE with integral antenna only, a reference antenna with a gain of 0 dBi is assumed.

Transmitter requirements for UL MIMO operation apply when the UE transmits on 2 ports on the same CDM group. The UE may use higher MPR values outside this limitation.

The applicability of transmitter requirements for Band n90 is in accordance with that for Band n41; a UE supporting Band n90 shall meet the minimum requirements for Band n41. The applicability of transmitter requirements for Band n101 is in accordance with that for Band n77; a UE supporting Band n101 shall meet the minimum requirements for Band n77.

## 6.1A General

*< text omitted*

## 7.1 General

Unless otherwise stated the receiver characteristics are specified at the antenna connector(s) of the UE. For UE(s) with an integral antenna only, a reference antenna(s) with a gain of 0 dBi is assumed for each antenna port(s). UE with an integral antenna(s) may be taken into account by converting these power levels into field strength requirements, assuming a 0 dBi gain antenna. For UEs with more than one receiver antenna connector, identical interfering signals shall be applied to each receiver antenna port if more than one of these is used (diversity).

The levels of the test signal applied to each of the antenna connectors shall be as defined in the respective clauses below.

The applicability of receiver requirements for Band n90 is in accordance with that for Band n41; a UE supporting Band n90 shall meet the minimum requirements for Band n41. The applicability of receiver requirements for Band n101 is in accordance with that for Band n77; a UE supporting Band n101 shall meet the minimum requirements for Band n77.

With the exception of clause 7.3, the requirements shall be verified with the network signalling value NS\_01 configured (Table 6.2.3-1).

All the parameters in clause 7 are defined using the UL reference measurement channels specified in Annex A.2.2, the DL reference measurement channels specified in Annex A.3.2 and using the set-up specified in Annex C.3.1.

The minium requirements specified in clauses 7.5, 7.6, 7.7 and 7.8 for NR band n48 refer to the minimum requirements for NR bands < 2.7 GHz.

For the additional requirements for intra-band non-contiguous carrier aggregation of two or more sub-blocks, an in-gap test refers to the case when the interfering signal is located at a negative offset with respect to the assigned lowest channel frequency of the highest sub-block and located at a positive offset with respect to the assigned highest channel frequency of the lowest sub-block.

For the additional requirements for intra-band non-contiguous carrier aggregation of two or more sub-blocks, an out-of-gap test refers to the case when the interfering signal(s) is (are) located at a positive offset with respect to the assigned channel frequency of the highest carrier frequency, or located at a negative offset with respect to the assigned channel frequency of the lowest carrier frequency.

For the additional requirements for intra-band non-contiguous carrier aggregation of two or more sub-blocks with channel bandwidth larger than or equal to 5 MHz, the existing adjacent channel selectivity requirements, in-band blocking requirements (for each case), and narrow band blocking requirements apply for in-gap tests only if the corresponding interferer frequency offsets with respect to the two measured carriers satisfy the following condition in relation to the sub-block gap size Wgap for at least one of these carriers *j* = 1,2, so that the interferer frequency position does not change the nature of the core requirement tested:

 Wgap ≥ 2∙|FInterferer (offset),*j*| – BWChannel(*j*)

where FInterferer (offset),*j*for a sub-block with a single component carrier is the interferer frequency offset with respect to carrier *j* as specified in clause 7.5, clause 7.6.2 and clause 7.6.4 for the respective requirement and BWChannel(*j*) the channel bandwidth of carrier *j*. FInterferer (offset),j for a sub-block with two or more contiguous component carriers is the interference frequency offset with respect to the carrier adjacent to the gap is specified in clause 7.5A, 7.6A.2 and 7.6A.3. The interferer frequency offsets for adjacent channel selectivity, each in-band blocking case and narrow- band blocking shall be tested separately with a single in-gap interferer at a time.

For the additional requirements for operation with shared spectrum channel access, the receiver requirements apply under the assumption that all 20 MHz sub-bands and all RB’s of each sub-band within the downlink channel are allocated with intra-cell guard bands configured to zero.

## 7.1A General

*< end of changes >*