**3GPP TSG-RAN WG4 Meeting #100-e *R4-2112290***

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

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| *CR-Form-v12.1* | | | | | | | | |
| **CHANGE REQUEST** | | | | | | | | |
|  | | | | | | | | |
|  |  | **CR** |  | **rev** |  | **Current version:** |  |  |
|  | | | | | | | | |
| *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)*.* | | | | | | | | |
|  | | | | | | | | |

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| ***Proposed change affects:*** | UICC apps |  | ME |  | Radio Access Network | **X** | Core Network |  |

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | | | | | | | | | | |
| ***Title:*** |  | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Source to WG:*** | Ericsson | | | | | | | | | |
| ***Source to TSG:*** | R4 | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Work item code:*** | NR\_newRAT-Core | | | | |  | ***Date:*** | | |  |
|  |  | | | |  | |  | | |  |
| ***Category:*** |  |  | | | | | ***Release:*** | | | Rel-16 |
|  | *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-15 (Release 15) Rel-16 (Release 16) Rel-17 (Release 17) Rel-18 (Release 18)* | |
|  |  | | | | | | | | | |
| ***Reason for change:*** | | AT RAN4#99e, the band tables in the MSR specifications were corrected to properly describe the support of NR in different bands. It was also proposed to create a new more streamlined band table with fewer notes in Rel-17, but that discussion was postponed.  The present band table has one column with MSR/E-UTRA band number and separate columns for NR, UTRA and GSM/EDGE band numbers. Since there are no columns for E-UTRA and NB-IoT, it is not possible to express the support of those RATs through table entries and it is instead done with notes, but not consistently. Notes are also used for the other RATs however, which duplicates information in the table. The number of notes has also grown with new RAT combinations added and there are presently 13 notes. This may get even more complicated with new bands added and the band table should be updated to become less ambiguous and more future proof. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Summary of change:*** | | Revised band tables are introduced where the RAT support is described in separate columns for each RAT, which also reduces the number of table notes from 13 to 6.  UTRA support for Bands 15 and 16 has been removed, since the corresponding ETSI standard (TS 102 735) was made *historical* in 2017. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Consequences if not approved:*** | | The RAT support in different bands for MSR BS would remain ambiguous and difficult to update. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Clauses affected:*** | | 4.5 | | | | | | | | |
|  | |  | | | | | | | | |
|  | | **Y** | **N** |  | | | |  | | |
| ***Other specs*** | |  | **X** | Other core specifications | | | |  | | |
| ***affected:*** | | **X** |  | Test specifications | | | | 37.141 | | |
| ***(show related CRs)*** | |  | **X** | O&M Specifications | | | |  | | |
|  | |  | | | | | | | | |
| ***Other comments:*** | |  | | | | | | | | |
|  | |  | | | | | | | | |
| ***This CR's revision history:*** | |  | | | | | | | | |

## 4.5 Operating bands and Band Categories

MSR requirements are applicable for band definitions and band numbering as defined in the specifications TS 45.005 [5], TS25.104 [2], TS 25.105 [3], TS 36.104 [4] and TS 38.104 [17]. For the purpose of defining the BS requirements, the operating bands are divided into three band categories as follows:

- Band Category 1 (BC1): Bands for NR FDD, E-UTRA FDD and/or UTRA FDD operation. Bands in this category are also used for NB-IoT operation (all modes)

- Band Category 2 (BC2): Bands for NR FDD, E-UTRA FDD, UTRA FDD and/or GSM/EDGE operation. Bands in this category are also used for NB-IoT operation (all modes)

- Band Category 3 (BC3): Bands for NR TDD, E-UTRA TDD and/or UTRA TDD operation. Bands in this category are also used for NB-IoT operation (all modes)

NOTE: For UTRA TDD, requirements in the present document cover the 1.28 Mcps UTRA TDD option.

The paired and unpaired bands for the three Band Categories are shown in Table 4.5-1 and 4.5-2, together with the supported RATs and corresponding NR, E-UTRA, UTRA and GSM/EDGE band designations.

Table 4.5-1: Paired bands in NR, E-UTRA, UTRA and GSM/EDGE.

| MSR Band number | Supported RATs and Band Numbers | | | | | Uplink (UL)  BS receive,  UE transmit  (MHz) | Downlink (DL)  BS transmit,  UE receive  (MHz) | BC | Notes |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| NR | E-UTRA | NB-IoT | UTRA | GSM/EDGE |  |
| 1 | n1 | 1 | X | I | - | 1920 – 1980 | 2110 – 2170 | 1 |  |
| 2 | n2 | 2 | X | II | PCS  1900 | 1850 – 1910 | 1930 – 1990 | 2 |  |
| 3 | n3 | 3 | X | III | DCS  1800 | 1710 – 1785 | 1805 – 1880 | 2 |  |
| 4 | - | 4 | X | IV | - | 1710 – 1755 | 2110 – 2155 | 1 |  |
| 5 | n5 | 5 | X | V | GSM  850 | 824 – 849 | 869 – 894 | 2 |  |
| 6 | - | - | - | VI | - | 830 – 840 | 875 – 885 | 1 |  |
| 7 | n7 | 7 | X | VII | - | 2500 – 2570 | 2620 – 2690 | 1 |  |
| 8 | n8 | 8 | X | VIII | E-GSM | 880 – 915 | 925 – 960 | 1 |  |
| 9 | - | 9 | - | IX | - | 1749.9 – 1784.9 | 1844.9 – 1879.9 | 1 |  |
| 10 | - | 10 | - | X | - | 1710 – 1770 | 2110 – 2170 | 1 |  |
| 11 | n11 | 11 | X | XI | - | 1427.9 – 1447.9 | 1475.9 – 1495.9 | 1 |  |
| 12 | n12 | 12 | X | XII | - | 699 – 716 | 729 – 746 | 1 |  |
| 13 | - | 13 | X | XIII | - | 777 – 787 | 746 – 756 | 1 |  |
| 14 | n14 | 14 | X | XIV | - | 788 – 798 | 758 – 768 | 1 |  |
| 15 | - | - | - | - | - | Reserved | |  |  |
| 16 | - | - | - | - | - | Reserved | |  |  |
| 17 | - | 17 | X | - | - | 704 – 716 | 734 – 746 | 1 |  |
| 18 | n18 | 18 | X | - | - | 815 – 830 | 860 – 875 | 1 |  |
| 19 | - | 19 | X | XIX | - | 830 – 845 | 875 – 890 | 1 |  |
| 20 | n20 | 20 | X | XX | - | 832 – 862 | 791 – 821 | 1 |  |
| 21 | - | 21 | X | XXI | - | 1447.9 – 1462.9 | 1495.9 – 1510.9 | 1 |  |
| 22 | - | 22 | - | XXII | - | 3410 – 3490 | 3510 – 3590 | 1 |  |
| 23 | - | 23 | - | - | - | 2000 – 2020 | 2180 – 2200 | 1 | Note 4 |
| 24 | - | 24 | X | - | - | 1626.5 – 1660.5 | 1525 – 1559 | 1 | Note 6 |
| 25 | n25 | 25 | X | XXV | - | 1850 – 1915 | 1930 – 1995 | 1 |  |
| 26 | n26 | 26 | X | XXVI | - | 814 – 849 | 859 – 894 | 1 |  |
| 27 | - | 27 | - | - | - | 807 – 824 | 852 – 869 | 1 |  |
| 28 | n28 | 28 | X | - | - | 703 – 748 | 758 – 803 | 1 |  |
| 29 | n29 | 29 | - | - | - | N/A | 717 – 728 | 1 | Note 1 |
| 30 | n30 | 30 | - | - | - | 2305 – 2315 | 2350 – 2360 | 1 |  |
| 31 | - | 31 | X | - | - | 452.5 – 457.5 | 462.5 – 467.5 | 1 |  |
| 32 | - | 32 | - | XXXII | - | N/A | 1452 – 1496 | 1 | Note1, Note 2 |
| 64 | - | - | - | - | - | Reserved | |  |  |
| 65 | n65 | 65 | X | - | - | 1920 – 2010 | 2110 – 2200 | 1 |  |
| 66 | n66 | 66 | X | - | - | 1710 – 1780 | 2110 – 2200 | 1 | Note 7 |
| 67 | - | 67 | - | - | - | N/A | 738 – 758 | 1 | Note 1 |
| 68 | - | 68 | - | - | - | 698 – 728 | 753 – 783 | 1 |  |
| 69 | - | 69 | - | - | - | N/A | 2570 – 2620 | 1 | Note 1 |
| 70 | n70 | 70 | X | - | - | 1695 – 1710 | 1995 – 2020 | 1 | Note 5 |
| 71 | n71 | 71 | X | - | - | 663 – 698 | 617 – 652 | 1 |  |
| 72 | - | 72 | X | - | - | 451 – 456 | 461 – 466 | 1 |  |
| 73 | - | 73 | X | - | - | 450 – 455 | 460 – 465 | 1 |  |
| 74 | n74 | 74 | X | - | - | 1427 – 1470 | 1475 – 1518 | 1 |  |
| 75 | n75 | 75 | - | - | - | N/A | 1432 – 1517 | 1 | Note 1 |
| 76 | n76 | 76 | - | - | - | N/A | 1427 – 1432 | 1 | Note 1 |
| 85 | - | 85 | X | - | - | 698 – 716 | 728 – 746 | 1 |  |
| 87 | - | 87 | X | - | - | 410 – 415 | 420 – 425 | 1 |  |
| 88 | - | 88 | X | - | - | 412 – 417 | 422 – 427 | 1 |  |
| NOTE 1: For NR and/or E-UTRA, the band is restricted to operation when carrier aggregation is configured. The downlink operating band is paired with the uplink operating band (external) of the carrier aggregation configuration that is supporting the configured Pcell.  NOTE 2: For UTRA, the band is restricted to operation when dual band is configured (e.g., DB-DC-HSDPA or dual band 4C-HSDPA). The down link frequenc(ies) of this band are paired with the uplink frequenc(ies) of the other FDD band (external) of the dual band configuration.  NOTE 3: In E-UTRA operation, the range 2180-2200 MHz of the DL operating band is restricted to operation when carrier aggregation is configured.  NOTE 4: Band 23 is not applicable.  NOTE 5: In E-UTRA operation, the range 2010-2020 MHz of the DL operating band is restricted to operation when carrier aggregation is configured, and TX-RX separation is 300 MHz. In E-UTRA operation, the range 2005-2020 MHz of the DL operating band is restricted to operation when carrier aggregation is configured, and TX-RX separation is 295 MHz.  NOTE 6: DL operation is restricted to 1526-1536 MHz frequency range. UL operation is restricted to 1627.5 – 1637.5 MHz and 1646.5 – 1656.5 MHz per FCC Order DA 20-48. | | | | | | | | | |



UTRA FDD can operate with DB-DC-HSDPA for the band configurations listed in subclause 5.2 c) of TS 25.104 [2].

NOTE: For BS capable of multi-band operation, the supported operating bands may belong to different Band Categories.



Table 4.5-2: Unpaired bands in NR, E-UTRA and UTRA.

| MSR Band number | Supported RATs and Band Numbers | | | | Uplink (UL)  BS receive,  UE transmit  (MHz) | Downlink (DL)  BS transmit,  UE receive  (MHz) | BC | Notes |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| NR | E-UTRA | NB-IoT | UTRA |  |
| 33 | - | 33 | - | a) | 1900 – 1920 | 1900 – 1920 | 3 |  |
| 34 | n34 | 34 | - | a) | 2010 – 2025 | 2010 – 2025 | 3 |  |
| 35 | - | 35 | - | b) | 1850 – 1910 | 1850 – 1910 | 3 |  |
| 36 | - | 36 | - | b) | 1930 – 1990 | 1930 – 1990 | 3 |  |
| 37 | - | 37 | - | c) | 1910 – 1930 | 1910 – 1930 | 3 |  |
| 38 | n38 | 38 | - | d) | 2570 – 2620 | 2570 – 2620 | 3 |  |
| 39 | n39 | 39 | - | f) | 1880 – 1920 | 1880 – 1920 | 3 |  |
| 40 | n40 | 40 | - | e) | 2300 – 2400 | 2300 – 2400 | 3 |  |
| 41 | n41 | 41 | X | - | 2496 – 2690 | 2496 – 2690 | 3 | Note 1 |
| 42 | - | 42 | X | - | 3400 – 3600 | 3400 – 3600 | 3 |  |
| 43 | - | 43 | X | - | 3600 – 3800 | 3600 – 3800 | 3 |  |
| 44 | - | 44 | - | - | 703 – 803 | 703 – 803 | 3 |  |
| 45 | - | 45 | - | - | 1447 – 1467 | 1447 – 1467 | 3 |  |
| 48 | n48 | 48 | - | - | 3550 – 3700 | 3550 – 3700 | 3 |  |
| 50 | n50 | 50 | - | - | 1432 – 1517 | 1432 – 1517 | 3 |  |
| 51 | n51 | 51 | - | - | 1427 – 1432 | 1427 – 1432 | 3 |  |
| 52 | - | 52 | - | - | 3300 – 3400 | 3300 – 3400 | 3 |  |
| 53 | n53 | 53 | - | - | 2483.5 – 2495 | 2483.5 – 2495 | 3 |  |
| 77 | n77 | - | - | - | 3300 – 4200 | 3300 – 4200 | 3 |  |
| 78 | n78 | - | - | - | 3300 – 3800 | 3300 – 3800 | 3 |  |
| NOTE 1: Band 41 supports NB-IoT in certain regions. | | | | | | | | |

E-UTRA is designed to operate for the carrier aggregation bands defined in TS 36.101 [18]. The E-UTRA channel bandwidth BWChannel for a single carrier and the Aggregated Channel Bandwidth BWChannel\_CA for E-UTRA carrier aggregation are specified in Clause 5.6 of TS 36.104 [4].

The NB-IoT channel bandwidth BWChannel is specified in Clause 5.6 of TS 36.104 [4].

The NR BS channel bandwidth and PRB utilization is specified in Clause 5.3 of TS 38.104 [17].