**3GPP TSG-RAN WG4 Meeting #104-e *R4-221xxxx***

**Electronic Meeting, 15 - 26 August, 2022**

|  |
| --- |
| *CR-Form-v12.2* |
| **CHANGE REQUEST** |
|  |
|  | **38.101-3** | **CR** | **CRNum** | **rev** | **-** | **Current version:** | **15.18.0** |  |
|  |
| *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)*.* |
|  |

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

|  |
| --- |
|  |
| ***Title:***  | Big CR for 38.101-3 maintenance (Rel-15) |
|  |  |
| ***Source to WG:*** | MCC, Huawei |
| ***Source to TSG:*** | R4 |
|  |  |
| ***Work item code:*** | NR\_newRAT-Core |  | ***Date:*** | 2022-08-30 |
|  |  |  |  |  |
| ***Category:*** | **F** |  | ***Release:*** | Rel-15 |
|  | *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-16 (Release 16)Rel-17 (Release 17)Rel-18 (Release 18)Rel-19 (Release 19)* |
|  |  |
| ***Reason for change:*** | This big CRs merge the mutiple endorsed draft CRs. The reason for change in each endorsed draft CR is copied below.R4-2212364 Draft CR for TS 38.101-3 Rel-15: Corrections on band combinations for UE co-existence Apple Rel-15 38.101-3 15.18.0 NR\_newRAT-Core F<Reason for change>This CR aims to introduce missing harmonic exceptions and correct certain errors in the UE coexistence tables. Furthermore, duplicate band entries are removed.The UE coexistence lists specify relaxed emission requirements in case a harmonic falls into a protected band. The relaxation is defined in Note 2 of the UE coexistence table.Cases exist where a harmonic can fall very close to a protected band so that the 1MHz extension of the exception interval (as defined in Note 2) overlaps with the protected band. Those cases are currently handled inconsistently as Note 2 is not always specified. For example, Note 2 is provided for the case where the second harmonic of n7 affects the protected band n79 or in case of second harmonic of n85 affecting the protected band 50. On the other side it is missing for second harmonic of band n2 affecting the protected band 48. To remove inconsistencies the Note 2 needs to be introduced for single bands and CA/DC combinations if harmonic relaxation is missing. A full list of changes is provided in ‘Summary of change’.R4-2214882 Addition of missing Additional Spurious Emissions Clause Rohde & Schwarz Rel-15 38.101-3 15.18.0 NR\_newRAT-Core F<Reason for change>There are several missing clauses on Additional Spurious Emissions for EN-DC. Currently requirements are only defined for NS\_04, but for no other EN-DC configuration, e.g. inter-band, incl. FR2, etc. This leads to problems in test coverage in RAN5, since no TCs can be defined for additional spurious emission under EN-DC, although this needs to be tested.R4-2215027 Draft CR for 38.101-3 to improve the wording for simultaneousRxTx clarification(R15) Huawei, HiSilicon Rel-15 38.101-3 15.18.0 NR\_newRAT-Core F<Reason for change>For the simultaneousRxTx clarification for CA and DC in clause 5.2A.1 and 5.5B.1, there are two kinds of band combinations, i.e. lower order and higher order band combinations. But it’s very hard to distinguish them in these clarification. That’s why the wording for simultaneousRxTx clarification need to be improved.R4-2215112 Draft CR to 38101-3-fi0 for n41 relevant MSD test frequencies MediaTek Inc. Rel-15 38.101-3 15.18.0 NR\_newRAT-Core F<Reason for change>To correct n41 MSD test frequencies to follow the channel raster rule |
|  |  |
| ***Summary of change:*** | The summary of change in each endorsed draft CR is copied below.R4-2212364 Draft CR for TS 38.101-3 Rel-15: Corrections on band combinations for UE co-existence Apple Rel-15 38.101-3 15.18.0 NR\_newRAT-Core F<Summary of change>The following modifications are made for :1. DC\_2\_n5, DC\_2\_n71: Second harmonic of band 2 overlaps with band 48 with its overall exception interval. Added Note 2 for harmonic exception.
2. DC\_12\_n5: Second harmonic of band 12 overlaps with band 50 with its overall exception interval. Added Note 2 for harmonic exception.
3. DC\_25\_n41: Second harmonic of band 25 overlaps with band 48 with its overall exception interval. Added Note 2 for harmonic exception.

R4-2214882 Addition of missing Additional Spurious Emissions Clause Rohde & Schwarz Rel-15 38.101-3 15.18.0 NR\_newRAT-Core F<Summary of change>Add clauses for additional spurious emissions for EN-DCR4-2215027 Draft CR for 38.101-3 to improve the wording for simultaneousRxTx clarification(R15) Huawei, HiSilicon Rel-15 38.101-3 15.18.0 NR\_newRAT-Core F<Summary of change>The wording for simultaneousRxTx clarification is improved to distinguish lower and higher order band combinations.R4-2215112 Draft CR to 38101-3-fi0 for n41 relevant MSD test frequencies MediaTek Inc. Rel-15 38.101-3 15.18.0 NR\_newRAT-Core F<Summary of change>To add general note in 7.3B.1: “For reference sensitivity exception test points where the specified carrier frequency does not correspond to a valid NR-ARFCN, the closest NR-ARFCN as specified in clause 5.4.2 applies” |
|  |  |
| ***Consequences if not approved:*** | The consequences if not approved for each endorsed draft CR are coppied below.R4-2212364 Draft CR for TS 38.101-3 Rel-15: Corrections on band combinations for UE co-existence Apple Rel-15 38.101-3 15.18.0 NR\_newRAT-Core F<Consequences if not approved>UE coexistence requirements stay missing or wrong.R4-2214882 Addition of missing Additional Spurious Emissions Clause Rohde & Schwarz Rel-15 38.101-3 15.18.0 NR\_newRAT-Core F<Consequences if not approved>Requirements remain missing.R4-2215027 Draft CR for 38.101-3 to improve the wording for simultaneousRxTx clarification(R15) Huawei, HiSilicon Rel-15 38.101-3 15.18.0 NR\_newRAT-Core F<Consequences if not approved>There are some ambiguities in simultaneousRxTx clarification.R4-2215112 Draft CR to 38101-3-fi0 for n41 relevant MSD test frequencies MediaTek Inc. Rel-15 38.101-3 15.18.0 NR\_newRAT-Core F<Consequences if not approved>n41 test frequencies error may make UE unable to connect to test equipments |
|  |  |
| ***Clauses affected:*** | 5.2A.1, 5.5B.1, 6.5B.3.3.2, 6.5B.4.1.1, 6.5B.4.2, 6.5B.4.3, 6.5B.4.4, 6.5B.4.4a, 6.5B.4.5, 6.5B.4.6, 7.3B.1 |
|  |  |
|  | **Y** | **N** |  |  |
| ***Other specs*** |  | **X** |  Other core specifications  | TS/TR ... CR ...  |
| ***affected:*** | **X** |  |  Test specifications | TS 38.521-3 |
| ***(show related CRs)*** |  | **X** |  O&M Specifications | TS/TR ... CR ...  |
|  |  |
| ***Other comments:*** |  |
|  |  |
| ***This CR's revision history:*** |  |

## **<<Start of Change>>**

### 5.2A.1 Inter-band CA between FR1 and FR2

NR carrier aggregation are designed to operate in the operating bands defined in Table 5.2A.1‑1. The band combinations include at least one FR1 operating band and one FR2 operating band.

If the mandatory simultaneous Rx/Tx capability applies for a lower order band combination, when the applicable lower order band combination is a band pair in a higher order band combination, the mandatory simultaneous Rx/Tx capability also applies for the band pairin the higher order band combination.

Table 5.2A.1-1: Band combinations for inter-band NR CA between FR1 and FR2

|  |  |
| --- | --- |
| NR CA Band | NR Band |
| CA\_n8-n2581 | n8, n258 |
| CA\_n71-n2571 | n71, n257 |
| CA\_n77-n2571 | n77, n257 |
| CA\_n78-n2571 | n78, n257 |
| CA\_n79-n2571 | n79, n257 |
| NOTE 1: Applicable for UE supporting inter-band carrier aggregation with mandatory simultaneous Rx/Tx capability. |

## **<<Next of Change>>**

### 5.5B.1 General

The operating bands and bandwidth classes are specified for operation with EN-DC, NGEN-DC, NE-DC or NR-DC configured. The EN-DC, NGEN-DC or NE-DC band combinations include at least one E-UTRA operating band.

For EN-DC or NE-DC configurations indicated by column "Single Uplink allowed" (e.g., problematic band combinations as defined in TS 38.306 [11]) in tables in this clause the UE may indicate capability of not supporting simultaneous dual and triple uplink operation due to possible intermodulation interference to its own primary downlink channel bandwidth of PCell or PSCell if the intermodulation order is 2 or if the intermodulation order is 3 for the combinations when both operating bands are between 450 MHz – 960 MHz or between 1427 MHz – 2690 MHz.

In the case for EN-DC or NE-DC configurations listed in tables in this clause for which the intermodulation products caused by the dual and triple uplink operation fall into the receive band but do not interfere with its own primary downlink channel bandwidth of PCell or PSCell as defined in Annex I the UE is mandated to operate in dual and triple uplink mode. Single Uplink is also allowed for certain band combinations where intermodulation or reverse intermodulation products could create difficulty for meeting emission requirements.

For EN-DC combinations of order 3 or higher, "Single Uplink allowed" UL configurations captured in Table 5.5B.2-1, Table 5.5B.3-1, and Table 5.5B.4-1 apply.

If multiple UL DC configurations are listed for multiple DL DC configurations, valid uplink configurations are such that uplink does not have more carriers than downlink.

Non‑contiguous resource allocation and almost contiguous allocation are not applicable for E‑UTRA or NR carrier part of intra‑band EN‑DC configuration.

If the mandatory simultaneous Rx/Tx capability applies for a lower order DC configuration, when the applicable lower order DC configuration is a band pair in a higher order DC configuration, the mandatory simultaneous Rx/Tx capability also applies for the band pair in the higher order DC configuration.

## **<<Next of Change>>**

##### 6.5B.3.3.2 Spurious emission band UE co-existence

This clause specifies the requirements for the specified EN-DC, for coexistence with protected bands. The requirements in Table 6.5B.3.3.2-1 apply on each component carrier with all component carriers are active.

NOTE: For inter-band EN-DC with uplink assigned to one LTE band and one NR band the requirements in Table 6.5B.3.3.2-1 could be verified by measuring spurious emissions at the specific frequencies where second and third order intermodulation products generated by the two transmitted carriers can occur.

Table 6.5B.3.3.2-1: Requirements

| EN-DC Configuration | Spurious emission  |
| --- | --- |
| Protected band | Frequency range (MHz) | Maximum Level (dBm) | MBW (MHz) | NOTE |
| DC\_1\_n28 | E-UTRA Band 5, 7, 8, 18, 19, 20, 26, 27, 31, 38, 40, 41, 72, 73NR band n79 | FDL\_low  | -  | FDL\_high | -50 | 1 |  |
| E-UTRA Band 1, 22, 32, 42, 43, 50, 51, 52, 65, 74, 75, 76NR band n77, n78 | FDL\_low | - | FDL\_high | -50 | 1 | 2 |
| E-UTRA band 3, 34 | FDL\_low  | -  | FDL\_high | -50 | 1 | 5 |
| E-UTRA Band 11, 21 | FDL\_low | - | FDL\_high | -50 | 1 | 9, 11 |
| E-UTRA Band 1, 65 | FDL\_low | - | FDL\_high | -50 | 1 | 9, 10 |
| Frequency range | 470 | - | 694 | -42 | 8 | 5, 17 |
| Frequency range | 470 | - | 710 | -26.2 | 6 | 14 |
| Frequency range | 758 | - | 773 | -32 | 1 | 5 |
| Frequency range | 773 | - | 803 | -50 | 1 |  |
| Frequency range | 662 | - | 694 | -26.2 | 6 | 5 |
| Frequency range | 1880 | - | 1895 | -40 | 1 | 5,16 |
| Frequency range | 1895 | - | 1915 | -15.5 | 5 | 5, 7, 16 |
| Frequency range | 1915 | - | 1920 | +1.6 | 5 | 5, 7, 16 |
| DC\_1\_n40 | Band 1, 5, 7, 8, 11, 18, 19, 20, 21, 22, 26, 27, 28, 31, 32, 38, 41, 42, 43, 44, 45, 50, 51, 52, 65, 67, 68, 69, 72, 73, 74, 75, 76NR band n78 | FDL\_low  | - | FDL\_high | -50 | 1 |  |
| Band 3, 34 | FDL\_low  | - | FDL\_high | -50 | 1 | 5 |
| NR band n77, n79 | FDL\_low  | - | FDL\_high | -50 | 1 | 2 |
| Frequency range | 1880 |  | 1895 | -40 | 1 | 5, 16 |
| Frequency range | 1895 |  | 1915 | -15.5 | 5 | 5, 7, 16 |
| Frequency range | 1915 |  | 1920 | +1.6 | 5 | 5, 7, 16 |
| Frequency range | 1884.5  | -  | 1915.7  | -41 | 0.3 | 3 |
| DC\_1\_n51 | E-UTRA Band 7, 12, 13, 17, 20, 22, 27, 28, 29, 31, 38, 44, 48, 67, 68, 69, 72, 73 | FDL\_low | - | FDL\_high | -50 | 1 |  |
| E-UTRA Band 3, 34 | FDL\_low | - | FDL\_high | -50 | 1 | 5, 2 |
| Frequency range | 1880 | - | 1895 | -40 | 1 | 5, 16 |
| Frequency range | 1895 | - | 1915 | -15.5 | 5 | 5, 7, 16 |
| Frequency range | 1915 | - | 1920 | +1.6 | 5 | 5, 7, 16 |
| E-UTRA Band 5, 6, 8, 26, 30, 40, 41, 42, 43, 46NR Band n77, n78, n79,  | FDL\_low | - | FDL\_high | -50 | 1 | 2 |
| DC\_1\_n77 | E-UTRA Band 1, 3, 5, 7, 8, 11, 18, 19, 20, 21, 26, 28, 34, 40, 41, 65, 74 | FDL\_low | - | FDL\_high | -50 | 1 |  |
| Frequency range | 1880 | - | 1895 | -40 | 1 | 5, 8 |
| Frequency range | 1895 | - | 1915 | -15.5 | 5 | 5, 7, 8 |
| Frequency range | 1915 | - | 1920 | +1.6 | 5 | 5, 7, 8 |
| DC\_1\_n78DC\_1\_n84\_ULSUP-TDM\_n78 | E-UTRA Band 1, 3, 5, 7, 8, 11, 18, 19, 20, 21, 26, 28, 34, 40, 41, 65, 74 | FDL\_low | - | FDL\_high | -50 | 1 |  |
| Frequency range | 1880 | - | 1895 | -40 | 1 | 5, 8 |
| Frequency range | 1895 | - | 1915 | -15.5 | 5 | 5, 7, 8 |
| Frequency range | 1915 | - | 1920 | +1.6 | 5 | 5, 7, 8 |
| DC\_1\_n79 | E-UTRA Band 1, 3, 5, 7, 8, 11, 18, 19, 21, 26, 28, 34, 40, 41, 42, 65, 74 | FDL\_low | - | FDL\_high | -50 | 1 |  |
| Frequency range | 1880 | - | 1895 | -40 | 1 | 5, 8 |
| Frequency range | 1895 | - | 1915 | -15.5 | 5 | 5, 7, 8 |
| Frequency range | 1915 | - | 1920 | +1.6 | 5 | 5, 7, 8 |
| DC\_2\_n5 | E-UTRA Band 4, 5, 12, 13, 14, 17, 24, 26, 28, 29, 30, 42, 50, 51, 66, 70, 71, 74, 85 | FDL\_low | - | FDL\_high | -50 | 1 |  |
| E-UTRA Band 2, 25 | FDL\_low | - | FDL\_high | -50 | 1 | 2 |
| E-UTRA Band 41, 43, 48, 53 | FDL\_low  | - | FDL\_high | -50 | 1 | 2 |
| DC\_2\_n66 | E-UTRA Band 4, 5, 12, 13, 14, 17, 24, 26, 27, 28, 29, 30, 41, 50, 51, 66, 70, 71, 74, 85 | FDL\_low | - | FDL\_high | -50 | 1 |  |
| E-UTRA Band 2, 25 | FDL\_low  | - | FDL\_high | -50 | 1 | 5 |
| E-UTRA Band 42, 48 | FDL\_low | - | FDL\_high | -50 | 1 | 2 |
| DC\_2\_n71 | E-UTRA Band 4, 5, 12, 13, 14, 17, 24, 26, 29, 30, 66 | FDL\_low | - | FDL\_high | -50 | 1 |  |
| E-UTRA Band 2, 25, 41, 48, 70 | FDL\_low | - | FDL\_high | -50 | 1 | 2 |
| E-UTRA Band 71 | FDL\_low | - | FDL\_high | -50 | 1 | 5 |
| DC\_2\_n78 | E-UTRA Band 4, 5, 12, 13, 14, 17, 24, 26, 27, 28, 29, 30, 41, 50, 51, 66, 70, 71, 74, 85 | FDL\_low  | - | FDL\_high | -50 | 1 |  |
| E-UTRA Band 2, 25 | FDL\_low  | - | FDL\_high | -50 | 1 | 2 |
| DC\_3\_n7 | E-UTRA Band 1, 5, 7, 8, 20, 26, 27, 28, 31, 32, 33, 34, 40, 43, 44, 50, 51, 65, 67, 72, 74, 75, 76 | FDL\_low | - | FDL\_high | -50 | 1 |  |
| E-UTRA band 3 | FDL\_low | - | FDL\_high | -50 | 1 | 5 |
| E-UTRA band 22, 42 | FDL\_low | - | FDL\_high | -50 | 1 | 2 |
| Frequency range | 2570  | -  | 2575 | +1.6 | 5 | 5, 6, 7 |
| Frequency range | 2575 | - | 2595 | -15.5 | 5 | 5, 6, 7 |
| Frequency range | 2595 | - | 2620 | -40 | 1 | 5, 6 |
| DC\_3\_n28 | E-UTRA Band 1, 42, 43, 50, 51, 65, 74, 75, 76NR band n77, n78, n79 | FDL\_low | - | FDL\_high | -50 | 1 | 2 |
| E-UTRA band 1 | FDL\_low | - | FDL\_high | -50 | 1 | 9, 11 |
| E-UTRA band 3 | FDL\_low | - | FDL\_high | -50 | 1 | 5 |
| E-UTRA Band 5, 7, 8, 18, 19, 20, 26, 27, 31, 34, 38, 40, 41, 72 | FDL\_low | - | FDL\_high | -50 | 1 |  |
| E-UTRA Band 11, 21 | FDL\_low  | - | FDL\_high | -50 | 1 | 9, 10 |
| Frequency range | 1884.5 | - | 1915.7 | -41 | 0.3 | 13 |
| Frequency range | 470 | - | 710 | -26.2 | 6 | 14 |
| Frequency range | 758 | - | 773 | -32 | 1 | 5 |
| Frequency range | 773 | - | 803 | -50 | 1 |  |
| Frequency range | 1884.5 | - | 1915.7 | -41 | 0.3 | 3, 9 |
| DC\_3\_n40 | E-UTRA Band 1, 5, 7, 8, 11, 18, 19, 20, 21, 26, 27, 28, 31, 32, 33, 34, 38, 39, 41, 43, 44. 45, 50, 51, 65, 67, 68, 69, 72, 73, 74, 75, 76 | FDL\_low | - | FDL\_high | -50 | 1 |  |
| E-UTRA Band 3 | FDL\_low | - | FDL\_high | -50 | 1 | 5 |
| E-UTRA Band 22, 42, 52NR band n77, n78, n79 | FDL\_low | - | FDL\_high | -50 | 1 | 2 |
| Frequency range | 1884.5  | -  | 1915.7  | -41 | 0.3 | 3 |
| DC\_3\_n51 | E-UTRA Band 7, 8, 12, 13, 17, 20, 27, 28, 31, 33, 38, 67, 68, 69, 72, 73 | FDL\_low  | - | FDL\_high | -50 | 1 |  |
| E-UTRA Band 3 | FDL\_low | - | FDL\_high | -50 | 1 | 5 |
| E-UTRA Band 1, 5, 6, 22, 26, 30, 34, 36, 40, 41, 42, 43, 44, 46, 48, 65, 71 | FDL\_low | - | FDL\_high | -50 | 1 | 2 |
| DC\_3\_n77 | E-UTRA Band 1, 3, 5, 7, 8, 11, 18, 19, 20, 21, 26, 28, 34, 39, 40, 41, 65, 74 | FDL\_low | - | FDL\_high | -50 | 1 |  |
| Frequency range | 1884.5  | -  | 1915.7  | -41 | 0.3 | 3 |
| DC\_3\_n78DC\_3\_n80\_ULSUP-TDM\_n78, | E-UTRA Band 1, 3, 5, 7, 8, 11, 18, 19, 20, 21, 26, 28, 34, 39, 40, 41, 65, 74 | FDL\_low | - | FDL\_high | -50 | 1 |  |
| Frequency range | 1884.5  | -  | 1915.7  | -41 | 0.3 | 3 |
| DC\_3\_n79 DC\_3\_n80\_ULSUP-TDM\_n79, | E-UTRA Band 1, 3, 5, 8, 11, 18, 19, 21, 28, 34, 39, 40, 41, 65, 74 | FDL\_low | - | FDL\_high | -50 | 1 |  |
| E-UTRA Band 42 | FDL\_low | - | FDL\_high | -50 | 1 | 2 |
| Frequency range | 1884.5  | -  | 1915.7  | -41 | 0.3 | 3 |
| DC\_3\_n82 | E-UTRA Band 1, 3 7, 8, 20 31, 32, 33, 34, 40, 43, 50, 51, 65, 67, 68, 72,74, 75, 76 | FDL\_low | - | FDL\_high | -50 | 1 |  |
| E-UTRA Band 22, 38, 42, 69 | FDL\_low | - | FDL\_high | -50 | 1 | 2 |
| DC\_5\_n40 | E-UTRA Band 1, 3, 5, 7, 8, 11, 18, 19, 21, 28, 31, 34, 38, 42, 43, 45, 65, 73, 74 | FDL\_low | - | FDL\_high | -50 | 1 |  |
| E-UTRA Band 26 | 859 | - | 869 | -27 | 1 |  |
| E-UTRA Band 41, 52NR band n77, n78, n79 | FDL\_low | - | FDL\_high | -50 | 1 | 2 |
| Frequency range | 1884.5  | -  | 1915.7  | -41 | 0.3 | 3 |
| DC\_5\_n66 | E-UTRA Band 1, 2, 3, 4, 5, 6, 7, 8, 12, 13, 14, 17, 24, 25, 28, 29, 30, 34, 38, 40, 43, 45, 50, 51, 65, 66, 70, 71, 85 | FDL\_low | - | FDL\_high | -50 | 1 |  |
| E-UTRA Band 26 | 859 | - | 869 | -27 | 1 |  |
| E-UTRA Band 41, 42, 48, 52 | FDL\_low | - | FDL\_high | -50 | 1 | 2 |
| DC\_5\_n78 | E-UTRA Band 1, 2, 3, 4, 5, 7, 8, 12, 13, 14, 17, 24, 25, 28, 29, 30, 31, 34, 38, 40, 45, 65, 66, 70 | FDL\_low | - | FDL\_high | -50 | 1 |  |
| E-UTRA Band 26 | 859 | - | 869 | -27 | 1 |  |
| E-UTRA Band 41 | FDL\_low | - | FDL\_high | -50 | 1 | 7, 2 |
| DC\_7\_n28 | E-UTRA Band 2, 3, 5, 7, 8, 20, 26, 27, 31, 34, 40, 72 | FDL\_low | - | FDL\_high | -50 | 1 |  |
| E-UTRA Band 1, 4, 42, 43, 50, 51, 65, 66, 74, 75, 76NR band n78 | FDL\_low | - | FDL\_high | -50 | 1 | 2 |
| E-UTRA band 1 | FDL\_low | - | FDL\_high | -50 | 1 | 9, 10 |
| Frequency range | 758 | - | 773 | -32 | 1 | 5 |
| Frequency range | 773 | - | 803 | -50 | 1 |  |
| Frequency range | 2570  | -  | 2575 | +1.6 | 5 | 5, 6, 7 |
| Frequency range | 2575 | - | 2595 | -15.5 | 5 | 5, 6, 7 |
| Frequency range | 2595 | - | 2620 | -40 | 1 | 5, 6 |
| DC\_7\_n51 | E-UTRA Band 2, 3, 5, 8, 26, 30, 31, 32, 33, 34, 40, 48, 72 | FDL\_low | - | FDL\_high | -50 | 1 |  |
| Frequency range | 2570  | - | 2575 | +1.6 | 5 | 5, 7, 16 |
| Frequency range | 2575 | - | 2595 | -15.5 | 5 | 5, 7, 16 |
| Frequency range | 2595 | - | 2620 | -40 | 1 | 5 |
| E-UTRA Band 1, 4, 12, 13, 14, 17, 20, 22, 23, 27, 28, 29, 42, 43, 44, 46, 65, 66, 67, 68NR Band n77, n78, n79, | FDL\_low | - | FDL\_high | -50 | 1 | 2 |
| DC\_7\_n78 | E-UTRA Band 1, 2, 3, 4, 5, 7, 8, 11, 18, 19, 20, 21, 26, 27, 28, 31, 32, 33, 34, 40, 50, 51, 65, 66, 67, 68, 72, 74, 75, 76 | FDL\_low | - | FDL\_high | -50 | 1 |  |
| Frequency range | 2570  | - | 2575 | +1.6 | 5 | 5, 6, 7 |
| Frequency range | 2575 | - | 2595 | -15.5 | 5 | 5, 6, 7 |
| Frequency range | 2595 | - | 2620 | -40 | 1 | 5, 6 |
| DC\_8\_n40 | E-UTRA Band 1, 5, 11, 18, 19, 20, 21, 26, 28, 31, 32, 33, 34, 38, 39,, 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, 52NR band n77, n78, n79 | FDL\_low  | - | FDL\_high | -50 | 1 | 2 |
| E-UTRA Band 8 | FDL\_low  | - | FDL\_high | -50 | 1 | 5 |
| Frequency range | 1884.5  | -  | 1915.7  | -41 | 0.3 | 3 |
| DC\_8\_n77 | E-UTRA Band 1, 20, 28, 31, 32, 33, 34, 38, 39, 40, 44, 45, 50, 51, 65, 67, 68, 69, 72, 73, 74, 75, 76 | FDL\_low | - | FDL\_high | -50 | 1 |  |
| E-UTRA band 3, 7, 41 | FDL\_low | - | FDL\_high | -50 | 1 | 2 |
| E-UTRA Band 8 | FDL\_low | - | FDL\_high | -50 | 1 | 5 |
| E-UTRA Band 11, 21 | FDL\_low | - | FDL\_high | -50 | 1 | 12 |
| Frequency range | 860 | - | 890 | -40 | 1 | 5, 12 |
| Frequency range | 1884.5 | - | 1915.7 | -41 | 0.3 | 3, 12 |
| DC\_8\_n78DC\_8\_n81\_ULSUP-TDM\_n78, | E-UTRA Band 1, 20, 28, 34, 39, 40, 65, 74 | FDL\_low | - | FDL\_high | -50 | 1 |  |
| E-UTRA Band 3, 7, 41 | FDL\_low | - | FDL\_high | -50 | 1 | 2 |
| E-UTRA Band 8 | FDL\_low | - | FDL\_high | -50 | 1 | 5 |
| E-UTRA Band 11, 21 | FDL\_low | - | FDL\_high | -50 | 1 | 12 |
| Frequency range | 860 | - | 890 | -40 | 1 | 5, 12 |
| Frequency range | 1884.5 | - | 1915.7 | -41 | 0.3 | 3, 12 |
| DC\_8\_n79DC\_8\_n81\_ULSUP-TDM\_n79, | E-UTRA Band 1, 8, 28, 34, 39, 40, 65, 74 | FDL\_low | - | FDL\_high | -50 | 1 |  |
| E-UTRA Band 3,41,42  | FDL\_low | - | FDL\_high | -50 | 1 | 2 |
| E-UTRA Band 11, 21 | FDL\_low | - | FDL\_high | -50 | 1 | 12 |
| Frequency range | 860 | - | 890 | -40 | 1 | 5, 12 |
| Frequency range | 1884.5 | - | 1915.7 | -41 | 0.3 | 3 |
| DC\_11\_n77 | E-UTRA Band 1, 3, 18, 19, 28, 34, 40, 65 | FDL\_low | - | FDL\_high | -50 | 1 |  |
| Frequency range | 945 | - | 960 | -50 | 1 |  |
| Frequency range | 1884.5  | -  | 1915.7  | -41 | 0.3 | 3 |
| Frequency range | 2545 | - | 2575 | -50 | 1 |  |
| Frequency range | 2595 | - | 2645 | -50 | 1 |  |
| DC\_11\_n78 | E-UTRA Band 1, 3, 18, 19, 28, 34, 40, 65 | FDL\_low | - | FDL\_high | -50 | 1 |  |
| Frequency range | 945 | - | 960 | -50 | 1 |  |
| Frequency range | 1884.5  | -  | 1915.7  | -41 | 0.3 | 3 |
| Frequency range | 2545 | - | 2575 | -50 | 1 |  |
| Frequency range | 2595 | - | 2645 | -50 | 1 |  |
| DC\_11\_n79 | E-UTRA Band 1, 3, 18, 19, 28, 34, 40, 42, 65 | FDL\_low | - | FDL\_high | -50 | 1 |  |
| Frequency range | 945 | - | 960 | -50 | 1 |  |
| Frequency range | 1884.5  | -  | 1915.7  | -41 | 0.3 | 3 |
| Frequency range | 2545 | - | 2575 | -50 | 1 |  |
| Frequency range | 2595 | - | 2645 | -50 | 1 |  |
| DC\_12\_n5 | E-UTRA Band 2, 5, 13, 14, 17, 24, 25, 26, 30, 43, 71, 74 | FDL\_low | - | FDL\_high | -50 | 1 |  |
| E-UTRA Bands 4, 41, 42, 48, 50, 51, 66, 70 | FDL\_low | - | FDL\_high | -50 | 1 | 2 |
| E-UTRA Band 12, 85 | FDL\_low | - | FDL\_high | -50 | 1 |  |
| DC\_12\_n66 | E-UTRA Band 2, 5, 13, 14, 17, 25, 26, 27, 30, 41, 53, 71, 74 | FDL\_low | - | FDL\_high | -50 | 1 |  |
| E-UTRA Band 4, 48, 50, 51, 66, 70 | FDL\_low | - | FDL\_high | -50 | 1 | 2 |
| E-UTRA Band 12, 85 | FDL\_low | - | FDL\_high | -50 | 1 | 5 |
| DC\_18\_n77 | E-UTRA Band 1, 3, 11, 21, 28, 34, 40, 65, 74 | FDL\_low | - | FDL\_high | -50 | 1 |  |
| Frequency range | 945 | - | 960 | -50 | 1 |  |
| Frequency range | 1884.5  | -  | 1915.7  | -41 | 0.3 | 3 |
| Frequency range | 2545 | - | 2575 | -50 | 1 |  |
| Frequency range | 2595 | - | 2645 | -50 | 1 |  |
| DC\_18\_n78 | E-UTRA Band 1, 3, 11, 21, 28, 34, 40, 65, 74 | FDL\_low | - | FDL\_high | -50 | 1 |  |
| Frequency range | 945 | - | 960 | -50 | 1 |  |
| Frequency range | 1884.5  | -  | 1915.7  | -41 | 0.3 | 3 |
| Frequency range | 2545 | - | 2575 | -50 | 1 |  |
| Frequency range | 2595 | - | 2645 | -50 | 1 |  |
| DC\_18\_n79 | E-UTRA Band 1, 3, 11, 21, 28, 34, 40, 42, 65, 74 | FDL\_low | - | FDL\_high | -50 | 1 |  |
| Frequency range | 945 | - | 960 | -50 | 1 |  |
| Frequency range | 1884.5  | -  | 1915.7  | -41 | 0.3 | 3 |
| Frequency range | 2545 | - | 2575 | -50 | 1 |  |
| Frequency range | 2595 | - | 2645 | -50 | 1 |  |
| DC\_19\_n77 | E-UTRA Band 1, 3, 11, 21, 28, 34, 40, 65, 74 | FDL\_low | - | FDL\_high | -50 | 1 |  |
| Frequency range | 945 | - | 960 | -50 | 1 |  |
| Frequency range | 1884.5  | -  | 1915.7  | -41 | 0.3 | 3 |
| Frequency range | 2545 | - | 2575 | -50 | 1 |  |
| Frequency range | 2595 | - | 2645 | -50 | 1 |  |
| DC\_19\_n78 | E-UTRA Band 1, 3, 11, 21, 28, 34, 40, 65, 74 | FDL\_low | - | FDL\_high | -50 | 1 |  |
| Frequency range | 945 | - | 960 | -50 | 1 |  |
| Frequency range | 1884.5  | -  | 1915.7  | -41 | 0.3 | 3 |
| Frequency range | 2545 | - | 2575 | -50 | 1 |  |
| Frequency range | 2595 | - | 2645 | -50 | 1 |  |
| DC\_19\_n79 | E-UTRA Band 1, 3, 11, 21, 28, 34, 40, 42, 65, 74 | FDL\_low | - | FDL\_high | -50 | 1 |  |
| Frequency range | 945 | - | 960 | -50 | 1 |  |
| Frequency range | 1884.5  | -  | 1915.7  | -41 | 0.3 | 3 |
| Frequency range | 2545 | - | 2575 | -50 | 1 |  |
| Frequency range | 2595 | - | 2645 | -50 | 1 |  |
| DC\_20\_n8 | E-UTRA Band 1, 28, 31, 32, 34, 65, 75, 76 | FDL\_low | - | FDL\_high | -50 | 1 |  |
| E-UTRA Band 3, 7, 22, 38, 42, 43NR Band n78  | FDL\_low | - | FDL\_high | -50 | 1 | 2 |
| DC\_20\_n28DC\_20\_n83 | E-UTRA Band 3, 7, 8, 31, 34 | FDL\_low | - | FDL\_high | -50 | 1 |  |
| E-UTRA Band 1, 22, 32, 38, 42, 43, 65, 75, 76,NR Band n78 | FDL\_low | - | FDL\_high | -50 | 1 | 2 |
| DC\_20\_n51 | E-UTRA Band 1, 3, 4, 8, 17, 22, 28, 29, 31, 40, 43, 48, 65, 66, 68, 72 | FDL\_low | - | FDL\_high | -50 | 1 |  |
| E-UTRA Band 20 | FDL\_low | - | FDL\_high | -50 | 1 | 5 |
| Frequency range | 758 | - | 788 | -50 | 1 |  |
| E-UTRA Band 2, 7, 25, 32, 33, 34, 35, 36, 37, 38, 39, 41, 42, 46, 69, 70NR Band n77, n78, n79,  | FDL\_low | - | FDL\_high | -50 | 1 | 2 |
| DC\_20\_n77 | E-UTRA Band 1, 3, 7, 8, 31, 32, 33, 34, 40, 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 | 5 |
| E-UTRA Band 38, 69 | FDL\_low  | - | FDL\_high | -50 | 1 | 2 |
| DC\_20\_n78,DC\_20\_n82\_ULSUP-TDM\_n78, | E-UTRA Band 1, 3, 7, 8, 31, 32, 33, 34, 40, 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 | 5 |
| E-UTRA Band 38, 69 | FDL\_low  | - | FDL\_high | -50 | 1 | 2 |
| DC\_21\_n77 | E-UTRA Band 1, 3, 18, 19, 21, 28, 34, 40, 65 | FDL\_low | - | FDL\_high | -50 | 1 |  |
| Frequency range | 945 | - | 960 | -50 | 1 |  |
| Frequency range | 1884.5  | -  | 1915.7  | -41 | 0.3 | 3 |
| Frequency range | 2545 | - | 2575 | -50 | 1 |  |
| Frequency range | 2595 | - | 2645 | -50 | 1 |  |
| DC\_21\_n78 | E-UTRA Band 1, 3, 18, 19, 21, 28, 34, 40, 65 | FDL\_low | - | FDL\_high | -50 | 1 |  |
| Frequency range | 945 | - | 960 | -50 | 1 |  |
| Frequency range | 1884.5  | -  | 1915.7  | -41 | 0.3 | 3 |
| Frequency range | 2545 | - | 2575 | -50 | 1 |  |
| Frequency range | 2595 | - | 2645 | -50 | 1 |  |
| DC\_21\_n79 | E-UTRA Band 1, 3, 18, 19, 21, 28, 34, 40, 42, 65 | FDL\_low | - | FDL\_high | -50 | 1 |  |
| Frequency range | 945 | - | 960 | -50 | 1 |  |
| Frequency range | 1884.5  | -  | 1915.7  | -41 | 0.3 | 3 |
| Frequency range | 2545 | - | 2575 | -50 | 1 |  |
| Frequency range | 2595 | - | 2645 | -50 | 1 |  |
| DC\_25\_n41 | E-UTRA Band 4, 5, 12, 13 , 14, 17, 24, 26, 27, 28, 29, 30, 42, 45, 66, 70, 71 | FDL\_low | - | FDL\_high | -50 | 1 |  |
| E-UTRA 48 | FDL\_low | - | FDL\_high | -50 | 1 | 2 |
| E-UTRA/NR Band 2, 25 | FDL\_low | - | FDL\_high | -50 | 1 | 5 |
| DC\_26\_n41 | E-UTRA Band 1, 2, 3, 4, 5, 11, 12, 13 , 14, 17, 18, 19, 21, 24, 25, 26, 29, 30, 31, 34, 39, 42, 43, 48, 50, 51, 65, 66, 70, 71, 74 | FDL\_low | - | FDL\_high | -50 | 1 |  |
| Frequency range | 1884.5 |  | 1915.7 | -41 | 0.3 | 3 |
| Frequency range | 703 | - | 799 | -50 | 1 |  |
| Frequency range | 799 | - | 803 | -40 | 1 | 5 |
| Frequency range | 945 | - | 960 | -50 | 1 |  |
| DC\_26\_n77 | E-UTRA Band 1, 3, 5, 11, 18, 19, 21, 26, 34, 39, 40, 65, 74 | FDL\_low | - | FDL\_high | -50 | 1 |  |
| E-UTRA Band 41 | FDL\_low | - | FDL\_high | -50 | 1 | 2 |
| Frequency range | 703 | - | 799 | -50 | 1 |  |
| Frequency range | 799 | - | 803 | -40 | 1 | 5 |
| Frequency range | 945 | - | 960 | -50 | 1 |  |
| Frequency range | 1884.5  | -  | 1915.7  | -41 | 0.3 | 3 |
| Frequency range | 2545 | - | 2575 | -50 | 1 | 2 |
| Frequency range | 2595 | - | 2645 | -50 | 1 |  |
| DC\_26\_n78 | E-UTRA Band 1, 3, 5, 11, 18, 19, 21, 26, 34, 39, 40, 65, 74 | FDL\_low | - | FDL\_high | -50 | 1 |  |
| E-UTRA Band 41 | FDL\_low | - | FDL\_high | -50 | 1 | 2 |
| Frequency range | 703 | - | 799 | -50 | 1 |  |
| Frequency range | 799 | - | 803 | -40 | 1 | 5 |
| Frequency range | 945 | - | 960 | -50 | 1 |  |
| Frequency range | 1884.5  | -  | 1915.7  | -41 | 0.3 | 3 |
| Frequency range | 2545 | - | 2575 | -50 | 1 | 2 |
| Frequency range | 2595 | - | 2645 | -50 | 1 |  |
| DC\_26\_n79 | E-UTRA Band 1, 3, 5, 11, 18, 19, 21, 26, 34, 39, 40, 42, 65, 74 | FDL\_low | - | FDL\_high | -50 | 1 |  |
| E-UTRA Band 41 | FDL\_low | - | FDL\_high | -50 | 1 | 2 |
| Frequency range | 703 | - | 799 | -50 | 1 |  |
| Frequency range | 799 | - | 803 | -40 | 1 | 5 |
| Frequency range | 945 | - | 960 | -50 | 1 |  |
| Frequency range | 1884.5  | -  | 1915.7  | -41 | 0.3 | 3 |
| Frequency range | 2545 | - | 2575 | -50 | 1 | 2 |
| Frequency range | 2595 | - | 2645 | -50 | 1 |  |
| DC\_28\_n51 | E-UTRA Band 2, 3, 5, 7, 8, 25, 26, 31, 34, 38, 40, 41, 72 | FDL\_low  | - | FDL\_high | -50 | 1 |  |
| E-UTRA Band 4, 20, 22, 24, 32, 42, 43, 45, 46, 65, 66, 71, 73NR band n78, n79 | FDL\_low | - | FDL\_high | -50 | 1 | 2 |
| E-UTRA Band 1 | FDL\_low | - | FDL\_high | -50 | 1 | 2, 9, 10 |
| Frequency range | 470 | - | 694 | -42 | 8 | 5, 17 |
| Frequency range | 470 | - | 710 | -26.2 | 6 | 14 |
| Frequency range | 662 | - | 694 | -26.2 | 6 | 5 |
| Frequency range | 758 | - | 773 | -32 | 1 | 5 |
| Frequency range | 773 | - | 803 | -50 | 1 |  |
| DC\_28\_n77 | E-UTRA Band 3, 5, 7, 8, 18, 19, 20, 26, 34, 39, 40, 41 | FDL\_low | - | FDL\_high | -50 | 1 |  |
| E-UTRA Band 1, 65, 74 | FDL\_low | - | FDL\_high | -50 | 1 | 2 |
| E-UTRA Band 1 | FDL\_low | - | FDL\_high | -50 | 1 | 9, 11 |
| E-UTRA Band 11, 21 | FDL\_low | - | FDL\_high | -50 | 1 | 9, 10 |
| Frequency range | 758 | - | 773 | -32 | 1 |  |
| Frequency range | 773 | - | 803 | -50 | 1 |  |
| Frequency range | 1884.5  | -  | 1915.7  | -41 | 0.3 | 3, 9 |
| DC\_28\_n78DC\_28\_n83\_ULSUP-TDM\_n78, | E-UTRA Band 3, 5, 7, 8, 18, 19, 20, 26, 34, 39, 40, 41 | FDL\_low | - | FDL\_high | -50 | 1 |  |
| E-UTRA Band 1, 65, 74 | FDL\_low | - | FDL\_high | -50 | 1 | 2 |
| E-UTRA Band 1 | FDL\_low | - | FDL\_high | -50 | 1 | 9, 11 |
| E-UTRA Band 11, 21 | FDL\_low | - | FDL\_high | -50 | 1 | 9, 10 |
| Frequency range | 758 | - | 773 | -32 | 1 |  |
| Frequency range | 773 | - | 803 | -50 | 1 |  |
| Frequency range | 1884.5  | -  | 1915.7  | -41 | 0.3 | 3, 9 |
| DC\_28\_n79 | E-UTRA Band 3, 5, 8, 18, 19, 34, 39, 40, 41 | FDL\_low | - | FDL\_high | -50 | 1 |  |
| E-UTRA Band 1, 42, 65, 74 | FDL\_low | - | FDL\_high | -50 | 1 | 2 |
| E-UTRA Band 1 | FDL\_low | - | FDL\_high | -50 | 1 | 9, 11 |
| E-UTRA Band 11, 21 | FDL\_low | - | FDL\_high | -50 | 1 | 9, 10 |
| Frequency range | 758 | - | 773 | -32 | 1 |  |
| Frequency range | 773 | - | 803 | -50 | 1 |  |
| Frequency range | 1884.5  | -  | 1915.7  | -41 | 0.3 | 3, 9 |
| DC\_30\_n5 | E-UTRA Band 2, 4, 5, 7, 12, 13, 14, 17, 24, 25, 26, 29, 30, 38, 48, 66, 70, 71, 85 | FDL\_low | - | FDL\_high | -50 | 1 |  |
| E-UTRA Band 41, 53, | FDL\_low | - | FDL\_high | -50 | 1 | 2 |
| DC\_30\_n66 | E-UTRA Band 2, 4, 5, 12, 13, 14, 17, 24, 25, 26, 27, 29, 30, 38, 41, 66, 70, 71 | FDL\_low | - | FDL\_high | -50 | 1 |  |
| E-UTRA Band 48 | FDL\_low | - | FDL\_high | -50 | 1 | 2 |
| DC\_38\_n78 | N/A |
| DC\_39\_n78 | E-UTRA Band 1, 8, 28, 34, 40, 41, 44, 45 | FDL\_low | - | FDL\_high | -50 | 1 |  |
| Frequency range | 1805 | - | 1855 | -40 | 1 | 18 |
| Frequency range | 1855 | - | 1880 | -15.5 | 5 | 18 |
| DC\_39\_n79 | E-UTRA Band 1, 8, 28, 34, 40, 41, 44, 45  | FDL\_low | - | FDL\_high | -50 | 1 |  |
| Frequency range | 1805 | - | 1855 | -40 | 1 | 18 |
| Frequency range | 1855 | - | 1880 | -15.5 | 5 | 18 |
| DC\_40\_n77 | N/A |
| DC\_41\_n77 | E-UTRA Band 1, 3, 5, 8, 11, 18, 19, 21, 26, 28, 33, 34, 39, 40, 44, 45, 73, 74 | FDL\_low | - | FDL\_high | -50 | 1 |  |
| Frequency range | 1884.5 |  | 1915.7 | -41 | 0.3 | 3 |
| DC\_41\_n78 | E-UTRA Band 1, 3, 5, 8, 11, 18, 19, 21, 26, 28, 34, 39, 40, 44, 45, 74 | FDL\_low | - | FDL\_high | -50 | 1 |  |
| Frequency range | 1884.5 | - | 1915.7 | -41 | 0.3 | 3 |
| DC\_41\_n79 | E-UTRA Band 1, 3, 5, 8, 11, 18, 19, 21, 26, 28, 34, 40, 42, 44, 45, 65, 74 | FDL\_low | - | FDL\_high | -50 | 1 |  |
| Frequency range | 1884.5 | - | 1915.7 | -41 | 0.3 | 3 |
| DC\_42\_n51 | E-UTRA Band 3, 8, 20, 25, 30, 31, 34, 39, 41, 73 | FDL\_low  | - | FDL\_high | -50 | 1 |  |
| E-UTRA Band 1, 2, 4, 5, 6, 7, 12, 13, 14, 17, 23, 24, 26, 27, 28, 29, 32, 38, 40, 44, 46, 65, 66, 67, 68, 70, 71 | FDL\_low  | - | FDL\_high | -50 | 1 | 2 |
| DC\_42\_n77 | N/A |
| DC\_42\_n78 | N/A |
| DC\_42\_n79 | N/A |
| DC\_66\_n5 | E-UTRA Band 1, 2, 3, 4, 5, 6, 7, 8, 12, 13, 14, 17, 24, 25, 26, 28, 29, 30, 34, 38, 40, 43, 45, 50, 51, 65, 66, 70, 71, 85 | FDL\_low | - | FDL\_high | -50 | 1 |  |
| E-UTRA Band 41, 42, 48, 52 | FDL\_low | - | FDL\_high | -50 | 1 | 2 |
| DC\_66\_n71 | E-UTRA Band 4, 5, 13, 14, 17, 24, 26, 27, 29, 30, 43,50, 51, 66, 74 | FDL\_low | - | FDL\_high | -50 | 1 |  |
| E-UTRA Band 2, 7, 22, 25, 41, 42, 48, 70 | FDL\_low | - | FDL\_high | -50 | 1 | 2 |
| E-UTRA Band 71 | FDL\_low | - | FDL\_high | -50 | 1 | 5 |
| DC\_66\_n78,DC\_66\_n86\_ULSUP-TDM\_n78, | E-UTRA Band 1, 3, 5, 7, 8, 20, 26, 28, 34, 39, 40, 41, 65 | FDL\_low | - | FDL\_high | -50 | 1 |  |
| NOTE 1: FDL\_low and FDL\_high refer to each frequency band specified in Table 5.5-1 in 3GPP TS 36.101 [4] or in Table 5.2-1 in 3GPP TS 38.101-1 [2].NOTE 2: As exceptions, measurements with a level up to the applicable requirements defined in Table 6.6.3.1-2 in 3GPP TS 36.101 [4] and Table 6.5.3.1-2 in 3GPP TS 38.101-1 [2] are permitted for each assigned 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 180 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: Applicable when co-existence with PHS system operating in 1884.5 - 1915.7 MHzNOTE 4: VoidNOTE 5: These requirements also apply for the frequency ranges that are less than FOOB (MHz) in Table 6.6.3.1-1, Table 6.6.3.1A-1 in 3GPP TS 36.101 [4] or in Table 6.5.3.1-1 in 3GPP TS 38.101-1 [2] from the edge of the channel bandwidth.NOTE 6: 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 7: For these adjacent bands, the emission limit could imply risk of harmful interference to UE(s) operating in the protected operating band.NOTE 8: This requirement is applicable for any channel bandwidths within the range 1920 - 1980 MHz with the following restriction: for carriers of 15 MHz bandwidth when carrier centre frequency is within the range 1927.5 - 1929.5 MHz and for carriers of 20 MHz bandwidth when carrier centre frequency is within the range 1930 - 1938 MHz the requirement is applicable only for an uplinkNOTE 9: Applicable when the assigned E-UTRA or NR carrier is confined within 718 MHz and 748 MHz and when the channel bandwidth used is 5 or 10 MHz.NOTE 10: As exceptions, measurements with a level up to the applicable requirement of -38 dBm/MHz is permitted for each assigned E-UTRA 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 5.6-1) for which the 2nd harmonic totally or partially overlaps the measurement bandwidth (MBW).NOTE 11: As exceptions, measurements with a level up to the applicable requirement of -36 dBm/MHz is permitted for each assigned E-UTRA 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 5.6-1) for which the 3rd harmonic totally or partially overlaps the measurement bandwidth (MBW).NOTE 12: This requirement is applicable only for the following cases: A: for carriers of 5 MHz channel bandwidth when carrier centre frequency (Fc) is within the range 902.5 MHz ≤ Fc < 907.5 MHz with an uplink transmission bandwidth less than or equal to 20 RB; B: for carriers of 5 MHz channel bandwidth when carrier centre frequency (Fc) is within the range 907.5 MHz ≤ Fc ≤ 912.5 MHz without any restriction on uplink transmission bandwidth; C: for carriers of 10 MHz channel bandwidth when carrier centre frequency (Fc) is Fc = 910 MHz with an uplink transmission bandwidth less than or equal to 32 RB with RBstart > 3.NOTE 13: VoidNOTE 14: This requirement is applicable for 5 and 10 MHz E-UTRA or NR channel bandwidth allocated within 718-728MHz. 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 15: VoidNOTE 16: This requirement is applicable for any channel bandwidths within the range 1920 - 1980 MHz with the following restriction: for carriers of 15 MHz bandwidth when carrier centre frequency is within the range 1927.5 - 1929.5 MHz and for carriers of 20 MHz bandwidth when 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 17: This requirement is applicable in the case of a 10 MHz E-UTRA or NR carrier confined within 703 MHz and 733 MHz, otherwise the requirement of -25 dBm with a measurement bandwidth of 8 MHz applies.NOTE 18: This requirement is only applicable for E-UTRA carriers with bandwidth 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 E-UTRA carriers of 15 MHz bandwidth when carrier center frequency is within the range 1892.5 - 1894.5 MHz and for E-UTRA carriers of 20 MHz bandwidth when carrier center frequency is within the range 1895 - 1903 MHz.NOTE 19: Void |

NOTE: To simplify the above Table, 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.

## **<<Next of Change>>**

### 6.5B.4 Additional spurious emissions

#### 6.5B.4.1 General

These requirements are specified in terms of an additional spectrum emission requirement. Additional spurious 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.

NOTE: For measurement conditions at the edge of each frequency range, the lowest frequency of the measurement position in each frequency range should be set at the lowest boundary of the frequency range plus MBW/2. The highest frequency of the measurement position in each frequency range should be set at the highest boundary of the frequency range minus MBW/2. MBW denotes the measurement bandwidth defined for the protected band.

##### 6.5B.4.1.1 Void

|  |  |  |
| --- | --- | --- |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |

#### 6.5B.4.2 Intra-band contiguous EN-DC

##### 6.5B.4.2.1 Minimum requirement (network signalled value "NS\_04")

When "NS 04" is indicated in the cell, the power of any UE emission shall not exceed the levels specified in Table 6.5B.4.1.1-1. This requirement also applies for the frequency ranges that are less than FOOB (MHz) in Table 6.6.3.1-1 from the edge of the channel bandwidth.

Table 6.5B.4.1.1-1: Additional requirements

|  |  |  |
| --- | --- | --- |
| Frequency band(MHz) | Channel bandwidth / Spectrum emission limit (dBm) | Measurement bandwidth  |
| 2495 ≤ f < 2496 | -13 | 1 % of Channel BW for contiguous BW up to 100 MHz,1 MHz for contiguous BW > 100 MHz |
| 2490.5 ≤ f < 2495 | -13 | 1 MHz |
| 0 < f < 2490.5 | -25 | 1 MHz |

#### 6.5B.4.3 Intra-band non-contiguous EN-DC

##### 6.5B.4.3.1 Minimum requirement (network signalled value "NS\_04")

When "NS 04" is indicated in the cell, the power of any UE emission shall not exceed the levels specified in Table 6.5B.4.1.1-1. This requirement also applies for the frequency ranges that are less than FOOB (MHz) in Table 6.6.3.1-1 from the edge of the channel bandwidth.

Table 6.5B.4.1.1-1: Additional requirements

|  |  |  |
| --- | --- | --- |
| Frequency band(MHz) | Channel bandwidth / Spectrum emission limit (dBm) | Measurement bandwidth  |
| 2495 ≤ f < 2496 | -13 | 1 % of Channel BW for contiguous BW up to 100 MHz,1 MHz for contiguous BW > 100 MHz |
| 2490.5 ≤ f < 2495 | -13 | 1 MHz |
| 0 < f < 2490.5 | -25 | 1 MHz |

#### 6.5B.4.4 Inter-band EN-DC within FR1

The additional spurious emissions requirements specified for E-UTRA in clause 6.6.3.3 and 6.6.3.3A of TS 36.101 [4] and for NR single carrier, CA operation and UL-MIMO specified in clause 6.5.3.3, 6.5A.3.3 and 6.5D.3 of TS 38.101-1 [2] apply for each component carrier.

#### 6.5B.4.4a Inter-band NE-DC within FR1

The additional spurious emissions requirements specified for E-UTRA in clause 6.6.3.3 and 6.6.3.3A of TS 36.101 [4] and for NR single carrier, CA operation and UL-MIMO specified in clause 6.5.3.3, 6.5A.3.3 and 6.5D.3 of TS 38.101-1 [2] apply for each component carrier.

#### 6.5B.4.5 Inter-band EN-DC including FR2

The additional spurious emissions requirements specified for E-UTRA in clause 6.6.3.3 and 6.6.3.3A of TS 36.101 [4] and for NR single carrier, CA operation and UL-MIMO specified in clause 6.5.3.3, 6.5A.3.3 and 6.5D.3 of TS 38.101-2 [3] apply for each component carrier.

#### 6.5B.4.6 Inter-band EN-DC including both FR1 and FR2

The additional spurious emissions requirements specified for E-UTRA in clause 6.6.3.3 and 6.6.3.3A of TS 36.101 [4] and for NR single carrier, CA operation and UL-MIMO specified in clause 6.5.3.3, 6.5A.3.3 and 6.5D.3 of TS 38.101-1 [2] and in clause 6.5.3.3, 6.5A.3.3 and 6.5D.3 of TS 38.101-2 [3] apply for each component carrier.

## **<<Next of Change>>**

## 7.3B Reference sensitivity level for DC

### 7.3B.1 General

For EN-DC, E-UTRA and NR single carrier, CA, and MIMO operation of REFSENS requirements defined in TS 38.101-1 [2], TS 38.101-2 [3] and TS 36.101 [4] apply to all downlink bands of EN-DC configurations listed in clause 5.5B, unless sensitivity degradation exception is allowed in this clause of this specification, clause 7.3 in TS 38.101-1 [2], clause 7.3 in TS 38.101-2 [3] or clause 7.3 in TS 36.101 [4]. Allowed exceptions specified in this clause also apply to any higher order EN-DC configuration combination containing one of the band combinations that exception is allowed for. Reference sensitivity exeptions are specified by applying maximum sensitivity degradation (MSD) into applicaple REFSENS requirement. EN-DC REFSENS requirements shall be met for NR uplink transmissions using QPSK DFT-s-OFDM waveforms as defined in clause 7.3.2 [2]. Unless otherwise specified UL allocation uses the lowest SCS allowable for a given channel BW. Limits on configured maximum output power for the uplink according to clause 6.2B.4 shall apply.

In case of interband EN-DC the receiver REFSENS requirements in this clause do not apply for 1.4 and 3 MHz E-UTRA carriers. For the case of inter-band EN-DC with a single carrier per cell group and multi‑carrier per cell group, in addition to the E-UTRA and NR single carrier, CA, and MIMO operation of REFSENS requirements defined in TS 38.101-1 [2], TS 38.101-2 [3], and TS 36.101 [4], the REFSENS requirements specified therein also apply with both downlink carriers and both uplink carriers active unless sensitivity exceptions are allowed in this clause of this specification, clause 7.3 in TS 38.101-1 [2] or clause 7.3 in TS 36.101 [4].

For reference sensitivity exception test points where the specified carrier frequency does not correspond to a valid NR-ARFCN, the closest NR-ARFCN as specified in clause 5.4.2 applies.

NOTE: For inter-band EN-DC, the reference sensitivity requirement with both uplink carriers active is allowed to be verified for only a single inter-band EN-DC configuration per NR band.

## **<<End of Change>>**