**3GPP TSG-RAN4 WG4 Meeting#112 *Rev R4-2412621***

**Maastricht, Netherlands, 19th – 23rd May 2024**

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| *CR-Form-v12.3* | | | | | | | | |
| **CHANGE REQUEST** | | | | | | | | |
|  | | | | | | | | |
|  | **38.101-3** | **CR** | **1293** | **rev** | 1 | **Current version:** | **18.6.0** |  |
|  | | | | | | | | |
| *For* [***HE******LP***](http://www.3gpp.org/3G_Specs/CRs.htm#_blank)*on using this form: comprehensive instructions can be found at* [*http://www.3gpp.org/Change-Requests*](http://www.3gpp.org/Change-Requests)*.* | | | | | | | | |
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| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| ***Proposed change affects:*** | UICC apps |  | ME | **X** | Radio Access Network |  | Core Network |  |

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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | | | | | | | | | | |
| ***Title:*** | CR for EN-DC Harmonic Mixing clean-up PC3 | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Source to WG:*** | Qualcomm France | | | | | | | | | |
| ***Source to TSG:*** | RAN4 | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Work item code:*** | DC\_R18\_1BLTE\_1BNR\_2DL2UL-Core | | | | |  | ***Date:*** | | | 2024-08-06 |
|  |  | | | |  | |  | | |  |
| ***Category:*** | F |  | | | | | ***Release:*** | | | Rel-18 |
|  | *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-17 (Release 17) Rel-18 (Release 18) Rel-19 (Release 19)  Rel-20 (Release 20)* | |
|  |  | | | | | | | | | |
| ***Reason for change:*** | | R4-2405453 was agreed in RAN4#110bis, which proposed a set of principles to clean-up RX mixing specification | | | | | | | | |
|  | |  | | | | | | | | |
| ***Summary of change:*** | | PC3 Harmonic mixing MSD tables are modified according to principles agreed in R4-2405453 and in R4-2410651. Additionally, RBstart for each combination is now described in Note | | | | | | | | |
|  | |  | | | | | | | | |
| ***Consequences if not approved:*** | | Harmonic mixing tables remain erroneous and inconsistent | | | | | | | | |
|  | |  | | | | | | | | |
| ***Clauses affected:*** | | 7.3B.2.3.2 | | | | | | | | |
|  | |  | | | | | | | | |
|  | | **Y** | **N** |  | | | |  | | |
| ***Other specs*** | |  | **X** | Other core specifications | | | | TS/TR ... CR ... | | |
| ***affected:*** | | **X** |  | Test specifications | | | | TS38.521-1 | | |
| ***(show related CRs)*** | |  | **X** | O&M Specifications | | | | TS/TR ... CR ... | | |
|  | |  | | | | | | | | |
| ***Other comments:*** | | Changes to UL harmonic and Rx harmonic MSD tables are applicable only from Rel-18 and onward to subsequent Releases | | | | | | | | |
|  | |  | | | | | | | | |
| ***This CR's revision history:*** | |  | | | | | | | | |

**---Start of changes---**

**Table 7.3B.2.3.2-1: Reference sensitivity exceptions (MSD) due to receiver harmonic mixing for EN-DC in NR FR1**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **UL band** | **DL band** | **UL BW** | **SCS of UL band** | **UL RB Allocation** | **DL BW** | **MSD** | **UL/DL fc condition** | **UL/DL harmonic order** |
| **(MHz)** | **(kHz)** | **LCRB** | **(MHz)** | **(dB)** |
| 1 | n71 | 5 | 15 | 25 | 5 | 26.8 | NOTE 4 | UL1/DL3 |
| 1 | n71 | 5 | 15 | 25 | 20 | 15.6 | NOTE 4 | UL1/DL3 |
| 1 | n105 | 5 | 15 | 25 | 5 | 26.8 | NOTE 4 | UL1/DL3 |
| 1 | n105 | 5 | 15 | 25 | 20 | 16.5 | NOTE 4 | UL1/DL3 |
| 2 | n71 | 5 | 15 | 25 | 5 | 26.8 | NOTE 4 | UL1/DL3 |
| 2 | n71 | 5 | 15 | 25 | 20 | 15.6 | NOTE 4 | UL1/DL3 |
| n2 | 71 | 5 | 15 | 25 | 5 | 26.8 | NOTE 4 | UL1/DL3 |
| n2 | 71 | 5 | 15 | 25 | 20 | 17.1 | NOTE 4 | UL1/DL3 |
| 7 | n2612 | 5 | 15 | 25 | 5 | [2.0] | NOTE 4 | UL1/DL3 |
| 7 | n105 | 5 | 15 | 25 | 5 | 5.7 | NOTE 14 | UL1/DL4 |
| 7 | n105 | 5 | 15 | 25 | 20 | 1 | NOTE 14 | UL1/DL4 |
| n25 | 71 | 5 | 15 | 25 | 5 | 26.8 | NOTE 4 | UL1/DL3 |
| n25 | 71 | 5 | 15 | 25 | 20 | 17.1 | NOTE 4 | UL1/DL3 |
| n38 | 59 | NA | NA | NA | NA | NA | NOTE 4 | UL1/DL3 |
| n40 | 20 | 10 | 15 | 25 | 5 | 27.8 | NOTE 4 | UL1/DL3 |
| n40 | 20 | 10 | 15 | 25 | 20 | 20.8 | NOTE 4 | UL1/DL3 |
| n40 | 28 | 10 | 15 | 25 | 5 | 37.8 | NOTE 4 | UL1/DL3 |
| n40 | 28 | 10 | 15 | 25 | 20 | 30.3 | NOTE 4 | UL1/DL3 |
| n41 | 5 | 10 | 15 | 25 | 5 | 24.3 | NOTE 4 | UL1/DL3 |
| n41 | 5 | 10 | 15 | 25 | 10 | 21.3 | NOTE 4 | UL1/DL3 |
| n41 | 18 | 10 | 15 | 25 | 5 | 26.3 | NOTE 4 | UL1/DL3 |
| n41 | 18 | 10 | 15 | 25 | 15 | 21.5 | NOTE 4 | UL1/DL3 |
| n41 | 26 | 10 | 15 | 25 | 5 | 23.8 | NOTE 4 | UL1/DL3 |
| n41 | 26 | 10 | 15 | 25 | 15 | 19 | NOTE 4 | UL1/DL3 |
| n46 | 2 | 20 | 15 | 25 | 5 | 28 | NOTE 4 | UL1/DL3 |
| n46 | 48 | 20 | 15 | 12 | 5 | 26.8 | NOTE 2 | UL2/DL3 |
| n46 | 48 | 20 | 15 | 12 | 20 | 20.8 | NOTE 2 | UL2/DL3 |
| 48 | n12 | 5 | 15 | 25 | 5 | 31 | NOTE 2 | UL1/DL5 |
| 48 | n12 | 5 | 15 | 25 | 10 | 27.8 | NOTE 2 | UL1/DL5 |
| n77 | 2 | 10 | 15 | 25 | 5 | 6.7 | NOTE 13 | UL1/DL2 |
| n77 | 2 | 10 | 15 | 25 | 20 | 2.9 | NOTE 13 | UL1/DL2 |
| n77 | 3 | 10 | 15 | 25 | 5 | 5.7 | NOTE 13 | UL1/DL2 |
| n77 | 3 | 10 | 15 | 25 | 20 | 2.3 | NOTE 13 | UL1/DL2 |
| n77 | 5 | 10 | 15 | 25 | 5 | 5.7 | NOTE 14 | UL1/DL4 |
| n77 | 7 | 10 | 15 | 12 | 5 | 13.4 | NOTE 8 | UL2/DL3 |
| n77 | 7 | 10 | 15 | 12 | 20 | 7.9 | NOTE 8 | UL2/DL3 |
| n77 | 12 | 10 | 15 | 25 | 5 | 31 | NOTE 2 | UL1/DL5 |
| n77 | 12 | 10 | 15 | 25 | 10 | 28 | NOTE 2 | UL1/DL5 |
| n77 | 13 | 10 | 15 | 25 | 5 | 31 | NOTE 2 | UL1/DL5 |
| n77 | 13 | 10 | 15 | 25 | 10 | 28 | NOTE 2 | UL1/DL5 |
| n77 | 14 | 10 | 15 | 25 | 5 | 31 | NOTE 2 | UL1/DL5 |
| n77 | 14 | 10 | 15 | 25 | 10 | 28 | NOTE 2 | UL1/DL5 |
| n77 | 19 | 10 | 15 | 25 | 5 | 7.3 | NOTE 14 | UL1/DL4 |
| n77 | 19 | 10 | 15 | 25 | 15 | 3.9 | NOTE 14 | UL1/DL4 |
| n77 | 25 | 10 | 15 | 25 | 5 | 5.6 | NOTE 13 | UL1/DL2 |
| n77 | 25 | 10 | 15 | 25 | 20 | 2.2 | NOTE 13 | UL1/DL2 |
| n77 | 28 | 10 | 15 | 25 | 5 | 31 | NOTE 2 | UL1/DL5 |
| n77 | 28 | 10 | 15 | 25 | 20 | 23.5 | NOTE 2 | UL1/DL5 |
| n77 | 29 | 10 | 15 | 25 | 5 | 31 | NOTE 2 | UL1/DL5 |
| n77 | 29 | 10 | 15 | 25 | 10 | 28 | NOTE 2 | UL1/DL5 |
| n77 | 41 | 10 | 15 | 12 | 5 | 14.7 | NOTE 8 | UL2/DL3 |
| n77 | 41 | 10 | 15 | 12 | 20 | 9.1 | NOTE 8 | UL2/DL3 |
| n78 | 2 | 10 | 15 | 25 | 5 | 6.7 | NOTE 13 | UL1/DL2 |
| n78 | 2 | 10 | 15 | 25 | 20 | 2.9 | NOTE 13 | UL1/DL2 |
| n78 | 3 | 10 | 15 | 25 | 5 | 5.7 | NOTE 13 | UL1/DL2 |
| n78 | 3 | 10 | 15 | 25 | 20 | 2.3 | NOTE 13 | UL1/DL2 |
| n78 | 8 | 10 | 15 | 25 | 5 | 5.7 | NOTE 14 | UL1/DL4 |
| n78 | 8 | 10 | 15 | 25 | 20 | 3.8 | NOTE 14 | UL1/DL4 |
| n78 | 12 | 10 | 15 | 25 | 5 | 31 | NOTE 2 | UL1/DL5 |
| n78 | 12 | 10 | 15 | 25 | 10 | 28 | NOTE 2 | UL1/DL5 |
| n78 | 13 | 10 | 15 | 25 | 5 | 31 | NOTE 2 | UL1/DL5 |
| n78 | 13 | 10 | 15 | 25 | 10 | 28 | NOTE 2 | UL1/DL5 |
| n78 | 19 | 10 | 15 | 25 | 5 | 7.3 | NOTE 14 | UL1/DL4 |
| n78 | 19 | 10 | 15 | 25 | 15 | 3.9 | NOTE 14 | UL1/DL4 |
| n78 | 40 | 10 | 15 | 12 | 5 | 14.7 | NOTE 8 | UL2/DL3 |
| n78 | 40 | 10 | 15 | 12 | 20 | 9.1 | NOTE 8 | UL2/DL3 |
| n78 | 41 | 10 | 15 | 12 | 5 | 14.7 | NOTE 8 | UL2/DL3 |
| n78 | 41 | 10 | 15 | 12 | 20 | 9.1 | NOTE 8 | UL2/DL3 |
| n79 | 5 | 10 | 15 | 25 | 5 | 27.5 | NOTE 2 | UL1/DL5 |
| n79 | 8 | 10 | 15 | 25 | 5 | 25 | NOTE 2 | UL1/DL5 |
| n79 | 8 | 10 | 15 | 25 | 10 | 22 | NOTE 2 | UL1/DL5 |
| n79 | 11 | 10 | 15 | 25 | 5 | 39.3 | NOTE 4 | UL1/DL3 |
| n79 | 11 | 10 | 15 | 25 | 10 | 36.3 | NOTE 4 | UL1/DL3 |
| n79 | 19 | 10 | 15 | 25 | 5 | 29.5 | NOTE 2 | UL1/DL5 |
| n79 | 19 | 10 | 15 | 25 | 15 | 24.7 | NOTE 2 | UL1/DL5 |
| n79 | 21 | 10 | 15 | 25 | 5 | 39.3 | NOTE 4 | UL1/DL3 |
| n79 | 21 | 10 | 15 | 25 | 15 | 34.5 | NOTE 4 | UL1/DL3 |
| n79 | 26 | 10 | 15 | 25 | 5 | 27 | NOTE 2 | UL1/DL5 |
| n79 | 26 | 10 | 15 | 25 | 15 | 22.2 | NOTE 2 | UL1/DL5 |
| NOTE 1: These requirements apply when there is at least one individual RE within the uplink transmission bandwidth of the aggressor (higher) band for which the mixing product due to harmonic of victim (lower) band LO with leakage of aggressor (higher) band is within the downlink transmission bandwidth of a victim (lower) band.  NOTE 2: The requirements should be verified for DL EARFCN of the victim (lower) band (superscript LB) such that  and with  the DL carrier frequency in the lower band and the UL carrier frequency and the channel bandwidth configured in the higher band, both in MHz.  NOTE 3: Void.  NOTE 4: The requirements should be verified for DL EARFCN or NR ARFCN of the victim (lower) band (superscript LB) such that  and with   the DL carrier frequency in the lower band and the UL carrier frequency and the channel bandwidth configured in the higher band, both in MHz.  NOTE 5: Void  NOTE 6: Void  NOTE 7: Void  NOTE 8: The requirements should be verified for DL EARFCN of the victim (lower) band (superscript LB) such that and the channel bandwidth configured with the DL carrier frequency in the lower band and the UL carrier frequency and the channel bandwidth configured in the higher band, both in MHz.  NOTE 9: No requirements apply for the case that there is at least one individual RE within the uplink transmission bandwidth of the relative higher band and when the frequency range of relative higher band’s uplink channel bandwidth or uplink 1st adjacent channel bandwidth is fully or partially overlapped with the 3 times of the frequency range of the relative lower band’s downlink channel bandwidth. The reference sensitivity is only verified when this is not the case.  NOTE 10: MSD test point can be chosen according to supported BW and lowest SCS supported by the UE.  NOTE 11: The MSD test points cannot be verified for the band combination in US due to the Band n77 frequency range restriction.  NOTE 12: The requirements should be verified for the lowest NR ARFCN of the affected DL (lower) band and for the highest NR ARFCN of the UL (higher) band  NOTE 13: The requirements should be verified for DL EARFCN or NR ARFCN of the victim (lower) band (superscript LB) such that and with   the DL carrier frequency in the lower band and the UL carrier frequency in the higher band, both in MHz.  NOTE 14: The requirements should be verified for DL EARFCN or NR ARFCN of the victim (lower) band (superscript LB) such that and with   the DL carrier frequency in the lower band and the UL carrier frequency in the higher band, both in MHz.  NOTE 15: The requirements should be verified for DL EARFCN or NR ARFCN of the victim (lower) band (superscript LB) such that and with   the DL carrier frequency in the lower band and the UL carrier frequency in the higher band, both in MHz.  NOTE 16: The requirements should be verified using RBstart = floor((NRB-LCRB)/2), where floor(x) is the greatest integer less than or equal to x, and where the UL parameters NRB and LCRB are respectively, the transmission bandwidth configuration and the number of RB’s for the specified UL band channel bandwidth and the UL band subcarrier spacing. | | | | | | | | |

**---End of changes---**