3GPP TSG-RAN WG4 Meeting #109 R4-2318721

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Source: Huawei, HiSilicon

Title: TP for TR 38.880: DC\_20A\_n78A with 3Tx

Agenda Item: 7.29.2

Document for: Approval

# **Introduction**

This contribution provides a text proposal on DC band combination of LTE bands B20 (1Tx) with NR band n78 (2Tx) for TR 38.880.

# Text Proposal

**----- Start of TP -----**

6.3 DC\_20\_n78

6.3.1 Operating bands for EN-DC

**Table 6.3.1-1: EN-DC band combination of band 20+n78**

|  |  |
| --- | --- |
| **EN-DC Band combination** | **Bands** |
| DC\_20A\_n78A | 20, n78 |

6.3.2 Maximum output power for inter-band EN-DC

**Table 6.3.2-1: UE Power Class for 3Tx inter-band EN-DC**

| **EN-DC configuration** | **Power class 2**  **(dBm)** | **Tolerance**  **(dB)** | **Power class 3**  **(dBm)** | **Tolerance**  **(dB)** |
| --- | --- | --- | --- | --- |
| DC\_20A\_n78A5,6 | 26 | +2/-3 | 23 | +2/-3 |
| NOTE 1: (Void in this TR)  NOTE 2: (Void in this TR)  NOTE 3: (Void in this TR)  NOTE 4: (Void in this TR)  NOTE 5: The UE supports PC3 in E-UTRA band, and supports PC2 with UL MIMO in NR band  NOTE 6: The UE supports PC3 in E-UTRA band, and supports PC3 with UL MIMO in NR band | | | | |

6.3.3 MSD scenario studies

Table 6.3.3-1 summarizes frequency ranges where harmonics mixing occur for DC\_20\_n78

**Table 6.3.3-1: MSD scenarios for DC\_20\_n78 with total power class 2**

|  |  |  |  |
| --- | --- | --- | --- |
|  | **Aggressor Tx band** | **Victim Rx band** | **Whether 2Tx requirements exists** |
| **IMD** | IMD4 (3rd order of b20 UL+ fundamental n78 UL) | 20 DL | No |

6.3.4 REFSENS requirements

As the MSD for PC2, with 2Tx, on this band combination is not yet specified, we propose the following MSD values based on the following analysis.

|  |  |  |  |
| --- | --- | --- | --- |
| **DC\_20-n78 parameters** | | | |
| Antenna ISO | 10 | dB |
| PCB isolation Paout-Pain | 60 | dB |
| PCB isolation Paout Div-Pain main | 65 | dB |
| Diplexer ISO | 15 | dB |
| 20 TX SAW/duplexer rejection at n78 Tx | 30 | dB |
| 20 RX duplexer rejection at n78 Tx | 50 | dB |
| 20 SAW/Duplexer TX rejection at 20 RX band | 60 | dB |
| filter n78 TX rejection at 20 RX band | 47 | dB |
| n78 Tx attenuation at 20 RX | 47 | dB |
| n78 Tx attenuation at 20 TX | 47 | dB |
| Diplexer IL | 0.5 | dB |
| Antenna switch IL | 1 | dB |
| TX/RX switch IL | 0.5 | dB |
| 20 Dup IL | 4 | dB |
| n78 RX SAW filter IL | 3 | dB |
| Pout 20 | 23 | dBm |
| Pout n78 | 24.8 | dBm |
| Pout n78 Div | 24.8 | dBm |
| REFSENS 20 | -97 | dBm |

|  |  |
| --- | --- |
| **Main Path** | **received interference, IMD4 (dBm) on 20 Rx** |
| Antenna switch | -74.7 |
| Diplexer (H-H or L-L) | -68.8 |
| 20 SAW/Duplexer | -82.5 |
| 20 PA Forward mixing | -80.3 |
| n78 PA Forward mixing | -176.8 |
| 20 PA Reverse mixing | -111.9 |
| n78 PA Reverse mixing | -260.8 |
| Total | -67.4 |
| n78 LNA via filters | -121.1 |
| n78 LNA via PCB coupling | -118.3 |
| Total main IMD | -67.4 |

|  |  |
| --- | --- |
| **Diversity Path** | **received interference, IMD4 (dBm) on 20 Rx** |
| From main path | -77.4 |
| Diplexer | -105.6 |
| Antenna switch | -107.6 |
| 20 SAW Filter | -103.3 |
| n78 PA div Forward mixing | -193.3 |
| 20 LNA via antenna ISO | -154.1 |
| 20 LNA via PCB coupling | -126.3 |
| Total div IMD | -77.4 |

|  |  |
| --- | --- |
| **MSD calculation parameters** | **received interference, IMD4 (dB) on 20 Rx** |
| MSD | 23.7 |
| SNR | -19.8 |
| MSD at SNR=-1 | 18.8 |

Table 6.3.4-1: Reference sensitivity exceptions (MSD) due to receiver harmonic mixing for EN-DC in NR FR1

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Band / Channel bandwidth / NRB / Duplex mode** | | | | | | | |
| EN-DC  Configuration | EUTRA or NR band | UL Fc  (MHz) | UL/DL BW  (MHz) | UL  LCRB | DL Fc (MHz) | MSD  (dB) | IMD order |
| DC\_20\_n78 | 20 | 850 | 5 | 25 | 809 | 18.8 | IMD4 |
|  | n78 | 3359 | 10 | 50 | 3359 | N/A | N/A |

**----- End of TP -----**