**3GPP TSG-RAN WG4 Meeting #112 R4-2211835**

**Maastricht, Netherlands, August 19 – 23, 2024**

**Source:** ZTE Corporation, Sanechips

**Title:** TP for TR 37.719-21-11: DC\_20-28\_n7

**Agenda item:** 7.2.3

**Document for:** Approval

1. Introduction

This contribution is a text proposal for TR 37.719-21-11 to include DC\_20-28\_n7. The IMD3 MSD value from DC\_7A-28A\_n20A has been re-used due to similarity of spectrum.

# 2. Reference

[1] TR 37.719-21-11, Rel-19 Dual Connectivity of EN-DC and NE-DC configurations consisting of 2 bands LTE inter-band CA (2DL/1UL) and 1 NR band (1DL/1UL), or consisting of 1 band LTE (1DL/1UL) and 2 bands NR inter-band CA (2DL/1UL).

3. Text Proposal

**<Start of Text Proposal>**

## 6.x DC\_20-28\_n7

### 6.x.1 Configurations for DC

Table 6.x.1-1: Inter-band EN-DC configurations within FR1 (three bands)

| **EN-DC**  **configuration** | **Uplink EN-DC**  **configuration**  **(NOTE x)** |
| --- | --- |
| DC\_20A-28A\_n7A | DC\_20A\_n7A  DC\_28A\_n7A |

### 6.x.2 Co-existence analysis for DC

Table 6.x.2-1 lists the Band 20A + Band n7A 2UL DC 2nd, 3rd, 4th and 5th order IMD for the UE-to-UE coexistence analysis.

Table 6.x.2-1: Band n7 and Band 20 UL IMD products

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **UE UL carriers** | **fx\_low** | **fx\_high** | **fy\_low** | **fy\_high** |
| UL frequency (MHz) | 2500 | 2570 | 832 | 862 |
| 2nd order IMD products | |fy\_low – fx\_high| | |fy\_high – fx\_low| | |fy\_low + fx\_low| | |fy\_high + fx\_high| |
| IMD frequency limits (MHz) | 1638 – 1738 | | 3332 – 3432 | |
| Two-tone 3rd order IMD products | |2\*fx\_low – fy\_high| | |2\*fx\_high – fy\_low| | |2\*fy\_low – fx\_high| | |2\*fy\_high – fx\_low| |
| IMD frequency limits (MHz) | 4138 – 4308 | | 776 – 906 | |
| Two-tone 3rd order IMD products | |2\*fx\_low + fy\_low| | |2\*fx\_high + fy\_high| | |2\*fy\_low + fx\_low| | |2\*fy\_high + fx\_high| |
| IMD frequency limits (MHz) | 5832 – 6002 | | 4164 – 4294 | |
| Two-tone 4th order IMD products | |3\*fx\_low – 1\*fy\_high| | |3\*fx\_high – 1\*fy\_low| | |3\*fy\_low – 1\*fx\_high| | |3\*fy\_high – 1\*fx\_low| |
| IMD frequency limits (MHz) | 6638 – 6878 | | 74 – 86 | |
| Two-tone 4th order IMD products | |2\*fx\_low – 2\*fy\_high| | |2\*fx\_high – 2\*fy\_low| |  | |
| IMD frequency limits (MHz) | 3276 – 3476 | |
| Two-tone 4th order IMD products | |3\*fx\_low + 1\*fy\_low| | |3\*fx\_high + 1\*fy\_high| | |3\*fy\_low + 1\*fx\_low| | |3\*fy\_high + 1\*fx\_high| |
| IMD frequency limits (MHz) | 8332 – 8572 | | 4996 – 5156 | |
| Two-tone 4th order IMD products | |2\*fx\_low + 2\*fy\_low| | |2\*fx\_high + 2\*fy\_high| |  | |
| IMD frequency limits (MHz) | 6664 – 6864 | |
| Two-tone 5th order IMD products | |fx\_low – 4\*fy\_high| | |fx\_high – 4\*fy\_low| | |fy\_low – 4\*fx\_high| | |fy\_high – 4\*fx\_low| |
| IMD frequency limits (MHz) | 758 – 948 | | 9138 – 9448 | |
| Two-tone 5th order IMD products | |2\*fx\_low – 3\*fy\_high| | |2\*fx\_high – 3\*fy\_low| | |2\*fy\_low – 3\*fx\_high| | |2\*fy\_high – 3\*fx\_low| |
| IMD frequency limits (MHz) | 2414 – 2644 | | 5776 – 6046 | |
| Two-tone 5th order IMD products | |fx\_low + 4\*fy\_low| | |fx\_high + 4\*fy\_high| | |fy\_low + 4\*fx\_low| | |fy\_high + 4\*fx\_high| |
| IMD frequency limits (MHz) | 5828 – 6018 | | 10832 – 11142 | |
| Two-tone 5th order IMD products | |2\*fx\_low + 3\*fy\_low| | |2\*fx\_high + 3\*fy\_high| | |2\*fy\_low + 3\*fx\_low| | |2\*fy\_high + 3\*fx\_high| |
| IMD frequency limits (MHz) | 7496 – 7726 | | 9164 – 9434 | |

Based on Table 6.x.2-1,

- 3rd order IMD may fall into Rx frequencies of band 28.

- 5th order IMD may fall into Rx frequencies of band 28.

The requirements for spurious emission band UE coexistence already exist in 38.101-3 for DC\_20\_n7.

Table 6.x.2-2 lists the Band 28A + Band n7A 2UL DC 2nd, 3rd, 4th and 5th order IMD for the UE-to-UE coexistence analysis.

Table 6.x.2-2: Band n7 and Band 28 UL IMD products

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **UE UL carriers** | **fx\_low** | **fx\_high** | **fy\_low** | **fy\_high** |
| UL frequency (MHz) | 2500 | 2570 | 703 | 748 |
| 2nd order IMD products | |fy\_low – fx\_high| | |fy\_high – fx\_low| | |fy\_low + fx\_low| | |fy\_high + fx\_high| |
| IMD frequency limits (MHz) | 1752 – 1867 | | 3203 – 3318 | |
| Two-tone 3rd order IMD products | |2\*fx\_low – fy\_high| | |2\*fx\_high – fy\_low| | |2\*fy\_low – fx\_high| | |2\*fy\_high – fx\_low| |
| IMD frequency limits (MHz) | 4252 – 4437 | | 1004 – 1164 | |
| Two-tone 3rd order IMD products | |2\*fx\_low + fy\_low| | |2\*fx\_high + fy\_high| | |2\*fy\_low + fx\_low| | |2\*fy\_high + fx\_high| |
| IMD frequency limits (MHz) | 5703 – 5888 | | 3906 – 4066 | |
| Two-tone 4th order IMD products | |3\*fx\_low – 1\*fy\_high| | |3\*fx\_high – 1\*fy\_low| | |3\*fy\_low – 1\*fx\_high| | |3\*fy\_high – 1\*fx\_low| |
| IMD frequency limits (MHz) | 6752 – 7007 | | 256 – 461 | |
| Two-tone 4th order IMD products | |2\*fx\_low – 2\*fy\_high| | |2\*fx\_high – 2\*fy\_low| |  | |
| IMD frequency limits (MHz) | 3504 – 3734 | |
| Two-tone 4th order IMD products | |3\*fx\_low + 1\*fy\_low| | |3\*fx\_high + 1\*fy\_high| | |3\*fy\_low + 1\*fx\_low| | |3\*fy\_high + 1\*fx\_high| |
| IMD frequency limits (MHz) | 8203 – 8458 | | 4609 – 4814 | |
| Two-tone 4th order IMD products | |2\*fx\_low + 2\*fy\_low| | |2\*fx\_high + 2\*fy\_high| |  | |
| IMD frequency limits (MHz) | 6406– 6636 | |
| Two-tone 5th order IMD products | |fx\_low – 4\*fy\_high| | |fx\_high – 4\*fy\_low| | |fy\_low – 4\*fx\_high| | |fy\_high – 4\*fx\_low| |
| IMD frequency limits (MHz) | 242 – 492 | | 9252 – 9577 | |
| Two-tone 5th order IMD products | |2\*fx\_low – 3\*fy\_high| | |2\*fx\_high – 3\*fy\_low| | |2\*fy\_low – 3\*fx\_high| | |2\*fy\_high – 3\*fx\_low| |
| IMD frequency limits (MHz) | 2756 – 3031 | | 6004 – 6304 | |
| Two-tone 5th order IMD products | |fx\_low + 4\*fy\_low| | |fx\_high + 4\*fy\_high| | |fy\_low + 4\*fx\_low| | |fy\_high + 4\*fx\_high| |
| IMD frequency limits (MHz) | 5312 – 5562 | | 10703 – 11028 | |
| Two-tone 5th order IMD products | |2\*fx\_low + 3\*fy\_low| | |2\*fx\_high + 3\*fy\_high| | |2\*fy\_low + 3\*fx\_low| | |2\*fy\_high + 3\*fx\_high| |
| IMD frequency limits (MHz) | 7109 – 7384 | | 8906 – 9206 | |

Based on Table 6.x.2-2, no IMD may fall into Rx frequencies of band 20.

### 6.x.3 ∆TIB and ∆RIB values

For DC\_20-28\_n7, the ΔTIB,c and ΔRIB,c values are reused from DC\_7-28\_n20 and are given in the tables below.

Table 6.x.3-1: ΔTIB,c due to EN-DC (three bands)

| Inter-band EN-DC configuration | ΔTIB,c for E-UTRA band / NR band (dB)6 | | |
| --- | --- | --- | --- |
| Component band in order of bands in configuration7 | | |
| DC\_20-28\_n7 | 0.6 | 0.6 | 0.3 |
| NOTE 6: “-” denotes ΔTIB,c = 0.  NOTE 7: The component band order in the configuration should be listed by the order of E-UTRA band and NR band respectively, such as for DC\_66\_(n)12 the band order from left to right is 12, 66 and n12. | | | |

Table 6.x.3-2: ΔRIB due to EN-DC (three bands)

| **Inter-band EN-DC configuration** | ΔRIB,c for E-UTRA band / NR band (dB)7 | | |
| --- | --- | --- | --- |
| Component band in order of bands in configuration8 | | |
| DC\_20-28\_n7 | 0.2 | 0.2 | - |
| NOTE 7: “-” denotes ΔRIB,c = 0.  NOTE 8: The component band order in the configuration should be listed by the order of E-UTRA band and NR band respectively, such as for DC\_5\_(n)12 the band order from left to right is 5, 12 and n12. | | | |

### 6.x.4 Analysis of MSD requirements

Table 6.x.4-1 lists the MSD requirements for the dual connectivity configuration for the cases that IMD interference fall into the own 3rd Rx frequency band. The MSD values for DC\_7-28\_n20 are reused.

Table 6.x.4-1: MSD test points for Scell due to dual uplink operation for EN-DC in NR FR1 (three bands)

| NR or E-UTRA Band / Channel bandwidth / NRB / MSD | | | | | | | |
| --- | --- | --- | --- | --- | --- | --- | --- |
| EN-DC Configuration | EUTRA / NR band | UL Fc  (MHz) | UL/DL BW  (MHz) | UL  LCRB | DL Fc (MHz) | MSD  (dB) | IMD order |
| DC\_20A-28A\_n7A | n7 | 2505 | 5 | 25 | 2625 | N/A | N/A |
|  | 20 | 859 | 5 | 25 | 818 | N/A | N/A |
|  | 28 | N/A | 5 | N/A | 787 | 17.4 | IMD34 |
| NOTE 4: This band is subject to IMD5 also which MSD is not specified. | | | | | | | |

<End of Text Proposal>