**3GPP TSG-RAN WG4 Meeting # 112bis *R4-2416032***

**Hefei, China, October 14 – 18, 2024**

**Source:** Huawei, HiSilicon

**Title:** TP for TR 37.719-21-11 on introduction of DC\_1A\_n1A-n78A

**Agenda item:** 5.2.3

**Document for:** Approval

# 1 Background

This contribution provides text proposal on the NR band combination DC\_1A\_n1A-n78A.

# 2 Text Proposal

##### ---Start of changes---

## 7.X DC\_1\_n1-n78

### 7.X.1 Configurations for DC

Table 7.X.1-1: Inter-band EN-DC configurations within FR1 (three bands)

| EN-DC  configuration | Uplink EN-DC  configuration  (NOTE X) |
| --- | --- |
| DC\_1A\_n1A-n78A | DC\_1A\_n1A2  DC\_1A\_n78A |
| NOTE 2: Only single switched UL is supported | |

### 7.X.2 Co-existence analysis for DC

Table 7.X.2-1: Band 1 and Band n78 UL IMD products

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **UE UL carriers** | **fx\_low** | **fx\_high** | **fy\_low** | **fy\_high** |
| 2nd order IMD products | |fy\_low – fx\_high| | |fy\_high – fx\_low| | |fy\_low + fx\_low| | |fy\_high + fx\_high| |
| IMD frequency limits (MHz) | 1320 | 1880 | 5220 | 5780 |
| 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) | 40 | 660 | 4620 | 5680 |
| 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) | 7140 | 7760 | 8520 | 9580 |
| 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) | 1960 | 2640 | 7920 | 9480 |
| Two-tone 4th order IMD products | |2\*fx\_low –2\* fy\_high| | |2\*fx\_high –2\* fy\_low| |  |  |
| IMD frequency limits (MHz) | 3760 | 2640 |  |  |
| 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) | 9060 | 9740 | 11820 | 13380 |
| Two-tone 4th order IMD products | |2\*fx\_low +2\* fy\_low| | |2\*fx\_high +2\* fy\_high| |  |  |
| IMD frequency limits (MHz) | 10440 | 11560 |  |  |
| 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) | 13280 | 11220 | 4620 | 3880 |
| 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) | 7560 | 5940 | 660 | 1840 |
| 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) | 15120 | 17180 | 10980 | 11720 |
| 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) | 13740 | 15360 | 12360 | 13540 |
| NOTE 1: For each IMD item, when two bound values before taking absolute have different signs, the relevant IMD range shall be set such that (1) the lower bound is 0 and (2) the upper bound is the bigger value of the two after taking absolute.  NOTE 2: The lowest even order and lowest odd order IMD MSDs shall be considered. | | | | |

Based on Table 7.X.2-1, IMD4 generated by band 1 and n78 may fall into Rx frequencies of band n1.

### 7.X.3 ∆TIB and ∆RIB values

Table 7.X.3-1: ΔTIB,c due to EN-DC

| Inter-band EN-DC configuration | ΔTIB,c for E-UTRA band / NR band (dB)\* | | |
| --- | --- | --- | --- |
| Component band in order of bands in configuration\*\* | | |
| DC\_1\_n1-n78 | 0.3 | 0.3 | 0.8 |
| NOTE \*: “-” denotes ΔTIB,c = 0.  NOTE \*\*: The component band order in the configuration should be listed by the order of E-UTRA band and NR band respectively. | | | |

Table 7.X.3-2: ΔRIB,c due to EN-DC

| **Inter-band EN-DC configuration** | ΔRIB,c for E-UTRA band / NR band (dB)\* | | |
| --- | --- | --- | --- |
| Component band in order of bands in configuration\*\* | | |
| DC\_1\_n1-n78 | - | - | 0.5 |
| NOTE \*: “-” denotes ΔRIB,c = 0.  NOTE \*\*: The component band order in the configuration should be listed by the order of E-UTRA band and NR band respectively. | | | |

### 7.X.4 Analysis of MSD requirements

Referring to the DC\_1A\_n78A, the IMD4 can be specified below.

Table 7.x.4-1: MSD test points for Scell due to dual uplink operation for EN-DC in NR FR1 (three bands)

| EN-DC Configuration | EUTRA / NR band | UL Fc  (MHz) | UL/DL BW  (MHz) | UL  LCRB | DL Fc (MHz) | MSD  (dB) | IMD order |
| --- | --- | --- | --- | --- | --- | --- | --- |
| DC\_1A\_n1A-n78A | 1 | 1945 | 5 | 25 | 2135 | N/A | N/A |
|  | n1 | N/A | 5 | N/A | 2125 | 12.0 | IMD4 |
|  | n78 | 3710 | 10 | 50 | 3710 | N/A | N/A |

##### ---End of changes---

# Reference

[1] RP-241786, “Revised WID for for Rel-19 Dual connectivity (DC) of x LTE band(s), y NR band(s) (1<=x<6, 1<=y<6, x+y<=6) and single or two NR Supplementary Uplink (SUL) bands”, Nokia, CHTTL, LGE, Samsung