3GPP TSG-RAN WG4 Meeting # 111 R4-2407211

**Fukuoka, Japan, 20th - 24th May 2024**

**Title: TP for TR38.899 to add new HP-NRCA 1-77-79 with 2UL**

**Source: Softbank Corp., LG Electronics**

**Agenda item: 6.17.2**

**Document for: Approval**

# 1 Introduction

This contribution is a text proposal for TR38.899[8] to add the following HP-NRCA combinations.

* CA\_n1A-n77A-n79A (PC2 2UL)

# 2. Reference

[3] 3GPP TS 38.101-1 " NR; User Equipment (UE) radio transmission and reception; Part 1: Range 1 Standalone; (Release 18)", v18.5.0.

[8] 3GPP TR38.899 “High power UE for FR1 NR inter-band CA/DC or NR SUL band combination with y (1<y<=6) bands DL and x (x=1, 2) bands UL and power class m (m<3) and high power on TDD band(s); (Release 18)”, v0.9.0

[9] 3GPP TR38.717-03-02 V17.0.0: “Rel-17 NR inter-band Carrier Aggregation/Dual connectivity for 3 bands DL with 2 bands UL (Release 17)”

# Text Proposal

**-- Start of TP –**

**-- Unaffected parts omitted –**

6.xx DL CA\_n1-n77-n79

6.xx.1 Configurations

**Table 6.xx.1-1: NR CA configurations and bandwidth combinations sets defined for inter-band CA (three bands)**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **NR CA configuration** | **Uplink CA configuration or****single uplink carrier** | **NR Band** | **Channel bandwidth (MHz)** | **Bandwidth combination set** |
| CA\_n1A-n77A-n79A4 | CA\_n1A-n77A**7**CA\_n1A-n79A**7**CA\_n77A-n79A**7** | n1 | 5, 10, 15, 20 | 0 |
| n77 | 10, 15, 20, 40, 50, 60, 80, 90, 100 |
| n79 | 40, 50, 60, 80, 100 |
| CA\_n1A-n77(2A)-n79A4 | CA\_n1A-n77A**7**CA\_n1A-n79A**7**CA\_n77A-n79A**7**CA\_n77A(2A)**7** | n1 | 5, 10, 15, 20 | 0 |
| n77 | CA\_n77(2A) BCS0 |
| n79 | 40, 50, 60, 80, 100 |
| NOTE 4: The minimum requirements only apply for non-simultaneous Tx/Rx between all carriers for TDD combinations.NOTE 7: Power Class 2 is allowed for this uplink combination or single uplink carrier in this downlink/uplink combination.NOTE 9: Power Class 1.5 is allowed for this single uplink carrier in this downlink/uplink combination. |

6.xx.2 Maximum output power

 **Table 6.xx.2-1 UE Power Class 2 for uplink inter-band CA (two bands)**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Uplink CA configuration** | **Power class 2 cases for CA\_nX-nY** | **CA power class** | **Carrier X power class** | **Carrier Y power class** |
| CA\_n1A-n77A | Case a | 26dBm | 23dBm | 23dBm |
| Case b | 26dBm | 23dBm | 26dBm |
| CA\_n1A-n79A | Case a | 26dBm | 23dBm | 23dBm |
| Case b | 26dBm | 23dBm | 26dBm |
| CA\_n77A-n79A | Case a | 26dBm | 23dBm | 23dBm |
| Case b | 26dBm | 23dBm | 26dBm |
| Case c | 26dBm | 26dBm | 23dBm |
| Case d | 26dBm | 26dBm | 26dBm |

6.xx.3 REFSENS requirements

Analysis of REFSENS exceptions or MSD requirements is needed due to higher power uplink.

6.xx.3.1 Power class 2 case a, b, c, d

MSD analysis of ULCA\_n77(2A) can be skipped. Because the impact of it has already been investigated in PC3’s fallback combination.

Based on PC3’s co-existence studies of 2UL/2DL CA\_n1-n77, CA\_n1-n79, and CA\_n77-n79 in TR38.717-03-02[9], own Rx impact of the 3rd band is the followings

-3rd, 4th and 5th order IMD generated by dual uplink of CA\_n1-n77 may fall into part of own band n79.

=> There is no need to have MSD added because non-simultaneous Rx-Tx operation for CA\_n77-n79 is assumed, therefore no MSD is needed for CA\_n1-n77.

-5th order IMD generated by dual uplink of CA\_n1-n79 may fall into part of own band n77.

=> There is no need to have MSD added because non-simultaneous Rx-Tx operation for CA\_n77-n79 is assumed, therefore no MSD is needed for CA\_n1-n79.

-3rd, 4th and 5th order IMD generated by dual uplink of CA\_n77-n79 may fall into part of own band n1.

=> The MSD values are shown in the following table. This MSD value is the average of the analysis results of the two companies. Also, we define only the highest MSD, and omit the MSDs due to IM4 and IM5. This is described in NOTE2 and NOTE1.

Table 6.xx.3-1: MSD for the CA configuration

| **NR Band / Channel bandwidth / NRB / MSD** |
| --- |
| **CA Configuration** | **NR band** | **UL Fc (MHz)** | **UL/DL BW (MHz)** | **UL****LCRB** | **DL Fc (MHz)** | **MSD (dB)** | **IMD order** |
| CA\_n1A-n77A-n79A | n1 | 1950 | 5 | 25 | 2140 | 24.6 | IMD31,2 |
| n77 | 3400 | 10 | 50 | 3400 | N/A | N/A |
| n79 | 4660 | 40 | 216 | 4660 | N/A | N/A |
| NOTE 1: This band is subject to IMD5 also which MSD is not specified.NOTE 2: This band is subject to IMD4 also which MSD is not specified. |

6.xx.4 ∆TIB and ∆RIB values

There is no change by comparing to the values for PC3 CA.

**-- Unaffected parts omitted –**

**-- End of TP --**