3GPP TSG-RAN WG4 Meeting # 98-e R4-2100273

Electronic Meeting, 25th January – 5th February, 2021

Source: Verizon, Ericsson, MediaTek, LGE

Title: TP for TR38.xxx for PC2 CA\_n2A-n77A

Agenda item: 9.19.2

Document for: Approval

# **Introduction**

This contribution is a text proposal to introduce PC2 2DL/2UL CA\_n2-n77 according to the request in [1].

# **Reference**

[1] RP-202373, Revised basket WID: High power UE for NR inter-band Carrier Aggregation with 2 bands downlink and x bands uplink (x =1,2)

# **Text Proposal**

**<Start of Text Proposal>**

## 5.x CA\_n2-n77

### 5.x.1 Configurations

**Table 5.x.1-1: NR CA configurations and bandwidth combinations sets for supporting power class 2**

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| NR CA configuration | Uplink CA configuration | NR Band | SCS  (kHz) | 5 MHz | 10  MHz | 15  MHz | 20  MHz | 25 MHz | 30 MHz | 40  MHz | 50  MHz | 60  MHz | 70  MHz | 80  MHz | 90 MHz | 100 MHz | Bandwidth combination set |
| CA\_n2A-n77A  CA\_n2A-n77(2A) | CA\_n2A-n77A | n2 | 15 | Yes | Yes | Yes | Yes |  |  |  |  |  |  |  |  |  | 0 |
| 30 |  | Yes | Yes | Yes |  |  |  |  |  |  |  |  |  |
| 60 |  | Yes | Yes | Yes |  |  |  |  |  |  |  |  |  |
| n77 | 15 |  | Yes | Yes | Yes | Yes | Yes | Yes | Yes |  |  |  |  |  |
| 30 |  | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes4 | Yes | Yes4 | Yes |
| 60 |  | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes4 | Yes | Yes4 | Yes |
| NOTE 4: This UE channel bandwidth is optional in this release of the specification | | | | | | | | | | | | | | | | | |

### 5.x.2 Maximum output power

Table 5.x.2-1 UE Power Class 2 for uplink inter-band CA (two bands)

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Uplink CA configuration** | **Power class 2 cases for CA\_n2A-n77A** | **CA power class** | **Carrier n2 power class** | **Carrier n77 power class** |
| CA\_n2A-n77A | Case a | 26dBm | 23dBm | 23dBm |
| Case b | 26dBm | 23dBm | 26dBm |

The tolerance +2/-3 dB is applied. Also when the transmission bandwidths confined within FUL\_low and FUL\_low + 4 MHz or FUL\_high – 4 MHz and FUL\_high, the maximum output power requirement is relaxed by reducing the lower tolerance limit by 1.5 dB.

### 5.x.3 REFSENS requirements

According to the PC3 CA\_n2A-n77A study, the same results are listed below,

* The 2nd harmonic mixing products from band 2 may fall into band n77 UL frequency range.
* The 2nd, 4th and 5th order IMD products generated by dual uplink from both band 2 and band n77 may fall into band 2 Rx frequency range.

Thus additional MSD should be considered to mitigate the impact of the interference for PC2 CA\_n2A-n77A combination.

#### 5.x.3.1 Power class 2 case a

The additional MSD due to receiver harmonic mixing are defined in table 5.x.3.1-1.

Table 5.x.3.1-1: Reference sensitivity exceptions (MSD) due to receiver harmonic mixing for NR CA in NR FR1

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| NR Band / Channel bandwidth of the affected DL band / MSD | | | | | | | | | | | | | |
| UL band | DL band | 5  MHz (dB) | 10  MHz (dB) | 15 MHz  (dB) | 20 MHz  (dB) | 25 MHz  (dB) | 40 MHz  (dB) | 50 MHz  (dB) | 60 MHz  (dB) | 70 MHz  (dB) | 80 MHz  (dB) | 90 MHz  (dB) | 100 MHz  (dB) |
| n77 | 2 | 9.1 | 8.0 | 7.0 | 6.7 |  |  |  |  |  |  |  |  |

The additional MSD due to intermodulation for PC2 CA\_n2A-n77A are defined in table 5.x.3.1-2.Table 5.x.3.1-2: MSD test points for PCell due to dual uplink operation for PC2 NR CA in NR FR1 (two bands)

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Band / Channel bandwidth / NRB / Duplex mode** | | | | | | | | |  |  |
| **NR CA** | **NR band** | **UL Fc** | **UL/DL BW** | **UL** | **DL Fc (MHz)** | **MSD for PC2** | **Duplex mode** | **Source of IMD** |
| **Configuration** | **(MHz)** | **(MHz)** | **CLRB** | **(dB)** |
| CA\_n2A-n77A | n2 | 1855 | 5 | 25 | 1935 | 32.10 | FDD | IMD2 |
| 34.755 |
| n77 | 3790 | 10 | 50 | 3790 | N/A | TDD | N/A |
| n2 | 1885 | 5 | 25 | 1965 | 19.10 | FDD | IMD4 |
| 21.855 |
| n77 | 3690 | 10 | 50 | 3690 | N/A | TDD | N/A |
| n2 | 1885 | 5 | 25 | 1965 | [19.10] | FDD | IMD5 |
| [21.855  ] |
| n77 | 3790 | 10 | 50 | 3790 | N/A | TDD | N/A |
| NOTE 5: Applicable only if operation with 4 antenna ports is supported in the band with carrier aggregation configured. | | | | | | | | |

#### 5.x.3.2 Power class 2 case b

The additional MSD due to receiver harmonic mixing are defined in table 5.x.3.2-1.

Table 5.x.3.2-1: Reference sensitivity exceptions (MSD) due to receiver harmonic mixing for NR CA in NR FR1

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| NR Band / Channel bandwidth of the affected DL band / MSD | | | | | | | | | | | | | |
| UL band | DL band | 5  MHz (dB) | 10  MHz (dB) | 15 MHz  (dB) | 20 MHz  (dB) | 25 MHz  (dB) | 40 MHz  (dB) | 50 MHz  (dB) | 60 MHz  (dB) | 70 MHz  (dB) | 80 MHz  (dB) | 90 MHz  (dB) | 100 MHz  (dB) |
| n77 | 2 | 9.1 | 8.0 | 7.0 | 6.7 |  |  |  |  |  |  |  |  |

The additional MSD due to intermodulation for PC2 CA\_n2A-n77A are defined in table 5.x.3.2-2.

Table 5.x.3.2-2: MSD test points for PCell due to dual uplink operation for PC2 NR CA in NR FR1 (two bands)

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Band / Channel bandwidth / NRB / Duplex mode** | | | | | | | | |  | |  |
| **NR CA** | **NR band** | **UL Fc** | **UL/DL BW** | **UL** | **DL Fc (MHz)** | **MSD for PC2** | **Duplex mode** | **Source of IMD** | |
| **Configuration** | **(MHz)** | **(MHz)** | **CLRB** | **(dB)** |
| CA\_n2A-n77A | n2 | 1855 | 5 | 25 | 1935 | 35.10 | FDD | IMD2 | |
| 37.755 |
| n77 | 3790 | 10 | 50 | 3790 | N/A | TDD | N/A | |
| n2 | 1885 | 5 | 25 | 1965 | 22.10 | FDD | IMD4 | |
| 24.855 |
| n77 | 3690 | 10 | 50 | 3690 | N/A | TDD | N/A | |
| n2 | 1885 | 5 | 25 | 1965 | [22.10] | FDD | IMD5 | |
| [24.855] |
| n77 | 3790 | 10 | 50 | 3790 | N/A | TDD | N/A | |
| NOTE 5: Applicable only if operation with 4 antenna ports is supported in the band with carrier aggregation configured. | | | | | | | | | |

### 5.x.4 ∆TIB and ∆RIB values

For the ∆TIB,c and ∆RIB,c values, same PC3 CA\_n2A-n77A requirements are applied for PC2 CA\_n2A-n77A.

**<End of Text Proposal>**