3GPP TSG-RAN WG4 Meeting # 100-e Rev of R4-2112159

Electronic Meeting, 16th – 27th August, 2021

**Source:** Huawei, HiSilicon

**Title:** TP for TR 38.717-02-01 CA\_n8A-n77A and CA\_n8A-n77(2A)

**Agenda item:** 8.8.2

**Document for:** Approval

# 1 Background

This contribution provides text proposal on the NR CA band combination CA\_n8A-n77A and CA\_n8A-n77(2A) as defined in New WID on NR Inter-band Carrier Aggregation/Dual Connectivity for 2 bands DL with x bands UL (x=1,2) RP-211058 [1].

# 2 Text Proposal

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

## 6.X CA\_n8-n77

### 6.X.1 Common for 1 band UL and 2 bands UL CA

#### 6.X.1.1 Operating bands for CA

Table 6.X.1.1-1: CA band combination CA\_n8A-n77A

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **NR CA Band Combination** | **NR Band** | **Uplink (UL) band** | | | **Downlink (DL) band** | | | **Duplex**  **mode** |
| **BS receive / UE transmit** | | | **BS transmit / UE receive** | | |
| **FUL\_low – FUL\_high** | | | **FDL\_low – FDL\_high** | | |
| CA\_n8-n77 | n8 | 880 MHz | – | 915 MHz | 925 MHz | – | 960 MHz | FDD |
| n77 | 3300 MHz | – | 4200 MHz | 3300 MHz | – | 4200 MHz | TDD |
|  | | | | | | | | |

#### 6.X.1.2 Channel bandwidths per operating band for CA

Table 6.X.1.2-1: Supported bandwidths per CA band combination CA\_n8A-n77A

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| NR CA configuration | Uplink CA configuration | NR Band | Channel bandwidth (MHz) (NOTE 3) | | | | | | | | | | | | | Bandwidth combination set |
|  |  |  | 5 | 10 | 15 | 20 | 25 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 |  |
| CA\_n8A-n77A | - | n8 | 5 | 10 | 15 | 20 |  |  |  |  |  |  |  |  |  | 0 |
|  |  | n77 |  | 10 | 15 | 20 | 25 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 |  |
| CA\_n8A-n77(2A) | - | n8 | 5 | 10 | 15 | 20 |  |  |  |  |  |  |  |  |  | 0 |
| n77 | See CA\_n77(2A) Bandwidth Combination Set 1 in Table 5.5A.2-1 | | | | | | | | | | | | |

#### 6.X.1.3 UE Co-existence studies

Table 6.X.1.3-1/2 summarizes frequency ranges where harmonics and/or harmonics mixing occur for CA\_n8-n77.

**Table 6.X.1.3-1: Impact of UL/DL Harmonic**

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  |  |  |  | **2nd Harmonic** | | **3rd Harmonic** | | **4th Harmonic** | |
| **Band** | **UL Low Band Edge** | UL High Band Edge | DL Low Band Edge | DL High Band Edge | UL Low Band Edge | UL High Band Edge | UL Low Band Edge | UL High Band Edge | UL Low Band Edge | UL High Band Edge |
| n8 | 880 | 915 | 925 | 960 | 1760 | 1830 | 2640 | 2745 | 3520 | 3660 |
| n77 | 3300 | 4200 | 3300 | 4200 | 6600 | 8400 | 9900 | 12600 | 13200 | 16800 |

**Table 6.X.1.3-2: Impact of UL/DL Harmonic mixing**

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  |  |  |  | **2nd Harmonic** | | **3rd Harmonic** | | **4th Harmonic** | |
| **Band** | **UL Low Band Edge** | UL High Band Edge | DL Low Band Edge | DL High Band Edge | DL Low Band Edge | DL High Band Edge | DL Low Band Edge | DL High Band Edge | DL Low Band Edge | DL High Band Edge |
| n8 | 880 | 915 | 925 | 960 | 1850 | 1920 | 2775 | 2880 | 3700 | 3840 |
| n77 | 3300 | 4200 | 3300 | 4200 | 6600 | 8400 | 9900 | 12600 | 13200 | 16800 |

In analysis, it could be seen,

* The 4nd harmonic from band n8 UL may fall into band n77 DL frequency range.
* The 4nd harmonic mixing from band n8 DL is negligible.

#### 6.X.1.4 ∆TIB and ∆RIB values

For CA\_n8-n77 , the ∆TIB,c and ∆RIB,c values are given in the tables below which refer to TS 38.101-3 DC\_8\_n77 values.

Table 6.X.1.4-1: ΔTIB,c

| Inter-band CA Configuration | NR Band | ΔTIB,c [dB] |
| --- | --- | --- |
| CA\_n8-n77 | n8 | 0.6 |
| n77 | 0.8 |
|  | | |

Table 6.X.1.4-2: ΔRIB

| Inter-band CA Configuration | NR Band | ΔRIB [dB] |
| --- | --- | --- |
| CA\_n8-n77 | n8 | 0.2 |
| n77 | 0.5 |
|  | | |

#### 6.X.1.5 REFSENs requirements

MSD values are copied from CA\_n8-n78 as it has also 4th harmonic relation. The MSD for cross band Tx-Rx interference is shown below.

Table 6.x.1.5-1: MSD due to harmonic issue for CA\_n8-n78

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  | MSD due to harmonic exception for the DL band | | | | | | | | | | | | |
| UL band | DL band | **5 MHz** | **10 MHz** | **15 MHz** | **20 MHz** | **25 MHz** | **30 MHz** | **40 MHz** | **50 MHz** | **60 MHz** | **70 MHz** | **80 MHz** | **90MHz** | **100 MHz** |
| dB | dB | dB | dB | dB | dB | dB | dB | dB | dB | dB | dB | dB |
| n8 | n774,5 |  | 10.8 | 9.1 | 8.0 | 7.2 | 6.5 | 5.1 | 4.2 | 3.5 | 2.9 | 2.3 | 2.1 | 1.4 |
| NOTE 4: These requirements apply when there is at least one individual RE within the uplink transmission bandwidth of the aggressor (lower) band for which the 4th transmitter harmonic is within the downlink transmission bandwidth of a victim (higher) band.  NOTE 5: The requirements should be verified for UL EARFCN of the aggressor (lower) band (superscript LB) such that in MHz and  with carrier frequency in the victim (higher) band in MHz and  the channel bandwidth configured in the lower band. | | | | | | | | | | | | | | |

Table 6.x.1.5-2 Uplink configuration for the low band (exceptions)

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| UL band | DL band | 5 MHz | 10 MHz | 15 MHz | 20 MHz | 25 MHz | 30 MHz | 40 MHz | 50 MHz | 60 MHz | 70MHz | 80 MHz | 90MHz | 100 MHz |
| n8 | n77 |  | 16 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 |

#### 6.X.1.6 OOB blocking exception requirements

Table 6.x.1.6-1: CA band combination with exceptions allowed

|  |
| --- |
| CA band combination |
| CA\_n8-n77 |

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

# Reference

[1] RP-211058, “Rel-17 NR Inter-band Carrier Aggregation/Dual Connectivity for 2 bands DL with x bands UL (x=1,2)”, ZTE Corporation