**3GPP TSG-WG RAN4 Meeting #98-e *R4-2100738***

**Online, 25th January – 5th February, 2021**

**Source:** Nokia, Nokia Shanghai Bell, [Bell Mobility]

**Title:** TP to TR 38.717-03-01 CA\_n5-n25-n77

**Agenda Item:** 9.9.2 [NR\_CA\_R17\_3BDL\_1BUL]

**Document for:** Approval

# Introduction

In this contribution, a text proposal to complete 3DL/1UL NR CA configuration CA\_n5A-n25A-n77A is provided.

# TP to TR 38.717-03-01

## 6.x CA\_n5-n25-n77

### 6.x.1 Operating bands for CA

Table 6.X.1-1: 3DL Inter-band CA operating bands

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **NR CA Band** | **NR Band** | **Uplink (UL) operating band** | | | **Downlink (DL) operating band** | | | **Duplex Mode** |
| **BS receive / UE transmit** | | | **BS transmit / UE receive** | | |
| **FUL\_low – FUL\_high** | | | **FDL\_low – FDL\_high** | | |
| CA\_n5-n25-n77 | n5 | 824 MHz | – | 849 MHz | 869 MHz | – | 894 MHz | FDD |
| n25 | 1850 MHz | – | 1915 MHz | 1930 MHz | – | 1995 MHz | FDD |
| n77 | 3300 MHz | – | 4200 MHz | 3300 MHz | – | 4200 MHz | TDD |

### 6.X.2 Channel bandwidths per operating band for CA

Table 6.X.2-1: Supported channel bandwidths per CA configuration for 3DL inter-band CA

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **NR CA Configuration** | **UL Config** | **NR Band** | **Channel bandwidth (MHz)** | | | | | | | | | | | | | **Bandwidth combination set** |
| **5** | **10** | **15** | **20** | **25** | **30** | **40** | **50** | **60** | **70** | **80** | **90** | **100** |
| CA\_n5A-n25A-n77A | - | n5 | 5 | 10 | 15 | 10 |  |  |  |  |  |  |  |  |  | 0 |
| n25 | 5 | 10 | 15 | 20 | 25 | 30 | 40 |  |  |  |  |  |  |
| n77 | 5 | 10 | 15 | 20 | 25 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 |

### 6.X.3 Co-existence studies

Table 6.X.3-1 summarizes frequency ranges where harmonics occur due to 3DL bands CA with 1 UL. The 4th and 5th harmonics of band n5 uplink may fall into band n77 downlink. The 2nd harmonic of band n25 may fall into band n77 downlink.

Table 6.X.3-1: Harmonic Interference for 3DLs/1UL

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  |  |  |  | **2nd Harmonic** | | **3rd Harmonic** | | **4th Harmonic** | | **5th 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 | UL Low Band Edge | UL High Band Edge |
| n5 | 824 | 849 | 869 | 894 | 1648 | 1698 | 2472 | 2547 | 3296 | 3396 | 4120 | 4245 |
| n25 | 1850 | 1915 | 1930 | 1995 | 3700 | 3830 | 5550 | 5745 | - | - | - | - |
| n77 | 3300 | 4200 | 3300 | 4200 | 6600 | 8400 | 9900 | 12600 | - | - | - | - |

Table 6.X.3-2 gives harmonic mixing issue for CA with Band n5, n25 and n77. Theare is a harmonic mixing relation for the 4th harmonic of n5 downlink and n77 downlink. Theare is a harmonic mixing relation for the 2nd harmonic of n25 downlink and n77 downlink.

Table 6.X.3-2 Harmonic mixing for 3DLs/1UL

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  |  |  |  | **2nd Harmonic** | | **3rd Harmonic** | | **4th Harmonic** | | **5th 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 | UL Low Band Edge | UL High Band Edge |
| n5 | 824 | 849 | 869 | 894 | 1738 | 1788 | 2607 | 2682 | 3476 | 3576 | 4345 | 4470 |
| n25 | 1850 | 1915 | 1930 | 1995 | 3860 | 3990 | 5790 | 5985 | - | - | - | - |
| n77 | 3300 | 4200 | 3300 | 4200 | 6600 | 8400 | 9900 | 12600 | - | - | - | - |

For single uplink, the UE coexistence is already considered for these bands in TS 38.101-1 [3].

### 6.X.4 ∆TIB,c and ∆RIB,c values

For three simultaneous DLs and one UL of Band n5, n25 and n77, the ΔTIB,c and ΔRIB,c values are shown in table 6.X.4-1 and table 6.X.4-2, respectively. The requirement is reused from the similar combination, DC\_2-5\_n77.

Table 6.X.4-1: ΔTIB,c for 3DL aggregation

| **Inter-band CA Configuration** | **NR Band** | **ΔTIB,c [dB]** |
| --- | --- | --- |
| CA\_n5-n25-n77 | n5 | 0.6 |
| n25 | 0.6 |
| n77 | 0.8 |

Table 6.X.4-2: ΔRIB,c for 3DL aggregation

| **Inter-band CA Configuration** | **NR Band** | **ΔRIB,c [dB]** |
| --- | --- | --- |
| CA\_n5-n25-n77 | n5 | 0.2 |
| n25 | 0.2 |
| n77 | 0.5 |

### 6.X.5 REFSENS requirements

MSD due to the above harmonic issues are specifed in 2DL/1UL fallback CAs, CA\_n5-n77 and CA\_n25-n77.