**3GPP TSG-RAN WG4 Meeting #94-e R4-2001522**

**Online, 24th February – 6th March 2020**

**Source:** Ericsson, BT plc

**Title:** TP for TR 38.716-03-02: CA\_n1-n7-n28

**Agenda item:** 9.11.2

**Document for:** Approval

# 1. Introduction

This contribution is a text proposal for TR 38.716-03-02 to include CA\_n1A-n7A-n28A as defined in WID [1].

# 2. Text Proposal

# ---Start of changes---

### 5.1.x CA\_n1A-n7A-n28A

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

Table 5.1.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\_n1-n7-n28 | n1 | 1920 MHz | – | 1980 MHz | 2110 MHz | – | 2170 MHz | FDD |
| n7 | 2500 MHz | – | 2570 MHz | 2620 MHz | – | 2690 MHz | FDD |
| n28 | 880 MHz | – | 915 MHz | 925 MHz | – | 960 MHz | FDD |

#### 5.1.x.2 Channel bandwidths per operating band for CA

Table 5.1.x.2-1: Supported channel bandwidths per CA configuration for 3DL inter-band CA

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **NR CA Configuration** | **UL Config** | **NR Band** | **SCS [kHz]** | **5** | **10** | **15** | **20** | **25** | **30** | **40** | **50** | **60** | **80** | **90** | **100** | **Bandwidth combination set** |
| CA\_n1A-n7A-n28A | CA\_n1A-n7A  CA\_n1A- n28A  CA\_n7A-n28A | n1 | 15 | Yes | Yes | Yes | Yes |  |  |  |  |  |  |  |  | 0 |
| 30 |  | Yes | Yes | Yes |  |  |  |  |  |  |  |  |
| 60 |  | Yes | Yes | Yes |  |  |  |  |  |  |  |  |
| n7 | 15 | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |  |  |  |  |
| 30 |  | Yes | Yes | Yes | Yes | Yes | Yes | Yes |  |  |  |  |
| 60 |  | Yes | Yes | Yes | Yes | Yes | Yes | Yes |  |  |  |  |
| n28 | 15 | Yes | Yes | Yes | Yes2 |  |  |  |  |  |  |  |  |
| 30 |  | Yes | Yes | Yes2 |  |  |  |  |  |  |  |  |
| 60 |  |  |  |  |  |  |  |  |  |  |  |  |
| NOTE 1: This UE channel bandwidth is optional in this release of the specification.  NOTE 2: For the 20 MHz bandwidth, the minimum requirements are specified for NR UL carrier frequencies confined to either 713-723 MHz or 728-738 MHz | | | | | | | | | | | | | | | | |

#### 5.1.x.3 UE co-existence studies

The harmonic issue for Band n1+Band n7 + Band n28 has already been addressed in TR38.716-03-01, where there are no harmonic interference and harmonic mixing problem for CA\_n1A\_n7A-n28A.

Based on co-existence studies of Band n1 + Band n7, Band n1 + Band n28 and Band n7 + Band n28 captured in TR 38.716-02-00, own Rx impact of the IMD5 is the followings:

* 2nd order IMD generated by dual uplink of Band n1 + Band n28 may fall into part of own band n7.
* 5th order IMD generated by dual uplink of Band n1 + Band n7 may fall into part of own band n28.

#### 5.1.x.4 ∆TIB and ∆RIB values

For three simultaneous DLs and one UL of Band n1, n7 and n28, the ΔTIB,c and ΔRIB,c  values are shown in table 5.1.x.4-1 and table 5.1.x.4-2, respectively. Values are derived from DC\_1-7\_n28.

Table 5.1.x.4-1: ΔTIB,c for 3DL aggregation

| **Inter-band CA Configuration** | **NR Band** | **ΔTIB,c [dB]** |
| --- | --- | --- |
| CA\_n1-n7-n28 | n1 | 0.5 |
| n7 | 0.6 |
| n28 | 0.6 |

Table 5.1.x.4-2: ΔRIB,c for 3DL aggregation

| **Inter-band CA Configuration** | **NR Band** | **ΔRIB,c [dB]** |
| --- | --- | --- |
| CA\_n1-n7-n28 | n1 | 0 |
| n7 | 0 |
| n28 | 0.2 |

#### 5.1.x.5 REFSENS requirements

CA\_n1-n7-n28 need to have the same MSD requirements as DC\_1-7\_n28. Below are the updates needed in Table 7.3A.5-2 of TS 38.101-1.

Table 5.1.x.5-1: 3DL/2UL interband Reference sensitivity QPSK PREFSENS and uplink/downlink configurations

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Band / Channel bandwidth / NRB / Duplex mode | | | | | | | | Source of IMD |
| NR CA  Configuration | NR band | UL Fc  (MHz) | UL/DL BW  (MHz) | UL  CLRB | DL Fc (MHz) | MSD  (dB) | Duplex mode |
| CA\_n1A-n7A-n28A | n1 | 1935 | 5 | 25 | 2125 | N/A | FDD | N/A |
| n7 | 2533 | 10 | 50 | 2653 | 30.0 | FDD | IMD2 |
| n28 | 718 | 5 | 25 | 773 | N/A | FDD | N/A |
| n1 | 1935 | 5 | 25 | 2125 | N/A | FDD | N/A |
| n7 | 2510 | 10 | 50 | 2630 | N/A | FDD | N/A |
| n28 | 730 | 10 | 50 | 785 | 4.5 | FDD | IMD5 |

---End of changes---

# Reference

[1] RP-192617, “Revised WID on Rel-16 NR Inter-band Carrier Aggregation/Dual Connectivity for 3 bands DL with 2 bands UL”, ZTE