3GPP TSG-RAN WG4 Meeting #110 R4-240xxxx

Athens, Greece, 26th Feb – 1st Mar, 2024

**Source:** Huawei, HiSilicon, BT plc

**Title:** TP to TR 38.718-02-01 Addition of UL\_n102B/C to existing CA configurations

**Agenda item:** 7.10.2

**WI code:** NR\_CADC\_R18\_2BDL\_xBUL-Core

**Document for:** Approval

# Background

This contribution provides text proposal for adding UL\_n102B/C to the UL configurations of the NR CA band combinations as defined in the WID [1].

# Text Proposal

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

## 5.64 CA\_n46-n102

### 5.64.1 Common for 1 band UL and 2 bands UL CA

#### 5.64.1.1 Operating bands for CA

Table 5.64.1.1-1: CA band combination CA\_n46-n102

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **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\_n46-n10215,16,18,20 | n46 | 5150 MHz | – | 5925 MHz | 5150 MHz | – | 5925 MHz | TDD |
| n102 | 5925 MHz | – | 6425 MHz | 5925 MHz | – | 6425 MHz |
| NOTE 15: Simultaneous Rx/Tx capability does not apply for UEs supporting CA\_n46-n96 or CA\_n46-n102. Same restrictions are applied when applicable NR CA configuration is part of a higher order configurations.  NOTE 16: The minimum requirements for intra-band non-contiguous CA/DC apply for CA\_n46-n96, CA\_n46-n102 and related higher order CA/DC configurations.  NOTE 18: The minimum requirements for inter-band CA apply when the maximum power spectral density imbalance between downlink carriers is within 6 dB. The power spectral density imbalance condition also applies for these carriers when applicable CA configuration is a subset of a higher order CA configuration.  NOTE 20: The combination is not used alone as fall back mode of other band combinations in which UL in Band n78 is not used. | | | | | | | | |

Note: CA\_n46-n102 with UL is not specified and it is only used on higher order BC’s. Only 1UL in n46 or n102 will be allowed in higher order combos.

#### 5.64.1.2 Channel bandwidths per operating band for CA

Table 5.64.1.2-1: Supported bandwidths per CA band combination CA\_n46-n102

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **NR CA Configuration** | **UL CA Configuration** | **NR Band** | **Channel bandwidth [MHz]** | **Bandwidth combination set** |
| CA\_n46A-n102A | - | n46 | 10, 20, 40, 60, 80, 100 | 0 |
| n102 | 20, 40, 60, 80, 100 |
| CA\_n46A-n102(2A) | - | n46 | 10, 20, 40, 60, 80, 100 | 0 |
| n102 | CA\_n102(2A)\_BCS0 |
| CA\_n46A-n102B | CA\_n102B | n46 | 10, 20, 40, 60, 80, 100 | 0 |
| n102 | CA\_n102B\_BCS0 |
| CA\_n46A-n102C | CA\_n102C | n46 | 10, 20, 40, 60, 80, 100 | 0 |
| n102 | CA\_n102C\_BCS0 |
| CA\_n46A-n102D | - | n46 | 10, 20, 40, 60, 80, 100 | 0 |
| n102 | CA\_n102D\_BCS0 |
| CA\_n46A-n102E | - | n46 | 10, 20, 40, 60, 80, 100 | 0 |
| n102 | CA\_n102E\_BCS0 |
| CA\_n46(2A)-n102A | - | n46 | CA\_n46(2A)\_BCS0 | 0 |
| n102 | 20, 40, 60, 80, 100 |
| CA\_n46(2A)-n102(2A) | - | n46 | CA\_n46(2A)\_BCS0 | 0 |
| n102 | CA\_n102(2A)\_BCS0 |
| CA\_n46(2A)-n102B | CA\_n102B | n46 | CA\_n46(2A)\_BCS0 | 0 |
| n102 | CA\_n102B\_BCS0 |
| CA\_n46(2A)-n102C | CA\_n102C | n46 | CA\_n46(2A)\_BCS0 | 0 |
| n102 | CA\_n102C\_BCS0 |
| CA\_n46(2A)-n102D | - | n46 | CA\_n46(2A)\_BCS0 | 0 |
| n102 | CA\_n102D\_BCS0 |
| CA\_n46(2A)-n102E | - | n46 | CA\_n46(2A)\_BCS0 | 0 |
| n102 | CA\_n102E\_BCS0 |
| CA\_n46C-n102A | - | n46 | CA\_n46C\_BCS0 | 0 |
| n102 | 20, 40, 60, 80, 100 |
| CA\_n46C-n102(2A) | - | n46 | CA\_n46C\_BCS0 | 0 |
| n102 | CA\_n102(2A)\_BCS0 |
| CA\_n46C-n102B | CA\_n102B | n46 | CA\_n46C\_BCS0 | 0 |
| n102 | CA\_n102B\_BCS0 |
| CA\_n46C-n102C | CA\_n102C | n46 | CA\_n46C\_BCS0 | 0 |
| n102 | CA\_n102C\_BCS0 |
| CA\_n46C-n102D | - | n46 | CA\_n46C\_BCS0 | 0 |
| n102 | CA\_n102D\_BCS0 |
| CA\_n46C-n102E | - | n46 | CA\_n46C\_BCS0 | 0 |
| n102 | CA\_n102E\_BCS0 |
| CA\_n46D-n102A | - | n46 | CA\_n46D\_BCS0 | 0 |
| n102 | 20, 40, 60, 80, 100 |
| CA\_n46D-n102(2A) | - | n46 | CA\_n46D\_BCS0 | 0 |
| n102 | CA\_n102(2A)\_BCS0 |
| CA\_n46D-n102B | CA\_n102B | n46 | CA\_n46D\_BCS0 | 0 |
| n102 | CA\_n102B\_BCS0 |
| CA\_n46D-n102C | CA\_n102C | n46 | CA\_n46D\_BCS0 | 0 |
| n102 | CA\_n102C\_BCS0 |
| CA\_n46D-n102D | - | n46 | CA\_n46D\_BCS0 | 0 |
| n102 | CA\_n102D\_BCS0 |
| CA\_n46D-n102E | - | n46 | CA\_n46D\_BCS0 | 0 |
| n102 | CA\_n102E\_BCS0 |

#### 5.64.1.3 UE Co-existence studies

Due to non-simultaneous Tx/Rx operation, there are no harmonic/harmonic mixing/IMD issues for CA\_n46-n102.

The network may signal NS\_30 in the cell on band n46 and NS\_58 in the cell on band n102. Hence, the UL transmission on band n102 (or n46) may need to meet both of the additional emission requirements.

The additional requirements for NS\_58 are duplicated from TS 38.101-1 as below.

##### 6.5F.3.3.6 Requirements for network signalling value "NS\_58"

When "NS\_58" is indicated in the cell, the power of any UE emission for channels assigned within 5945-6425 MHz shall not exceed the levels specified in Table 6.5F.3.3.6-1. These requirements also apply for frequency ranges that are less than FOOB (MHz) in Table 6.5.3.1-1 from the edge of the channel bandwidth.

Table 6.5F.3.3.6-1: Additional requirements

|  |  |  |
| --- | --- | --- |
| Frequency band  (MHz) | Channel bandwidth /  Spectrum emission limit  (dBm) | Measurement bandwidth |
| 87.5 ≤ f ≤ 118 | -54 | 100 kHz |
| 174 ≤ f ≤ 230 | -54 | 100 kHz |
| 470 ≤ f ≤ 694 | -54 | 100 kHz |
| f ≤ 5935 | -22 | 1 MHz |

And the additional requirements for NS\_30 (the most relevant part) are duplicated as below, too.

Table 6.5F.3.3.3-3: Additional requirements for shared access channels assigned within 5725-5850 MHz

|  |  |  |
| --- | --- | --- |
| Protected range  (MHz) | Channel bandwidth /  Spectrum emission limit  (dBm) | Measurement bandwidth |
|  | 20, 40, 60, 80, [100] MHz |  |
| f < 5650 | -27 | 1 MHz |
| 5650 ≤ f < 5700 | -27 to 10 |
| 5700 ≤ f < 5720 | 10 to 15.6 |
| 5720 < f ≤ 5725 | 15.6 to 27 |
| 5850 ≤ f ≤ 5855 | 27 to 15.6 |
| 5855 < f ≤ 5875 | 15.6 to 10 |
| 5875 < f ≤ 5925 | 10 to -27 |
| 5925 < f | -27 |
| NOTE: The minimum requirement when specified as a range denotes the emission requirement at the end points of the protected range. The requirement within the protected range is obtained by linear interpolation between the requirements at the end points. | | |

It can be seen that for a UE transmitting on band n102 and compliant with NS\_58 will meet -22dBm/1MHz emission requirements for f ≤ 5935MHz. With a further 10MHz gap, it’s expected that the UE will be able to meet the 10 to -27dBm/1MHz emission requirements for 5875MHz < f ≤ 5925MHz as indicated by NS\_30.

Since the NS\_30 requirements are more stringent (-27dBm/1MHz vs -22dBm/1MHz), it’s expected that a UE transmitting on band n46 will meet the NS\_58 requirements.

In summary, no new A-MPR requirements will be needed.

#### 5.64.1.4 ∆TIB and ∆RIB values

For CA\_n46-n102, the ΔTIB,c and ΔRIB are reused from CA\_n46-n96 and given in the tables below.

Table 5.64.1.4-1: ΔTIB,c

| Inter-band CA Configuration | NR Band | ΔTIB,c [dB] |
| --- | --- | --- |
| CA\_n46-n102 | n46 | 0 |
| n102 | 0.5 |

Table 5.64.1.4-2: ΔRIB

| Inter-band CA Configuration | NR Band | ΔRIB [dB] |
| --- | --- | --- |
| CA\_n46-n102 | n46 | 0 |
| n102 | 0 |

#### 5.64.1.5 REFSENs requirements

There is no REFSENS exception requirements for CA\_n46-n102.

#### 5.64.1.6 OOB blocking exception requirements

There is no OOB blocking exception requirement for CA\_n46-n102.

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

# Reference

[1] RP-222904, “Revised WID Rel-18 NR Inter-band Carrier Aggregation/Dual Connectivity for 2 bands DL with x bands UL (x=1,2)”, ZTE Corporation