**3GPP TSG-RAN WG4 Meeting # 111 rev.of R4-2408381**

**Fukuoka, Japan, May. 20th – 24th, 2024**

Source: ZTE Corporation, Mediatek, Sanechips

Title: TP for TR38.718-02-01\_CA\_n41A-n79C and CA\_n41C-n79A

Agenda Item: 6.1.1.1

Document for: Approval

# **Introduction**

The BCS4 and 5 for CA\_n41A-n79C and CA\_n41C-n79A were requested and included in the WID, this contribution provides a text proposal to introduce CA\_n41A-n79C in TR38.718-02-01.

The fallback have already been defined in the spec.

In the current spec, UL CA\_n79C was included via draft CR in previous meeting. However, the technical analysis to check the MSD issues are missing considering the n41 and n79 support simultaneous Rx/Tx operation. Thus in the TP, we also provide the co-existence study on whether UL CA\_n79C would falls into band n41 DL Rx.

This TP is revised from R4-2408381, in which the contents related to the UL CA configuration of CA\_n41C-n79A is removed.

# **Reference**

[1] TR38.718-02-01,Rel-18 NR Inter-band Carrier Aggregation/Dual Connectivity for 2 bands DL with x bands UL (x=1,2),v0.9.0

# Text Proposal

**----- Start of TP -----**

## 5.x CA\_n41-n79

### 5.x.1 Common for 1 band UL and 2 bands UL CA

#### 5.x.1.1 Operating bands for CA

Table 5.x.1.1-1: CA band combination CA\_n41-n79

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **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\_n41-n79 | n41 | 2496 MHz | – | 2690 MHz | 2496 MHz | – | 2690 MHz | TDD |
| n79 | 4400 MHz | – | 5000 MHz | 4000 MHz | – | 5000 MHz | TDD |

#### 5.x.1.2 Channel bandwidths per operating band for CA

Table 5.x.1.2-1: Supported bandwidths per CA band combination CA\_n41-n79

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| NR CA configuration | Uplink CA configuration or single uplink carrier10 | NR Band | Channel bandwidth (MHz) (NOTE 3) | Bandwidth combination set |
| CA\_n41A-n79C | CA\_n41A-n79C | n41 | See n41 channel bandwidths in Table 5.3.5-1 | 4 and 5 |
|  |  | n79 | CA\_n79C\_BCS4 and 5 |  |
|  |  |  |  |  |
|  |  |  |  |  |

#### 5.x.1.3 UE Co-existence studies

For the UL/DL harmonic and harmonic mixing caused by single band n41 or single band n79, it was already analyzed in the fallback configurations of DL CA\_n41A-n79A with UL single carrier, and it can be applied for DL CA\_n41A-n79C with UL single carrier.

#### 5.x.1.3.1 UE co-existence studies for 2 Uplink CCs in one Intra-Band CA

Due to simultaneous Rx/Tx operation is supported for TDD bands n41 and n79, thus the co-existence studies caused by UL CA\_n79C should be analyzed additionally for CA\_n41A-n79C, respectively, which can be found in table Table 5.x.1.3.1-1:

Table 5.x.1.3.1-1: Co-existence studies for Uplink Intra-Band Contiguous CA of n79

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Configuration | Channel BW | Minimum channel separation | Maximum channel separation | Minimum frequency | Maximum frequency |  |
| Data | 40 | 40 | 200 | 4400 | 5000 | - |
| CC location | fU1L | fU2L | fU3L | fU1H | fU2H | fU3H |
| Frequency | 4400 | 4480 | 4600 | 5000 | 4920 | 4800 |
| 2nd order IMD products | IfU1L-fU2LI | IfU1L-fU3LI | fU1L + fU2L | fU1H+fU2H |  |  |
| Interference ranges | 80 | 200 | 8880 | 9920 |  |  |
| 3rd order IMD products | 2\*fU1L-fU3L | 2\*fU1H-fU3H | 2\*fU1L + fU2L | 2\*fU1H + fU2H |  |  |
| Interference ranges | 4200 | 5200 | 13280 | 14920 |  |  |
| 4th order IMD products | I2\*fU1L-2\*fU2LI | I2\*fU1H-2\*fU3H I | 3\*fU1L-fU3L | 3\*fU1H-fU3H | 3\*fU1L+fU2L | 3\*fU1H+fU2H |
| Interference ranges | 160 | 400 | 8600 | 10200 | 17680 | 19920 |
| 5th order IMD products | I3\*fU1L-2\*fU3LI | I3\*fU1H-2\*fU3H I | 4\*fU1L-fU3L | 4\*fU1H-fU3H | 4\*fU1L+fU2L | 4\*fU1H+fU2H |
| Interference ranges | 4000 | 5400 | 13000 | 15200 | 22080 | 24920 |
| 6th order IMD products | I3\*fU1L-3\*fU2LI | I3\*fU1H-3\*fU3H I | 4\*fU1L-2\*fU3L | 4\*fU1H-2\*fU3H | 5\*fU1L-fU3L | 5\*fU1H-fU3H |
| Interference ranges | 240 | 600 | 8400 | 10400 | 17400 | 20200 |
| 7th order IMD products | I4\*fU1L-3\*fU3LI | I4\*fU1H-3\*fU3HI | 5\*fU1L-2\*fU3L | 5\*fU1H-2\*fU3H | 6\*fU1L-fU3L | 6\*fU1H-fU3H |
| Interference ranges | 3800 | 5600 | 12800 | 15400 | 21800 | 25200 |



It can be seen that there are no co-existence issues caused by CA\_n79C impact band n41 DL.

#### 5.x.1.4 ∆TIB and ∆RIB values

The ΔTIB,c and ΔRIB of CA\_n41-n79 are already defined in the spec TS38.101-1.

#### 5.x.1.5 REFSENs requirements

According to the co-existence study, no additional MSD requirements should be defined for CA\_n41A-n79C. Thus there are no changes for the current specification.



#### 5.x.1.6 OOB blocking exception requirements

No additional OOB blocking exception issue.

### 5.x.2 Specific for 2 bands UL CA

#### 5.x.2.1 Maximum output power for inter-band CA

**Table 5.x.2.1-1: UE Power Class for uplink inter-band CA**

|  |  |  |
| --- | --- | --- |
| Uplink CA Configuration | Class 3 (dBm) | Tolerance (dB) |
| CA\_n41A-n79C | 23 | +2/-3 |
|  |  |  |

#### 5.x.2.2 UE co-existence studies

Due to both band n41 and n79 are TDD bands, so there are no need to check the TB IMDs caused by UL CA\_n41A-n79C since the Tx and Rx for either n41 or n79 will not be operation at the same time.

#### 5.x.2.3 REFSENS requirements

Based on the co-existence , there is no need to define the additional REFSEN exception requirements.

**----- End of TP -----**