**3GPP TSG-RAN WG4 Meeting # 116-bis Rev R4-2514225**

**Prague Meeting, Oct. 13th – Oct. 17th, 2025**

**Title: TP to TR 38.719-03-01 CA\_n1-n75-n78**

**Source: Nokia, BT PLC**

**Agenda item: 5.3.4**

**Document for: Approval**

# 1 Introduction

This is a TP to TR 38.719-03-01 to add CA\_n1-n75-n78(2A) including CA\_n78(2A) in the uplink, and the contribution is supported with fallback contributions in the same meeting. Note that the CA\_n78(2A) impact is analysed in fallbacks, and not adding to further co-existence analysis.

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## 5.15 CA\_n1-n75-n78

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

#### 5.15.1.1 Operating bands for CA

Table 5.15.1.1-1: CA band combination constituent bands definition

|  |  |  |  |
| --- | --- | --- | --- |
| **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** |
| n1 | 1920 MHz –1980 MHz | 2110 MHz –2170 MHz | FDD |
| n75 | N/A | 1432 MHz – 1517 MHz | SDL19 |
| n78 | 3300 MHz – 3800 MHz | 3300 MHz – 3800 MHz | TDD |

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

Table 5.15.1.2-1: Supported bandwidths per CA band combination

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| CA operating/channel bandwidth (MHz) | | | | |
| NR CA configuration | **Uplink CA configuration or single uplink carrier** | **NR Band** | **Channel bandwidth (MHz)** | **Bandwidth combination set** |
| CA\_n1A-n75A-n78A | CA\_n1A-n78A | n1 | n1 channel bandwidths in Table 5.3.5-1 | 4 and 5 |
|  |  | n75 | n75 channel bandwidths in Table 5.3.5-1 |  |
|  |  | n78 | n78 channel bandwidths in Table 5.3.5-1 |  |
| CA\_n1A-n75A-n78(2A) | CA\_n78(2A)  CA\_n1A-n78A | n1 | n1 channel bandwidths in Table 5.3.5-1 | 4 and 5 |
|  |  | n75 | n75 channel bandwidths in Table 5.3.5-1 |  |
|  |  | n78 | CA\_n78(2A)\_BCS 4 and 5 |  |

#### 5.15.1.3 ∆TIB,c and ∆RIB,c values

For CA\_n1-n75-n78, the ΔTIB,c and ΔRIB,c values have already been specified in TS 38.101-1.

### 5.15.2 Specific for 2 bands UL CA

#### 5.15.2.1 UE co-existence studies

*Editor’s Note: The tables in this section are provided to identify potential issues to be analyzed based on interference frequency range calculations, whether to specify the MSD related to collisions with the victim receiver frequency range should be based on the detailed REFSENS analysis.*

##### 5.15.2.1.1 Co-existence studies for 2UL band with 1CC per band

Table 5.15.2.1.1-1 provides the two UL bands with one CC per band IMD interference analysis for CA\_n1A-n75A-n78A with UL CA\_n1A-n78A.

Table 5.15.2.1.1-1: Two UL bands IMD analysis

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| UE UL carriers | fx\_low | fx\_high | fy\_low | fy\_high |
| 2nd order IMD products | |fy\_low – fx\_high| | |fy\_high – fx\_low| | |fy\_low + fx\_low| | |fy\_high + fx\_high| |
| IMD frequency limits (MHz) | 1320–1880 | | 5220–5780 | |
| Two-tone 3rd order IMD products | |2\*fx\_low – fy\_high| | |2\*fx\_high – fy\_low| | |2\*fy\_low – fx\_high| | |2\*fy\_high – fx\_low| |
| IMD frequency limits (MHz) | 40–660 | | 4620–5680 | |
| Two-tone 3rd order IMD products | |2\*fx\_low + fy\_low| | |2\*fx\_high + fy\_high| | |2\*fy\_low + fx\_low| | |2\*fy\_high + fx\_high| |
| IMD frequency limits (MHz) | 7140–7760 | | 8520–9580 | |
| Two-tone 4th order IMD products | |3\*fx\_low –1\* fy\_high| | |3\*fx\_high – 1\*fy\_low| | |3\*fy\_low – 1\*fx\_high| | |3\*fy\_high – 1\*fx\_low| |
| IMD frequency limits (MHz) | 1960–2640 | | 7920–9480 | |
| Two-tone 4th order IMD products | |2\*fx\_low –2\* fy\_high| | |2\*fx\_high –2\* fy\_low| |  |  |
| IMD frequency limits (MHz) | 2640–3760 | |  | |
| Two-tone 4th order IMD products | |3\*fx\_low +1\* fy\_low| | |3\*fx\_high + 1\*fy\_high| | |3\*fy\_low + 1\*fx\_low| | |3\*fy\_high + 1\*fx\_high| |
| IMD frequency limits (MHz) | 9060–9740 | | 11820–13380 | |
| Two-tone 4th order IMD products | |2\*fx\_low +2\* fy\_low| | |2\*fx\_high +2\* fy\_high| |  |  |
| IMD frequency limits (MHz) | 10440–11560 | |  | |
| Two-tone 5th order IMD products | |fx\_low – 4\*fy\_high| | |fx\_high – 4\*fy\_low| | |fy\_low – 4\*fx\_high| | |fy\_high – 4\*fx\_low| |
| IMD frequency limits (MHz) | 11220–13280 | | 3880–4620 | |
| Two-tone 5th order IMD products | |2\*fx\_low - 3\*fy\_high| | |2\*fx\_high - 3\*fy\_low| | |2\*fy\_low - 3\*fx\_high| | |2\*fy\_high -3\*fx\_low| |
| IMD frequency limits (MHz) | 5940–7560 | | 660–1840 | |
| Two-tone 5th order IMD products | |fx\_low + 4\*fy\_low| | |fx\_high + 4\*fy\_high| | |fy\_low + 4\*fx\_low| | |fy\_high + 4\*fx\_high| |
| IMD frequency limits (MHz) | 15120–17180 | | 10980–11720 | |
| Two-tone 5th order IMD products | |2\*fx\_low + 3\*fy\_low| | |2\*fx\_high + 3\*fy\_high| | |2\*fy\_low + 3\*fx\_low| | |2\*fy\_high + 3\*fx\_high| |
| IMD frequency limits (MHz) | 13740–15360 | | 12360–13540 | |
| NOTE : For each IMD item, when two bound values before taking absolute have different signs, the relevant IMD range shall be set such that (1) the lower bound is 0 and (2) the upper bound is the bigger value of the two after taking absolute. The lowest even order and lowest odd order IMD MSDs shall be considered. | | | | |

Based on the above table, the 2nd and 5th order IMD generated by UL CA\_n1A-n78A may fall into own Rx of Band n75

#### 5.15.2.2 REFSENS requirements

IMD5 generated by UL CA\_n1A-n78A fall into own Rx of Band n75.However, since the MSD value is 0 dB, there is no need to define MSD of IMD5. Referring to DC\_1A\_n75A-n78A, the MSD requirements can be specified as below:

Table 5.15.2.2-3: MSD for the CA configuration

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Band / Channel bandwidth / NRB / Duplex mode | | | | | | | | Source of IMD |
| NR CA band combination | NR band | UL Fc  (MHz) | UL/DL BW  (MHz) | UL  CLRB | DL Fc (MHz) | MSD  (dB) | Duplex mode |  |
| CA\_n1-n75-n78 | n1 | 1930 | 5 | 25 | 2120 | N/A | FDD | N/A |
|  | n75 | N/A | 5 | N/A | 1470 | 30.4 | SDL | IMD2 |
|  | n78 | 3400 | 10 | 52 | 3400 | N/A | TDD | N/A |

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