**3GPP TSG-RAN WG4 Meeting # 116-bis R4-2514222**

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

**Title: TP to TR 38.719-02-01 CA\_n75-n78**

**Source: Nokia, BT PLC**

**Agenda item: 5.3.3**

**Document for: Approval**

# 1 Introduction

This is a TP to TR 38.719-02-01 to add CA\_n75-n78 with CA\_n78(2A) in the uplink. Analysis of CA\_n75A-n78A already has been completed, so no studies included for n78A UL.

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## 5.x CA\_n75-n78

### 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 of band n75+n78

|  |  |  |  |
| --- | --- | --- | --- |
| **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** |
| n75 | - | 1432-1517 | SDL |
| n78 | 3300-3800 | 3300-3800 | TDD |

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

Table 5.x.1.2-1: Supported bandwidths per CA band combination of band n75+n78

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| NR CA configuration | Uplink CA configuration or single uplink carrier | NR Band | Channel bandwidth (MHz) | Bandwidth combination set |
| CA\_n75A-n78(2A) | CA\_n78(2A) | n75 | 5,10,15,20,25,30,40,50 | 4 and 5 |
|  |  | n78 | CA\_n78(2A) BCS 4 and 5 |  |

#### 5.x.1.3 UE co-existence studies for 1 band UL

Table 5.x.1.3-3 summarizes frequency ranges where IMD products caused by one UL band with 2CC intra-band UL CA may occur for headline

**Table 5.x.1.3-3: Intra-band ULCA IMD overlap with the other DL band analysis.**

|  |  |  |  |
| --- | --- | --- | --- |
| **All in MHz** | **flow** | **fhigh** | **BB IMD range3** |
| **n78 fUL** | 3300 | 3800 | **Order** | **flow** | **fhigh** |
| **n75 fDL** | 1432 | 1517 |
| **2CCBW1** | Minimum  | Maximum  | **IMD2(1-1)** | Min2CCBW | Max2CCBW |
| 10 | 500 | 10 | 500 |
| **Close to UL IMD range2** | **IMD4(2-2)** | 2\*Min2CCBW | 2\*Max2CCBW |
| **Order** | **flow** | **fhigh** | 20 | 1000 |
| **IMD3(2-1)** | fULlow-Max2CCBW | fULhigh+Max2CCBW | **IMD6(3-3)** | 3\*Min2CCBW | 3\*Max2CCBW |
| 2800 | 4300 | 30 | 1500 |
| **IMD5(3-2)** | fULlow-2\*Max2CCBW | fULhigh+2\*Max2CCBW | **Close to H2 IMD range4** |
| 2300 | 4800 | **Order** | **flow** | **fhigh** |
| **IMD7(4-3)** | fULlow-3\*Max2CCBW | fULhigh+3\*Max2CCBW | **IMD4(3-1)** | 2\*fULlow-Max2CCBW | 2\*fULhigh+Max2CCBW |
| 1800 | 5300 | 6100 | 8100 |
| **IMD9(5-4)** | fULlow-4\*Max2CCBW | fULhigh+4\*Max2CCBW | **IMD6(4-2)** | 2\*fULlow-2\*Max2CCBW | 2\*fULhigh+2\*Max2CCBW |
| 1300 | 5800 | 5600 | 8600 |
| **IMD11(6-5)** | fULlow-5\*Max2CCBW | fULhigh+5\*Max2CCBW | **Close to H3 IMD range4** |
| 800 | 6300 | **Order** | **flow** | **fhigh** |
| **IMD13(7-6)** | fULlow-6\*Max2CCBW | fULhigh+6\*Max2CCBW | **IMD5(4-1)** | 3\*fULlow-Max2CCBW | 3\*fULhigh+Max2CCBW |
| 300 | 6800 | 9400 | 11900 |
| **Analysis** | *There is an issue of IMD9 and IMD6 into n75* |
| NOTE 1: 2CCBW is the instantaneous transmit bandwidth of the two intra-band UL CCs: - The minimum 2CCBW for contiguous / non-contiguous intra-band ULCA is 0 / minimum UL channel bandwidth - The maximum 2CCBW for contiguous / non-contiguous ULCA is Min(maximum aggregated bandwidth / maximum  separation bandwidth(600MHz),fULhigh-fULlow)NOTE 2: The close to UL IMD range is the most critical when the victim DL band in proximity to the UL band: - For contiguous/non-contiguous intra-band ULCA within a TDD band, IMD order up to 9/7 should be considered and MPR assumed - For intra-band ULCA within a FDD band, IMD order up to 13 should be considered for bands in the same band group and MPR is not assumed. If justified by poor filtering performance, higher order IMD may need to be specified.NOTE 3: The BB IMD range should only be considered if the DL band is below the UL band and for non-contiguous ULCA within a TDD band >3GHz (assuming CA with 450MHz bands is not considered) - IMD2 is not considered assuming CA with 450MHz bands is not considered - IMD4 is considered for FDD or SimRx/Tx TDD bands <1GHz - IMD6 is considered for FDD or SimRx/Tx TDD bands <1.68GHzNOTE 4: The harmonic 2 and 3 IMD ranges should only be considered if the DL band is above the UL band |

#### 5.x.1.4 ∆TIB,c and ∆RIB,c values

For CA\_n75-n78, requirements are already covered.

#### 5.x.1.5 REFSENS requirements

The CA combination has IMD9 / IMD6 and the MSD requirements. For IMD6 the value is evaluated and is found negligible, hence not defined. Therefore, only IMD is defined as below.

Table 5.x.1.5-3: 2DL/2UL inter-band Reference sensitivity QPSK PREFSENS and uplink/downlink configurations for PC3 CA

|  |  |
| --- | --- |
| Band / Channel bandwidth / NRB / Duplex mode | Source of IMD |
| NR CA band combination | NR band | UL Fc (MHz) | UL/DL BW (MHz) | UL LCRB | DL Fc (MHz) | MSD (dB) | Duplex mode |  |
| CA\_n75-n78 | n75 | N/A | 5 | N/A | 1505 | 2.7 | SDL | IMD9 |
|  | n7812 | 3305 | 10 | 1 (RBSTART=25) | 3305 | N/A | TDD | N/A |
|  |  | 3795 | 10 | 1 (RBSTART=25) | 3795 |  |  |  |
| NOTE 12: This band supports intra-band non-contiguous uplink configuration. |

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

There is no OOB exception for this CA combination.

Table 5.x.1.6-1: CA band combination with exceptions allowed

|  |
| --- |
| CA band combination |
|  |

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