**3GPP TSG-RAN WG4 Meeting #111 *R4-2409315***

Fukuoka, Japan, May 20 – May 24, 2024

**Source:** Huawei, HiSilicon

**Title:** TP for TR 38.718-02-01 to remove brackets and complete CA\_n78A-n104A

**Agenda item:** 6.10.2

**Document for:** Approval

# 1 Background

This contribution proposed to remove brackets in the technical report and complete the NR CA band combination CA\_n78A-n104A, which has been captured in the latest basket WI [1].

# 2 Text Proposal

##### ---Start of changes TR 38.718-02-01 ---

5.86.1.5 REFSENS requirements

**MSD due to cross band isolation:**

Referring to the contributions R4-2405325/R4-2405698/R4-2405450/R4-2405876, the calculations summary for MSD due to cross band isolation are summarised in Table 5.86.1.5-1 for different RF architectures.

**Table 5.86.1.5-1: calculation summary for CA\_n78-n104 MSD due to cross band isolation**

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **UL band** | **DL band** | **UL Fc** | **UL BW** | **SCS of UL band** | **UL RB Allocation** | **DL Fc** | **DL BW** | **Cross-band**  **Interference**  **source** | **Huawei**  **option 1** | **Murata**  **option 2** | **Qualcomm**  **option 3** | **Skyworks**  **option 4** |
| **(MHz)** | **(MHz)** | **(kHz)** | **LCRB** | **(MHz)** | **(MHz)** | **MSD (dB)** | | | |
| n78 | n104 | 3750 | 100 | 30 | 270 (RBstart=0) | 6435 | 20 | >ACLR2 | 4.78 ~ 12.82 | 10.3 | 4.8 | 17.2 |
| n104 | n78 | 6475 | 100 | 30 | 270 (RBstart=0) | 3795 | 10 | >ACLR2 | 26.29 ~ 17.12 | 17.2 | 4.3 | 10.1 |

The following test configurations for CA\_n78-n104 MSD due to cross band isolation are proposed after averaging companies’ values below.

**Table 5.86.1.5-2: MSD due to cross band isolation for CA\_n78-n104**

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **UL band** | **DL band** | **UL Fc** | **UL BW** | **SCS of UL band** | **UL RB Allocation** | **DL Fc** | **DL BW** | **MSD** | **Cross-band**  **Interference**  **source** |
| **(MHz)** | **(MHz)** | **(kHz)** | **LCRB** | **(MHz)** | **(MHz)** | **(dB)** |
| n78 | n104 | 3750 | 100 | 30 | 270 (RBstart=0) | 6435 | 20 | 14.4 | >ACLR2 |
| n104 | n78 | 6475 | 100 | 30 | 270 (RBstart=0) | 3795 | 10 | 15.8 | >ACLR2 |

**MSD due to 2nd harmonic interference:**

Referring to the contribution R4-2405325/R4-2405698/R4-2405450/R4-2405876, the calculations for MSD due to 2nd harmonic interference are summarised in Table 5.86.1.5-3 for different band n78 PA H2 Attenuation and Post PA Filter performance.

**Table 5.86.1.5-3: calculation summary for CA\_n78-n104 MSD due to 2nd harmonic interference**

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **UL band** | **DL band** | **UL BW** | **SCS of UL band** | **UL RB Allocation** | **DL BW** | **UL/DL fc condition** | **UL/DL harmonic order** | **Huawei**  **option 1** | **Murata**  **option 2** | **Qualcomm**  **option 3** | **Skyworks**  **option 4** |
| **(MHz)** | **(kHz)** | **LCRB** | **(MHz)** | **MSD (dB)** | | | |
| n78 | n104 | 10 | [15] | 50 (RBstart=0) | 20 | NOTE 2 | UL2/DL1  direct-hit | 23.6~32.9 dB  Lcrb=24RB | 38.7 | 44.9 | 38.8 |
| n78 | n104 | 10 | [15] | 50 (RBstart=0) | 20 | NOTE 6 | UL2/DL1  near-miss |  | 10.6 | 16.2 |  |

The following test configurations for CA\_n78-n104 MSD due to 2nd harmonic interference are proposed below. This DL band may be affected by near-miss interference for which the MSD is not specified

**Table 5.86.1.5-4: MSD due to 2nd harmonic interference for CA\_n78-n104**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **UL band** | **DL band** | **UL BW** | **SCS of UL band** | **UL RB Allocation** | **DL BW** | **MSD** | **UL/DL fc condition** | **UL/DL harmonic order** |
| **(MHz)** | **(kHz)** | **LCRB** | **(MHz)** | **(dB)** |
| n78 | n104 | 10 | 15 | 50 (RBstart=0) | 20 | 37.5 | NOTE 2 | UL2/DL1  direct-hit |

**MSD due to 2nd harmonic mixing interference:**

Referring to the contribution R4-2405325/R4-2405698/R4-2405450/R4-2405876, the calculations for MSD due to 2nd harmonic mixing interference are summarised below for different DL channel bandwidths and 2nd harmonic mixing attenuation in LO.

* + Option 1: Huawei

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **UL band** | **DL band** | **UL BW** | **SCS of UL band** | **UL RB Allocation** | **DL BW** | **MSD** | **UL/DL fc condition** | **UL/DL harmonic order** |
| **(MHz)** | **(kHz)** | **LCRB** | **(MHz)** | **(dB)** |
| n104 | n78 | 20 | 30 | 50 (RBstart=0) | 10 | 5.9~24.8dB | NOTE 1 | UL1/DL2 |
| n104 | n78 | 20 | 30 | 50 (RBstart=0) | 100 | 0.8~15.1dB | NOTE 1 | UL1/DL2 |

* + Option 2: Murata

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **UL band** | **DL band** | **UL BW** | **SCS of UL band** | **UL RB Allocation** | **DL BW** | **MSD** | **UL/DL fc condition** | **UL/DL harmonic order** |
| **(MHz)** | **(kHz)** | **LCRB** | **(MHz)** | **(dB)** |
| n104 | n78 | 5 | 15 | 25 (RBstart=0) | 10 | 17.6 | NOTE 7 | UL1/DL2 |
| n104 | n78 | 20 | 15 | 100 (RBstart=0) | 100 | 9.9 | NOTE 7 | UL1/DL2 |
| NOTE 7: The requirements should be verified for UL NR-ARFCN of the aggressor (higher) band (superscript HB) such that  in MHz and  with  the carrier frequency in the victim (lower) band and  the channel bandwidth configured in the higher band. | | | | | | | | |

* + Option 3: Qualcomm

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **UL band** | **DL band** | **UL BW** | **SCS of UL band** | **UL RB Allocation** | **DL BW** | **MSD** | **UL/DL fc condition** | **UL/DL harmonic order** |
| **(MHz)** | **(kHz)** | **LCRB** | **(MHz)** | **(dB)** |
| n104 | n78 | 20 | 15 | 50 (RBstart=0) | 10 | 24.5 | NOTE 7 | UL1/DL2 |

* + Option 4: Skyworks

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **UL band** | **DL band** | **UL BW** | **SCS of UL band** | **UL RB Allocation** | **DL BW** | **MSD** | **UL/DL fc condition** | **UL/DL harmonic order** |
| **(MHz)** | **(kHz)** | **LCRB** | **(MHz)** | **(dB)** |
| n104 | n78 | 20 | 15 | 50 (RBstart=0) | 10 | 34.1 | NOTE 7 | UL1/DL2 |

The following test configurations for CA\_n78-n104 MSD due to 2nd harmonic mixing interference are proposed below.

**Table 5.86.1.5-6: MSD due to 2nd harmonic mixing interference for CA\_n78-n104**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **UL band** | **DL band** | **UL BW** | **SCS of UL band** | **UL RB Allocation** | **DL BW** | **MSD** | **UL/DL fc condition** | **UL/DL harmonic order** |
| **(MHz)** | **(kHz)** | **LCRB** | **(MHz)** | **(dB)** |
| n104 | n78 | 20 | 15 | 50 (RBstart=0) | 10 | 29 | NOTE 1 | UL1/DL2 |
| n104 | n78 | 20 | 15 | 50 (RBstart=0) | 100 | 18.8 | NOTE 1 | UL1/DL2 |

## ---End of changes---

# Reference

[1] RP-240761, “Revised WID Rel-18 NR Inter-band Carrier Aggregation/Dual Connectivity for 2 bands DL with x bands UL (x=1,2)”, ZTE Corporation