**3GPP TSG-RAN WG4 Meeting #111 R4-2410555**

**Fukuoka, Japan, May 20-24, 2024 Revision of R4-2407710**

**Source:** T-Mobile USA

**Title:** TP for TR38.850: FDD PC2 for n25 with DL CA\_n25A-n41A

**Agenda item:** 6.18.2

**Document for:** Approval

1. **Introduction**

This contribution is a text proposal to introduce PC2 n25 for DL CA\_n25A-n41A.

There is currently no MSD for PC3 CA\_n25A-n41A but At RAN4#110 it was suggested that there might be UL4/DL3 Harmonic Mixing MSD and cross-band isolation MSD for n25 PC2. This issue was further discussed at RAN4#110bis. This contribution considers Harmonic Mixing MSD and cross-band isolation MSD for CA\_n25A-n41A with UL n25 PC2.

1. **Discussion**

In [1] we proposed that since there is usually MB-HB diplexing, and the filtering margin along with the PA TX filter response should be enough to mitigate the effect of power class 2 for UL4. Because there is no MSD for PC3, we proposed 0.1 dB MSD PC2. For cross-band isolation MSD, we assumed 0.2 dB MSD for PC3.

During RAN4#110bis [1] was postponed, awaiting additional input. This TP is a placeholder for agreement on the MSD at RAN4#111.

This revision filles in the TBDs with values based on a linear average of the values proposed by Qualcomm, Skyworks and Murata.

1. **Reference**

[1] R4-2404382 “TP for TR38.850: FDD PC2 for n25 with DL CA\_n25A-n41A,” T-Mobile USA

1. **Text Proposal**

<Start of text proposal>

## 5.x CA\_ n25A-n41A

5.x.1 UE maximum output power

Table 5.5A.3.1-1: NR CA configurations and bandwidth combinations sets defined for inter-band CA (two bands)

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| NR CA configuration | Uplink CA configuration or single uplink carrier10 | NR Band | Channel bandwidth (MHz) (NOTE 3) | Bandwidth combination set |
| CA\_n25A-n41A | n418,9n25A8CA\_n25A-n41A8, 13,14 | n25 | 5, 10, 15, 20 | 0 |
|  |  | n41 | 10, 15, 20, 40, 50, 60, 80, 90, 100 |  |
|  |  | n25 | 5, 10, 15, 20, 25, 30, 40 | 1 |
|  |  | n41 | 10, 15, 20, 30, 40, 50, 60, 70, 80, 90, 100 |  |
|  |  | n25 | See n25 channel bandwidths in Table 5.3.5-1 | 4 and 5 |
|  |  | n41 | See n41 channel bandwidths in Table 5.3.5-1 |  |

NOTE 8: Minimum requirements for Power Class 2 are applicable for this uplink combination with 1Tx antenna connector in each band or single uplink carrier with up to 2Tx antenna connectors in this downlink/uplink combination

NOTE 10: Only single uplink carriers with power class other than PC3 are listed.

### 5.x.2 Harmonic Mixing Reference sensitivity requirements

#### 5.x.2.0 General

For PC3, CA\_ n25A-n41A has no harmonic MSD for UL n25. This section will examine the existing PC3 MSD and propose MSD for PC2 FDD.

#### 5.x.2.1 Reference sensitivity requirements with PC2 on n25 without TxD

MSD for 1Tx PC2 in n25 was discussed at RAN4#111 and the following was agreed to:

**Table 7.3A.4-4a: Reference sensitivity exceptions and uplink/downlink configurations due to harmonic mixing from a PC2 aggressor NR UL band for NR DL CA FR1**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **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)** |
| n25 | n41 | 5 | 15 | 25 (RBstart=0) | 10 | 2.7 | NOTE 11 | UL4/DL3 |

#### 5.x.2.2 Harmonic Mixing reference sensitivity requirements with PC2 on n25 with TxD

MSD for 2Tx PC2 in n25 was discussed at RAN4#111 and the following was agreed to:

**Table 7.3A.4-4a: Reference sensitivity exceptions and uplink/downlink configurations due to harmonic mixing from a PC2 aggressor NR UL band for NR DL CA FR1**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **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)** |
| n25 | n41 | 5 | 15 | 25 (RBstart=0) | 10 | 3.9 | NOTE 11 | UL4/DL3 |

### 5.x.3 Cross-band isolation reference sensitivity requirements

#### 5.x.3.0 General

For PC3, CA\_ n25A-n41A has no cross band isolation MSD for UL n25. This section proposes MSD for PC2 FDD.

#### 5.x.3.1 Reference sensitivity requirements with PC2 on n25 without TxD

MSD for PC2 in n25 was discussed at RAN4#111 and the following was agreed to for single Tx:

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **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)** |
| n25 | n41 | 1760 | 40 | 15 | 40 (RBstart=176) | 2501 | 10 | 0.8 | >ACLR2 |
| NOTE 1: Applicable only when harmonic mixing MSD for this combination is not applied.NOTE 2: VoidNOTE 3: The requirements only apply for UEs supporting inter-band carrier aggregation with simultaneous Rx/Tx capability. Simultaneous Rx/Tx capability does not apply for UEs supporting band n78 with a n77 implementation.NOTE 4: VoidNOTE 5: The MSD exceptions are applicable to the case that interference of UL band 3rd order IMD product falls into the affected DL channels. |

#### 5.x.3.2 Cross-band isolation reference sensitivity requirements with PC2 on n25 with TxD

MSD for PC2 in n25 was discussed at RAN4#111 and the following was agreed to for dual Tx:

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **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)** |
| n25 | n41 | 1760 | 40 | 15 | 40 (RBstart=176) | 2501 | 10 | 1.0 | >ACLR2 |
| NOTE 1: Applicable only when harmonic mixing MSD for this combination is not applied.NOTE 2: VoidNOTE 3: The requirements only apply for UEs supporting inter-band carrier aggregation with simultaneous Rx/Tx capability. Simultaneous Rx/Tx capability does not apply for UEs supporting band n78 with a n77 implementation.NOTE 4: VoidNOTE 5: The MSD exceptions are applicable to the case that interference of UL band 3rd order IMD product falls into the affected DL channels. |