**3GPP TSG-RAN4 Meeting #110-bis *R4-2404464***

**Changsha, China, 15th Apr 2024 – 19th Apr 2024**

**Title: TP to TR 36.718-02-01 Addition of CA\_12-71**

**Source: Samsung**

**Agenda item: 7.1.2.1**

**Document for: Approval**

1 Introduction

This TP is to add CA\_12A-71A with single UL.

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\* Start of TP\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

5.2.x CA\_12-71

5.2.x.1 Channel bandwidths per operating band for CA

**Table 5.2.x.1-1: Inter-band CA operating bands**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **E‑UTRA Operating Band** | **Uplink (UL) operating band BS receive UE transmit** | | | **Downlink (DL) operating band BS transmit  UE receive** | | | **Duplex Mode** |
| **FUL\_low – FUL\_high** | | | **FDL\_low – FDL\_high** | | |
| 12 | 699 MHz | – | 716 MHz | 729 MHz | – | 746 MHz | FDD |
| 71 | 663 MHz | – | 698 MHz | 617 MHz | – | 652 MHz | FDD |

**Table 5.2.x.1-2: E-UTRA CA configurations and bandwidth combination sets defined for inter-band CA**

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **E-UTRA CA configuration / Bandwidth combination set** | | | | | | | | | | |
| **E-UTRA CA Configuration** | **Uplink CA configurations** | **E-UTRA Bands** | **1.4 MHz** | **3 MHz** | **5 MHz** | **10 MHz** | **15 MHz** | **20 MHz** | **Maximum aggregated bandwidth**  **[MHz]** | **Bandwidth combination set** |
| CA\_12A-71A | - | 12 |  |  | Yes | Yes |  |  | 20 | 0 |
|  |  | 71 |  |  | Yes | Yes |  |  |  |  |

5.2.x.2 Co-existence studies

Table 5.2.x.2-1 and Table 5.2.x.2-2 summarize frequency ranges where harmonics and/or harmonics mixing occur for CA\_12-71.

**Table 5.2.x.2-1: Impact of UL/DL Harmonic**

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  |  |  |  | **2nd Harmonic** | | **3rd Harmonic** | | **4th Harmonic** | | **5th Harmonic** | |
| **Band** | **UL Low Band Edge** | **UL High Band Edge** | **DL Low Band Edge** | **DL High Band Edge** | **UL Low Band Edge** | **UL High Band Edge** | **UL Low Band Edge** | **UL High Band Edge** | **UL Low Band Edge** | **UL High Band Edge** | **UL Low Band Edge** | **UL High Band Edge** |
| 12 | 699 | 716 | 729 | 746 | 1398 | 1432 | 2097 | 2148 | 2796 | 2864 | 3495 | 3580 |
| 71 | 663 | 698 | 617 | 652 | 1326 | 1396 | 1989 | 2094 | 2652 | 2792 | 3315 | 3490 |

**Table 5.2.x.2-2: Impact of UL/DL Harmonic mixing**

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  |  |  |  | **2nd Harmonic** | | **3rd Harmonic** | | **4th Harmonic** | | **5th Harmonic** | |
| **Band** | **UL Low Band Edge** | **UL High Band Edge** | **DL Low Band Edge** | **DL High Band Edge** | **UL Low Band Edge** | **UL High Band Edge** | **UL Low Band Edge** | **UL High Band Edge** | **UL Low Band Edge** | **UL High Band Edge** | **UL Low Band Edge** | **UL High Band Edge** |
| 12 | 699 | 716 | 729 | 746 | 1458 | 1492 | 2187 | 2238 | 2916 | 2984 | 3645 | 3730 |
| 71 | 663 | 698 | 617 | 652 | 1234 | 1304 | 1851 | 1956 | 2468 | 2608 | 3085 | 3260 |

As can be seen in Table 5.2.x.2-1 and Table 5.2.x.2-2 there are no harmonic or harmonic mixing issues identified.

However, there are cross band isolation interferences from UL 71 to DL 12.

5.2.x.3 ∆TIB and ∆RIB values

For CA\_12-71, the ΔTIB,c and ΔRIB,c values are reused from NR CA\_n12-n71 and are given in the tables below.

**Table 5.2.x.3-1: ΔTIB,c**

|  |  |  |
| --- | --- | --- |
| CA\_12-71 | 12 | 1 |
| 71 | 1 |

**Table 5.2.x.3-2: ΔRIB,c**

|  |  |  |
| --- | --- | --- |
| CA\_12-71 | 12 | 0.8 |
| 71 | 0.8 |

5.2.x.4 REFSENS Requirements

Based on the co-existence studies there is a need to define additional REFSENS requirements. MSD value and test points are shown as below.

**Table 5.2.x.4-1: Reference sensitivity for carrier aggregation QPSK PREFSENS, CA**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Channel bandwidth** | | | | | | | | |
| **EUTRA CA Configuration** | **EUTRA band** | **1.4 MHz**  **(dBm)** | **3 MHz**  **(dBm)** | **5 MHz**  **(dBm)** | **10 MHz**  **(dBm)** | **15 MHz**  **(dBm)** | **20 MHz**  **(dBm)** | **Duplex mode** |
| CA\_12A-71A | 12 |  |  | -93.2 | -90.2 |  |  | FDD |
| CA\_12A-71A | 71 |  |  | -96.4 | -93.4 |  |  | FDD |

**Table 5.2.x.4-2: Uplink configuration for the uplink band**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **E-UTRA Band / Channel bandwidth of the affected DL band / NRB / Duplex mode** | | | | | | | | |
| **EUTRA CA Configuration** | **UL band** | **1.4 MHz** | **3 MHz** | **5 MHz** | **10 MHz** | **15 MHz** | **20 MHz** | **Duplex mode** |
| CA\_12A-71A | 71 |  |  | 20 | 20 |  |  | FDD |
| CA\_12A-71A | 12 |  |  | 20 | 20 |  |  | FDD |

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\* End of TP\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

2 References

[1] RP-240414\_Revised WID: Rel-18 LTE-Advanced Carrier Aggregation for x bands (2<=x<= 6) DL with y bands (y=1, 2) UL