**3GPP TSG-RAN WG4 Meeting #111 R4-2408454**

**Fukuoka, Japan, 20th May – 24th May 2024**

**Source:** Ericsson, NBN

**Title:** TP for 37.718-11-11 to include DC\_n40\_42

**Agenda item:** 6.3.2

**Document for:** Approval

# 1. Introduction

A text proposal for TR 37.718-11-11 to add DC\_n40A\_42A, DC\_n40A\_42C and DC\_n40A\_42D.

There are no pending lower order fallbacks in the same meeting.

# 2. Text Proposal

---Start of changes---

### 6.1.x DC\_n40\_42

#### 6.1.x.1 Configuration for DC

Table 6.1.x.1-1: Inter-band NE-DC configurations within FR1 (two bands)

| NA-DC  configuration | Uplink NE-DC  configuration | Single UL allowed |
| --- | --- | --- |
| DC\_n40A\_42A  DC\_n40A\_42C  DC\_n40A\_42D | DC\_n40A\_42A | No |

#### 6.1.x.2 Maximum output power for DC

Table 6.1.x.2-1: Maximum output power for inter-band NE-DC (two bands)

| DC configuration | Power class 3  (dBm) | Tolerance  (dB) |
| --- | --- | --- |
| DC\_n40A\_42A | 23 | +2/-3 |

#### 6.1.x.3 Spurious emission band UE co-existence for DC

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **E-UTRA and NR DC Configuration** | **Spurious emission** | | | | | | |
| **Protected band** | **Frequency range (MHz)** | | | **Maximum Level (dBm)** | **MBW (MHz)** | **NOTE** |
| DC\_n40\_42 | Frequency range | 1884.5 | - | 1915.7 | -41 | 0.3 | 3 |
| NOTE 3: Applicable when co-existence with PHS system operating in 1884.5 - 1915.7 MHz | | | | | | | |

#### 6.1.x.4 MSD analysis for DC

Table 6.1.x.4-1 lists Band n40 + Band 42 2UL DCup to 5th order IMD for the UE-to-UE coexistence analysis.

Table 6.1.x.4-1: Band n40 and Band 42 IMD products

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **UE UL carriers** | **fx\_low** | **fx\_high** | **fy\_low** | **fy\_high** |
| UL frequency (MHz) | 2300 | 2400 | 3400 | 3600 |
| Two tone 2nd order IMD products | |fy\_high – fx\_low| | |fy\_low – fx\_high| | |fy\_low + fx\_low| | |fy\_high + fx\_high| |
| IMD frequency limits (MHz) | 1300 | 1000 | 5700 | 6000 |
| Two-tone 3rd order IMD products | |fy\_high – 2\*fx\_low| | |fy\_low – 2\*fx\_high| | |2\*fy\_low – fx\_high| | |2\*fy\_high – fx\_low| |
| IMD frequency limits (MHz) | 1000 | 1400 | 4400 | 4900 |
| 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) | 8000 | 8400 | 9100 | 9600 |
| Two-tone 4th order IMD products | |2\*fx\_low –2\* fy\_high| | |2\*fx\_high – 2\*fy\_low| | |2\*fx\_low +2\* fy\_low| | |2\*fx\_high +2\* fy\_high| |
| IMD frequency limits (MHz) | 2600 | 2000 | 11400 | 12000 |
| 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) | 3300 | 3800 | 7800 | 8500 |
| 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) | 10300 | 10800 | 12500 | 13200 |
| 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) | 12100 | 11200 | 6200 | 5600 |
| 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) | 15900 | 16800 | 12600 | 13200 |
| 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) | 6200 | 5400 | 400 | 300 |
| 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) | 14800 | 15600 | 13700 | 14400 |

Table 6.1.x.4-2 lists up to 5th order harmonics products for dual connectivity between band n40 and band 42,

Table 6.1.x.4-2: Band n40 and Band 42 UL harmonic products

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  |  |  |  | **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** |
| n40 | 2300 | 2400 | 2300 | 2400 | 4600 | 4800 | 6900 | 7200 | 9200 | 9600 | 11500 | 12000 |
| 42 | 3400 | 3600 | 3400 | 3600 | 6800 | 7200 | 10200 | 10800 | 13600 | 14400 | 17000 | 18000 |

Table 6.1.x.4-3 lists up to 5th order harmonics mixing products for dual connectivity between band n40 and band 42,

Table 6.1.x.4-3: Band n40 and Band 42 UL harmonic mixing products

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  |  |  |  | **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** | **DL Low Band Edge** | **DL High Band Edge** | **DL Low Band Edge** | **DL High Band Edge** | **DL Low Band Edge** | **DL High Band Edge** | **DL Low Band Edge** | **DL High Band Edge** |
| n40 | 2300 | 2400 | 2300 | 2400 | 4600 | 4800 | 6900 | 7200 | 9200 | 9600 | 11500 | 12000 |
| 42 | 3400 | 3600 | 3400 | 3600 | 6800 | 7200 | 10200 | 10800 | 13600 | 14400 | 17000 | 18000 |

#### 6.1.x.5 ∆TIB and ∆RIB values

For DC\_n40\_42, the ΔTIB,c and ΔRIB values from CA\_40-42 are reused, see tables below.

Table 6.1.x.5-1: ΔTIB,c

| **Inter-band NE-DC configuration** | **ΔTIB,c for E-UTRA band / NR band (dB)7** | |
| --- | --- | --- |
| **Component band in order of bands in configuration8** | |
| DC\_n40\_42 | 0 | 0.5 |

Table 6.1.x.5-2: ΔRIB,c

| Inter-band NE-DC configuration | ΔRIB,c for E-UTRA band / NR band (dB)6 | |
| --- | --- | --- |
| Component band in order of bands in configuration7 | |
| DC\_n40\_42 | 0.4 | 0.5 |

#### 6.1.x.6 Self-interference analysis

Based on the results in Table 6.1.x.4-1 There are theoretical IMD4 impact of both DL n40 and DL 42, but since these are TDD bands this is not relevant.

Based on the results in 6.1.x.4-2 and 6.1.x.4-3, there are harmonic mixing from 3rd harmonic mixing DL n40 into 2nd harmonics of UL 42. MSD requirements are reused from DC\_40\_n78.

Table 6.1.x.6-1: Reference sensitivity exceptions (MSD) due to receiver harmonic mixing for NE-DC in NR 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)** |
| 42 | n40 | 5 | 15 | 12 (RBstart=0) | 5 | 14.7 | NOTE X | UL2/DL3 |
| 42 | n40 | 5 | 15 | 12 (RBstart=0) | 20 | 9.1 | NOTE X | UL2/DL3 |
| NOTE X: The requirements should be verified for DL EARFCN of the victim (lower) band (superscript LB) such that with the DL carrier frequency in the lower band and the UL carrier frequency in the higher band, both in MHz. | | | | | | | | |

### ---End of changes---