**3GPP TSG-RAN WG4 Meeting #97-e R4-2014810**

Online, 2nd Nov-13th Nov, 2020

**Source:** KDDI

**Title:** TP to TR 37.717-11-11: DC\_18A\_n41A

**Agenda Item:** 10.3.2

**Document for:** Approval

# Introduction

This contribution is a text proposal for TR 37.717-11-11 to include DC\_18A\_41A and according to the request in [1].

# 2 References

[1] RP‑201553, “New WID on New WID on Dual Connectivity (DC) of 1 band LTE (1DL/1UL) and 1 NR band (1DL/1UL)”, CHTTL.

# 3 Text Proposal

**<Start to Text Proposal>**

6.1.x DC\_18\_n41

6.1.x.1 Configuration for DC

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

| EN-DC configuration | Uplink EN-DC configuration | Single UL allowed |
| --- | --- | --- |
| DC\_18A\_n41A | DC\_18A\_n41A | No |
| The frequency range in band n41 is restricted for this band combination to 2595 – 2645 MHz. |

6.1.x.2 Maximum output power for DC

**Table 6.1.x.2-1:** **Maximum output power for inter-band EN-DC of 1 LTE band + 1 NR band**

| DC configuration | Power class 3(dBm) | Tolerance(dB) |
| --- | --- | --- |
| DC\_18A\_n41A | 23 | +2/-3 |

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

**Table 6.1.x.3-1: Spurious emissions for inter-band EN-DC of 1 LTE band + 1 NR band**

|  |  |
| --- | --- |
| **E-UTRA and NR DC Configuration** | **Spurious emission**  |
| **Protected band** | **Frequency range (MHz)** | **Maximum Level (dBm)** | **MBW (MHz)** | **NOTE** |
| DC\_18\_n41 | E-UTRA Band 1, 3, 11, 19, 21, 28, 34, 42, 65NR Band n79 | FDL\_low | - | FDL\_high | -50 | 1 |  |
| NR Band n77, n78 | FDL\_low | - | FDL\_high | -50 | 1 | 2 |
| Frequency range | 945 | - | 960 | -50 | 1 |  |
| Frequency range | 1884.5 | - | 1915.7 | -41 | 0.3 | 3 |
| NOTE 2: As exceptions, measurements with a level up to the applicable requirements defined in Table 6.6.3.1-2 are permitted for each assigned E-UTRA carrier used in the measurement due to 2nd, 3rd, 4th or 5th harmonic spurious emissions. Due to spreading of the harmonic emission the exception is also allowed for the first 1 MHz frequency range immediately outside the harmonic emission on both sides of the harmonic emission. This results in an overall exception interval centred at the harmonic emission of (2 MHz + N x LCRB x 180 kHz), where N is 2, 3, 4, 5 for the 2nd, 3rd, 4th or 5th harmonic respectively. The exception is allowed if the measurement bandwidth (MBW) totally or partially overlaps the overall exception interval.NOTE 3: Applicable when co-existence with PHS system operating in 1884.5 - 1915.7 MHz |

6.1.x.4 MSD analysis for DC

For 2UL/2DL UE coexistence study 2nd, 3rd, 4th and 5th order harmonics and 2nd, 3rd, 4th and 5th order intermodulation products were calculated and presented in Table 6.1.x.4-1.

**Table 6.1.x.4-1: Harmonic and IMD analysis**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **UE UL carriers** | **Fx\_low** | **Fx\_high** | **Fy\_low** | **Fy\_high** |
| UL frequency (MHz) | 815 | 830 | 2496 | 2690 |
| 2nd harmonics frequency limits | 2\*fx\_low | 2\*fx\_high | 2\* fy\_low | 2\* fy\_high |
| 2nd harmonics frequency limits (MHz)  | 1630 | 1660 | 4992 | 5380 |
| 3rd harmonics frequency limits | 3\*fx\_low | 3\*fx\_high | 3\* fy\_low | 3\* fy\_high |
| 3rd harmonics frequency limits (MHz) | 2445 | 2490 | 7488 | 8070 |
| 2nd order IMD products | |fy\_low – fx\_high| | |fy\_high – fx\_low| | |fy\_low + fx\_low| | |fy\_high + fx\_high| |
| IMD frequency limits (MHz) | 1666 | 1875 | 3311 | 3520 |
| Two-tone 3rd order IMD products | |2\*fx\_low – fy\_high| | |2\*fx\_high – fy\_low| | |2\*fy\_low – fx\_high| | |2\*fy\_high – fx\_low| |
| IMD frequency limits (MHz) | 1060 | 836 | 4162 | 4565 |
| 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) | 4126 | 4350 | 5807 | 6210 |
| 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) | -245 | -6 | 6658 | 7255 |
| Two-tone 4th order IMD products | |2\*fx\_low –2\* fy\_high| | |2\*fx\_high –2\* fy\_low| | 　 | 　 |
| IMD frequency limits (MHz) | 3750 | 3332 | 　 | 　 |
| 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) | 4941 | 5180 | 8303 | 8900 |
| Two-tone 4th order IMD products | |2\*fx\_low +2\* fy\_low| | |2\*fx\_high +2\* fy\_high| | 　 | 　 |
| IMD frequency limits (MHz) | 6622 | 7040 | 　 | 　 |
| 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) | 9945 | 9154 | 824 | 570 |
| 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) | 6440 | 5828 | 2502 | 2935 |
| 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) | 10799 | 11590 | 5756 | 6010 |
| 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) | 9118 | 9730 | 7437 | 7870 |

Based on the co-existence studies, impact on own Rx is as follows.

- 3nd IMD may fall into own Rx of band 18. Since band 18 is KDDI only band, No IMD issue with considering KDDI spectrum.

- 5th order IMD may also fall into own Rx of band n41. There is no need to estimate MSD value for own Rx of TDD band.

No IMD and harmonic issue for this combination..

6.1.x.5 ∆TIB and ∆RIB values

For DC\_18\_n41, ΔTIB,c and ΔRIB,c values are given in the tables below.

**Table 6.1.x.5-1: ΔTIB,c**

| Inter-band DC Configuration | E-UTRA and NR Band | ΔTIB,c [dB] |
| --- | --- | --- |
| DC\_18\_n41 | 18 | 0.3 |
| n41 | 0.31 |
| NOTE 1: Applicable for the frequency range of 2515-2690 MHz. |

**Table 6.1.x.5-2: ΔRIB,c**

| E-UTRA and NR DC Configuration | E-UTRA and NR Band | ΔRIB,c [dB] |
| --- | --- | --- |
| DC\_18\_n41 | 18 | 0 |
| n41 | 01 |
|  NOTE 1: Applicable for the frequency range of 2515-2690 MHz. |

6.1.x.6 self-interference analysis

**Table 6.1.x.6-1: Reference sensitivity exceptions (MSD) due to receiver harmonic mixing for EN-DC in NR FR1**

**DC in NR FR1**

|  |
| --- |
| E-UTRA or NR Band / Channel bandwidth of the affected DL band / MSD |
| UL band | DL band | 5MHz(dB) | 10 MHz(dB) | 15 MHz(dB) | 20 MHz(dB) | 25 MHz(dB) | 40 MHz(dB) | 50 MHz(dB) | 60 MHz(dB) | 80 MHz(dB) | 90 MHz(dB) | 100 MHz(dB) |
| n41 | 1811 | N/A | N/A | N/A |  |  |  |  |  |  |  |  |
| NOTE 11: No requirements apply for the case that there is at least one individual RE within the uplink transmission bandwidth of the relative higher band and when the frequency range of relative higher band’s uplink channel bandwidth or uplink 1st adjacent channel bandwidth is fully or partially overlapped with the 3 times of the frequency range of the relative lower band’s downlink channel bandwidth. The reference sensitivity is only verified when this is not the case (the requirements specified in clause 7.3B.1 apply). |

**<End of Text ProposalP >**