3GPP TSG-RAN WG4 Meeting #109 R4-2318267

Chicago, US, 13th-17th November 2023

Title: TP for TR38.898 PC2 ENDC for FR1 2BLTE1BNR and 1BLTE2BNR

Source: Softbank, LG Electronics

Agenda Item: 7.17.2

Document for: Approval

# **Introduction**

This contribution is a text proposal for TR38.898[5] to include the following HP-ENDC combinations as requested in RAN4#108.

* DC\_8A\_n1A-n77A
* DC\_8A\_n3A-n77A
* DC\_8A\_n28A-n77A

# **Reference**

[3] 3GPP TS 38.101-3 "User Equipment (UE) radio transmission and reception; Part 3: Range 1 and Range 2 Interworking operation with other radios (Release 18)", v18.3.0.

[5] 3GPP TR38.898 “High power UE (power class m with 1<m<3) for a single FR1 band in UL of Dual Connectivity (DC) combinations of x bands (x=1,2,3, 4 for y=1 or x=1, 2 for y=2) LTE inter-band CA (xDL/1UL) and y bands NR inter-band CA (yDL/1UL) (Release 18)”, V0.6.0

[6] 3GPP TR38.899 “High power UE for FR1 NR inter-band CA/DC or NR SUL band combination with y (1<y<=6) bands DL and x (x=1, 2) bands UL and power class m (m<3) and high power on TDD band(s) (Release 18)”, V0.6.0

[7] 3GPP TR37.863-01-01 “E-UTRA (Evolved Universal Terrestrial Radio Access) - NR Dual Connectivity (EN-DC) of LTE 1 Down Link (DL) / 1 Up Link (UL) and 1 NR band (Release 15)”, V15.4.0

# **Text Proposal**

# **-- Start of TP –**

**-- Unaffected parts omitted –**

5.xx DC\_8\_n1-n77

5.xx.1 Configuration for DC

**Table 5.xx.1-1: Inter-band EN-DC configurations within FR1 (three bands)**

| **EN-DC**  **configuration** | **Uplink EN-DC**  **configuration**  **(NOTE 1)** |
| --- | --- |
| **DC\_8A\_n1A-n77A5, 14** | DC\_8A\_n1A  **DC\_8A\_n77A14** |
| NOTE1: Uplink EN-DC configurations are the configurations supported by the present release of specifications.  NOTE 5: Applicable for UE supporting inter-band EN-DC with mandatory simultaneous Rx/Tx capability  NOTE 14: PC3 or PC2 Uplink EN-DC configuration is applicable to EN-DC configurations. | |

5.xx.2 Maximum output power for DC

The maximum output power requirement for PC2 UL DC\_8\_n77 is already specified in Table 6.2B.1.3-1 in TS38.101-3[3]. So, this section can be omitted.

5.xx.3 REFSENS requirements for DC

Analysis of REFSENS exceptions or MSD requirements is needed due to higher power UL DC. Based on co-existence studies of DC\_8\_n1-n77 could be reused from DC\_1-8\_n77 captured to 5.55.3 in TR38.898[5], own Rx impacts of the 3rd band are as follows:

* 3rd order IMD generated by dual uplink of band 8 and band n77 may fall into Rx of band n1.

Table 5.xx.3-1: MSD test points for SCell due to dual uplink operation for PC2 EN-DC in NR FR1 (three bands)

| **NR or E-UTRA Band / Channel bandwidth / NRB / MSD** | | | | | | | |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **EN-DC Configuration** | **EUTRA / NR band** | **UL Fc  (MHz)** | **UL/DL BW  (MHz)** | **UL**  **LCRB** | **DL Fc (MHz)** | **MSD  (dB)** | **IMD order** |
| DC\_8A\_n1A-n77A | 8 | 910 | 5 | 25 | 955 | N/A | N/A |
|  | n77 | 3960 | 10 | 50 | 3960 | N/A | N/A |
|  | n1 | 1950 | 5 | 25 | 2140 | 27.5 | IMD3 |

5.xx.4 ∆TIB and ∆RIB values

There is no change by comparing to the values for PC3 DC.

5.xx DC\_8\_n3-n77

5.xx.1 Configuration for DC

**Table 5.xx.1-1: Inter-band EN-DC configurations within FR1 (three bands)**

| **EN-DC**  **configuration** | **Uplink EN-DC**  **configuration**  **(NOTE 1)** |
| --- | --- |
| **DC\_8A\_n3A-n77A5, 14** | DC\_8A\_n1A  **DC\_8A\_n77A14** |
| NOTE1: Uplink EN-DC configurations are the configurations supported by the present release of specifications.  NOTE 5: Applicable for UE supporting inter-band EN-DC with mandatory simultaneous Rx/Tx capability  NOTE 14: PC3 or PC2 Uplink EN-DC configuration is applicable to EN-DC configurations. | |

5.xx.2 Maximum output power for DC

The maximum output power requirement for PC2 UL DC\_8\_n77 is already specified in Table 6.2B.1.3-1 of TS38.101-3[3]. So, this section can be omitted.

5.xx.3 REFSENS requirements for DC

Analysis of REFSENS exceptions or MSD requirements is needed due to higher power UL DC. Based on co-existence studies of DC\_8\_n3-n77 could be reused from DC\_3-8\_n77 captured to 5.57.3 in TR38.898[5], own Rx impacts of the 3rd band are as follows:

- 3rd order IMD generated by dual uplink of band 8 and band n77 may also impact the own Rx of band 3.

Table 5.xx.3-1: MSD test points for SCell due to dual uplink operation for PC2 EN-DC in NR FR1 (three bands)

| **NR or E-UTRA Band / Channel bandwidth / NRB / MSD** | | | | | | | |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **EN-DC Configuration** | **EUTRA / NR band** | **UL Fc  (MHz)** | **UL/DL BW  (MHz)** | **UL**  **LCRB** | **DL Fc (MHz)** | **MSD  (dB)** | **IMD order** |
| DC\_8A\_n3A-n77A | 8 | 910 | 5 | 25 | 955 | N/A | N/A |
|  | n77 | 3640 | 10 | 50 | 3640 | N/A | N/A |
|  | n3 | N/A | 5 | N/A | 1820 | 24.5 | IMD3 |

5.xx.4 ∆TIB and ∆RIB values

There is no change by comparing to the values for PC3 DC.

5.xx DC\_8\_n28-n77

5.xx.1 Configuration for DC

**Table 5.xx.1-1: Inter-band EN-DC configurations within FR1 (three bands)**

| **EN-DC**  **configuration** | **Uplink EN-DC**  **configuration**  **(NOTE 1)** |
| --- | --- |
| **DC\_8A\_n28A-n77A5,14** | DC\_8A\_n28A  **DC\_8A\_n77A14** |
| NOTE1: Uplink EN-DC configurations are the configurations supported by the present release of specifications.  NOTE 5: Applicable for UE supporting inter-band EN-DC with mandatory simultaneous Rx/Tx capability  NOTE 14: PC3 or PC2 Uplink EN-DC configuration is applicable to EN-DC configurations. | |

5.xx.2 Maximum output power for DC

The maximum output power requirement for PC2 UL DC\_8\_n77 is already specified in Table 6.2B.1.3-1 of TS38.101-3[3]. So, this section can be omitted.

5.xx.3 REFSENS requirements for DC

Analysis of REFSENS exceptions or MSD requirements is needed due to higher power UL DC. Based on co-existence studies of DC\_8\_n77 captured in TR 37.863-01-01[7], own Rx impacts of the 3rd band are as follows:

* the 4th order IMD generated by dual uplink of band 8 and band n77 may fall into Rx frequencies of band n28.

Table 5.xx.3-1: MSD test points for SCell due to dual uplink operation for PC2 EN-DC in NR FR1 (three bands)

| **NR or E-UTRA Band / Channel bandwidth / NRB / MSD** | | | | | | | |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **EN-DC Configuration** | **EUTRA / NR band** | **UL Fc  (MHz)** | **UL/DL BW  (MHz)** | **UL**  **LCRB** | **DL Fc (MHz)** | **MSD  (dB)** | **IMD order** |
| DC\_8A\_n28A-n77A | 8 | 910 | 5 | 25 | 955 | N/A | N/A |
|  | n28 | N/A | 5 | N/A | 765 | 14 | IMD4 |
|  | n77 | 3495 | 10 | 50 | 3495 | N/A | N/A |

5.xx.4 ∆TIB and ∆RIB values

There is no change by comparing to the values for PC3 DC.

**-- Unaffected parts omitted –**

**-- End of TP –**