**3GPP TSG-RAN WG1 Meeting # 103-e *R1-200xxxx***

**e-Meeting, October 26th – November 13th, 2020**

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| *CR-Form-v12.0* | | | | | | | | |
| **CHANGE REQUEST** | | | | | | | | |
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|  | **38.213** | **CR** | **xxxx** | **rev** | **-** | **Current version:** | **16.3.0** |  |
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| *For* [***HE******LP***](http://www.3gpp.org/3G_Specs/CRs.htm#_blank)*on using this form: comprehensive instructions can be found at* [*http://www.3gpp.org/Change-Requests*](http://www.3gpp.org/Change-Requests)*.* | | | | | | | | |
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| ***Proposed change affects:*** | UICC apps |  | ME | **X** | Radio Access Network | **X** | Core Network |  |

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| ***Title:*** | 38.213 CR for NR-DC power control | | | | | | | | | |
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| ***Source to WG:*** | Moderator (Nokia), MediaTek, Nokia, Nokia Shanghai Bell, ZTE | | | | | | | | | |
| ***Source to TSG:*** | R1 | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Work item code:*** | LTE\_NR\_DC\_CA\_enh-Core | | | | |  | ***Date:*** | | |  |
|  |  | | | |  | |  | | |  |
| ***Category:*** | **F** |  | | | | | ***Release:*** | | |  |
|  | *Use one of the following categories:* ***F*** *(correction)* ***A*** *(mirror corresponding to a change in an earlier release)* ***B*** *(addition of feature),* ***C*** *(functional modification of feature)* ***D*** *(editorial modification)*  Detailed explanations of the above categories can be found in 3GPP [TR 21.900](http://www.3gpp.org/ftp/Specs/html-info/21900.htm). | | | | | | | | *Use one of the following releases: Rel-8 (Release 8) Rel-9 (Release 9) Rel-10 (Release 10) Rel-11 (Release 11) Rel-12 (Release 12)* *Rel-13 (Release 13) Rel-14 (Release 14) Rel-15 (Release 15) Rel-16 (Release 16)* | |
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| ***Reason for change:*** | | This CR collects three changes (PC-DC issues 2-4 discussed in RAN1#103)  **PC-DC Issue#2**  Currently, TS 38.213 has inconsistent description on whether PDCCH reception with a last symbol that is earlier by from the first symbol of the transmission occasion on the SCG should be considered or not because “more than ”, “at least ”, “less than or equal to ” and “less than ” are mixed in Section 7.6.2.  In this case, as shown in the following figure, it is not clear whether the MCG PDCCH whose last symbol is exactly Toffset before the first symbol of the transmission occasion on the SCG should be considered valid or not.    This CR tries to fix the issue by clarifying that   1. PDCCH reception with a last symbol that is earlier by from the first symbol of the transmission occasion on the SCG should be considered valid. 2. PDCCH reception with a last symbol that is earlier by more than from the first symbol of the transmission occasion on the SCG should be considered valid. 3. PDCCH reception with a last symbol that is earlier by less than from the first symbol of the transmission occasion on the SCG should NOT be considered valid.   **PC-DC Issue#3**  In current 38.213 g20 spec [1] 7.6.2 NR-DC, the power control mode semi-static-mode2 is used with TDD scenari, and it is not clear what the UE behaviour for FDD scenario is.  **PC-DC Issue#4**  The 38.213 definition for the UE power sharing for NR-DC is not alilgned with the final agreement on the UE capabilities for dynamic power sharing, and and how the capability was defined in TS38.306/38.331. | | | | | | | | |
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| ***Summary of change:*** | | **PC-DC issue#2**: Align the description in Section 7.6.2 to clarify that PDCCH reception with a last symbol that is earlier by from the first symbol of the transmission occasion on the SCG should be considered valid when computing power for MCG.  **PC-DC issue#3**: Introducing a clause for the power sharing modes that applies even if there is no TDD configuration provided.  **PC-DC issue#4**: Describing the UE dynamic power sharing mode for NR-DC according to the indicated capability as defined in TS38.306/38.331 | | | | | | | | |
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| ***Consequences if not approved:*** | | **Issue #2:** Inconsistent description on whether PDCCH reception with a last symbol that is earlier by from the first symbol of the transmission occasion on the SCG should be considered or not in TS38.213.  **Issue #3:** Unclear UE powr scaling behavior when an FDD carrier is in the NR-DC configuration  **Issue #4:** Incompatible RAN1 and RAN2 specifications for the NR-DC dynamic power sharing UE capability | | | | | | | | |
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| ***Clauses affected:*** | | 7.6.2 | | | | | | | | |
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|  | | **Y** | **N** |  | | | |  | | |
| ***Other specs*** | |  | **X** | Other core specifications | | | | TS/TR ... CR ... | | |
| ***affected:*** | |  | **X** | Test specifications | | | | TS/TR ... CR ... | | |
| ***(show related CRs)*** | |  | **X** | O&M Specifications | | | | TS/TR ... CR ... | | |
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| ***Other comments:*** | | **Isolated impact analysis:**  This CR is based on RAN1’s common understanding, which has no impact on UE behavior. | | | | | | | | |
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| ***This CR's revision history:*** | | This is the first version for this CR. | | | | | | | | |

### 7.6.2 NR-DC

If a UE is configured with an MCG using NR radio access in FR1 or in FR2 and with a SCG using NR radio access in FR2 or in FR1, respectively, the UE performs transmission power control independently per cell group as described in Clauses 7.1 through 7.5.

If a UE is configured with an MCG and a SCG using NR radio access in FR1 and/or in FR2, the UE is configured a maximum power for transmissions on the MCG by *p-NR-FR1* and/or by *p-NR-FR2-r16* and a maximum power for transmissions on the SCG by *p-NR-FR1* and/or by *p-NR-FR2-r16* and with an inter-CG power sharing mode by *nrdc-PCmode-FR1-r16* for FR1 and/or by *nrdc-PCmode-FR2-r16* for FR2. The UE determines a transmission power on the MCG and a transmission power on the SCG per frequency range.

If a UE is provided *semi-static-mode1* for *nrdc-PCmode-FR1-r16* or for *nrdc-PCmode-FR2-r16*,or *semi-static-mode2* for *nrdc-PCmode-FR1-r16* or for *nrdc-PCmode-FR2-r16*, the UE does not expect and to be configured such that , where is the linear value of , is the linear value of , and is the linear value of a configured maximum transmission power for NR-DC operation in FR1 or FR2 as defined in [8-3, TS 38.101-3].

If a UE is provided *semi-static-mode1* for *nrdc-PCmode-FR1-r16* or for *nrdc-PCmode-FR2-r16*, the UE determines a transmission power for the MCG or for the SCG as described in Clauses 7.1 through 7.5 using or as the maximum transmission power, respectively.

If a UE is provided *semi-static-mode2* for *nrdc-PCmode-FR1* or for *nrdc-PCmode-FR2*

- if the UE is not provided *tdd-UL-DL-ConfigurationCommon* for the MCG or SCG, the UE determines a transmission power for the MCG or for the SCG as described in Clauses 7.1 through 7.5 using or as the maximum transmission power, respectively

- if at least one symbol of slot of the MCG or of the SCG that is indicated as uplink or flexible to a UE by *tdd-UL-DL-ConfigurationCommon* and *tdd*-*UL-DL-ConfigurationDedicated*, if provided, overlaps with a symbol for any ongoing transmission overlapping with slot of the SCG or of the MCG, respectively, the UE determines a power for the transmission on the SCG or the MCG overlapping with slot as described in Clauses 7.1 through 7.5 using or , respectively, as the maximum transmission power

- otherwise, the UE determines a power for the transmission on MCG or the SCG overlapping with slot , as described in [8-3, TS 38.101-3] and in Clauses 7.1 through 7.5 without considering or , respectively

The UE expects to be provided *semi-static-mode2* for *nrdc-PCmode-FR1-r16* or for *nrdc-PCmode-FR2-r16* only for synchronous NR-DC operation [10, TS 38.133].

If a UE

- is provided *dynamic* for *nrdc-PCmode-FR1-r16* or for *nrdc-PCmode-FR2-r16*, and

- indicates a capability to support dynamic power sharing for intra-FR NR DC,

the UE determines a maximum transmission power on the SCG at a first symbol of a transmission occasion on the SCG by determining transmissions on the MCG that

- are scheduled by DCI formats in PDCCH receptions with a last symbol that is earlier by at least from the first symbol of the transmission occasion on the SCG, or are configured by higher layers, and

- overlap with the transmission occasion on the SCG

the maximum transmission power on the SCG is determined as

- , if the UE determines transmissions on the MCG with a total power

- , if the UE does not determine any transmissions on the MCG

where

- ,

- and is the maximum of , , , , and based on the configurations on the MCG and the SCG, respectively, when the UE indicates the value of 'long' for the capability,

- and is the maximum of , , based on the configurations on the MCG and the SCG, respectively, when the UE indicates the value of 'short' for the capability, and

- is the total power for the transmissions on the MCG that overlap with the transmission occasion on the SCG where is determined based on transmissions configured by higher layers and on transmissions scheduled by DCI formats in PDCCH receptions with a last symbol that is at least before the first symbol of the transmission occasion on the SCG.

The UE does not expect to have PUSCH, PUCCH, or SRS transmissions on the MCG that

- are scheduled/triggered by DCI formats in PDCCH receptions with a last symbol that is earlier by less than from the first symbol of the transmission occasion on the SCG, and

- overlap with the transmission occasion on the SCG

The UE does not expect to receive a positive TPC command value in a DCI format 2\_2 or a DCI format 2\_3 in a PDCCH reception with a last symbol that is less than before the first symbol of the transmission occasion on the SCG, if the transmission on the MCG overlaps with the transmission occasion on the SCG.

The UE is not required to apply a TPC command the UE receives in a DCI format 2\_2 or a DCI format 2\_3 in a PDCCH reception with a last symbol that is less than before the first symbol of the transmission occasion on the SCG, if the transmission on the MCG overlaps with the transmission occasion on the SCG.