3GPP TSG-RAN WG4 Meeting # 97-e *rev of R4-2015992*

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| *CR-Form-v12.1* | | | | | | | | |
| **CHANGE REQUEST** | | | | | | | | |
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|  | **38.101-3** | **CR** |  | **rev** | 1 | **Current version:** | **15.11.0** |  |
|  | | | | | | | | |
| *For* [***HELP***](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 |  | Core Network |  |

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| ***Title:*** | CR to TS 38.101-3 clarifications on indication of Single Uplink allowed for intra-band EN-DC and NE-DC | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Source to WG:*** | CHTTL | | | | | | | | | |
| ***Source to TSG:*** | R4 | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Work item code:*** | NewRAT-Core | | | | |  | | ***Date:*** | | 2020-10-23 |
|  |  | | | |  | | |  | |  |
| ***Category:*** | **F** |  | | | | | | ***Release:*** | | Rel-15 |
|  | *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-15 (Release 15) Rel-16 (Release 16) Rel-17 (Release 17) Rel-18 (Release 18)* | |
|  |  | | | | | | | | | |
| ***Reason for change:*** | | For the intra-band EN-DC and NE-DC combinations, as the indication of single UL allowed is due to potential emission issues, there is no need to check whether the IM2 or IM3 falls into own primary downlink channel bandwidth or not when determining dual uplink is mandatory support or not. The description for the equation of the self IM interference includes the intra-band configuration tables in the current specification, which might cause confusion. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Summary of change:*** | | Remove the reference of intra-band EN-DC or NE-DC configuration tables out of the desciption of determining the UE is mandatory support dual uplink based on the self IM interference. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Consequences if not approved:*** | | It is not clear whether the equation of the self interference applies when determining whether dual uplink is mandatory support for the intra-band configurations. | | | | | | | | |
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| ***Clauses affected:*** | | 5.5B.1, Annex I | | | | | | | | |
|  | |  | | | | | | | | |
|  | | **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 ... | | | |
|  | |  | | | | | | | | |
| ***Other comments:*** | |  | | | | | | | | |

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| ***This CR's revision history:*** |  |

## << Start of changes >>

## 5.5B Configuration for DC

### 5.5B.1 General

The operating bands and bandwidth classes are specified for operation with EN-DC, NGEN-DC, NE-DC or NR-DC configured. The EN-DC, NGEN-DC or NE-DC band combinations include at least one E-UTRA operating band.

For EN-DC or NE-DC configurations indicated by column "Single Uplink allowed" (e.g., problematic band combinations as defined in TS 38.306 [11]) in Table 5.5B.4.1-1 and Table 5.5B.4a.1-1 the UE may indicate capability of not supporting simultaneous dual and triple uplink operation due to possible intermodulation interference to its own primary downlink channel bandwidth of PCell or PSCell if the intermodulation order is 2 or if the intermodulation order is 3 for the combinations when both operating bands are between 450 MHz – 960 MHz or between 1427 MHz – 2690 MHz.

In the case for EN-DC or NE-DC configurations listed in Table 5.5B.4.1-1 and Table 5.5B.4a.1-1 for which the intermodulation products caused by the dual and triple uplink operation fall into the receive band but do not interfere with its own primary downlink channel bandwidth of PCell or PSCell as defined in Annex I the UE is mandated to operate in dual and triple uplink mode. Single Uplink is also allowed for certain band combinations where intermodulation or reverse intermodulation products could create difficulty for meeting emission requirements.

For EN-DC combinations of order 3 or higher, "Single Uplink allowed" UL configurations captured in Table 5.5B.2-1, Table 5.5B.3-1, and Table 5.5B.4-1 apply.

If multiple UL DC configurations are listed for multiple DL DC configurations, valid uplink configurations are such that uplink does not have more carriers than downlink.

Non‑contiguous resource allocation and almost contiguous allocation are not applicable for E‑UTRA or NR carrier part of intra‑band EN‑DC configuration.

### 5.5B.2 Intra-band contiguous EN-DC

Table 5.5B.2-1: Intra-band contiguous EN-DC configurations

|  |  |  |
| --- | --- | --- |
| EN-DC  configuration | Uplink EN-DC  configuration  (NOTE 1) | Single UL allowed |
| DC\_(n)41AA5  DC\_(n)41CA5  DC\_(n)41DA5 | DC\_(n)41AA | Yes3 |
| DC\_(n)41CA5  DC\_(n)41DA5 | DC\_41A\_n41A | Yes3 |
| DC\_(n)71AA2 | DC\_(n)71AA | No4 |
| NOTE 1: Uplink EN-DC configurations are the configurations supported by the present release of specifications.  NOTE 2: Requirements in this specification apply for NR SCS of 15 kHz only.  NOTE 3: Single UL allowed due to potential emission issues, not self-interference.  NOTE 4: For UE(s) supporting dynamic power sharing it is mandatory to do dual simultaneous UL. For UE(s) not supporting dynamic power sharing single UL is allowed.  NOTE 5: The minimum requirements only apply for non-simultaneous Tx/Rx between all carriers. | | |

### 5.5B.3 Intra-band non-contiguous EN-DC

Table 5.5B.3-1: Intra-band non-contiguous EN-DC configurations

|  |  |  |
| --- | --- | --- |
| EN-DC  configuration | Uplink EN-DC  configuration  (NOTE 1) | Single UL allowed |
| DC\_3A\_n3A | DC\_3A\_n3A2 | Yes2 |
| DC\_41A\_n41A3  DC\_41C\_n41A3  DC\_41D\_n41A3 | DC\_41A\_n41A | Yes4 |
| NOTE 1: Uplink EN-DC configurations are the configurations supported by the present release of specifications.  NOTE 2: Only single switched UL is supported in Rel.15  NOTE 3: The minimum requirements only apply for non-simultaneous Tx/Rx between all carriers.  NOTE 4: Single UL allowed due to potential emission issues, not self-interference. | | |

## << Next session >>

Annex I (normative):  
Dual uplink interferer

UE is mandated to support operation in dual and triple uplink mode for EN-DC configuration in NR FR1 listed in Table 5.5B.4.1-1 and indicated by column single uplink allowed, Table 7.3B.2.3.5.1-1, Table 7.3B.2.3.5.2-0, Table 7.3B.2.3.5.2-1 or NE-DC configuration in NR FR1 listed in Table 5.5B.4a.1-1 and indicated by column single uplink allowed if the intermodulation products caused by the dual uplink operation do not interfere with its own primary downlink transmission channel bandwidth of PCell or PSCell. For intermodulation products falling into any secondary downlink channel bandwidth, UE single UL capability is not considered.

Formula for determining if the EN-DC in NR FR1 configuration with dual uplink operation interferes with its own downlink reception.

Interference bandwidth: IBW = |a| \* CBW1 + |b| \* CBW2

- |a| + |b| = 2 (or 3)

- CBW1 and CBW2 are the transmission bandwidth configurations of the UL channels

Center frequency of IBW: fIBW = |a \* f1 + b \* f2|

- f1 and f2 are center frequency of the transmission bandwidth configurations of each UL channel

The range of IMD 2 (or 3): [fIBW – IBW/2, fIBW + IBW/2]

NOTE 1: UE shall be able to apply operations which are configured by RRC reconfiguration and corresponding HARQ timing on the transmission bandwidth.

NOTE 2: For identified difficult band combination, during two adjacent RRC reconfiguration, the changing of transmission bandwidth should not introduce IM2 and IM3, which will result in UE changing from 2Tx to 1Tx. Otherwise, UE behavior is not specified.

For DC\_3A\_n3A intra-band non-contiguous EN-DC combination, only single switched UL is supported in Rel-15.

## << End of changes >>