**3GPP TSG-RAN WG4 Meeting #104-e *R4-2213150***

**Electronic Meeting, 15 - 26 August, 2022**

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| *CR-Form-v12.2* |
| **CHANGE REQUEST** |
|  |
|  | **38.101-1** | **CR** | **1158** | **rev** | **-** | **Current version:** | **17.6.0** |  |
|  |
| *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 |  | Core Network |  |

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| ***Title:***  | CR for 38.101-1 to correct the errors for FR1 RedCap UE |
|  |  |
| ***Source to WG:*** | Huawei, HiSilicon |
| ***Source to TSG:*** | R4 |
|  |  |
| ***Work item code:*** | NR\_redcap-Core |  | ***Date:*** | 2022-07-11 |
|  |  |  |  |  |
| ***Category:*** | **F** |  | ***Release:*** | Rel-17 |
|  | *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 canbe 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-16 (Release 16)Rel-17 (Release 17)Rel-18 (Release 18)Rel-19 (Release 19)* |
|  |  |
| ***Reason for change:*** | 1. There are some editorial errors in clause 7.3I.2.
2. The clarification for band n70 20MHz DL channel bandwidth that do not have symmetric UL channel bandwidth is missing for HD-FDD RFESENS.
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|  |  |
| ***Summary of change:*** | 1. Some editorial errors in clause 7.3I.2 are modified.
2. “For DL channel bandwidths that do not have symmetric UL channel bandwidth, highest valid UL configuration with lowest TX-RX separation (Table 5.4.4-1) shall be used unless otherwise specified.” is added for band n70.
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|  |  |
| ***Consequences if not approved:*** | Some editorial errors in clause 7.3I.2 are not corrected.The clarification for band n70 20MHz DL channel bandwidth that do not have symmetric UL channel bandwidth is missing for HD-FDD RFESENS. |
|  |  |
| ***Clauses affected:*** | 7.3I.2 |
|  |  |
|  | **Y** | **N** |  |  |
| ***Other specs*** |  | **X** |  Other core specifications  | TS/TR ... CR ...  |
| ***affected:*** | **X** |  |  Test specifications | TS 38.521-1 |
| ***(show related CRs)*** |  | **X** |  O&M Specifications | TS/TR ... CR ...  |
|  |  |
| ***Other comments:*** |  |
|  |  |
| ***This CR's revision history:*** |  |

## **<<Start of Change>>**

### 7.3I.2 Reference sensitivity power level

For a RedCap UE equipped with 2 Rx antenna ports, the throughput shall be ≥ 95 % of the maximum throughput of the reference measurement channels as specified in Annexes A.2.2.2, A3.2 and A.3.3 (with one sided dynamic OCNG Pattern OP.1 FDD/TDD for the DL-signal as described in Annex A.5.1.1/A.5.2.1) with parameters specified in Table 7.3.2-1a and Table 7.3.2-1b for the applicable operating bands. The reference sensitivity (REFSENS) requirement specified for a RedCap UE equipped with 2 Rx antenna ports shall be met with uplink transmission bandwidth less than or equal to that specified in Table 7.3.2-3 and, for FDD bands, with the Tx-Rx separation as defined in clause 5.4.4 for the applicable band and UE channel bandwidth.

For a RedCap UE equipped with 1 Rx antenna ports, reference sensitivity for 2Rx antenna ports in Table 7.3.2-1a and in Table 7.3.2-1b shall be modified by the amount given in ΔR1R in Table 7.3I.2-1 for the applicable operating bands. The reference sensitivity (REFSENS) requirement specified for a RedCap UE equipped with 1 Rx antenna ports shall be met with uplink transmission bandwidth less than or equal to that specified in Table 7.3.2-3 and, for FDD bands, with the Tx-Rx separation as defined in clause 5.4.4 for the applicable band and UE channel bandwidth.

Table 7.3I.2-1: Single antenna port reference sensitivity allowance ΔR1R

|  |  |  |
| --- | --- | --- |
| Operating band | Channel bandwidth (MHz) | ΔR1R (dB) |
| TDD band  | 5, 10, 15, 20 | 2.5 |
| FDD band  | 5  | 2.5 |
| FDD band  | 10, 15, 20 | 3.0 |

For a RedCap UE equipped with 2 Rx antenna ports operating in HD-FDD mode, reference sensitivity for 2Rx antenna ports in Table 7.3I.2-2 shall be met with uplink transmission bandwidth less than or equal to that specified in Table 7.3I.2-4.

**Table 7.3I.2-2: HD-FDD RedCap UE with 2 Rx antenna port reference sensitivity**

| Operating band / SCS / Channel bandwidth |
| --- |
| Operating Band | SCS kHz | 5 MHz(dBm) | 10 MHz(dBm) | 15 MHz(dBm) | 20 MHz(dBm) |
| n1 | 15 | -100.0 | -96.8 | -95.0 | -93.7 |
| 30 |  | -97.2 | -95.2 | -93.9 |
| 60 |  | -97.5 | -95.4 | -94.2 |
| n2 | 15 | -98.8 | -95.6 | -93.8 | -92.5 |
| 30 |  | -96.0 | -94.0 | -92.7 |
| 60 |  | -96.3 | -94.2 | -93.0 |
| n3 | 15 | -97.8 | -94.6 | -92.8 | -91.5 |
| 30 |  | -95.0 | -93.0 | -91.7 |
| 60 |  | -95.3 | -93.2 | -92.0 |
| n5 | 15 | -98.8 | -95.6 | -93.8 | -92.5 |
| 30 |  | -96.0 | -94.0 | -92.7 |
| n7 | 15 | -98.8 | -95.6 | -93.8 | -92.5 |
| 30 |  | -96.0 | -94.0 | -92.7 |
| 60 |  | -96.3 | -94.2 | -93.0 |
| n8 | 15 | -97.8 | -94.6 | -92.8 | -91.5 |
| 30 |  | -95.0 | -93.0 | -91.7 |
| n12 | 15 | -97.8 | -94.6 | -92.8 |  |
| 30 |  | -95.0 | -93.0 |  |
| n13 | 15 | -97.8 | -94.6 |  |  |
| 30 |  | -95.0 |  |  |
| n14 | 15 | -97.8 | -94.6 |  |  |
| 30 |  | -95.0 |  |  |
| n18 | 15 | -100.0 | -96.8 | -95.0 |  |
| 30 |  | -97.2 | -95.2 |  |
| n20 | 15 | -97.8 | -94.6 | -92.8 | -91.5 |
| 30 |  | -95.0 | -93.0 | -91.7 |
| n24 | 15 | -100.0 | -96.8 |  |  |
| 30 |  | -97.2 |  |  |
| 60 |  | -97.5 |  |  |
| n25 | 15 | -97.3 | -94.1 | -92.3 | -91.0 |
| 30 |  | -94.5 | -92.5 | -91.2 |
| 60 |  | -94.8 | -92.7 | -91.5 |
| n26 | 15 | -98.3 | -95.1 | -93.3 | -92.0 |
| 30 |  | -95.5 | -93.5 | -92.2 |
| n28 | 15 | -99.3 | -96.1 | -94.3 | -93.0 |
| 30 |  | -96.5 | -94.5 | -93.2 |
| n30 | 15 | -99.5 | -96.3 |  |  |
| 30 |  | -96.7 |  |  |
| n65 | 15 | -100.0 | -96.8 | -95.0 | -93.7 |
| 30 |  | -97.2 | -95.2 | -93.9 |
| 60 |  | -97.5 | -95.4 | -94.2 |
| n66 | 15 | -100.0 | -96.8 | -95.0 | -93.7 |
| 30 |  | -97.2 | -95.2 | -93.9 |
| 60 |  | -97.5 | -95.4 | -94.2 |
| n70 | 15 | -100.0 | -96.8 | -95.0 | -93.7 |
| 30 |  | -97.2 | -95.2 | -93.9 |
| 60 |  | -97.5 | -95.4 | -94.2 |
| n71 | 15 | -98.0 | -94.8 | -93.0 | -91.7 |
| 30 |  | -95.2 | -93.2 | -91.9 |
| n74 | 15 | -100.0 | -96.8 | -95.0 | -93.7 |
| 30 |  | -97.2 | -95.2 | -93.9 |
| 60 |  | -97.5 | -95.4 | -94.2 |
| n85 | 15 | -97.8 | -94.6 | -92.8 |  |
| 30 |  | -95.0 | -93.0 |  |
| n91 | 15 | -100.0 |  |  |  |
| n92 | 15 | -100.0 | -96.8 | -95.0 | -93.7 |
| 30 |  | -97.2 | -95.2 | -93.9 |
| n93 | 15 | -100.0 |  |  |  |
| n94 | 15 | -100.0 | -96.8 | -95.0 | -93.7 |
| 30 |  | -97.2 | -95.2 | -93.9 |

For a RedCap UE equipped with 1 Rx antenna ports and operating in HD-FDD mode, reference sensitivity for 1Rx antenna ports in Table 7.3I.2-3 shall be met with uplink transmission bandwidth less than or equal to that specified in Table 7.3I.2-4.

Table 7.3I.2-3: HD-FDD RedCap UE with 1 Rx antenna port reference sensitivity

| Operating band / SCS / Channel bandwidth |
| --- |
| Operating Band | SCS kHz | 5 MHz(dBm) | 10 MHz(dBm) | 15 MHz(dBm) | 20 MHz(dBm) |
| n1 | 15 | -97.5 | -94.3 | -92.5 | -91.2 |
| 30 |  | -94.7 | -92.7 | -91.4 |
| 60 |  | -95.0 | -92.9 | -91.7 |
| n2 | 15 | -96.3 | -93.1 | -91.3 | -90.0 |
| 30 |  | -93.5 | -91.5 | -90.2 |
| 60 |  | -93.8 | -91.7 | -90.5 |
| n3 | 15 | -95.3 | -92.1 | -90.3 | -89.0 |
| 30 |  | -92.5 | -90.5 | -89.2 |
| 60 |  | -92.8 | -90.7 | -89.5 |
| n5 | 15 | -96.3 | -93.1 | -91.3 | -90.0 |
| 30 |  | -93.5 | -91.5 | -90.2 |
| n7 | 15 | -96.3 | -93.1 | -91.3 | -90.0 |
| 30 |  | -93.5 | -91.5 | -90.2 |
| 60 |  | -93.8 | -91.7 | -90.5 |
| n8 | 15 | -95.3 | -92.1 | -90.3 | -89.0 |
| 30 |  | -92.5 | -90.5 | -89.2 |
| n12 | 15 | -95.3 | -92.1 | -90.3 |  |
| 30 |  | -92.5 | -90.5 |  |
| n13 | 15 | -95.3 | -92.1 |  |  |
| 30 |  | -92.5 |  |  |
| n14 | 15 | -95.3 | -92.1 |  |  |
| 30 |  | -92.5 |  |  |
| n18 | 15 | -97.5 | -94.3 | -92.5 |  |
| 30 |  | -94.7 | -92.7 |  |
| n20 | 15 | -95.3 | -92.1 | -90.3 | -89.0 |
| 30 |  | -92.5 | -90.5 | -89.2 |
| n24 | 15 | -97.5 | -94.3 |  |  |
| 30 |  | -94.7 |  |  |
| 60 |  | -95.0 |  |  |
| n25 | 15 | -94.8 | -91.6 | -89.8 | -88.5 |
| 30 |  | -92.0 | -90.0 | -88.7 |
| 60 |  | -92.3 | -90.2 | -89.0 |
| n26 | 15 | -95.8 | -92.6 | -90.8 | -89.5 |
| 30 |  | -93.0 | -91.0 | -89.7 |
| n28 | 15 | -96.8 | -93.6 | -91.8 | -90.5 |
| 30 |  | -94.0 | -92.0 | -90.7 |
| n30 | 15 | -97.0 | -93.8 |  |  |
| 30 |  | -94.2 |  |  |
| n65 | 15 | -97.5 | -94.3 | -92.5 | -91.2 |
| 30 |  | -94.7 | -92.7 | -91.4 |
| 60 |  | -95.0 | -92.9 | -91.7 |
| n66 | 15 | -97.5 | -94.3 | -92.5 | -91.2 |
| 30 |  | -94.7 | -92.7 | -91.4 |
| 60 |  | -95.0 | -92.9 | -91.7 |
| n70 | 15 | -97.5 | -94.3 | -92.5 | -91.2 |
| 30 |  | -94.7 | -92.7 | -91.4 |
| 60 |  | -95.0 | -92.9 | -91.7 |
| n71 | 15 | -95.5 | -92.3 | -90.5 | -89.2 |
| 30 |  | -92.7 | -90.7 | -89.4 |
| n74 | 15 | -97.5 | -94.3 | -92.5 | -91.2 |
| 30 |  | -94.7 | -92.7 | -91.4 |
| 60 |  | -95.0 | -92.9 | -91.7 |
| n85 | 15 | -95.3 | -92.1 | -90.3 |  |
| 30 |  | -92.5 | -90.5 |  |
| n91 | 15 | -97.5 |  |  |  |
| n92 | 15 | -97.5 | -94.3 | -92.5 | -91.2 |
| 30 |  | -94.7 | -92.7 | -91.4 |
| n93 | 15 | -97.5 |  |  |  |
| n94 | 15 | -97.5 | -94.3 | -92.5 | -91.2 |
| 30 |  | -94.7 | -92.7 | -91.4 |

Table 7.3I.2-4: Uplink configuration for HD-FDD reference sensitivity

| Operating band / SCS / Channel bandwidth |
| --- |
| Operating Band | SCS kHz | 5 MHz | 10 MHz | 15 MHz | 20 MHz |
| n1 | 15 | 25 | 50 | 75 | 100 |
| 30 |  | 24 | 36 | 50 |
| 60 |  | 10 | 18 | 24 |
| n2 | 15 | 25 | 50 | 75 | 100 |
| 30 |  | 24 | 36 | 50 |
| 60 |  | 10 | 18 | 24 |
| n3 | 15 | 25 | 50 | 75 | 100 |
| 30 |  | 24 | 36 | 50 |
| 60 |  | 10 | 18 | 24 |
| n5 | 15 | 25 | 50 | 75 | 100 |
| 30 |  | 24 | 36 | 50 |
| n7 | 15 | 25 | 50 | 75 | 100 |
| 30 |  | 24 | 36 | 50 |
| 60 |  | 10 | 18 | 24 |
| n8 | 15 | 25 | 50 | 75 | 100 |
| 30 |  | 24 | 36 | 50 |
| n12 | 15 | 25 | 50 | 75 |  |
| 30 |  | 24 | 36 |  |
| n13 | 15 | 25 | 50 |  |  |
| 30 |  | 24 |  |  |
| n14 | 15 | 25 | 50 |  |  |
| 30 |  | 24 |  |  |
| n18 | 15 | 25 | 50 | 75 |  |
| 30 |  | 24 | 36 |  |
| n20 | 15 | 25 | 50 | 75 | 100 |
| 30 |  | 24 | 36 | 50 |
| n24 | 15 | 25 | 50 |  |  |
| 30 |  | 24 |  |  |
| 60 |  | 10 |  |  |
| n25 | 15 | 25 | 50 | 75 | 100 |
| 30 |  | 24 | 36 | 50 |
| 60 |  | 10 | 18 | 24 |
| n26 | 15 | 25 | 50 | 75 | 100 |
| 30 |  | 24 | 36 | 50 |
| n28 | 15 | 25 | 50 | 75 | 100 |
| 30 |  | 24 | 36 | 50 |
| n30 | 15 | 25 | 50 |  |  |
| 30 |  | 24 |  |  |
| n65 | 15 | 25 | 50 | 75 | 100 |
| 30 |  | 24 | 36 | 50 |
| 60 |  | 10 | 18 | 24 |
| n66 | 15 | 25 | 50 | 75 | 100 |
| 30 |  | 24 | 36 | 50 |
| 60 |  | 10 | 18 | 24 |
| n70 | 15 | 25 | 50 | 75 | NOTE 1 |
| 30 |  | 24 | 36 | NOTE 1 |
| 60 |  | 10 | 18 | NOTE 1 |
| n71 | 15 | 25 | 50 | 75 | 100 |
| 30 |  | 24 | 36 | 50 |
| n74 | 15 | 25 | 50 | 75 | 100 |
| 30 |  | 24 | 36 | 50 |
| 60 |  | 10 | 18 | 24 |
| n85 | 15 | 25 | 50 | 75 |  |
| 30 |  | 24 | 36 |  |
| n91 | 15 | 25 |  |  |  |
| n92 | 15 | 25 | 50 | 75 | 100 |
| 30 |  | 24 | 36 | 50 |
| n93 | 15 | 25 |  |  |  |
| n94 | 15 | 25 | 50 | 75 | 100 |
| 30 |  | 24 | 36 | 50 |
| NOTE 1: For DL channel bandwidths that do not have symmetric UL channel bandwidth, highest valid UL configuration with lowest TX-RX separation (Table 5.4.4-1) shall be used unless otherwise specified. |

## **<<End of Change>>**