**3GPP TSG-RAN WG4 Meeting #104-e *R4-22xxxxx***

Draft

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

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| *CR-Form-v12.2* | | | | | | | | |
| **CHANGE REQUEST** | | | | | | | | |
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|  |  | **CR** |  | **rev** |  | **Current version:** | **15.9.0** |  |
|  | | | | | | | | |
| *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 |  | Radio Access Network | **X** | Core Network |  |

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| ***Title:*** | Big CR for TR 38.817-02 Maintenance (Rel-15, CAT F) | | | | | | | | | |
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| ***Source to WG:*** | MCC, Ericsson | | | | | | | | | |
| ***Source to TSG:*** | R4 | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Work item code:*** | NR\_newRAT-Core | | | | |  | ***Date:*** | | | 2022-08-31 |
|  |  | | | |  | |  | | |  |
| ***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-16 (Release 16) Rel-17 (Release 17) Rel-18 (Release 18) Rel-19 (Release 19)* | |
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| ***Reason for change:*** | | This big CR contains one endorsed draft CRs. The reason for change in each endorsed draft CR is copied below.  **R4-2211802 Draft CR to TR 38.817-02 on calculations of wanted and interfering signal power level from EISREFSENS\_50M.**  The general formula on calculations of wanted and interfering signal power level from EISREFSENS\_50M are not recorded in the TR, only an example with specific wanted and interfering signal bandwidth is given. | | | | | | | | |
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| ***Summary of change:*** | | The summary of change in the endorsed draft CR is copied below.  **R4-2211802 Draft CR to TR 38.817-02 on calculations of wanted and interfering signal power level from EISREFSENS\_50M.**  The general formula on calculations of wanted and interfering signal power level from EISREFSENS\_50M for future reference, the formula are copied from the agreed WF in R4-2203017. | | | | | | | | |
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| ***Consequences if not approved:*** | | The consequences if not approved for the endorsed draft CR are copied below.  **R4-2211802 Draft CR to TR 38.817-02 on calculations of wanted and interfering signal power level from EISREFSENS\_50M.**  Ambiguity remains and would lead to different interpretations of calculations with different wanted and interfering signal bandwidth. | | | | | | | | |
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| ***Clauses affected:*** | | **R4-2211802 Draft CR to TR 38.817-02 on calculations of wanted and interfering signal power level from EISREFSENS\_50M.**  10.9.3 | | | | | | | | |
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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 ... | | |
|  | |  | | | | | | | | |
| ***Other comments:*** | |  | | | | | | | | |
|  | |  | | | | | | | | |
| ***This CR's revision history:*** | |  | | | | | | | | |

**<Start of change>**

10.9.3 BS type 2-O

Similar to E-UTRA BS, the UL signal is defined for just 2 users, one being the “wanted” signal and the other one being the “interfering” signal at elevated power. The wanted signal and interferingsignal power level can be calculated in the following way:

Interfering signal power level = -174dBm/Hz+10\*log10(BW)+NF+ICS-G,  
Where:

- BW is interfering signal bandwidth in Hz, e.g. 33PRB for 50MHz SCS:60 kHz;

- G is dependent on the mmWave receiver antenna gain and other factors for OTA REFSENS requirement

- ICS is agreed as 14dBc for all BS type, the specific reasons can be found in the following Table.;

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| R4-1710771,ZTE | The observed IoT level for mmWave BS is around [0-5] dB which is much less than 16dB assumed for legacy LTE BS. Considering the legacy *C/I* 9dB assumed for interfering signal, then maximum in-channel selectivity is 14dB which is still much less than 25dB assumed for legacy LTE BS. |
| R4-1711156, Nokia | Comparing the simulation results between mmWave and below 6GHz, it can be seen the UL IOT for below 6GHz NR BS is around 10 dB higher than that for mmWave NR BS. It has been agreed that the current 25dB E-UTRA BS receiver in-channel selectivity could be reuse for below 6GHz NR BS, hence (25-10=)15dB should be a suitable level for mmWave NR BS in-channel selectivity based on the agreed below 6GHz NR BS receiver in-channel selectivity |

Similar as FR1 ICS requirement, it should be noted that DFT-s-OFDM has been adopted as the interfering signal of ICS requirement, the PRB number of interfering signal should comply with basic DFT process principle specified in TS 38.211 [25].

Wanted signal power level for ICS requirement for BS type 2-O could be calculated as following:

Wanted signal power level = -174dBm/Hz+10\*log10(BW)+NF+SNR+IM+3dB-G;  
Where:

- BW is wanted signal bandwidth in Hz;

- G is dependent on the mmWave receiver antenna gain and other factors for OTA REFSENS requirement;

- SNR is dependent on the link level simulation results;

- IM is implementation margin which is assumed as 2dB;

- 3dB is reference sensitivity degradation which is reused from legacy E-UTRA requirement;

Regarding the interferer power level, the modulation scheme for interfering signal is assumed as 16QAM and modulation scheme for wanted signal is assumed as QPSK.

The values of the wanted signal and the interferer have been specified based on the declared sensitivity EISREFSENS\_50M. This declared sensitivity is based on an FR2 signal of 50 MHz channel bandwidth (66 PRBs – 60kHz SCS), while the FRCs (used for the wanted signal) and the interferers have different channel bandwidth, bandwidth adaptation needs to be done then for each requirement. The wanted signal and interferingsignal power level can be calculated as follows:

EISREFSENS\_wanted = EISREFSENS\_50M +10\*log10(BWwanted/ BW50M)+( SNRwanted - SNR50M)+3

EISREFSENS\_interfer = EISREFSENS\_50M +10\*log10(BWinterfer/ BW50M)+ ICS-0.9

Note: ICS in above equation = 14 dBc

For example, for 50 MHz and 60 kHz SCS:

- The wanted signal is specified based on G-FR2-A1-4 FRC which is 33 PRBs wide and 60 kHz SCS, so its value should be:

EISREFSENS\_50M + 3 + 10 \* log10(33\*12\*60\*1000/66\*12\*60\*1000) = EISREFSENS\_50M + 3 -3.01

- The interferer signal is specified based on 32 PRBs and 60 kHz SCS, so its value should be:

EISREFSENS\_50M + 13 + 10 \* log10(32\*12\*60\*1000/66\*12\*60\*1000) = EISREFSENS\_50M + 13 - 3.14

**<End of change>**

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*End of change\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*Next changed section\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*