**3GPP TSG-WG4 Meeting #110 *R4-2403904***

**Athens, Greece, February 26 – March 01, 2024**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| *CR-Form-v12.2* | | | | | | | | |
| **CHANGE REQUEST** | | | | | | | | |
|  | | | | | | | | |
|  | **38.101-1** | **CR** |  | **rev** | **-** | **Current version:** | **18.4.0** |  |
|  | | | | | | | | |
| *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)*.* | | | | | | | | |
|  | | | | | | | | |

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| ***Proposed change affects:*** | UICC apps |  | ME | **X** | Radio Access Network |  | Core Network |  |

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | | | | | | | | | | |
| ***Title:*** | Compensating for post antenna connector gain impact to unwanted emissions for n101 band | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Source to WG:*** | Vodafone, Deutsche Telekom, Orange, Telia Company, KPN, Telecom Italia | | | | | | | | | |
| ***Source to TSG:*** | R4 | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Work item code:*** | NR\_RAIL\_HPUE\_n100\_n101, NR\_RAIL\_EU\_1900MHz\_TDD | | | | |  | ***Date:*** | | | 2024-02-16 |
|  |  | | | |  | |  | | |  |
| ***Category:*** | A |  | | | | | ***Release:*** | | | Rel-18 |
|  | *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)* | |
|  |  | | | | | | | | | |
| ***Reason for change:*** | | During RAN#102 meeting, it has been agreed to investigate what possibilities exist in the RAN4 specifications for n101 to avoid causing interference on already established networks.  Review in R4-2401966 shows that the unwanted emissions from the n101 band UE can harm reception by band 1 base stations, especailly if the n101 UE uses an antenna with positive gain.  This is because the current RAN 4 specifications measure the unwanted emissions with conducted emission tests and without any compensation for post-antenna-connector antenna gain.  Similar problems have been addressed for V2X by refering to annex I in TS 36.101. | | | | | | | | |
| ***INS*** | |  | | | | | | | | |
| ***Summary of change:*** | | Conducted mode, for band n100 and n101 are updated to compensate for post antenna connector antenna gain.  Declared supported post antenna gain for UE in band 100 and band n101. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Consequences if not approved:*** | | Uncertainty of using post antenna gain remains. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Clauses affected:*** | | 6.1, Annex X (new) | | | | | | | | |
|  | |  | | | | | | | | |
|  | | **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:*** | |  | | | | | | | | |

## **Background Information**

In 38.101-1, the post antenna connector gain was added to the unwanted emission for V2X as follows:

“The EIRP requirement is converted to conducted requirement depend on the supported post antenna connector gain Gpost connector declared by the UE following the principle described in annex I in [11].”

The annex I can be found in 36.101, which contains the following:

“ For V2X service at band 47, some regional requirements (region 1) are defined per effective isotropic radiated power (EIRP), which is a combination of the transmitted power (or in some cases spectral density) and the effective antenna gain.

Due to large form factor, V2X UE can have external antenna placed far away from the chipset unit. In this case, the effective antenna gain is a UE specific condition. This effective antenna gain includes the feeding loss of all components after the chipset unit antenna connector and the peak directional gain of the external antenna and hence will be call the post connector gain Gpost connector.

The 3GPP specifications mandate UE manufacturer declarations of at least one supported value of the post connector gain Gpost connector as a way to accommodate the refered regional requirement without putting requirements on the UE specific condtion.

The possible values of declared supported post connector gains are: 0, 1, 2, 3, 4, 5, 6, 7 dBi. If no value is declared, or if external antenna is not used, the default value of 0dBi will be used.

The regional requirements in PEIRP in Subclauses 6.2.2G, 6.2.5G, 6.6.2.2.4, 6.6.3.2 and 7.9.1 will be converted to conducted requirements by subtracting Gpost connector as.

PConducted = PEIRP - Gpost connector.

”

Following the same logic, the post antenna connector gain needs to be also added to the unwanted emission for radio cabs in band n101.

## **<<Start of Change 1>>**

## 6.1 General

Unless otherwise stated, the transmitter characteristics are specified at the antenna connector of the UE with a single or multiple transmit antenna(s). For UE with integral antenna only, a reference antenna with a gain of 0 dBi is assumed.

Transmitter requirements for UL MIMO operation apply when the UE transmits on 2 ports/4 ports on the same CDM group. The UE may use higher MPR values outside this limitation.

The applicability of transmitter requirements for Band n90 is in accordance with that for Band n41; a UE supporting Band n90 shall meet the minimum requirements for Band n41.

NOTE : For band n100 and n101, the EIRP requirements shall be converted to conducted requirements based on the post chipset unit antenna connector gain Gn100\_101post connector declared for the UE following the principle described in annex X.

## **<<End of Change 1>>**

## **<<Start of Change 2>>**

Annex X (normative): Declared Supported Post Antenna Gain for UE

Due to large form factor, UE in bands n100 and n101 can have external antenna placed far away from the chipset unit. In this case, the effective antenna gain is a UE specific condition. This effective antenna gain includes the feeding loss of all components after the chipset unit antenna connector and the peak directional gain of the external antenna and hence will be called the post connector gain Gn100\_101post connector.

The 3GPP specifications mandate UE manufacturer declarations of the supported value of the post connector gain Gn100\_n101post connector as a way to accommodate the requirement without putting requirements on the UE specific condition. If external antenna is not used, the value of 0dBi will be used.

The applicable regional requirements in PEIRP shall be converted to conducted requirements by subtracting Gn100\_101post connector as:

PConducted = PEIRP - Gn100\_101post connector.

## **<<End of Change 2>>**