3GPP TSG-RAN WG4 Meeting #111 R4-2409523

Fukuoka City, Fukuoka, Japan, 20th – 24th May, 2024

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| *CR-Form-v12.3* | | | | | | | | |
| **CHANGE REQUEST** | | | | | | | | |
|  | | | | | | | | |
|  |  | **CR** | **2350** | **rev** | **1** | **Current version:** |  |  |
|  | | | | | | | | |
| *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 to TS 38.101-1: Clarification on band-specific post antenna gain values for the FRMCS operation | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Source to WG:*** | Huawei, HiSilicon | | | | | | | | | |
| ***Source to TSG:*** | R4 | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Work item code:*** | NR\_RAIL\_EU\_900MHz-Core, NR\_RAIL\_EU\_1900MHz\_TDD-Core | | | | |  | ***Date:*** | | |  |
|  |  | | | |  | |  | | |  |
| ***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 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-17 (Release 17) Rel-18 (Release 18) Rel-19 (Release 19)  Rel-20 (Release 20)* | |
|  |  | | | | | | | | | |
| ***Reason for change:*** | | It was observed, that the Gn100\_101post connector value applies to two distinct bands. Even if the post chipset unit antenna connector gain values may be expected to be similar for n100 and n101, those would not be the same. Furthermore, another implication is that band n100 and n101 may or may not be deployed at the same time – therefore using a single term to denote post chipset unit antenna connector gain for 900MHz and 1900MHz bands is expected to be ambiguous.  In this CR we provide correction to split the RMR-related existing Gn100\_101post connector declaration into two band-specific declarations for n100 and n101 separately. | | | | | | | | |
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| ***Summary of change:*** | | Separation of the post chipset unit antenna connector gain to be declared separately for band n100, and for band n101.  Missing symbols added. | | | | | | | | |
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| ***Consequences if not approved:*** | | Ambiguity on the post antenna gain value declaration being applicable to two separate bands would remain in the specification. | | | | | | | | |
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| ***Clauses affected:*** | | 3.2, 6.1, M | | | | | | | | |
|  | |  | | | | | | | | |
|  | | **Y** | **N** |  | | | |  | | |
| ***Other specs*** | |  | **X** | Other core specifications | | | |  | | |
| ***affected:*** | |  | **X** | Test specifications | | | |  | | |
| ***(show related CRs)*** | |  | **X** | O&M Specifications | | | |  | | |
|  | |  | | | | | | | | |
| ***Other comments:*** | |  | | | | | | | | |
|  | |  | | | | | | | | |
| ***This CR's revision history:*** | |  | | | | | | | | |

*------------------------------ Modified section ------------------------------*

## 3.2 Symbols

For the purposes of the present document, the following symbols apply:

ΔFGlobal Granularity of the global frequency raster

ΔFRaster Band dependent channel raster granularity

ΔfOOB Δ Frequency of Out Of Band emission

ΔFTX-RX Maximum deviation to the Tx-Rx carrier center frequency separation for asymmetric uplink/downlink channel bandwidth operation

∆MPRc Allowed Maximum Power Reduction relaxation for serving cell *c*

ΔPPowerClass Adjustment to maximum output power for a given power class

RB The starting frequency offset between the allocated RB and the measured non-allocated RB

ΔRIB,c Allowed reference sensitivity relaxation due to support for inter-band CA operation, for serving cell *c*

ΔRIBC Allowed reference sensitivity relaxation due to support for intra-band contiguous CA operation

ΔRIBNC Allowed reference sensitivity relaxation due to support for intra-band non-contiguous CA operation

ΔRIB,4R Reference sensitivity adjustment due to support for 4 antenna ports

ΔR1RReference sensitivity adjustment due to support for 1 antenna ports

ΔShift Channel raster offset

TC Allowed operating band edge transmission power relaxation

TC,*c*Allowed operating band edge transmission power relaxation for serving cell *c*

ΔTIB,c Allowed maximum configured output power relaxation due to support for inter-band CA operation, inter-band NR-DC operation and due to support for SUL operations, for serving cell *c*

BWChannel Channel bandwidth

BWChannel,block Sub-block bandwidth, expressed in MHz. BWChannel,block= Fedge,block,high- Fedge,block,low

BWChannel\_CA Aggregated channel bandwidth, expressed in MHz

BWChannel,max Maximum channel bandwidth supported among all bands in a release

BWGB max( BWGB,Channel(*k*) )

BWGB,Channel(k) Minimum guard band defined in clause 5.3A.1 of carrier *k*

BWDL Channel bandwidth for DL

BWUL Channel bandwidth for UL

BWinterferer Bandwidth of the interferer

Ceil(x) Rounding upwards; ceil(x) is the smallest integer such that ceil(x) ≥ x

Floor(x) Rounding downwards; floor(x) is the greatest integer such that floor(x) ≤ x

FC Center frequency of a carrier for a numerology defined by the *RF reference frequency* on the channel raster mapped to the carrier according to sub-clause 5.4.2.2

FC,block, high Fc of the highest transmitted/received carrier in a *sub-block*

FC,block, low Fc of the lowest transmitted/received carrier in a *sub-block*

FC,low The Fc of the lowest carrier, expressed in MHz

FC,high The Fc of the highest carrier, expressed in MHz

FDL\_low The lowest frequency of the downlink *operating band*

FDL\_high The highest frequency of the downlink *operating band*

FUL\_low The lowest frequency of the uplink *operating band*

FUL\_high The highest frequency of the uplink *operating band*

Fedge,block,low The lower *sub-block* edge, where Fedge,block,low = FC,block,low - Foffset, low.

Fedge,block,high The upper *sub-block* edge, where Fedge,block,high = FC,block,high + Foffset, high.

Fedge , low The *lower edge* of *aggregated channel bandwidth*, expressed in MHz. Fedge,low = FC,low - Foffset,low.

Fedge, high The *higher edge* of *aggregated channel bandwidth*, expressed in MHz. Fedge,high = FC,high + Foffset,high.

FInterferer (offset) Frequency offset of the interferer (between the center frequency of the interferer and the carrier frequency of the carrier measured). For intra-band contiguous CA, the FInterferer (offset) is the frequency separation of the center frequency of the carrier closest to the interferer and the center frequency of the interferer

FInterferer Frequency of the interferer

FIoffset Frequency offset of the interferer (between the center frequency of the interferer and the closest edge of the carrier measured)

Foffset Frequency offset from FC\_high to the *higher edge* or FC\_low to the *lower edge.*

Foffset,high Frequency offset from FC,high to the upper *UE RF Bandwidth edge*, or from FC,block, high to the upper sub-block edge

Foffset,low Frequency offset from FC,low to the lower *UE RF Bandwidth edge*, or from FC,block, low to the lower sub-block edge

FOOB The boundary between the NR out of band emission and spurious emission domains

FREF RF reference frequency

FREF-Offs Offset used for calculating FREF

FREF, shift RF reference frequency for Supplementary Uplink (SUL) bands, the uplink of all FDD bands, and TDD bands

Fuw (offset) The frequency separation of the center frequency of the carrier closest to the interferer and the center frequency of the interferer

Gn100post connector Declared value of the post chipset unit antenna connector gain for band n100, used for conversion of the radiated requirement into a conducted requirement (see principles described in annex M)

Gn101post connector Declared value of the post chipset unit antenna connector gain for band n101, used for conversion of the radiated requirement into a conducted requirement (see principles described in annex M)

GBChannel Minimum guard band defined in clause 5.3.3, expressed in kHz

*------------------------------ Next modified section ------------------------------*

# 6 Transmitter characteristics

## 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.

For UEs that do not indicate IE *dualPA-Architecture*, transmitter requirements for CA operation apply only when the DMRS initialization parameters (including the case when the UE applies cell ID as DMRS scrambling ID) are different across all CCs. The UE may use higher MPR values outside this limitation.

Transmitter requirements for UL MIMO operation apply when the UE transmits on 2 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 FRMCS (Future Railway Mobile Communication System) operation in bands n100 and n101, the EIRP requirements shall be converted to conducted requirements based on the post chipset unit antenna connector gain Gn100post connector or Gn101post connector declared for the UE following the principle described in annex M.

*------------------------------ Next modified section ------------------------------*

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

M.1 FRMCS operating bands

Due to large form factor of the FRMCS (Future Railway Mobile Communication System) rooftop mounted cab-radio unit, 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 Gn100post connector and Gn101post connector for band n100 and n101, respectively.

The 3GPP specifications mandate UE manufacturer declarations of the supported value of the post connector gain Gn100post connector and Gn101post 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 for bands n100 and n101 in PEIRP shall be converted to conducted requirements by subtracting Gn100post connector or Gn101post connector as:

PConducted = PEIRP - Gn100post connector for band n100, and

PConducted = PEIRP - G101post connector for band n101..

*------------------------------ End of modified section -------------------------*