**3GPP TSG-RAN4 Meeting #110 *R4-2403819***

**Athens, Greece, 26th Feb 2024 - 1st Mar 2024**

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| *CR-Form-v12.2* | | | | | | | | |
| **CHANGE REQUEST** | | | | | | | | |
|  | | | | | | | | |
|  | **38.101-5** | **CR** | **0065** | **rev** | **1** | **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:*** | (NR\_NTN\_solutions-Core) CR for 38.101-5 to exclude phase continuity requirements for NTN UE (R17) | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Source to WG:*** | Huawei, HiSilicon | | | | | | | | | |
| ***Source to TSG:*** | R4 | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Work item code:*** | NR\_NTN\_solutions-Core | | | | |  | ***Date:*** | | | 2024-02-29 |
|  |  | | | |  | |  | | |  |
| ***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-16 (Release 16) Rel-17 (Release 17) Rel-18 (Release 18) Rel-19 (Release 19)* | |
|  |  | | | | | | | | | |
| ***Reason for change:*** | | Based on the latest agreements [R4-2321974] for NTN UE phase continuity requirements, current RF Phase continuity requirements specified in TS 38.101-5 are not aligned and applicable due to the lack of NTN-specific optimization and consideration especailly for NGSO. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Summary of change:*** | | To optimize phase continuity requirements and adjust application for NTN UE in Rel-17. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Consequences if not approved:*** | | Current RF Phase continuity requirements specified in TS 38.101-5 are not aligned and applicable due to the lack of NTN-specific optimization and consideration especailly for NGSO. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Clauses affected:*** | | 6.4.2, 6.4.2.1 (New clause), 6.4.2.2 (New clause) | | | | | | | | |
|  | |  | | | | | | | | |
|  | | **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>>**

### 6.4.2 Transmit modulation quality

#### 6.4.2.1 General

The requirements for transmit modulation quality defined in 3GPP TS 38.101-1 [5] clause 6.4.2 shall apply for NTN satellite UE except for clause 6.4.2.5.

#### 6.4.2.2 Phase continuity requirements for DMRS bundling

For bands that NTN UE indicates the support of DMRS bundling, when the NTN UE is configured with DMRS bundling, the maximum allowable difference between the measured phase value in any slot p-1 and slot p, or slot 0 and any slot p for each antenna connector shall satisfy the requirements as listed in Table 6.4.2.2-1 for the measurement conditions defined in Table 6.4.2.2-2, within a measurement time window limited by the UE capability of maximum duration for DMRS bundling [*maxDurationDMRS-Bundling-r17*] for GSO scenario, and defined for each frequency band separately. The phase value for each slot is measured as shown in Annex F.9 of TS 38.101-1 [5]. These requirements apply to PUCCH and PUSCH transmissions with DFT-s-OFDM and CP-OFDM waveforms.

Table 6.4.2.2-1: Maximum allowable phase difference for DMRS bundling

|  |  |  |  |
| --- | --- | --- | --- |
| UL channel | Modulation order | Phase difference between any slot *p-1* and slot *p*  (NOTE 2) | Phase difference between slot *0* and any slot *p*  (NOTE 3) |
| PUSCH | Pi/2 BPSK, QPSK | 25 degrees | 30 degrees |
| PUCCH | Pi/2 BPSK, BPSK, QPSK |  |  |
| NOTE 1: The UE capability of the length of maximum duration refers to the maximum time duration during which UE is able to meet the phase continuity requirements, assuming no phase consistency violating events defined in TS 38.214 in between.  NOTE 2: This requirement applies for NTN FDD bands as follows: if ntn-ScenarioSupport-r17 is present and indicated as GSO, then this requirement applies for the supported DMRS bundling configurations ≤ [8] slots indicated by [*maxDurationDMRS-Bundling-r17*].  NOTE 3: This requirement applies for NTN FDD bands as follows: if ntn-ScenarioSupport-r17 is present and indicated as GSO, then this requirement applies for the supported DMRS bundling configurations ≤ [16] slots. | | | |

The above requirements are applicable when all the following conditions are met within the measurement time window:

- RB allocation in terms of length and frequency position does not change, and intra-slot and inter-slot frequency hopping is not activated.

- Modulation order does not change.

- No network commanded TA takes effect.

- The TPMI precoder does not change.

- There is no change in UE transmission power level, and no change in the level of P-MPR applied by the UE.

- UE is not scheduled with uplink transmission of other physical channel/signal in-between the PUSCH or PUCCH transmissions.

- Doppler conditions are set to zero and delay conditions are set to constant.

Table 6.4.2.2-2: Measurement conditions for the maximum allowable phase difference

|  |  |  |
| --- | --- | --- |
| Parameter | Unit | Level |
| UE Output Power | dBm | PCMAX,f,c in clause 6.2.4, P-MPR = 0 |
| UE downlink received power |  | Not change |
| Operating conditions |  | Normal conditions |
| Transmission bandwidth |  | Confined within FUL\_low + 4 MHz and FUL\_high – 4 MHz |
| DL signal frequency |  | Not change before and during the measurement window |
| DL signal timing |  | Maintained constant before and during the measurement window |
| UL slots for testing |  | Tested on consecutive UL slots |
| PUSCH waveform for testing |  | DFT-s-OFDM |

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