**3GPP TSG-RAN4 WG4 Meeting # 99-e *R4-21XXXX***

**Electronic meeting, May 19- 27, 2021**

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| *CR-Form-v12.0* |
| **CHANGE REQUEST** |
|  |
|  | **36.101-1** | **CR** | 5793 | **rev** | **-** | **Current version:** | **12.26.0** |  |
|  |
| *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 on EVM requirement for TS 36.101 |
|  |  |
| ***Source to WG:*** | Huawei, HiSilicon |
| ***Source to TSG:*** | R4 |
|  |  |
| ***Work item code:*** | LTE-RF |  | ***Date:*** | 2021-05-07 |
|  |  |  |  |  |
| ***Category:*** | **F** |  | ***Release:*** | Rel-8 |
|  | *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-12 (Release 12)**Rel-13 (Release 13)Rel-14 (Release 14)Rel-15 (Release 15)Rel-16 (Release 16)* |
|  |  |
| ***Reason for change:*** | Off-on transient is within the 1st symbol of a subframe. It is not clear in the spec that the off-on transient need to be reduced for EVM meansurement. |
|  |  |
| ***Summary of change:*** | Add clairification to reduce the off-on transient for EVM measurement. |
|  |  |
| ***Consequences if not approved:*** | The spec is not clear. |
|  |  |
| ***Clauses affected:*** | 6.5.2.1 |
|  |  |
|  | **Y** | **N** |  |  |
| ***Other specs*** |  | **x** |  Other core specifications  | TS/TR … CR …  |
| ***affected:*** | **x** |  |  Test specifications | TS 36.521 |
| ***(show related CRs)*** |  | **x** |  O&M Specifications | TS/TR … CR …  |
|  |  |
| ***Other comments:*** |  |

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| --- | --- |
| ***This CR’s revision history:*** |  |

***<Start of change>***

#### 6.5.2.1 Error Vector Magnitude

The Error Vector Magnitude is a measure of the difference between the reference waveform and the measured waveform. This difference is called the error vector. Before calculating the EVM the measured waveform is corrected by the sample timing offset and RF frequency offset. Then the carrier leakage shall be removed from the measured waveform before calculating the EVM.

The measured waveform is further modified by selecting the absolute phase and absolute amplitude of the Tx chain. The EVM result is defined after the front-end IDFT as the square root of the ratio of the mean error vector power to the mean reference power expressed as a %.

The basic EVM measurement interval in the time domain is one preamble sequence for the PRACH and is one slot for the PUCCH and PUSCH in the time domain.. When the PUSCH or PUCCH transmission slot is shortened due to multiplexing with SRS, the EVM measurement interval is reduced by one symbol, accordingly. The PUSCH or PUCCH EVM measurement interval is also reduced when the mean power, modulation or allocation between slots is expected to change, or when the off-on power transient is expected at the 1st symbol of the uplink transmission. In the case of PUSCH transmission, the measurement interval is reduced by a time interval equal to the sum of 5 μs and the applicable exclusion period defined in subclause 6.3.4, adjacent to the boundary where the power change is expected to occur. The PUSCH exclusion period is applied to the signal obtained after the front-end IDFT. In the case of PUCCH transmission with power change, the PUCCH EVM measurement interval is reduced by one symbol adjacent to the boundary where the power change is expected to occur.

##### 6.5.2.1.1 Minimum requirement

The RMS average of the basic EVM measurements for 10 sub-frames excluding any transient period for the average EVM case, and 60 sub-frames excluding any transient period for the reference signal EVM case, for the different modulations schemes shall not exceed the values specified in Table 6.5.2.1.1-1 for the parameters defined in Table 6.5.2.1.1-2. For EVM evaluation purposes, [all PRACH preamble formats 0-4 and] all PUCCH formats 1, 1a, 1b, 2, 2a and 2b are considered to have the same EVM requirement as QPSK modulated.

Table 6.5.2.1.1-1: Minimum requirements for Error Vector Magnitude

|  |  |  |  |
| --- | --- | --- | --- |
| Parameter | Unit | Average EVM Level | Reference Signal EVM Level |
| QPSK or BPSK | % | 17.5 | 17.5 |
| 16QAM  | % | 12.5 | 12.5 |

Table 6.5.2.1.1-2: Parameters for Error Vector Magnitude

|  |  |  |
| --- | --- | --- |
| Parameter | Unit | Level |
| UE Output Power | dBm | ≥ -40 |
| Operating conditions |  | Normal conditions |

***<End of change>***