**3GPP TSG-RAN4 Meeting # *R4-2205533***

 **Electronic Me**e**ting, 21st Feb – 3rd March 2022**

|  |
| --- |
| *CR-Form-v12.1* |
| **CHANGE REQUEST** |
|  |
|  | **38.101-1** | **CR** |  | **rev** | **-** | **Current version:** | **17.4.0** |  |
|  |
| *For* [***HELP***](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:***  | CR on DMRS bundling |
|  |  |
| ***Source to WG:*** | Ericsson |
| ***Source to TSG:*** | R4 |
|  |  |
| ***Work item code:*** | NR\_cov\_enh-Core |  | ***Date:*** | 2022-2-21 |
|  |  |  |  |  |
| ***Category:*** | **B** |  | ***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 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-15 (Release 15)Rel-16 (Release 16)Rel-17 (Release 17)Rel-18 (Release 18)* |
|  |  |
| ***Reason for change:*** | UE RF requirmeent on DMRS bundling is introduced in Rel-17 in NR |
|  |  |
| ***Summary of change:*** | Inroduce the annex F.9 on the DMRS measurement |
|  |  |
| ***Consequences if not approved:*** | No UE RF requirmeent on DMRS bundling in specificaitons. |
|  |  |
| ***Clauses affected:*** | F.9, F.9.1, F9.2, F.9.3 |
|  |  |
|  | **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 changes >

# F.9 Phase offset measurement for DMRS bundling

The measurement point for phase offset measurement is defined in Figure F.9-1.



Figure F.9-1: measurement point for phase offset for DMRS bundling

## F.9.1 Modified test signal

TX chain equalizer coefficients are calculated once per slot with  set to , as described in Annex F.4:

In the case of PUCCH and PUSCH, the UL EVM analyzer shall estimate the TX chain equalizer coefficients and  used by the ZF equalizer for all subcarriers by time averaging at each signal subcarrier of the amplitude and phase of the reference and data symbols. The time-averaging length is 1 slot. This process creates an average amplitude and phase for each signal subcarrier used by the ZF equalizer. The knowledge of data modulation symbols may be required in this step because the determination of symbols by demodulation is not reliable before signal equalization.

At this stage estimates of , ,  and  are available.

## F.9.2 Phase offset measurement

**Option 1:**

The phase offset measurement is based on the phase response of the Tx chain  as derived based on Annex F.4.

The average phase for each slot i is then calculated independently, as shown below:

In the next step the phase offset between a reference timeslot tref and a measurement timeslot tm is then calculated as below, with the individual average phases for each slot calculated as per the formula above.

**Option 2:**

The phase offset measurement is based on the phase response of the Tx chain  as derived based on Annex F.4.

The phase difference for each subcarrier between a reference timeslot tref and the measurement timeslot tmis then calculated as defined below:

The average phase offset between the reference and measurement timeslots are then calculated as the RMS average over the results for all subcarriers as shown below:

Where N is the number of subcarriers in each timeslot.

[The measurement should be done within all bundled time slot except the reference time slot and repeated over [10] bundles, the rms value of phase offset should be calculated with below equation assuming the total number of measurement sample is L.

]

## << Unchanged part is omitted>>

## < end of changes >