**3GPP TSG-RAN WG4 Meeting #97-e R4-2016616**

**Electronic Meeting, 2nd – 13th November, 2020**

**Agenda item:** 7.19.1

**Source:** Moderator (CMCC)

**Title:** Email discussion summary for [97e] [114]\_UE transient period

**Document for:** Information

# Introduction

In RAN4#95-e and RAN4#96-e meetings, RAN4 discussed the feasibility of testing transient period capability, WF and Draft CR were agreed in last meeting (R4-2008477, R4-2011766)：

This email discussion includes contributions in agenda 7.19.1, the targets of email discussion based on companies’ contributions submitted in this e-meeting are as below:

* 1st round:

Provide comments on the CR and discuss the testability issues.

* 2nd round:

Discuss left open issues for 2nd round and strive to approve CR.

# Topic #1: Testability of transient period capability

*Main technical topic overview. The structure can be done based on sub-agenda basis.*

## Companies’ contributions summary

|  |  |  |
| --- | --- | --- |
| **T-doc number** | **Company** | **Proposals / Observations** |
| [**R4-2014489**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2014489.zip) | Qualcomm Incorporated | **In this paper we further discussed the testing issues related to the newly introduce transient periods. We propose to define new EVM measurement windows that are designed specifically for each transient period. This will enable precise testing with minimum impact on the test equipment.** |
| [**R4-2016516**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2016516.zip) | Huawei, HiSilicon | **Proposal 1: Specify tpstart for shorter transient period as in table 1.**  **Proposal 2: Further discuss test method based on tpstart definition.**  **Observation 1: Large power change case cannot be ignored. Further discuss on testability on large power change range issue.**  **Proposal 3: Initiate the simulation discussion on symbol level EVM evaluation.** |

## Open issues summary

*Before e-Meeting, moderators shall summarize list of open issues, candidate options and possible WF (if applicable) based on companies’ contributions.*

### Sub-topic 1-1 CR on introduction of shorter Transient Period Capability

Issue 1-1-1

* How gNB take the FFT window
  + Option 1: take FFT window as in R4-2016516
  + Option 2: others
* Recommended WF
  + TBA. Collect companies’ view in 1st round

Issue 1-1-2

* Proposals
  + Introduce tpstart as the start line of shorter transient, the reason is provided in R4-2016516.
* Recommended WF
  + TBA. Collect companies’ view in 1st round

Issue 1-1-3

* Proposals
  + - Option1: If introduce tpstart, define the value for tpstart as in R4-2016516
    - Option2: positioning the transient as close as possible to the symbol boundary is the simplest approach that will offer the best performance in practice. (From R4-2014489)
* Recommended WF
  + TBA. Collect companies’ view in 1st round

### Sub-topic 1-2 Testability issues for Transient period

**Issue 1-2-1: For RMS EVM over 1 symbol, how to define EVM measurement procedure in the spec**

* Proposals: defined the procedure as proposed in R4-2014489
* Recommended WF
  + TBA. Collect companies’ view in 1st round

**Issue 1-2-2: Whether 20dB power change can represent the maximum power change in the network, if not, whether TE can provide the test condition for the maximum power change**

* Proposals
  + Option 1: 20 dB power step is reasonable for on-on power change.
  + Option 2: no, power change>20dB is common case under real network. If the reference power change for transient period is 20dB, it will have performance impact on network, if the reference power change for transient period is worst case(e.g.58dB), how UE vendor get known our capability without reliable test environment. The calculation is provided in R4-2016516.
* Recommended WF
  + TBA. Collect companies’ view in 1st round

**Issue 1-2-3: How to ensure the transient period is symmetrically positioned: discuss in Issue 1-1**

**Issue 1-2-4: Whether RMS EVM with DFT-OFDM measurement similar with LTE can be tested for transient period**

* Proposals
  + For a transient period of 7us and 30kHz SCS, the transient period will be longer than the CP and a similar approach with the current LTE methodology has to be used(only DFT-s-OFDM can be used and some time domain samples have to be removed). But new EVM window is needed. (R4-2014489)
* Recommended WF
  + TBA. Collect companies’ view in 1st round

**Issue 1-2-5 How to calculate EVM for symbols in which the transient occurs**

* Proposals
  + Option 1: Test procedure detail that needs to be discussed in RAN5.
  + Option 2: Transient period is different for ramp up and ramp down, it should be clearly clarified.
  + Option 3: The EVM should be measured on the last and first symbol and averaged over multiple instances. Also, EVM can be measured on all other symbols against the legacy values based on the legacy measurement windows.(R4-2014489)
* Recommended WF
  + TBA. Collect companies’ view in 1st round

**Issue 1-2-6 EVM budget for symbol where the transient occurs**

* Proposals
  + Option 1: Keeping EVM budget in square brackets. EVM values can be discussed after agreement is reached on the feasibility of testing transient periods.
  + Option 2: EVM requirement should decide based on simulation results which can meet network performance on high order modulation. Initiate EVM simulation to evaluate network performance.
* Recommended WF
  + TBA. Collect companies’ view in 1st round

## Companies views’ collection for 1st round

### Open issues

|  |  |
| --- | --- |
| **Company** | **Comments** |
| XXX | Issue 1-1-1:  Issue 1-1-2:  ….  Others: |

### CRs/TPs comments collection

*Major close-to-finalize WIs and Rel-15 maintenance, comments collections can be arranged for TPs and CRs. For Rel-16 on-going WIs, suggest to focus on open issues discussion on 1st round.*

|  |  |
| --- | --- |
| **CR/TP number** | **Comments collection** |
| [**R4-2014490**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2014490.zip) | Company A |
| Company B |
|  |
| [**R4-2016517**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2016517.zip) | Company A |
| Company B |
|  |

## Summary for 1st round

### Open issues

*Moderator tries to summarize discussion status for 1st round, list all the identified open issues and tentative agreements or candidate options and suggestion for 2nd round i.e. WF assignment.*

|  |  |
| --- | --- |
|  | **Status summary** |
| **Sub-topic#1** | *Tentative agreements:*  *Candidate options:*  *Recommendations for 2nd round:* |

*Recommendations on WF/LS assignment*

|  |  |  |
| --- | --- | --- |
|  | **WF/LS t-doc Title** | **Assigned Company,**  **WF or LS lead** |
| #1 |  |  |

### CRs/TPs

*Moderator tries to summarize discussion status for 1st round and provides recommendation on CRs/TPs Status update*

|  |  |
| --- | --- |
| **CR/TP number** | **CRs/TPs Status update recommendation** |
| XXX | *Based on 1st round of comments collection, moderator can recommend the next steps such as “agreeable”, “to be revised”* |

## Discussion on 2nd round (if applicable)

## Summary on 2nd round (if applicable)

*Moderator tries to summarize discussion status for 2nd round and provided recommendation on CRs/TPs/WFs/LSs Status update suggestion*

|  |  |
| --- | --- |
| **CR/TP/LS/WF number** | **T-doc Status update recommendation** |
| XXX | *Based on 2nd round of comments collection, moderator can recommend the next steps such as “agreeable”, “to be revised”* |