**3GPP TSG-RAN WG4 Meeting # 97-e R4-2017627**

**Electronic Meeting, 20 – 30 Apr., 2020**

**Agenda item:** 7.17

**Source:** Moderator (Huawei)

**Title:** Email discussion summary for [97e][311] OTA\_BS\_Testing

**Document for:** Information

# Introduction

This is the email discussion summary for [97e][311] OTA\_BS\_testing on OTA BS testing WI, with the following topics covered:

* Topic 1: TR 37.941 cleanup
* Topic 2: MU / TT values: derivation and tables
* Topic 3: Others

Conclusion of the first round should conclude if the submitted CRs can be agreed or need to be revised for the second round discussion.

# Topic #1: TR 37.941 cleanup

CRs with editorials corrections to the TR 37.941 are collected in this topic.

## Companies’ contributions summary

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| **T-doc number** | **Company** | **Proposals / Observations** |
| [**R4-2015960**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2015960.zip)  / R4-2015961 | Huawei | CR to TR 37.941: overall TR cleanup  Proposals: Missing symbols added, cross-references corrections, empty sections filled, Drafting rules implementation, all the outstanding [] removed from the MU calculation tables.  More corrections may be introduced during the meeting. |
| [**R4-2015714**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2015714.zip)  / R4-2015715 | Ericsson | CR to TR 37.941: Removal of Square Brackets  Proposals: Removal of [ ] in MU tables in TR 37.941 |
| [**R4-2016290**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2016290.zip)  / R4-2016291 | Nokia, Nokia Shanghai Bell | CR to TR 37.941: Corrections to TRP measurement procedures  Proposals: Cross-references in the following procedures are corrected: Two cuts with pattern multiplication, full sphere, two or three cuts |

## Open issues summary

### Sub-topic 1-1

Sub-topic description: [] for the outstanding MU values were corrected in TR 37.941 by 3 different CRs. Single CR shall be selected as the Way Forward.

**Issue 1-1: Removal of square brackets for the outstanding MU values**

* Proposals
  + Option 1: Follow CR correcting MU values and removing [] in R4-2016466 (Rohde & Schwarz) – refer to Topic #2.
  + Option 2: Follow CR removing outstanding [] in R4-2015714 (Ericsson)
  + Option 3: Follow CR for the overall TR cleanup in R4-2015960 (Huawei)
* Recommended WF
  + Option 1

## Companies views’ collection for 1st round

### Open issues

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| **Company** | **Comments** |
| Huawei | Sub topic 1-1: Option 1 is preferred. Related modifications of CRs in Option 2 and Option 3 are actually covered by Option 1. Furthermore, CR in Option 3 can focus on the overall cleanup, while CR in Option 1 to focus on fixing the outstanding PWS MU values. |
| Nokia | Sub topic 1-1: Should discuss on finalizing the pending MU terms first, then decide which CR to be revised to incorporate the agreements. |
| Ericsson | Sub topic 1-1: We can agree to approve the updated MUs provided by R&S in Option 1 and thereby removing remaining [ ]. The new values seem reasonable with provided technical analysis. |
| R&S | Sub topic 1-1: agree with Huawei’s comment. Option 1 is preferred. |
| Huawei | @Nokia: if you have any comments to the MU values provided by R&S, please share. Please let us know if we can conclude on Option 1 and take R4-2016466 as baseline (it will be revised for sedond round anyway). |

### CRs/TPs comments collection

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| **CR/TP number** | **Comments collection** |
| [**R4-2015960**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2015960.zip)  / R4-2015961 | Moderator: CR is subject to Issue 1-1. CR to be kept as a placeholder for any other identified corrections and TR improvements. To be revised. |
| Huawei: if we would follow Option 1, this CR needs to be revised to remove overlapping modifications. Furthermore, This CR is to be kept as the placeholder for any additional TR corrections of the WI which is to be closed. |
| Nokia: clause 2, references 10 and 23 are the same; clause 3.1: 'transceiver unit array' is still used in AAS BS definition so should not be deleted; clause 6.3.4.2: 'Spherical diameter' and 'Cylindrical diameter' should be moved to clause 3.1. |
| Huawei: as indicated already, additional corrections to be considered in the revision during second round. |
| [**R4-2015714**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2015714.zip)  / R4-2015715 | Moderator: CR is subject to Issue 1-1. |
| Huawei: if we would follow Option 1, this CR can be noted as it includes modification embedded in R4-2016466. |
| Nokia: Clause 9.2.6.3 should be included in clauses affected in cover page; Table 9.2.6.3-2 and Table 10.2.6.3-1 Table 11.3.6.3-2 have different final values than in TR 37.941. |
| Huawei: as commented by Ericsson in Issue 1-1, this CR is proposed to be Noted. So the above Nokia comment would be not applicable. Maybe Ericsson could confirm our understanding. |
| Ericsson: Yes we are ok to note this CR since there are updates to MU values from R&S in R4-2016466 |
| [**R4-2016290**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2016290.zip)  / R4-2016291 | Huawei: more corrections of the cross-references in this CR were identified, e.g. in 6.3.2.3.3, or to add clarifications to the existing references in 6.3.2.3.2 or 6.3.2.3.4 (to spell out the actual procedure name for clarify and consistency). To be addressed in the revision. |

## Summary for 1st round

### Open issues

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|  | **Status summary** |
| **Sub-topic 1-1** | Proposals   * Option 1: Follow CR correcting MU values and removing [] in R4-2016466 (Rohde & Schwarz) – refer to Topic #2. * Option 2: Follow CR removing outstanding [] in R4-2015714 (Ericsson) * Option 3: Follow CR for the overall TR cleanup in R4-2015960 (Huawei)   Recommended WF: Option 1 |

### CRs/TPs

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| **CR/TP number** | **CRs/TPs Status update recommendation** |
| [**R4-2015960**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2015960.zip) | Revised to R4-2017575 |
| R4-2015961 | (Cat A) |
| [**R4-2015714**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2015714.zip) | To be noted |
| R4-2015715 | (Cat A) |
| [**R4-2016290**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2016290.zip) | Revised to R4-2017576 |
| R4-2016291 | (Cat A) |

## Discussion on 2nd round (if applicable)

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| **CR/TP number** | **Comments collection** |
| R4-2017575 | R&S: there is a small overlap between this CR and the one approved in the 1st round R4-2016293 for the title in Figure 7.6.1-1. It would be better to remove that change from this CR.  All other changes are ok. |
| Huawei: well spotted – thank you for careful review. The overlap was fixed. |
| R4-2017576 | Huawei: additional corrections were provided in updated version. |

## Summary on 2nd round (if applicable)

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| **CR/TP/LS/WF number** | **T-doc Status update recommendation** |
| R4-2017575 | **To be revised (with content agreeable) –> revision for e-mail approval (final review as WI closes; the only allowed corrections in this revision: cross-reference corrections, editorials)** |
| R4-2017576 | Agreeable |

# Topic #2: MU / TT values: derivation and tables

Tdocs related to the modifications related to the MU/TT values and MU/TT contributors descriptions were collected in this topic.

## Companies’ contributions summary

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| **T-doc number** | **Company** | **Proposals / Observations** |
| [**R4-2016370**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2016370.zip) | Rohde & Schwarz | Plane Wave Synthesizer – Pending MU terms from 4.2GHz to 6GHz  Proposals: Proposed values for the pending MU terms for the Plane Wave Synthesizer has been provided to finalize the MU for 4.2GHz to 6GHz frequency range.  The corresponding changes to TR 37.941 are provided in the separate CRs (R4-2016466 / R4-2016467). |
| [**R4-2016466**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2016466.zip)  / R4-2016467 | Rohde & Schwarz | CR to TR 37.941: PWS – Pending MU terms from 4.2GHz to 6GHz  Proposals: There are still MU values and MU descriptions between brackets for PWS that requires completion:   * System non-linearity and Field repeatability have been included in all applicable tables for the frequency range 4.2GHz to 6GHz. * Combined and expanded uncertainties have been updated in all applicable tables for the frequency range 4.2GHz to 6GHz. * Pending square brackets have been removed for the frequency range 4.2GHz to 6GHz in all applicable tables.   As described in Annex G, excel spreadsheets for MU derivation have been corrected and are attached. |
| [**R4-2015962**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2015962.zip)  / R4-2015963 | Huawei | CR to TR 37.941: MU and TT values alignments and corrections  Proposals: Inconsistencies across the MU and TT values in requirements specific sections and in the summary tables in clause 17 and 18.   * 2: new reference added * 12.3.4: updated of the motivation for the TT value of the OTA RX spur requirement as per recent regulatory decisions which were already implemented in AAS BS and NR BS specifications, i.e. 0 instead of MU * 13.2.4: correction of the TT values to align with MU. * 13.3.3, 13.3.4: value rounding corrections, TT and MU alignments * 15.6, 15.7: addition of missing information on MU and TT values for the OTA BS demodulation requirements, which are also in the scope of this technical report. * 17, 18:   + Cross-reference corrections to the requirement clauses   + Notes added, to reflect the assumption on Normal test conditions   + Text consistency improvements and editorials   + TT for OTA RX spur: corrected to reflect latest regulations. |
| [**R4-2015964**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2015964.zip)  / R4-2015965 | Huawei | CR to TR 37.941: alignments and corrections to the MU contributors and MU derivations  Proposals: MU contributor terms alignment for MU tables and annexes.   * Multiple MU terms reshuffling to align UID and their descriptions among MU tables and annex A, B, C descriptions. * Multiple terminology and wording alignments among MU contributors entries in MU tables and MU definitions in Annex A, B, C * Wording alignments among MU terms used in different OTA tests. |

## Open issues summary

### Sub-topic 2-1

Sub-topic description: two CRs were submitted with the Excel spreadsheets attached. For proper CR implementation to the TR, just one CR shall be finally agreed with the Excel spreadsheets attached.

**Issue 2-1: Alignment of the Excel spreadsheet updates**

* Proposals
  + Option 1: Follow CR in R4-2016466 (Rohde & Schwarz) – two updated Excel spreadsheets attached
  + Option 2: Follow CR in R4-2015964 (Huawei) – all 5 Excel spreadsheets attached
* Recommended WF
  + Option 2

## Companies views’ collection for 1st round

### Open issues

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| **Company** | **Comments** |
| Huawei | Issue 2-1: Option 2, as it is expected to revise all 5 Excel sheets to align with modifications in R4-2015964. |
| Ericsson | Issue 2-1: We do not have strong view on which CR to follow, however isn’t R&S CR containing new values – updates to PWS test method? Perhaps it’s better to somehow merge these 2 CRs together? |
| R&S | Issue 2-1: We are fine with option 2, but agree with Ericsson’s comment. If we use the CR in R4-2015964 to update the spreadsheets, they shall include the new values for PWS as detailed in R4-2016466. |
| Huawei | It seems that I was not clear enough: or course we need to somehow include new values values from R&S, as well as corrections from R4-2015964. How to achieve this can be debated: probably the easiest would be to take two modified Excels from R4-2016466 (and the other unmodified) and then apply modifications from R4-2015964 to all 5 spreadsheets. |

### CRs/TPs comments collection

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| **CR/TP number** | **Comments collection** |
| [**R4-2016466**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2016466.zip)  / R4-2016467 | Moderator: CR is subject to Issue 1-1 and Issue 2-1. All the modifications to the Excel spreadsheets needs to be aligned in a single CR. |
| Huawei: according to the Issue 1-1 and 2-1, we would suggest to keep the TR corrections in the (revision of) this CR, while the Excel spreadsheets modifications to be collected in the revision of R4-2015964. |
| Nokia: Would R&S share how it has been concluded that the following MU contributors are not affected? C1-1, A7-3, A7-13, A7-6, A7-7, C1-4, C7-4b. |
| R&S: We are ok with Huawei’s proposal to keep TR correction in a revised version of this CR and handle the Excel spreadsheet modification in the revision of R4-2015964.  To Nokia’s comment: equipment related contributors are aligned among all methodologies and use the agreed values in Annex C. This is valid for C1-1 and C1-4.  For all other contributors (A7-3, A7-13, A7-6, A7-7 and A7-4b) the square brackets were removed a few meeting ago as part of the consolidation of the MU tables, but our internal results show the numbers from 3 < f ≤ 4.2GHz are still valid for the range 4.2<f≤6 GHz. |
| [**R4-2015962**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2015962.zip)  / R4-2015963 | Ericsson: The CR is ok, other than the statement added in Section 12.3.4 regarding ERC recommendation. We would like further time for checking on this (may come back at second round). |
| Huawei: with the above, we would suggest to mark this CR as Return to. |
| Ericsson: The majority of this CR is editorial and based upon RAN4 guidelines those changes should not be brought in CR. However, a few added missing references in tables such as Table 17-2 OTA TX emissions. The editorial changes should be kept out of the CR.  Regarding the statement added in Section 12.3.4, we do not believe it’s needed and adding regional regulatory requirements is not needed in this TR. |
| Huawei: I think some of Chair guidance is misinterpreted here: clearly the driver for this CR was tables content consistency (errors in MU/TT tables, wrong references, missing note) and not editorials itself. Editorial were added to the CR as add-on’s. Anyway, I will check with Chair and MCC if they would want me to spend time un-doing introduce editorial improvements.  For 12.3.4: as you can see in table 18-3 the TT value for OTA Rx spur was corrected from MU to 0. Then text in 12.3.4 was added to explain this and for future reference – this is the purpose of TR so that the reader can trace back this modification. |
| [**R4-2015964**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2015964.zip)  / R4-2015965 | Moderator: once the modifications in this CR are agreed, related updates in all the affected Excel spreadsheets needs to be implemented. Revision will be required. |
| Huawei: as captured in the CR cover page, it is proposed to revise it to align all the Excels with the TR modifications, plus the PWS updates from R4-2016466. |
| Nokia: no need to add 'normal test conditions' and 'extreme test conditions' in table entries where these are already clearly stated in table headings. |
| Ericsson: Not sure it’s needed to have the “normal test conditions” in brackets of the MU as this is table (Table 9.2.2.3-1) already highlights that the contents of the table is for normal test conditions. This applies in a few places within the document where the heading (table caption) already specifies the MU is under normal test conditions  Several places the “NOTES” in the annex are not needed. As an example:  NOTE: For the MU derivation, this contribution is denoted as B2-4a for QZ ripple experienced by BS, and as B2-4b for QZ ripple experienced by calibration antenna.  However the “a” and “b” has already been defined by the heading:  **B2-4 QZ ripple BS (a) /calibration antenna (b)**  It’s also our understanding that correcting editorial aspects such as lower case or upper case in words should be left for MCC and not needed as a CR. |
| Huawei:  @Nokia, Ericsson: the reason “normal test conditions” and “extreme test conditions” wording was added can be found e.g. in table 9.3.2.3-1: in this table we have “Quality of quiet zone” used as A1-3 and as A1-17: one is for normal test conditions, the other one is for extreme test conditions. So the “normal test conditions” and “extreme test conditions” wording was introduced to properly differentiate them (then as a consequence, all appearances of A1-3 and A1-17 were aligned across the TR for consistence – so in some tables the newly added text in brackets might have looked as unnecessary clarification). All in all: we should keep “normal test conditions” and “extreme test conditions” wording at least for the tables where both normal and extreme MU contributors appear.  @Ericsson: on the notes for a/b cases: we came up with those clarifications, as in some cases the naming conventions for MU terms in annexes was confusing – you can see . We would prefer to have some sort of clarification of this aspects as there is no clear link among the “a/b” text in annexes and the MU tables itself.  Maybe we can think of some simpler for of the “a/b cases” clarification, so that it is not repeated all over the places, but e.g. once per each annex.  For editorials such as lower/upper case: we don’t mind, but in our opinion MCC is busy enough with CRs implementation, etc. it was done as per TR quality improvement, and as this was already done, we see no good reason to revert it back. Maybe we can have some RAN4-level clarification for future. |
| Ericsson: There are UIDs for different MUs depending on extreme or normal conditions, it is therefore introducing unnecessary text by adding the condition in ( ). If further description is required then this is the reasoning of having 2 tables as we originally had; however with compromise to include the UID with the Annex numbering this was removed.  For the lower/upper case editorials this is done by ETSI Edit Help, we were incorrect earlier commenting that this is done by MCC.  Based upon these unnecessary changes introduced, which may even cause more confusion than provide clarity, we do not agree to approve this CR. |
| Huawei: leaving “editorials” alone: we can debate what is necessary and what is not – this CR is for TR quality improvement provided by its rapporteur. There were plenty inconsistencies among Mus for different test methods.  Despite of the above comments, there are still multiple MU inconsistencies and alignments applied in this CR among text methods. There was no comments indicating that any of the modification is incorrect. |

## Summary for 1st round

### Open issues

### CRs/TPs

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| **CR/TP number** | **CRs/TPs Status update recommendation** |
| [**R4-2016466**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2016466.zip) | Revised to R4-2017577 |
| R4-2016467 | (Cat A) |
| [**R4-2015962**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2015962.zip) | Revised to R4-2017579 |
| R4-2015963 | (Cat A) |
| [**R4-2015964**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2015964.zip) | Revised to R4-2017578 |
| R4-2015965 | (Cat A) |

## Discussion on 2nd round (if applicable)

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| **CR/TP number** | **Comments collection** |
| R4-2017577 | Huawei: ok |
| R4-2017578 | Nokia: Still not sure why (extreme test conditions) needs to be added to those MU contributors (e.g. A1-19) where there are no corresponding MU contributors for (normal test conditions). It should be straightforward to derive that they are for extreme test conditions. |
| Huawei: ok to remove text in brackets for A1-19, A1-18, A1-20 (and related ones for other test methods) as those MU contributors do not occur in for normal test conditions. |
| R&S: updated values for PWS are ok in the spreadsheets. Thanks.  The filename for “FR2 TX MU calculation tables” should not contain “\_uptaded” at the end of it when attached to the final tdoc.  There is an editorial comment in table 13.2.2.3-1, C2-9 that should not be left in the final tdoc, although the comment is appropriate.  It would be nice to briefly capture in the cover page what are the changes in rev 1 of this CR under the “CR revision history”. |
| Nokia: Not sure why (extreme test conditions) needs to be added to A-1 and A-2, as now this create unalignment with the MU terms used in the main text. Also ‘(‘ is incorrectly deleted in some table, e.g. 9.3.3.4-1. |
| Huawei:  @R&S:  You are certainly right. There is range of editorial issues in the Excel sheets to be corrected, actually. The plan was to ask for e-mail approval just for the Excel spreadsheets final cleanup to align with modifications Agreed in the Word document (not to modify values in Excel) – otherwise, it is impossible (workload-wise) to run modifications in parallel in MS Word and Excel.  I also noticed before the meeting that History tab would be useful to have in all those Excel spreadsheets.  For the filenames: MCC is doing their own modifications anyway (as was communicated by Kai-Erik and done last time) – thank you for raising this.  @Nokia:  Please note, that in the original TR, the “(extreme)” text was already there. e.g. refer to Table 9.3.2.3-1, A1-17. The same goes for A1-17 description in Annex A.1. So what we do here is just alignment for consistency within TR. |
| Nokia: the ‘(extreme)’ is there for A1-17 and A2-13, but not the others like A1-18 and A2-14, etc.) which are only referred to in the tables for extreme test conditions, why do we need to add ‘(extreme)’ in the annexes when the related tables do not have it? |
| Huawei: keeping those additions in annex were seen as good clarifications – but this is nothing critical. I will remove them from A1-18 and A2-14, etc. in annex as well. |
| R4-2017579 |  |

## Summary on 2nd round (if applicable)

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| **CR/TP/LS/WF number** | **T-doc Status update recommendation** |
| R4-2017577 | Agreeable |
| R4-2017578 | **To be revised (with content agreeable) –> revision for e-mail approval (need to align MU Excel spreadsheets with the modifications in MS Word; no MU values to be changed)** |
| R4-2017579 | Agreeable |

# Topic #3: Other

Additional test cases for PWS are captured in this topic.

## Companies’ contributions summary

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| **T-doc number** | **Company** | **Proposals / Observations** |
| [**R4-2016292**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2016292.zip) | Rohde & Schwarz | Justification for additional test cases for PWS  Proposals: justification to add the corresponding clauses for PWS and cover additional test cases: OTA transmitted signal quality: TAE, OTA dynamic range, OTA adjacent channel selectivity, general blocking and narrowband blocking, OTA receiver intermodulation, OTA in-channel selectivity.  Related CRs submitted in R4-2016293 and R4-2016300. |
| [**R4-2016293**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2016293.zip)  / R4-2016300 | Rohde & Schwarz | CR to TR 37.941: Additional test cases for PWS  Proposals: PWS method is able to cover additional test cases for BS OTA conformance.   * Added sub-clauses for PWS for the following requirements: 9.8 OTA transmitted signal quality: TAE, 10.4 OTA dynamic range, 10.5 OTA adjacent channel selectivity, general blocking and narrowband blocking, 10.6 OTA receiver intermodulation and 10.7 OTA in-channel selectivity. * Added missing figures in clause 7.6.1. |

## Open issues summary

## Companies views’ collection for 1st round

### Open issues

### CRs/TPs comments collection

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| **CR/TP number** | **Comments collection** |
| [**R4-2016293**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2016293.zip)  / R4-2016300 | Huawei: ok with the motivation of this CR. |

## Summary for 1st round

### Open issues

### CRs/TPs

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| **CR/TP number** | **CRs/TPs Status update recommendation** |
| [**R4-2016293**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2016293.zip) | Agreeable |
| R4-2016300 | Agreeable |