**3GPP TSG-RAN WG4 Meeting # 95-e DRAFT R4-2008700**

**Electronic Meeting, 25 May – 5 June, 2020**

**Agenda item:** 6.19

**Source:** Moderator (Huawei)

**Title:** Email discussion summary for [95e][311] OTA\_BS\_testing

**Document for:** Information

# Introduction

This is the email discussion summary for [95e][311] OTA\_BS\_testing on OTA BS testing WI, with the following topics covered:

* Topic 1: TPs to TR 37.941
* Topic 2: Conformance testing framework
* Topic 3: MU / TT values: derivation and tables
* Topic 4: CRs to legacy TR/TS

Conclusion of the first round should conclude if the submitted TPs and CRs can be agreed or need to be revised.

*List of candidate target of email discussion for 1st round and 2nd round*

* 1st round: TBA
* 2nd round: TBA

# Topic #1: TPs to TR 37.941

## Companies’ contributions summary

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| --- | --- | --- |
| **T-doc number** | **Company** | **Proposals / Observations** |
| R4-2008137 | Huawei | TP to TR 37.941: editorial cleanup  It is expected that this TP may be revised during the meeting to incorporate more corrections. |
| R4-2007566 | Ericsson, Rohde & Schwarz | TP to TR 37.941: Improvement of technical background information in Clause 6  Continuation of the discussion from the previous meeting with additional improvements: improvements to the spatial definitions and requirements classification description. |
| R4-2007568 | Ericsson | TP to TR 37.941: Improvement of the Clause 6.3.3  Continuation of the discussion from the previous meeting with additional improvements to the “Angular alignment in TRP measurements” clause. |
| R4-2008005 | ROHDE & SCHWARZ | TP to TR 37.941 on editorial corrections for PWS references  PWS terminology corrections. |

## Open issues summary

### Sub-topic 1-1

### Sub-topic 1-2

## Companies views’ collection for 1st round

### Open issues

### CRs/TPs comments collection

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| --- | --- |
| **CR/TP number** | **Comments collection** |
| R4-2008137 | Nokia:  - Clause 6.4.2.2.2 is referred to in 5 clauses, but this clause does not exist.  - Can remove 'FFS' in last statement in 16.4 and third paragraph in Annex E. |
| Huawei: it is proposed to revise it for the purpose of the final editorial cleanup during this meeting. |
|  |
| R4-2007566 | Huawei: Still some text issues, as commented last meeting, e.g. shift all the TRP equations from 6.1 to section 6.3. In 6.1 we have only very high level overview of the requirements – details are in the following sections 6.2, 6.3. Revision is proposed.  Some wording issues in 6.2.1 (EIS sentence under equations).  6.3.1: further clarification on the coordinate system reference may be needed. |
| Nokia, Nokia Shanghai Bell  The term “power flux” should be clarified using a diagram.  The directional requirements are defined with respect to an isotropic antenna. However, an isotropic antenna is an ideal source that radiates in all directions. What is the purpose of such definitions and their relevance to directional requirements?  EIRP is a far-field parameter as stated in Equation (6) in [2]. This is not obvious from the EIRP equation and can be interpreted as a near-field parameter as well.  Why taking limit r -> ∞? This is not realistic in practice. is the minimum far-field distance, which is commonly used in technical references.  Adding “near-field measurements” can be misleading, referring to the following equation:  From the above equation, is a far-field parameter according to Equation (4) in [2]. In [2], it says “This relation holds also in most of the radiating near-field”. This means, the above equation is not valid for all cases but with some exceptions. What are these exceptions? A suggestion is to distinguish this type of near-field measurement from traditional near-field measurements (which require near-field to far-field transformation). |
| R&S  Adding the definitions of EIRP/EIS in the General section for Directional measurements helps provide the theoretical background for those 2 metrics that are essential to many of the measurements, referred many times along the document but not defined anywhere else. Actual requirements are in fact defined as EIRP/EIS, and thus referred to an isotropic antenna,  The fact that EIRP is actually a far-field parameter is implied by the methodologies or measurement systems that are listed for the corresponding requirements, but maybe some wording can be added in this section to clarify that.  Regarding the treatment of “near-field measurements” for TRP, it is already said at the beginning of clause 6.3.1 that “Due to energy conservation, TRP is independent of choice of test distance and shape of the used closed measurement surface.”, but we agree that more clarification should be added to ensure that measurements are not performed in the reactive near field. |
| Ericsson  In order to define true EIRP it is certainly at r = infinity, but in reality/practice you get small errors if r >= 2D^2/lambda. In other words, r = infinity is the accurate mathematical expression, but realistically this cannot be achieved. The approximation is derived from the r = infinity expression and the intention is to provide this background information to the reader for completeness.  Regarding “This relation holds also in most of the radiating near-field” can be changed to add more background on near field itself. Since the near field contains a reactive and radiative region the boundary is not always so clear. The background for this text was to indicate that the measurement is far enough away from the EUT to capture the radiative near field rather than reactive near field.    We have also done studies to understand how far away from the EUT the measurement can be taken in order to not incur TRP errors. |
| R4-2007568 | Huawei:  - Not related to the proposed modifications: last meeting, the relation among the figure 6.3.3-2 and table 6.3.3-1 was initiated, but not concluded. It would be good to clarify this issues as the Angular misalignment column concept and the values of the max absolute error in table 6.3.3.-1 does not seem to correspond to the shape on figure 6.3.3-2. We can trace back for the source text for some more clarification of this content.  One particular concern is whether the table’s heading shall be renamed from “angular misalignment” to “sampling grid step size” (or the values of 3dB should correspond to HPBW/2 misalignment). Anyway, further clarification from other companies are welcome.  - Typo: broadside 🡪 boresight. |
| Nokia, Nokia Shanghai Bell  Interpolation has not been discussed before. So, it is a topic for further discussion. Contributions addressing peak and direction finding are encouraged.  Concerning the misleading text on the application and reference angular steps in orthogonal cuts with pattern multiplication method, the text explicitly refers to Step 2 in clauses 6.3.2.2.2 and 6.3.2.3.2, where Step 2 is specified as follows.   1. Align the BS to allow for proper pattern multiplication. Measure EIRP on two orthogonal cuts with steps smaller or equal to the reference steps according to step 1.   According to Step 2, it gives the option of selecting steps that are smaller than the reference steps. However, Step 2 does not provide further details on how to choose such smaller steps. The text is meant to provide such missing information, which can be used to select smaller steps. It is not about measurement errors of orthogonal cuts with pattern multiplication. Perhaps, the wording can be improved to avoid the misunderstanding. |
| Ericsson  Regarding the comment “It is not about measurement errors of orthogonal cuts with pattern multiplication”, then perhaps Nokia can help us to understand why the Figure and Table captions have this in the title “measurement errors”?  Our intension of this TP was to add some clarity and simplicity to the existing text based of course on our understanding of this section.  Regarding selecting angular steps: e.g. if the reference step is calculated as 1.0346 degrees you would probably use 1.00 degrees in the measurement. There are practicalities that play in and they easily get convoluted if we try to describe them. Moreover, for any step lower than the reference step, the result will be the same.  In general, this section is difficult to follow; is it only E/// view on this? It would be good to understand if any other companies have the same reflection upon reading this section. |
| R4-2008005 | Huawei: OK |
| *Company B* |
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## Summary for 1st round

### Open issues

### CRs/TPs

|  |  |
| --- | --- |
| **CR/TP number** | **CRs/TPs Status update recommendation** |
| R4-2008137 | *Based on 1st round of comments collection, moderator can recommend the next steps such as “agreeable”, “to be revised”* |
| R4-2007566 |  |
| R4-2007568 |  |
| R4-2008005 |  |

## 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”* |

# Topic #2: Conformance testing framework

## Companies’ contributions summary

|  |  |  |
| --- | --- | --- |
| **T-doc number** | **Company** | **Proposals / Observations** |
| R4-2007914 | Huawei | TP to TR 37.941 MU budget procedure update  Based on the discussion last meetings, the conformance testing framework was updated to explain the proposed approach for the “single table vs. two tables” topic for MU derivation tables. |
| R4-2007915 | Huawei | TP to TR 37.941 EIRP MU budget procedure update  Based on the updated conformance framework in R4-2007914, the 9.2 clause (EIRP, Normal conditions) is updated to implement two tables approach as an example. |

## Open issues summary

### Sub-topic 2-1

### Sub-topic 2-2

## Companies views’ collection for 1st round

### Open issues

### CRs/TPs comments collection

|  |  |
| --- | --- |
| **CR/TP number** | **Comments collection** |
| R4-2007914 | Company A |
| Company B |
|  |
| R4-2007915 | Ericsson: As this is an example based upon TR 37.482 we are curious to understanding why the UID was not kept and changed to something new? |
| Company B |
|  |

## Summary for 1st round

### Open issues

### CRs/TPs

|  |  |
| --- | --- |
| **CR/TP number** | **CRs/TPs Status update recommendation** |
| R4-2007914 | *Based on 1st round of comments collection, moderator can recommend the next steps such as “agreeable”, “to be revised”* |
| R4-2007915 |  |

## 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”* |

# Topic #3: MU / TT values: derivation and tables

## Companies’ contributions summary

|  |  |  |
| --- | --- | --- |
| **T-doc number** | **Company** | **Proposals / Observations** |
| R4-2007595 | ROHDE & SCHWARZ | TP to 37.941: MU tables for additional Tx test cases for PWS  TP for the missing tables for additional PWS requirements which were introduced last meeting. It also introduces the text proposal for EVM MU value derivation for FR1. |
| R4-2007910 | Huawei | TX directional FR2 MU budget spreadsheet  This is resubmission of the RX FR2 MU calculation tables in R4-2004532. The tables were submitted to RAN4#94bis-e but were not approved the TE companies wished to confirm the TE MU values used.  In particular the value for the IAC in the frequency range 37<f<40GHz is 0.02dB larger than the previously agreed MU value. It was requested to have another meeting cycle to try to resolve this minor issue (it is not intended to change any agreed MU or TT values only resolve eth MU calculation table). |
| R4-2007911 | Huawei | TP to TR 37.941 FR2 TX directional  This TP updates the MU value derivation sections for the FR2 TX directional requirements, it is a resubmission of R4-2005505, which was noted in the last meeting to give more time to assess the TE values.  In particular the value for the CATR EIRP in the frequency range 37<f<40GHz is 0.02dB larger than the previously agreed MU value. It was requested to have another meeting cycle to try to resolve this minor issue (it is not intended to change any agreed MU or TT values only resolve the MU calculation table). |
| R4-2007912 | Huawei | RX directional FR2 MU budget spreadsheet  This is resubmission of the TX FR2 MU calculation tables R4-2004529. The tables were submitted to RAN4#94bis-e but were not approved the TE companies wished to confirm the TE MU values used.  In particular the value for the CATR EIRP in the frequency range 37<f<40GHz is 0.02dB larger than the previously agreed MU value. It was requested to have another meeting cycle to try to resolve this minor issue (it is not intended to change any agreed MU or TT values only resolve the MU calculation table). |
| R4-2007913 | Huawei | TP to TR 37.941 FR2 RX directional  This TP is a resubmission of R4-2004533 which was submitted in the last meeting but more time was requested to study the TE values used in the MU calculations.  In particular the value for the IAC in the frequency range 37<f<40GHz is 0.02dB larger than the previously agreed MU value. It was requested to have another meeting cycle to try to resolve this minor issue (it is not intended to change any agreed MU or TT values only resolve eth MU calculation table). |

## Open issues summary

### Sub-topic 3-1

### Sub-topic 3-2

## Companies views’ collection for 1st round

### Open issues

### CRs/TPs comments collection

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| --- | --- |
| **CR/TP number** | **Comments collection** |
| R4-2007595 | Nokia:  Section 9.7.5.2.2: testing should be carried out in the OTA conformance reference direction, not the beam peak direction of the OTA peak directions set reference direction. According to 38.141-2, test is carrier out at OTA coverage range reference direction and OTA coverage range maximum direction.  Section 9.7.5.3: Text and table is copy-paste from CATR, including the word “CATR” from there. |
| Huawei:  Based on the bug identified by Nokia in section 9.7.5.2.2, the whole TR will be scanned by the Rapporteur and compared with the TS 37.145-2 and TS 38.141-2 for consistency purposes. |
| Response to Nokia’s comment on section 9.7.5.2.2:   * The text there is harmonized with the procedure for other methods (i.e. IAC and CATR), while NFTR only refers to the “declared conformance direction”. * If a change is required, it shall be implemented for all methodologies as Huawei mentions.   Response to Nokia’s comment on section 9.7.5.3:   * Yes, the wording was reused from CATR clause just because it applies in the same way to PWS, but it is also common almost in full to IAC and NFTR.   Following the rationale, MU value table assumes the same components as CATR just because PWS is a natural extension of a CATR so the MU factors affecting EVM are the same. It has to be noted that the Uncertainty sources, UID and MU values has been updated to use the corresponding ones to PWS, so the table is not just a copy-paste.  As pointed by Nokia, there is a typo on the wording after the table that still refers to CATR. Thanks for catching that. It has been solved in the draft revision shared on the drafts folder. |
| R4-2007910 | Nokia: Discussion part contains RX contents instead of TX contents. |
| *Company B* |
|  |
| R4-2007911 | *Company A* |
| *Company B* |
|  |
| R4-2007912 | Nokia: Discussion part contains TX contents instead of RX contents. |
| *Company B* |
|  |
| R4-2007913 | *Company A* |
| *Company B* |
|  |

## Summary for 1st round

### Open issues

### CRs/TPs

|  |  |
| --- | --- |
| **CR/TP number** | **CRs/TPs Status update recommendation** |
| R4-2007595 | *Based on 1st round of comments collection, moderator can recommend the next steps such as “agreeable”, “to be revised”* |
| R4-2007910 |  |
| R4-2007911 |  |
| R4-2007912 |  |
| R4-2007913 |  |

## 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”* |

# Topic #4: CRs to legacy TR/TS

## Companies’ contributions summary

|  |  |  |
| --- | --- | --- |
| **T-doc number** | **Company** | **Proposals / Observations** |
| R4-2007451 | Huawei | CR to TR 37.842: internal TR references corrections and content redundancy removal (wrt. TR 37.941 for OTA BS testing), Rel-15  This CR provides corrections to the internal TR references (i.e. TR 37.840) in TR 37.842 and removes content (i.e. multiple sections removed/voided) which was already captured in the TR 37.941. Modifications include scope clarification. |
| R4-2007452 | Huawei | CR to TR 37.843: internal TR references corrections and content redundancy removal (wrt. TR 37.941 for OTA BS testing), Rel-15  This CR provides corrections to the internal TR references (i.e. TR 37.840, TR 37.842) in TR 37.843 842 and removes content (i.e. multiple sections removed/voided) which was already captured in the TR 37.941. Modifications include scope clarification. |
| R4-2007453 | Huawei | CR to TR 38.817-02: internal TR references corrections and content redundancy removal (wrt. TR 37.941 for OTA BS testing), Rel-15  This CR provides corrections to the internal TR references (i.e. TR 37.842 and TR 37.843) in TR 38.817-02 and removes content (i.e. multiple sections removed/voided) which was already captured in the TR 37.941. Modifications include scope clarification. |
| R4-2007454 | Huawei | CR to TS 37.145-2: internal TR references corrections (wrt. TR 37.941 for OTA BS testing), Rel-15  This CR provides correction to the internal TR references (i.e. TR 37.842 and TR 37.843) in TS 37.145-2. |
| R4-2007455 | Huawei | CR to TS 37.145-2: internal TR references corrections (wrt. TR 37.941 for OTA BS testing), Rel-16  Cat. A CR: This CR provides correction to the internal TR references (i.e. TR 37.842 and TR 37.843) in TS 37.145-2. |
| R4-2007456 | Huawei | CR to TS 38.141-2: internal TR references corrections (wrt. TR 37.941 for OTA BS testing), Rel-15  This CR provides correction to the internal TR references (i.e. TR 38.817-02, TR 37.842 and TR 37.843) in TS 38.141-2. |
| R4-2007457 | Huawei | CR to TS 38.141-2: internal TR references corrections (wrt. TR 37.941 for OTA BS testing), Rel-16  Cat. A CR: This CR provides correction to the internal TR references (i.e. TR 38.817-02, TR 37.842 and TR 37.843) in TS 38.141-2. |
| R4-2007458 | Huawei | CR to TS 37.114: internal TR reference corrections, Rel-15  This CR provides correction to the internal TR references (i.e. TR 37.842) in TS 37.114 (AAS BS EMC specification). |

## Open issues summary

### Sub-topic 4-1

### Sub-topic 4-2

## Companies views’ collection for 1st round

### Open issues

### CRs/TPs comments collection

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| --- | --- |
| **CR/TP number** | **Comments collection** |
| R4-2007451 | Nokia:  In general, the contents in this TR may already be referred to outside of 3GPP, thus a pointer to the new TR 37.941 like ‘Moved to [26]’ should be placed in the ‘shifted’ contents instead of just ‘Void’ them.  In particular, the ‘Note’ in table 5.3.3.2-1 can refer to TR 37.941 or deleted. |
| Huawei: the “shifted/voided” issue commented above was addressed by the text proposed to the Scope of the TR. Still for the voided sections (such as EIRP in 10.2.1 and EIS in 10.3.2) having additional pointers to TR 37.941 (instead of sections Voiding) is also ok.  Note correction to be addressed in the revision. |
|  |
| R4-2007452 | Nokia:  In general, the contents in this TR may already be referred to outside of 3GPP, thus a pointer to the new TR 37.941 like ‘Moved to [36]’ should be placed in the ‘shifted’ contents instead of just ‘Void’ them.  In particular, first statement in 5.1.1 should say 'three groups' as 'co-location requirements' is added to the list below; last statement in 5.2.3.1 can refer to new TR or listed out the '3 methods'. |
| Huawei: similar comment for the “shifted/voided” issue as in 7451.  Other text corrections in 5.1.1 and 5.2.3.1 to be addressed in the revision. |
|  |
| R4-2007453 | Nokia:  In general, the contents in this TR may already be referred to outside of 3GPP, thus a pointer to the new TR 37.941 like ‘Moved to [36]’ should be placed in the ‘shifted’ contents instead of just ‘Void’ them.  In particular, reference to TR 38.803 in 10.3.3.3 and 10.5.3.3 can be kept as this is an 800 series TR. |
| Huawei: similar comment for the “shifted/voided” issue as in 7451.  For the TR 38.803 reference deletion: I think you are not correct here. 800-series TR is an internal one which we shall not refer to. Can you clarify?  Nokia response:  It is stated in clause 6.1.6 of TR 21.801 that:  “In documents intended to be formally issued as publications of the Standards Development Organizations which comprise the Organizational Partners of 3GPP, references shall not be made to internal working documents of 3GPP which are not issued as such formal publications.”  But according to 3GPP:  “Technical Reports are of two classes:  • Those intended to be transposed and issued by the Organizational Partners as their own publications; and  • Those not intended for publication but which are simply 3GPP internal working documents, used, for example, for documenting planning and scheduling of work, or for holding the interim results of feasibility studies.  The first category have numbers of the form: xx.9xx  The second category have numbers of the form:  xx.8xx (feasibility study reports, etc) or, more rarely,  30.xxx / 50.xxx (planning and scheduling)  For some spec series, the stock of xx.8xx TRs has been exhausted, and in these cases, further internal TRs are allocated xx.7xx numbers.”  Therefore, the rule above in clause 6.1.6 of TR 21.801 does not need to apply to TR 38.817-02, and it can refer to TR 38.803. |
| Huawei: good point – so internal TR can refer to other internal TRs. Related TPs will be further verified to double check this issue. |
| R4-2007454  /  R4-2007455 | *Company A* |
| *Company B* |
|  |
| R4-2007456  /  R4-2007457 | *Company A* |
| *Company B* |
|  |
| R4-2007458 | *Company A* |
| *Company B* |
|  |

## Summary for 1st round

### Open issues

### CRs/TPs

|  |  |
| --- | --- |
| **CR/TP number** | **CRs/TPs Status update recommendation** |
| R4-2007451 | *Based on 1st round of comments collection, moderator can recommend the next steps such as “agreeable”, “to be revised”* |
| R4-2007452 |  |
| R4-2007453 |  |
| R4-2007454 |  |
| R4-2007455 |  |
| R4-2007456 |  |
| R4-2007457 |  |
| R4-2007458 |  |

## 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”* |