**3GPP TSG-RAN WG4 Meeting # 103-e R4-22XXXXX**

**Electronic Meeting, 09 – 20 May 2022**

**Agenda item:** 11.1

**Source:** Moderator (Intel Corporation)

**Title:** Email discussion summary for [103-e][335] FR2\_enhTestMethods

**Document for:** Information

# Introduction

*This document focuses on discussions for the Enhanced Test Methods for FR2 study item, covered in AI 11.1.*

# Topic #1: Study on enhanced test methods for FR2 in NR (AI 11.1)

## Companies’ contributions summary

|  |  |  |
| --- | --- | --- |
| **T-doc number** | **Company** | **Proposals / Observations** |
| R4-2207691  Proposal to conclude the study on enhanced test methods for FR2 in NR | Apple | Withdrawn |
| [**R4-2207692**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_103-e/Docs/R4-2207692.zip)  Draft CR to 38.884 on finalizing the study outcomes | Apple | Editor’s notes have been removed from several clauses in the TR |

## Open issues summary

### Sub-topic 1-1: Updates to TR 38.884

**Issue 1-1: TR 38.884 updates to finalize study outcomes**

* Draft CR R4-2207692 removes editor’s notes from several clauses of TR 38.884
* Recommended WF
  + Moderator suggests companies provide any feedback on the current content of draft CR R4-2207692 directly into **Section 1.3.2 CRs/TPs comments collection**.
  + Additionally, companies may share their views on content/agreements, if any, that is not currently captured in TR 38.884 and can be captured in the draft CR.

## Companies views’ collection for 1st round

### Open issues

Sub topic 1-1: TR 38.884 updates

|  |  |
| --- | --- |
| **Company** | **Comments** |
| XXX |  |

### CRs/TPs comments collection

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

|  |  |
| --- | --- |
| **CR/TP number** | **Comments collection** |
| R4-2207692 | Company A |
| Company B |
|  |
| YYY | 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 # 1-1** | *Tentative agreements:*  *Candidate options:*  *Recommendations for 2nd round:* |

### CRs/TPs

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

*Note: The tdoc decisions shall be provided in Section 3 and this table is optional in case moderators would like to provide additional information.*

|  |  |
| --- | --- |
| **CR/TP number** | **CRs/TPs Status update recommendation** |
| R4-2207692 | *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)

# Topic #2: OTA test methods for UE RF, RRM and demodulation for 52.6~71GHz (AI 11.1.2.1)

## Companies’ contributions summary

|  |  |  |
| --- | --- | --- |
| **T-doc number** | **Company** | **Proposals / Observations** |
| [**R4-2207927**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_103-e/Docs/R4-2207927.zip)  On FR2-2 Measurement Grids | Keysight Technologies UK Ltd | **Observation 1:** A slight increase in measurement grid points for the beam peak search can be observed for FR2-2 when compared to FR2-1.  **Observation 2:** A slight increase in measurement grid points for the spherical coverage test can be observed for FR2-2 when compared to FR2-1 with a slight increase in MU.  **Observation 3:** A slight increase in measurement grid points for the TRP test can be observed for FR2-2 when compared to FR2-1 with similar MUs.  **Proposal 1:** If the UE antenna assumptions can be confirmed, include the measurement grid assumptions in [TR 38.884]. |
| [**R4-2210212**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_103-e/Docs/R4-2210212.zip)  General aspects of test methods for 52.6~71GHz | Intel Corporation | **Proposal 1:** Add a column for 71 GHz to the minimum range length of DFF table and include in the TR.  Table 5.2.1.2-1: Minimum Range Length of DFF System for D = 5cm   |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | | f [GHz]  QZ [cm] | 24.25 | 30 | 40 | 50 | 52.6 | 71 | | **15** | 0.45 | 0.55 | 0.72 | 0.88 | 0.93 | 1.23 | | **30** | 0.53 | 0.63 | 0.79 | 0.96 | 1.00 | 1.31 |   **Observation 1:** While MU assessment will focus on PC3 in Rel-17, several agreements for PC1 and PC2 were reached. RAN4 should discuss whether the permitted test methods can apply to PC1 and PC2 and consider communicating the outcome to RAN5. |

## Open issues summary

### Sub-topic 2-1: General aspects

*During RAN4 #102e, the current radiating aperture D = 5cm was agreed to be reused for PC3 (R4-2207201). To complete the full extent of FR2 range, a column for 71 GHz should be added to the minimum range length of DFF table.*

**Issue 2-1: Minimum range length of DFF at 71GHz**

* Proposal
  + Proposal 1: Add a column for 71 GHz to the minimum range length of DFF table and include in the TR.

Table 5.2.1.2-1: Minimum Range Length of DFF System for D = 5cm

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| f [GHz]  QZ [cm] | 24.25 | 30 | 40 | 50 | 52.6 | 71 |
| **15** | 0.45 | 0.55 | 0.72 | 0.88 | 0.93 | 1.23 |
| **30** | 0.53 | 0.63 | 0.79 | 0.96 | 1.00 | 1.31 |

* Recommended WF
  + Companies should provide their views on Proposal 1, where this should be captured and if additional wording needs to be included.

### Sub-topic 2-2: UE types

*Preliminary MU assessment required to conclude the FR2-2 test methods objective will focus on PC3 (RP-220924). In RAN4 #101Bis-e, the worst-case antenna array size for PC3 was agreed after core discussions converged on an 8-elment array to define FR2-2 requirements (R4-2203079).*

**RAN4 #101e agreement (R4-2120767):** MU assessment for FR2-2 will focus on PC3 in Rel-17 timeline. This, however, does not deprioritize the general work on other UE types in the WI (i.e., FWA and vehicular).

**RAN4 #101Bis-e agreement (R4-2203079):** The worst-case antenna assumption for testability and MU assessment of handheld UEs in FR2-2 is [8 x2]. Single UE antenna element pattern parameters, similar to Table 5.2.3.3-1, need to be finalized in RAN4#102-e.

*Discussions for other UE types (FWA and vehicular UE) also progressed and produced agreements (RP-220924).*

**RAN4 #102e agreement (R4-2207201):** Worst-case antenna array configuration (MxN) for PC1 and PC2 on MU assessment

* PC1: [144(12\*12)]
* PC2: [40 (10\*4)]

**RAN4 #101Bis-e agreement (R4-2203079):**

* Avoid developing a standardized ground plane for FR2 vehicular UEs as part of this SI.
* Consider the optional ground plane designed and manufactured by the OEM an integral part of the FR2 vehicular UE DUT submitted for conformance testing.
* Consider battery and AC/DC powered operation acceptable for FR2 vehicular UEs and request manufacturers to provide proper guidance on cable routings.

**RAN4 #101e agreement (R4-2120767):** Adopt embedded UE only testing for FR2 vehicular UEs. The term embedded UE implies the OBU/TCU + antenna + optional ground plane.

*Based on the above, RAN4 should discuss whether the permitted test methods in TR 38.810 can apply to PC1 and/or PC2 and consider what information may be relevant to communicate to RAN5.*

**Issue 2-2: PC1 and PC2 agreements**

* Recommended WF
  + Companies are encouraged to share their views on where we should capture the above agreements for PC1 and PC2, what they mean in terms of permitted test methods applicability and what we may communicate to RAN5.

### Sub-topic 2-3: Measurement grid assumptions

*Most antenna assumptions for PC3 have been agreed*

**Agreement (RAN4#102-e):**

* Single UE antenna element pattern parameters can be reused as Table G.1.1-1 in TR38.810, with below exceptions:
  + half-power beamwidth: [80º/60º] as starting point
  + Gain: [5dBi]

**Agreement (RAN4#102-e):** Reuse the beam steering assumptions in TR38.810 for PC3

**Agreement (RAN4#101-bis-e):** The worst-case antenna assumption for testability and MU assessment of handheld UEs in FR2-2 is [8 x2].

**Issue 2-3a: UE antenna assumptions and measurement grid assumptions**

* Proposal
  + Proposal 1: If the UE antenna assumptions can be confirmed, include the measurement grid assumptions in [TR 38.884]. (Keysight, R4-2207927)
* Recommended WF
  + Companies should provide their views on Proposal 1 and whether the tentative antenna agreements currently in brackets for PC3 can be confirmed.
    - Can also discuss the simulation results comparison in R4-2207927 and what content to include in TR 38.884.

## Companies views’ collection for 1st round

### Open issues

Sub topic 2-1: Minimum range length of DFF at 71GHz

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| --- | --- |
| **Company** | **Comments** |
| XXX |  |
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Sub topic 2-2: UE types (PC1 and PC2 agreements)

|  |  |
| --- | --- |
| **Company** | **Comments** |
| XXX |  |
|  |  |

Sub topic 2-3: Measurement grid assumptions

|  |  |
| --- | --- |
| **Company** | **Comments** |
| XXX |  |
|  |  |

### 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** |
| XXX | 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# 2-1** | *Tentative agreements:*  *Candidate options:*  *Recommendations for 2nd round:* |

### CRs/TPs

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

|  |  |
| --- | --- |
| **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)

*Moderator can provide summary of 2nd round here. Note that recommended decisions on tdocs should be provided in the section titled ”Recommendations for Tdocs”.*

# Recommendations for Tdocs

## 1st round

**New tdocs**

|  |  |  |  |
| --- | --- | --- | --- |
| **New Tdoc number** | **Title** | **Source** | **Comments** |
|  | WF on … | YYY |  |
|  | LS on … | ZZZ | To: RAN\_X; Cc: RAN\_Y |
|  |  |  |  |

**Existing tdocs**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Tdoc number** | **Revised to** | **Title** | **Source** | **Recommendation** | **Comments** |
| R4-22xxxxx |  | CR on … | XXX | Agreeable, Revised, Merged, Postponed, Not Pursued |  |
|  |  |  |  |  |  |
|  |  |  |  |  |  |
|  |  |  |  |  |  |

Notes:

1. Please include the summary of recommendations for all tdocs across all sub-topics incl. existing and new tdocs.
2. For the Recommendation column please include one of the following:
   1. CRs/TPs: Agreeable, Revised, Merged, Postponed, Not Pursued
   2. Other documents: Agreeable, Revised, Noted
3. For new LS documents, please include information on To/Cc WGs in the comments column
4. Do not include hyper-links in the documents

## 2nd round

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Tdoc number** | **Revised to** | **Title** | **Source** | **Recommendation** | **Comments** |
| R4-22xxxxx |  | CR on … | XXX | Agreeable, Revised, Merged, Postponed, Not Pursued |  |
| R4-22xxxxx |  | WF on … | YYY | Agreeable, Revised, Noted |  |
| R4-22xxxxx |  | LS on … | ZZZ | Agreeable, Revised, Noted |  |
|  |  |  |  |  |  |

Notes:

1. Please include the summary of recommendations for all tdocs across all sub-topics.
2. For the Recommendation column please include one of the following:
   1. CRs/TPs: Agreeable, Revised, Merged, Postponed, Not Pursued
   2. Other documents: Agreeable, Revised, Noted
3. Do not include hyper-links in the documents

# Annex

Contact information

|  |  |  |
| --- | --- | --- |
| **Company** | **Name** | **Email address** |
|  |  |  |

Note:

1. Please add your contact information in above table once you make comments on this email thread.
2. If multiple delegates from the same company make comments on single email thread, please add you name as suffix after company name when make comments i.e. Company A (XX, XX)