**3GPP TSG-RAN WG4 Meeting # 99-e R4-2108432**

**Electronic Meeting, 19th – 27th May, 2021**

**Agenda item:** 6.3.2.1

**Source:** Moderator (Nokia)

**Title:** Email discussion summary for [99-e][307] NR\_IAB\_Conformance\_Part2

**Document for:** Information

# Introduction

This email discussion focuses on IAB conformance test. Following sub-AIs are covered in this discussion:

*6.3.2.3 Conducted conformance testing [NR\_IAB-Perf]*

*6.3.2.3.1 Transmitter characteristics [NR\_IAB-Perf]*

*6.3.2.3.2 Receiver characteristics [NR\_IAB-Perf]*

*6.3.2.3.3 Other test issues [NR\_IAB-Perf]*

*6.3.2.4 Radiated conformance testing [NR\_IAB-Perf]*

*6.3.2.4.1 Transmitter characteristics [NR\_IAB-Perf]*

*6.3.2.4.2 Receiver characteristics [NR\_IAB-Perf]*

*6.3.2.4.3 Other test issues [NR\_IAB-Perf]*

Most of contribution includes TPs for conducted or OTA test specification. Discussion is split for these two types of specifications.

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

* 1st round: To discuss submitted TPs to TS 38.176-1 (conducted) and TS 38.176-2 (OTA).
* 2nd round: TBA

# Topic #1: Updated TS 38.176-1 and text proposals (conducted)

This topic includes submitted contributions and mainly test proposals (TPs) to conducted IAB conformance specification 38.176-1.

## Companies’ contributions summary

|  |  |  |
| --- | --- | --- |
| **T-doc number** | **Company** | **Proposals / Observations** |
| R4-2111397 | Huawei | Title: TS 38.176-1 -Updated TS 37.176-1 |
| R4-2111399 | Huawei | Title: TP to TS 38.176-1 -Clean up |
| R4-2109019 | CATT | Title: TP for TS 38.176-1: Transmitted signal quality |
| R4-2111403 | Huawei | Title: TP to TS 38.176-1 - OTA Tx dynamic range, clause 6.3 |
| R4-2111177 | Ericsson | Title: TP for IBB, OBB and RX spurious of conducted receiver test |
| R4-2111405 | Huawei | Title: TP to TS 38.176-1 - Sensitivity, clause 7.2 |
| R4-2110609 | ZTE Corporation | Title: TP to TS 38.176-1: Annex G and H: In-channel TX test |
| R4-2109832 | Nokia, Nokia Shanghai Bell | Title: TP to TS 38.176-1 Clause 4.6 Declarations for IAB conducted test specification    Definition of share IAB hardware proposed:   |  |  |  |  |  | | --- | --- | --- | --- | --- | | D.IAB-1 | Shared or common RF implementation. | Declaration whether IAB-MT and IAB-DU have shared or identical RF implementation, used for testing efficiency improvement. | x | x | |
| R4-2111175 | Ericsson | Title: On IAB-MT dynamic range and power control test for conduct test  (Moderator note: no proposal 1 and 2, only 3 and 4 in Tdoc)  Proposal-3: Use the table 1 as the Tx dynamic test requirement.  Proposal-4: Z = [2] dB in the test point accuracy relating to the Y (RB change).   |  |  |  |  | | --- | --- | --- | --- | | Test point | Expected power step size (Down) | PUSCH (normal condition) | | |  | ΔP [dB] | [dB] | | | Test point 1 | 0 | Relative to the declare output power | f ≤ 3.0 GHz: ± 2.7 dB | | 3.0 GHz < f ≤ 6.0 GHz: ± 3.0 dB | | Test point 2 | 10 log(Maximum RB)+ 5 / 10 acc. to WA/LA IAB-MT Tx danymic range requirement | Relative to the Test point 2’ output power | -10 log(Maximum RB)- 5/10 ± 5.5 +/- (Z +TT) | |
| R4-2111181 | Ericsson | Title: IAB-MT specific declaration FR1  Definition of share IAB hardware proposed:   |  |  |  |  |  | | --- | --- | --- | --- | --- | | [D.IAB-1] | Share IAB hardware | Declaration whether IAB-MT and IAB-DU share the same hardware. | x | x | |
| R4-2111402 | Huawei | Title: Discussion on IAB-MT TX dynamic range testing  (Moderator note: Tdoc for discussion)  The MU for each of the IAB types has been proposed and they are the same in all cases:  ±0.7 dB, BW ≤ 40MHz  ±1.0 dB, 40MHz < f ≤ 100MHz  And with TT=MU the test requirement is for example FR1 conducted:  The issue of merging the DR test with the relative power requirement is also discussed and whilst the 2 core requirements are not fully aligned for such a merger it sufficient to test only the final step in the relative power tolerance and hence the 2 test can be merged. It is suggested that the power control step applied to test point 2 is left to the vendor to select (it is not strictly a free choice but the 1st step that can pass both requirements, which could differ depending on accuracy capability).  The test requirement is hence (for example):  For Local area IAB-MT  (BW≤40MHz)  PTest point 1- PTest point 2≥ 9.3dB + 10log10(Max RB)  And  STEP\_max – 6.2 ≤PTest point 1- PTest point 2 + 10log10(Max RB) ≤ STEP\_max + 6.2,  (40MHz < BW ≤ 100MHz)  PTest point 1- PTest point 2≥ 9.0dB + 10log10(Max RB)  And  STEP\_max – 6.5 ≤PTest point 1- PTest point 2 + 10log10(Max RB) ≤ STEP\_max + 6.5,  The relative power control requirement does not apply to wide area so the threshold requirement is sufficient for this. |

## 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

*Sub-topic description:*

*Open issues and candidate options before e-meeting:*

**Issue 1-1: IAB declaration with definition of shared IAB hardware:**

* Proposals
  + Option 1: Nokia proposal from R4-2109832
  + Option 2: Ericsson proposal from R4-2111181
* Recommended WF
  + TBA

### Sub-topic 1-2

*Sub-topic description:*

*Open issues and candidate options before e-meeting:*

There are two different views on Tx dynamic range test requirements. One view is as described in Tdoc R4-2111175 and second as described in Tdoc R4-2111402.

**Issue 1-2: Tx dynamic range test requirements**

* Proposals
  + Option 1: As proposed in R4-2111175 (Ericsson)
  + Option 2: As proposed in R4- 2111402 (Huawei)
  + Option 3: TBA
* Recommended WF
  + TBA

## Companies views’ collection for 1st round

### Open issues

*One of the two formats, i.e. either example 1 or 2 can be used by moderators.*

Sub topic 1-1

|  |  |
| --- | --- |
| **Company** | **Comments** |
| Ericsson | We have a WF agreement to use the shared hardwar wording, it will be even better to align with the TR 38.809 for the RF architecture. In declaration, there is no need to mention the purpose as it will be reflected in the performance specification. |

Sub topic 1-2

|  |  |
| --- | --- |
| **Company** | **Comments** |
| Ericsson | Th dynamic range required is in place of the power control requirement for local area IAB-MT (ΔP <10 dB). There is no need to go beyond 10 dB which is TX PSD dynamic range requirement. From this perspective, the output power accuracy needs to be considered in the test requirement as the radio chain condition cannot be the same (TX gain and PA operationg point needs to be changed for different PSD ) and thus it cannot be cancel out. We are however ok with reduced the MU as the test point 1 and 2 measurment setup will be kept the same and thus the uncertainty of measurement can be cencle out. |

### 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** |
| R4-2111397  Huawei | Company A  Company B |
| R4-2111399  Huawei | Ericsson: ok  Company B |
| R4-2109019  CATT | Ericsson: ok |
| R4-2111403  Huawei | Ericsson: need more discussion on issue 1-2 |
| R4-2111177  Ericsson |  |
| R4-2111405  Huawei | Ericsson;ok |
| R4-2110609  ZTE Corporation | Ericsson: CATT has a CR on corresponding core part, maybe need to double check after the CR is agreed. |
| R4-2109832  Nokia, Nokia Shanghai Bell | Ericsson: need discussion in issue 1-1 |
| R4-2111175  Ericsson |  |
| R4-2111181  Ericsson |  |
| R4-2111402  Huawei | Moderator note: This Tdoc is not a TP, but document for discussion. Included here to collect companies’ comments and views.  Ericsson: need discussion in issue 1-2. |

## 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:* |

### 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** |
| 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)

# Topic #2: Updated TS 38.176-2 and text proposals (OTA)

This topic includes submitted contributions and mainly test proposals (TPs) to OTA IAB conformance specification 38.176-2.

## Companies’ contributions summary

|  |  |  |
| --- | --- | --- |
| **T-doc number** | **Company** | **Proposals / Observations** |
| R4-2110944 | Nokia, Nokia Shanghai Bell | Title: TS 38.176-2 v.0.1.0 - update after RAN4#98bis meeting |
| R4-2110945 | Nokia, Nokia Shanghai Bell | Title: TP to 38.176-2 Editor update - editorials |
| R4-2109021 | CATT | Title: TP for TS 38.176-2: OTA transmitted signal quality |
| R4-2110142 | Nokia, Nokia Shanghai Bell | Title: TP to TS 38.176-2: clauses 6.1, 6.2, 6.3 and 6.7 |
| R4-2111404 | Huawei | Title: TP to TS 38.176-2 - OTA Tx dynamic range, clause 6.4 |
| R4-2110608 | ZTE Corporation | Title: TP to TS 38.176-2: RX ICS requirements |
| R4-2111178 | Ericsson | Title: TP on IBB, OBB and RX spurious for OTA receiver characteristic test |
| R4-2111406 | Huawei | Title: TP to TS 38.176-2 - OTA Sensitivity, clause 7.2, 7.3 |
| R4-2109833 | Nokia, Nokia Shanghai Bell | Title: TP to TS 38.176-2 Clause 4.6 Declarations for IAB radiated test specification  Declaration proposed:   |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | | D.IAB-1 | Shared or common RF implementation | Declaration whether IAB-MT and IAB-DU have shared or common RF implementation, used for testing efficiency improvement. | c | x | x | |
| R4-2109999 | Samsung | Title: TP to TS38.176-2 on Annex I and Annex K |
| R4-2110610 | ZTE Corporation | Title: TP to TS 38.176-2: Annex L and M: In-channel TX test |
| R4-2110818 | Qualcomm Incorporated | Title: TP to TS 38.176-2 – Clause 3 |
| R4-2111182 | Ericsson | Title: IAB-MT specific declaration FR2  Proposed declarations:   |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | | [D.IAB-1] | Share IAB hardware | Declaration whether IAB-MT and IAB-DU share the same hardware. | c | x | x | | D.IAB-2 | IAB-MT test model PT-RS configuration | Declaration of PT-RS configuration in IAB-MT test model: without PT-RS, with PT-RS or both. |  |  | x | |
| R4-2111176 | Ericsson | Title: On IAB-MT dynamic range and power control test for OTA test  Proposal-3: Use the table 1 and 2 as the Tx dynamic test requirement.  Proposal-4: Z1 = Z2 = [3] dB in the test point accuracy relating to the Y (RB change).  Table 1: Test requirement of the Tx dynamic range/power control for LA IAB-MT   |  |  |  |  | | --- | --- | --- | --- | | **Test point** | **Expected power step size (Down)** | **PUSCH (normal condition)** | | |  | **ΔP [dB]** | **[dB]** | | | Test point 1 | 0 | relative to the manufacturer's declared rated beam EIRP (D.11) value | For IAB-MT type 1-O, see table 2 below | | For IAB-MT type 2-O, see table 2 below | | Test point 2 | 10 log(Maximum RB) +5 / 10 acc. to WA/LA IAB-MT Tx danymic range requirement | Relative to the Test point 2’ output power | For IAB-MT type 1-O :  -10 log(Maximum RB)- 5/10 +/-5.5 +/- (Z1+ TT) | | For IAB-MT type 2-O:  -10 log(Maximum RB)- 5/10 +/-6 +/- (Z2+TT) |   **Table 2: Output power accuracy for test requirement of test point 1**   |  |  |  | | --- | --- | --- | |  | **Normal test environment** | **Extreme test environment** | | IAB-MT type 1-O | f  ≤ 3 GHz: ± 3.3 dB | f  ≤ 3 GHz: ± 5.2 dB | |  | 3 GHz < f ≤ 6 GHz: ± 3.5 dB | 3 GHz < f ≤ 4.2 GHz: ± 5.3 dB | |  |  | 4.2 GHz < f ≤ 6 GHz: ± 5.3 dB | | IAB-MT type 2-O | 24.15 GHz < f ≤ 29.5 GHz: ± 5.1 dB  37 GHz < f ≤ 43.5 GHz: ± 5.4 dB  … | 24.15 GHz < f ≤ 29.5 GHz: ± 7.6 dB  37 GHz < f ≤ 43.5 GHz: ± 7.8 dB | |

## 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 2-1

*Sub-topic description:*

*Open issues and candidate options before e-meeting:*

**Issue 2-1: IAB declarations**

* Proposals
  + Option 1: Ericsson proposal from R4-2111182 (on share HW)
  + Option 2: Nokia proposal from R4-2109833 (on share HW)
  + Option 3: Ericsson proposal from R4-2111182 (on test model PT-RS configuration)
* Recommended WF
  + TBA

### Sub-topic 2-2

*Sub-topic description:*

*Open issues and candidate options before e-meeting:*

There are two different views on Tx dynamic range test requirements. One view is as described in Tdoc R4-2111175 and second as described in Tdoc R4-2111402 o (submitted in conducted agenda but cover both conducted and OTA parts).

**Issue 2-2: Tx dynamic range test requirements**

* Proposals
  + Option 1: As proposed in R4-2111176 (Ericsson)
  + Option 2: As proposed in R4- 2111402 (Huawei)
  + Option 3: TBA
* Recommended WF
  + TBA

## Companies views’ collection for 1st round

### Open issues

Sub topic 2-1

|  |  |
| --- | --- |
| **Company** | **Comments** |
| Ericsson | We have a WF agreement to use the shared hardwar wording, it will be even better to align with the TR 38.809 for the RF architecture. In declaration, there is no need to mention the purpose as it will be reflected in the performance specification. |

Sub topic 2-2

|  |  |
| --- | --- |
| **Company** | **Comments** |
| Ericsson | Th dynamic range required is in place of the power control requirement for local area IAB-MT (ΔP <10 dB). There is no need to go beyond 10 dB which is TX PSD dynamic range requirement. From this perspective, the output power accuracy needs to be considered in the test requirement as the radio chain condition cannot be the same (TX gain and PA operationg point needs to be changed for different PSD ) and thus it cannot be cancel out. We are however ok with reduced the MU as the test point 1 and 2 measurment setup will be kept the same and thus the uncertainty of measurement can be cencle out. |

### 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** |
| R4-2110944  Nokia, Nokia Shanghai Bell | Company A  Company B |
| R4-2110945  Nokia, Nokia Shanghai Bell | Company A  Company B |
| R4-2109021  CATT | Ericsson: For PT-RS signal configuration for IAB-MT, should the declaration mentioned here, note there is new IAB-MT declaration for PT-RS signal to be agreed. |
| R4-2110142  Nokia, Nokia Shanghai Bell | Ericsson: there are some place reference to 38.174 still “x” and other place is [2]. |
| R4-2111404  Huawei | Ericsson: more discussion in issue 2-2 |
| R4-2110608  ZTE Corporation | Ericsson:ok |
| R4-2111178  Ericsson |  |
| R4-2111406  Huawei | Ericsson:ok |
| R4-2109833  Nokia, Nokia Shanghai Bell | Ericsson: disccsion in issue 2-1 |
| R4-2109999  Samsung | Ericsson: ok |
| R4-2110610  ZTE Corporation | Ericsson: CATT has a CR on corresponding core part, maybe need to double check after the CR is agreed. |
| R4-2110818  Qualcomm Incorporated | Ericsson: ok |
| R4-2111182  Ericsson |  |
| R4-2111176  Ericsson |  |

## 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:* |

### 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**

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

**Existing tdocs**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Tdoc number** | **Title** | **Source** | **Recommendation** | **Comments** |
| R4-210xxxx | 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** | **Title** | **Source** | **Recommendation** | **Comments** |
| R4-210xxxx | CR on … | XXX | Agreeable, Revised, Merged, Postponed, Not Pursued |  |
| R4-210xxxx | WF on … | YYY | Agreeable, Revised, Noted |  |
| R4-210xxxx | 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