**3GPP TSG-RAN WG4 Meeting # 97-e R4-200XXXX**

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

**Agenda item:** 7.4.3

**Source:** Moderator (Nokia)

**Title:** Email discussion summary for [97e][309] NR\_IAB\_Conformance\_Part1

**Document for:** Information

# Introduction

This document summarizes the email discussion covering work plan, general topics and common test issues for NR IAB conformance testing. The discussion is arranged into multiple topics and for each topic the relevant observations and proposals are extracted from contributions. Therefore, same contribution may repeat in multiple topics in case the contribution content covers multiple topics.

In each issue the main views from companies are presented. Therefore, it is also possible to provide additional views on top of the provided options.

# Topic #1: General and work plan

This topic covers .

## Companies’ contributions summary

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| --- | --- | --- |
| **T-doc number** | **Company** | **Proposals / Observations** |
| R4-2014484 | Qualcomm Incorporated | **Proposal**: Create a new IAB specific conformance test specification.  Contribution also includes work plan:  **RAN4#97-e:**  High level agreements: specification handling, work plan  High level discussion on testing framework, setup, etc  **RAN4#98-e:**  High level agreements on testing: agree testing framework, test setup, test models, test plan(which tests to be defined)  Discuss the specification skeleton  Agree work split on TPs for conformance specifications  **RAN4#98-e Bis:**  Discuss draft TPs for specifications  **RAN4#99-e:**  Approval of TPs |
| R4-2015439 | Nokia, Nokia Shanghai Bell | **Proposal 1:** Create a new conformance specification for IAB-Nodes. |
| R4-2016084 | Huawei | **Observation1:** Due to the potential size of the specification and potential problems with maintenance referencing may be necessary.  **Observation 2:** In most cases IAB-DU and IAB-MT requirements are identical to or very similar to BS. Test procedures can be merged.  **Proposal 1:** Introduce a section in clause 4 on relationship between specifications and the use of referencing  Contribution includes also a draft skeleton for TS. |
| R4-2016245 | Ericsson | **Proposal#1: RAN4 needs to have the reasonable meeting time for IAB conformance testing.**  **Proposal#2: New IAB conformance test specification would be preferred to have a clear structure and easier to maintain.**  **Proposal#3: Consider the new the conducted and OTA conformance testing specification.** |

## Open issues summary

### Sub-topic 1-1: Work plan

This sub-topic covers comments to work plan provided in R4-2014484

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

**Issue 1-1: Work plan**

**RAN4#97-e:**

High level agreements: specification handling, work plan

High level discussion on testing framework, setup, etc

**RAN4#98-e:**

High level agreements on testing: agree testing framework, test setup, test models, test plan(which tests to be defined)

Discuss the specification skeleton

Agree work split on TPs for conformance specifications

**RAN4#98-e Bis:**

Discuss draft TPs for specifications

**RAN4#99-e:**

Approval of TPs

Comments to work plan can be provided, and aim is to agree the plan either as is or taking account comments, if those are provided.

* Proposals:
  + Option 1: Agree work plan
  + Option 2: Agree work plan with modifications
* Recommended WF
  + TBA

### Sub-topic 1-2: Conformance specification(s)

This sub-topic covers how to organize conformance specification(s) for IAB.

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

**Issue 1-2-1: Number of specifications and how the split is done**

In this issue it will be discussed how many conformance specifications will be needed and how topics are arranged between the specifications. Two clear options have been provided but other opinions are also welcomed.

* Proposals
  + Option 1: Single specification covering conducted and radiated testing for RF, demod and RRM.
  + Option 2: Two specifications, one capturing conducted and the other radiated testing. Each specification captures RF, demod and RRM.
* Recommended WF
  + Option 2

**Issue 1-2-2: Initial views on specification skeleton**

While no explicit proposal for specification skeleton is done, R4-2016084 includes an example skeleton and also other views on how to arrange the content. In this issue free-form comments are invited to be provided on aspects raised in these aspects.

* Recommented WF
  + Gather comments and aim to agree at least guidelines how skeleton is arranged

## Companies views’ collection for 1st round

### Open issues

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

### 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.*

No CR or TP provided.

## 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*

No CR or TP provided.

## 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: Common test issues

This topic covers common test issues including

* test models
* test configurations
* test environments
* other test issues

## Companies’ contributions summary

|  |  |  |
| --- | --- | --- |
| **T-doc number** | **Company** | **Proposals / Observations** |
| R4-2014750 | Samsung | **Observation**: IAB node conformance testing should follow BS approach as starting point.  In addition, the contribution contains text (not as observations or proposals) stating:   1. As IAB-DU fully reuse the gNB requirement with the same type and class, the MU and TT agreement of gNB should be applied without question. 2. For IAB-MT side the methodology of test configuration generation can be reused, even though the use case for IAB-MT of some NTC is not so clear at current stage. However, more study may be needed to figure out the power allocation especially for requirement different compared with gNB. 3. For IAB-MT the Test model for UL transmission should be analyzed based on physical layer design updated for IAB-MT and existing set-up defined for gNB. 4. The RF channel defined for gNB can be applied for IAB-MT if no additional issue identified. |
| R4-2015439 | Nokia, Nokia Shanghai Bell | **Proposal 2:** Test environments including chamber types specified for gNBs apply also for IAB-DU and IAB-MT testing.  **Proposal 3:** As the test environments are similar, the baseline is that measurement uncertainties and test tolerances should be the same as for gNB, unless a justified need for a change is shown.  **Proposal 4:** IAB-DU can re-use the gNB tests from 38.141 specifications. However, to keep the test burden of IAB-Node reasonable while maintaining sufficient test coverage, the tested channel positions, number of beams and other similar aspects, if any, which account for repeating the same baseline test multiple times shall be considered to be limited compared to 38.141.  **Proposal 5:** Tested channel positions and beam directions, when applicable, for IAB-MT should be reduced compared to gNB.  **Proposal 6:** For implementations sharing the same RF hardware between IAB-MT and IAB-DU, amount of duplicated testing shall be minimized when it does not bring added value.  **Proposal 7:** Aligned with the principles of gNB testing, test modes and test configurations are specified for IAB-MT.  **Proposal 8:** Test setups specified for gNB testing shall be the baseline for IAB-Node testing |
| R4-2016245 | Ericsson | **Proposal#4:** IAB-DU RF conformance testing reuse the BS conformance testing.  **Proposal#5:** DUT can be IAB-MT and IAB-DU separately depending on the implementation or configuration.  **Proposal#6:** IAB-MT test environment should not mention or mandate specific test equipment  **Proposal#7:** Not specify any test function on how to set the IAB-MT beam peak direction.  **Proposal#8:** RAN4 discuss how to treat the different TT &MU definition for BS test environment and UE test environment.  **Proposal#9:** consider to use the BS test configuration and test model principle on IAB-MT to construct the test case. |
| R4-2016138 | ZTE Corporation | **Proposal 1:** test configurations, RF channels, test models, MU/TT and test procedures of NR BS could be reused for IAB-DU.  **Proposal 2:** test frequency, test channel bandwidth, test parameters of IAB-MT should follow the configuration specified in TS 38.508 and TS 38.521.  **Proposal 3:**MU/TT and test procedures of NR BS could be reused for IAB-MT. |
| R4-2014389 | CATT | **Proposal:** For IAB test configuration, BS test configuration is reused for both IAB-DU and IAB-MT. |
| R4-2014485 | Qualcomm Incorporated | **Observation:** the IAB-MT test setup has to be a mix of the BS setup and the UE setup. |
| R4-2015440 | Nokia, Nokia Shanghai Bell | **Observation 1:** The test configurations defined for gNB define scenarios which are relevant also for IAB-MT.  **Observation 2:** Having all the test configurations in place does not mandate supporting all these configurations in the IAB-MT implementation.  **Proposal 1:** Test configurations are specified for both IAB-MT and IAB-DU  **Proposal 2:** Support for various configurations shall be covered by manufacturer declarations.  **Proposal 3:** Adopt the test configuration from TS 38.141-1/2 for both IAB-DU and IAB-MT |
| R4-2016243 | Ericsson | **Proposal#1:** Reusing the BS test configuration for IAB-DU without NB-IoT support.  **Proposal#2:** Reusing the BS test configuration principle for IAB-MT.  **Proposal#3:** Reusing the below declared parameter for IAB-MT relating to the test configuration. |
| R4-2014390 | CATT | **Proposal 1:** BS test models are reused by IAB-DU.  **Proposal 2:** UE test models in TS 38.521 can be the references for IAB-MT.  **Proposal 3:** Simplification of UE RMCs for IAB-MT is discussed case by case. |
| R4-2016244 | Ericsson | **Proposal#1:** Reusing the BS test model for IAB-DU.  **Proposal#2:** Reusing the BS test model principle for IAB-MT.  **Proposal#3:** Start with the BS TM model test requirement under the BS TM model and further discussion of modification if needed.  **Proposal#4:** Reuse the DMRS configuration of UE uplink RMC design.  **Proposal#5:** Align the TDD configuration with Demod discussion.  **Proposal#6:** UE RMC could be reference to the IAB-MT test model physical channel parameter design.  **Observation#1:** Some TM could be merged as uplink TM has no multiple user differentiation.  **Proposal#7:** No need to construct the power boosting PRB for DMRS signal in TM design of IAB-MT. |
| R4-2016242 | Ericsson | **Observation#1:** The UE test temperature is not declared but specified as fixed range. The power supply is based on the batteries which may or may not be used by IAB.  **Observation #2:** The BS declare the temperature, humidity and vibration which applies to the DUT.  **Proposal:** Reuse the BS environment condition for FR1 in annex B in TS 38.141-1 and annex B in TS 38.141-2 for FR2. |
| R4-2016246 | Ericsson | **Observation#1:** Measurement/connection setup in BS and UE both are informative.  **Proposal#2:** Allow the test measurement/connection setup flexibility in the conducted transmitter test procedure.  **Proposal#3**: In test procedure description, there is no need to describe downlink configuration and how to trigger the IAB-MT uplink transmission. The test model/waveform to be transmitted shall be specified.  **Proposal#4:** One option is to reuse the clause of BS interpretation of measurement results for IAB-MT with the modification of adding the UE test system uncertainty if different MU from different test environment would be allowed for IAB-MT testing.  **Proposal#5:** RAN4 discuss if the same TT definition for the different transmitter test setup for the same test case.  **Proposal#6:** RAN4 discuss if it the same MU definition for the different transmitter test setup for the same test case  **Proposal#7**: Use the BS test case structure for test case drafting.  **Proposal#8:** There is no need to specify the message content in test case.  **Proposal#9:** RAN4 discuss the recommendation of TT for IAB-MT test case in the Table 1 and Table 2 above. |
| R4-2016247 | Ericsson | **Observation#1**: Measurement/connection setup in BS and UE both are informative.  **Proposal#2**: Allow the test measurement/connection setup flexibility in the conducted receiver test procedure.  **Proposal#3**: align with performance testing FRC definition.  **Proposal#4:** One option is to reuse the clause of BS interpretation of measurement results for IAB-MT with the modification of adding the UE test system uncertainty if different MU from different test environment would be allowed for IAB-MT testing.  **Proposal#5:** RAN4 discuss if the same TT definition for the different test setup for the same test case.  **Proposal**#6: RAN4 discuss if it the same MU definition for the different test setup for the same test case. |
| R4-2016248 | Ericsson | **Proposal#1**: Reusing the BS type 1-H, 1-O and 2-O test specification for radiated transmitter characteristic for IAB-DU type 1-H, 1-O and 2-O.  **Proposal#2**: RAN4 discuss how to allow the reusing the UE and BS OTA test methodology for IAB-MT.  **Proposal#3:** RAN4 investigate if test time could be further reduce on shared transceiver architecture using the same OTA test methodology.  **Observation#1**: co-location requirement needs to be defined for IAB-MT type 1-O when the UE OTA test methodology is used.  Proposal#4: IAB-MT TX ON/OFF and IAB-MT TX transient period should be classified with co-location requirement for conformance testing.  Proposal#5: RAN4 further discuss the Number of the conformance directions needed for each Tx requirement.  **Observation#2**: Measurement/connection setup in BS and UE both are informative.  **Proposal#2**: Allow the test measurement/connection setup flexibility in the radiated transmitter test procedure.  **Proposal#3:** In test procedure description, one option is that no description of downlink configuration and how to trigger the IAB-MT uplink transmission. Only the test model/waveform to be transmitted shall be specified.  **Proposal#4**: One option is to reuse the clause of BS interpretation of measurement results for IAB-MT with the modification of adding the UE test system uncertainty if different MU from different test environment would be allowed for IAB-MT testing.  **Observation#3**: UE test system uncertainty does not contain the extreme conditions and has several limitation factors (Power class, testing method and quiet zone size).  **Proposal#5:** RAN4 discuss further the extreme condition test system uncertainty for IAB-MT test.  **Proposal#6:** RAN4 discuss if the same TT definition for the different transmitter test setup for the same test case.  **Proposal#7:** RAN4 discuss if it the same MU definition for the different transmitter test setup for the same test case  **Proposal#7:** Use the BS test case structure for test case drafting.  **Proposal#8**: There is no need to specify the message content in test case.  **Observation#4:** UE TS 38.521-2 does not have FR1 OTA testing, thus FR1 OTA testing MU and TT needs to be added in UE test environment.  **Proposal#7:** RAN4 discuss the recommendation of TT for IAB-MT test case in the Table 1 and Table 2 above. |
| R4-2016249 | Ericsson | **Proposal#1**: Reusing the BS type 1-H, 1-O and 2-O test specification for radiated receiver characteristic for IAB-DU type 1-H, 1-O and 2-O.  **Proposal#2**: RAN4 discuss how to allow the reusing the UE and BS OTA test methodology for IAB-MT.  **Observation#1:** Measurement/connection setup in BS and UE both are informative.  **Proposal#5:** Allow the test measurement/connection setup flexibility in the radiated receiver test procedure.  **Proposal#6:** align with performance testing FRC definition.  **Proposal#7:** One option is to reuse the clause of BS interpretation of measurement results for IAB-MT with the modification of adding the UE test system uncertainty if different MU from different test environment would be allowed for IAB-MT testing.  **Proposal#8:** RAN4 discuss if the same TT definition for the different receiver test setup for the same test case.  **Proposal#9:** RAN4 discuss if it the same MU definition for the different receiver test setup for the same test case  **Proposal#11**: There is no need to specify the message content in test case.  **Observation#2:** UE TS 38.521-2 does not have FR1 OTA testing, thus FR1 OTA testing MU and TT needs to be added in UE test environment. |

## Open issues summary

### Sub-topic 2-1: IAB-MT test aspects

This sub-topic covers IAB-MT related proposals and observations.

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

**Issue 2-1-1: IAB-MT test setup**

Some individual proposals are also made to confirm the test setup as a starting point. These proposals are gathered below for commenting.

* Proposals
  + BS principles of constructing and configuring the test case using test models and configurations is adopted.
  + In the same test setup, DUT can be either IAB-DU or IAB-MT i.e. different setups are not needed
  + TS descriptions of environments shall not mandate specific equipment and therefore allow flexibility in connection setup
* Recommended WF
  + Agree above proposals

**Issue 2-1-2: IAB-MT test models**

For test models two main views are present. Either BS test models are taken as baseline and the content is modified to reflect UL operation, or UE test models are taken into use either directly or with modifications.

* Proposals
  + Option 1: BS test models are the baseline for IAB-MT test models, content is modified for UL operation. Combining some TMs can be further discussed.
  + Option 2: UE test models are the reference for IAB-MT test models. These models will be further simplified to be used for IAB-MT.
* Recommended WF
  + Discuss above options. Discuss in second round details including proposals for TDD configuration and DM-RS configuration.

**Issue 2-1-3: IAB-MT test configurations**

Majority of the companies express a view that BS test configurations can be re-used for IAB-MT while some details like power allocation may need some modification. One company also raised the option that some test configuration related parameters are adopted from UE test specifications.

* Proposals
  + Option 1: BS test configurations are the baseline to be used for IAB-MT.
  + Option 2: Test frequency, test channel bandwidth and test parameters of IAB-MT should follow the UE configuration
* Recommended WF
  + option 1

**Issue 2-1-4: IAB-MT test environments**

Majority of the companies express that the same test facilities are used for gNB and IAB-Node testing. However, concerns are also raised if there is a need to try to adopt also some UE aspects, which differ from gNB, into the environment discussion.

* Proposals
  + Option 1: IAB-MT uses the same test environments, i.e. chamber types, MU/TT, environmental conditions, as IAB-DU.
  + Option 2: Additional work is needed to see if/how UE test environment aspects can to be accommodated to coexist with option 1. Aspects to be considered include at least MU/TT, temperature, humidity, vibration and power source conditions.
* Recommended WF
  + Option 1

**Issue 2-1-5: IAB-MT receiver testing**

* Proposals:
  + Receiver DL baseband configuration for RF: align with performance testing FRC definition
  + There is no need to specify the message content in receiver test case.
* Recommended WF
  + TBA

## Companies views’ collection for 1st round

### Open issues

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

### 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.*

No CR or TP provided.

## 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*

No CR or TP provided.

## 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”* |