**3GPP TSG-RAN WG4 Meeting # 98-e R4-2103745**

**Electronic Meeting, 25th January – 5th February, 2021**

**Agenda item:** 7.4.3.1

**Source:** Moderator (Nokia)

**Title:** Email discussion summary for [98e][306] NR\_IAB\_Conformance\_Part1

**Document for:** Information

# Introduction

This document summarizes the email discussion covering 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: Test environment

This topic covers proposals related to test environment, including test setup and MU/TT.

## Companies’ contributions summary

|  |  |  |
| --- | --- | --- |
| **T-doc number** | **Company** | **Proposals / Observations** |
| R4-2102087 | Keysight Technologies UK Ltd | **Proposal 1:** For IAB-MT conformance testing, leave choice of Test Equipment flexible and implementation between one for UE test and for BS test  **Proposal 2:** In order to make Proposal 1 possible, for IAB-MU test MU budget calculation, choose larger TE MU value between one for UE test and one for BS test  **Proposal 2a:** For FR1 conducted MU, take values from TS38.521-1 “Annex F.1 Acceptable uncertainty of Test System” and compare with BS conducted test MU value from TS38.141-1, then use larger value for IAB-MT test MU value  **Proposal 2b:** For FR1 Radiated MU, take value from TS38.521-1 “Annex F.1 Acceptable uncertainty of Test System” and compare with BS radiated test TE value from TR37.941, then use larger value for IAB-MT TE MU value for FR1 radiated TE MU  **Proposal 2c:** For FR2 Radiated MU, take TE MU values from TR38.903 Annex B and compare with TE MU value used in FR2 BS radiated test MU in TR37.941, then use larger value for IAB-MT TE MU value for FR2 radiated TE MU  **Proposal 3:** In order to make Proposal 1 possible, allow to use of gNB emulator for IAB-MT conformance test setup whenever appropriate and not to eliminate existence of DL signal from TE for control as well as frequency and timing reference. In other words, not to specify certain procedure which does not allow to have DL signal existence while testing. |
| R4-2102326 | Ericsson | **Observation#1:** For BS RF TX and RX testing, the synchronization between DUT and TE is achieved with either external synchronization or DUT internal generated signal.  **Observation#2:** synchronization test setup between DUT (IAB-MT) and TE can at least using the same for the BS test environment setup for the shared IAB-DU/IAB-MT architecture.  **Proposal-1:** Synchronization test setup between DUT and TE for both IAB-DU and IAB-MT testing can be flexible. |
| R4-2102015 | Nokia, Nokia Shanghai Bell | **Observation 1:** RRM requirements do not need to be considered in test setup  **Observation 2:** To enable flexibility of test equipment and test system implementations, test setup description needs to be generic and not go in details which are specific for only one testing approach.  **Observation 3:** Further inputs on gNB emulator uncertainties are needed if gNB emulator is expected to be used.  **Proposal 1:** It is up to implementation how IAB-node gets timing based on available synchronization sources in the test situation.  **Proposal 2:** Test setup specification shall be left to minimum what is needed for the test purpose. Test setup shall not be used to verify other functionality which is not part of the main test purpose.  **Proposal 3:** Two-way communication between test equipment and DUT in the RF interface is not specified in RF tests. Implementation of possible feedback link for demodulation testing is out of scope of this proposal.  **Proposal 4:** In case gNB emulator uncertainty values are not available, it is assumed that gNB emulator has similar uncertainty contribution as signal generator and gNB test setup MU/TT values are re-used. |
| R4-2102017 | Nokia, Nokia Shanghai Bell | **Observation 1:** The test purpose of the receiver test is to verify RF performance, such as noise level and linearity, whereas throughput measurements as just a tool used in the process. Demodulation performance tests are separate from RF tests.  **Proposal 1:** Adopt the BS Rx testing approach as described in [1] for IAB-MT. *(moderator comment, [1] refers to R4-2017672)*  **Proposal 2:** It is up to implementation how IAB-node gets timing synchronization in the test situation.  **Proposal 3:** RAN4 to allow at least the approach used in BS testing where performance indicators are derived by the DUT, i.e., by the IAB-MT. It is not required to specify which entity derives the KPIs in the test situation and this can be left up to implementation. |
| R4-2102331 | Ericsson | **Observation#1:** Measurement/connection setup in BS and UE both are informative.  **Proposal#1:** Allow the test measurement/connection setup flexibility in the OTA receiver test procedure.  **Proposal-2:** Use the BS approach for the downlink FRC and also add missing parameter to complete the FRC design for RF receiver test.  **Proposal#3:** Use the BS TT as the baseline, further modification to account the UE test equipment should be possible.  **Proposal-4:** Discuss the above points for the drafting rules to facilitate TP drafting. *(moderator comment: see section 2.2 of the contribution)* |
| R4-2102328 | Ericsson | **Observation#1:** Measurement/connection setup in BS and UE both are informative.  **Proposal#1:** Allow the test measurement/connection setup flexibility in the conducted receiver test procedure.  **Proposal-2:** Use the BS approach for the downlink FRC and also add missing parameter to complete the FRC design for RF receiver test.  **Proposal#3:** Use the BS TT as the baseline, further modification to account the UE test equipment should be possible.  **Proposal-4:** Discuss the above points for the drafting rules to facilitate TP drafting. *(moderator comment: see section 2.2 of the contribution)* |
| R4-2102332 | Ericsson | **Observation#1:** RAN4 consensus on the signal common testing framework implying the same specification structure as the BS test specification can be reused.  **Observation#2:** The TT and MU needs to be discussed separately to consider both BS TE and UE TE.  **Proposal-1:** consider the above table for the radiated TX/RX IAB-MT requirement. (*moderator comment: This refers likely to both table 1 and table 4.1.1-2 in the contribution.)*  **Proposal-2:** Use the BS TT and MU as a baseline for IAB-MT test specification, further modification could be possible based for UE test equipment based on test equipment vendor input.  **Proposal-3:** Reuse the clause 4.1.3 in TS 38.141-1 for interpretation of measurement results. |
| R4-2102327 | Ericsson | **Proposal#1**: Allow the test measurement/connection setup flexibility in the conducted transmitter test procedure.  **Proposal#2:** In test procedure description, there is no need to describe downlink configuration and how to trigger the IAB-MT uplink transmission. The basic information is the test model of IAB-MT.  **Proposal#3:**  Use the BS TT as the baseline, further modification to account the UE test equipment should be possible.  **Proposal-4:** consider the power output inaccuracy due to the TX gain setting change in TX dynamic change test.  **Proposal-5:** Test model design need to cover the case where less # of RB could be configured for power control testing case. |

## Open issues summary

### Sub-topic 1-1: Test setup, MU and TT

This sub-topic covers test setup related proposals including synchronization and connection setup, two way communication, description of measurement setups and measurement uncertainties and test tolerance

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

**Issue 1-1-1: Synchronization**

Based on the contributions there seems to be good alignment to leave synchronization between DUT and test equipment up to implementation

* Proposals:
  + Option 1: synchronization between DUT and test equipment is left up to implementation
  + Option 2: TBA
* Recommended WF
  + Option 1

**Issue 1-1-2: Two-way communication in IAB-MT tests**

One company proposes not to specify two-way communication for RF tests. One company proposes to write the specification in a manner which does not preclude the existence of DL signals

* Proposals:
  + Option 1: Two-way communication is not specified
  + Option 2: Two-way communication is not specified, specification shall not preclude DL signals to be used e.g. for timing and frequency reference purposes during the test
* Recommended WF
  + TBA

**Issue 1-1-3: Description of connection/measurement setup in specification annex**

One company notes that the specification annexes capturing the measurement setups are informative in UE and BS specification and proposes to use the same practice in IAB specification

* Proposals:
  + Option 1: Flexibility in connection / measurement setup is allowed by keeping the specified setup informative
  + Option 2: TBA
* Recommended WF
  + Option 1

**Issue 1-1-4: MU/TT**

Two companies prefer to adopt BS measurement uncertainties and test tolerances by default, but are open to allow modification if using UE test equipment requires this. One company prefers to adopt the higher of UE and BS values, but does not propose specific numbers. It should be noted that UE specifications do not cover radiated testing in FR1, which may cause difficulties if UE MU is considered.

* Proposals:
  + Option 1: BS MU/TT will be adopted
  + Option 2: The higher value of BS and UE MU/TT are adopted
  + Option 3: The higher value of BS and UE MU/TT are adopted only regarding the individual contribution of system simulator
  + Option 4: Chapter 4.1.3 in 38.141-1 can be re-used for IAB.
* Recommended WF
  + TBA

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

#### Companies views’ collection for 1st round

##### Open issues

|  |  |
| --- | --- |
| **Company** | **Comments** |
| XXX | Issue 1-1-1:  Issue 1-1-2:  … |
| CATT | **Issue 1-1-1: Synchronization**  One clarification for the recommended WF is that should DUT supports all of the possible implementations or supporting one of them is ok. We’re not sure if this should be clarified in spec. If one of them is ok, it may be related to the discussion of frequency error test in [307].  **Issue 1-1-2: Two-way communication in IAB-MT tests**  The comment is similar with 1-1-1 that some specific requirement like power control may need some discussion and conclusion.  **Issue 1-1-4: MU/TT**  We think Option 1 can be the baseline but if there’s some implementation flexibility or difference compared with BS, some exceptions should be allowed to consider the difference. |
| Samsung | **Issue 1-1-1: Synchronization**  Fine with moderator recommendation as option 1. It’s supposed that in common thread the proposal should be for common requirement except the requirement on dynamic range, power control and frequency error of which there is delta in IAB-MT requirement compared with gNB. It would be good if we can achieve consensus first for IAB-DU and IAB-MT common part. Then we can further clarify the applicability to delta part.  **Issue 1-1-2: Two-way communication in IAB-MT tests**  It seems both options share the common part as “Two-way communication is not specified” which is agreeable to us. Furthermore, option 2 can ensure the forward compatibility and flexibility which sounds attractive. But further work needed on specification draft detail.  **Issue 1-1-3: Description of connection/measurement setup in specification annex**  Fine with moderator recommendation as option 1.  **Issue 1-1-4: MU/TT**  The option to use the higher value of BS and UE was discussed in last meeting, and there is concern on that for regulation based restriction TT should be zero. Better to review and compare the table first to decide this. |
| Ericsson | **Issue 1-1-1: Option 1, agree with recommended WF.**  **Issue 1-1-2: Option 1. Seems option 1&2 not mutual exclude each other and in our opinion, option 1 better as no specified in detail means the option 2 not be excluded.**  **Issue 1-1-3: option 1. Agree with recommended WF.**  **Issue 1-1-4: Option 1&option 3&option 4. As UE TE (system simulator) is also allowed to be used so is MU associated with it. However, the UE MU has different MU with different condition (BW and frequency range), how to adopt the UE MU should be discussed case by case. As moderator indicated, there is no OTA UE conformance specification so BS MU should be used as baseline. Then option 3 indicate a way to further modification of MU which including the UE TE also.** |

### 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: Test models, configurations and FRC

## Companies’ contributions summary

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| --- | --- | --- |
| **T-doc number** | **Company** | **Proposals / Observations** |
| **Test configurations** | | |
| R4-2100906 | Samsung | **Proposal 1:** it is suggested to take table 1 and table 2 in contribution for IAB-MT TC definition for FR1 and FR2 respectively  **Proposal 2:** adopt NRTC1, NRTC2 and NRTC3 for IAB-MT  **Proposal 3**: power allocation for IAB-MT should be the same as BS for each NRTC to be defined.  **Proposal 4**: BS TC generation can be applied for IAB-MT with minor change for each NRTC to be defined. |
| R4-2101565 | Nokia, Nokia Shanghai Bell | **Observation 1:** There are at least two options how to define in IAB conformance specification channel bandwidth for test configurations.  **Observation 2:** Having all the test configurations in place does not mandate supporting all these configurations in the IAB-MT implementation.  **Proposal 1:** It is proposed to use a note that narrowest supported channel bandwidth should be used to build IAB test configurations signal for conformance tests for conducted IAB test specification.  **Proposal 2:** It is proposed to use a note that narrowest supported channel bandwidth according D.7 declaration should be used to build IAB test configurations signal for conformance tests for radiated IAB test specification.  **Proposal 3:** It is proposed to reuse NRTC1 test configuration for IAB conformance tests.  **Proposal 4:** It is proposed to reuse NRTC2 test configuration for IAB conformance tests.  **Proposal 5:** It is proposed to reuse NRTC3 test configuration for IAB conformance tests.  **Proposal 5:** It is proposed to reuse NRTC4 test configuration for IAB conformance tests.  **Proposal 6:** It is proposed to reuse NRTC5 test configuration for IAB conformance tests. |
| R4-2101960 | ZTE Corporation | **Proposal 1:** to remove in-band NB-IoT from test configurations for IAB-DU 1-H and 1-O.  **Proposal 2:** to define the same test configurations for IAB-DU and IAB-MT. |
| R4-2102322 | Ericsson | **Proposal#1**: Reusing the below declared parameter for IAB-MT relating to the test configuration.  **Proposal-2:** Use the above declaration for IAB-MT to construct the test configuration.  (*moderator comment, see table x.y-1 in the contribution*)  **Proposal-3**: NRTC generation and NRTC power allocation for IAB-MT can be the same with IAB-DU.  **Proposal-4:** Use the same IAB principle for the 5MHz minimum supported bandwidth for test signal generation. |
| R4-2102323 | Ericsson | **Proposal#1:** Reusing the below declared parameter for IAB-MT relating to the test configuration. (*moderator comment, see table x.y-1 in the contribution*)  **Proposal-2:** Use the above declaration for IAB-MT to construct the test configuration. (*moderator comment, refers to same table as proposal 1*)  **Proposal-3:** NRTC generation and NRTC power allocation for IAB-MT can be the same with IAB-DU.  **Proposal-4:** Use the same BS principle for the 5MHz minimum supported bandwidth for test signal generation. |
| **Test models** | | |
| R4-2100371 | CATT | **Observation 1:** NR-FR1-TM1.1, NR-FR1-TM3.1 and NR-FR1-TM3.1a are needed for IAB-MT, some modifications are needed to adapt to UL signal.  **Observation 2:** The test models for IAB-MT power control and frequency error need to be reviewed after the decision of the two tests.  **Observation 3:** FR1 IAB-MT physical channel and signals mapping can refer TS 38.521-1 with the clarification that only the information for the used physical channels is referred.  **Observation 4:** For FR2, TDD pattern for UE Tx and BS Tx are different. It may need some discussion if UE TDD reference parameters can be reused for IAB-MT**.**  **Observation 5:** FR2 IAB-MT common physical channel parameters can refer TS 38.521-2 with the clarification that only the information for the used CBW is referred.  **Observation 6:** FR2 IAB-MT physical channel and signals mapping can refer TS 38.521-2 with the clarification that only the information for the used physical channels is referred.  **Proposal 1:** Only PUSCH is tested for the RF test.  **Proposal 2:** The configurations of TDD for IAB-MT reuse the same configuration table as BS test, i.e. leave the special slot configuration in test implementation.  **Proposal 3:** IAB-MT common physical channel parameters can refer TS 38.521 with the clarification that only the information for the used CBW is referred. |
| R4-2100907 | Samsung | **Observation 1**: PHY layer update on IAB should have no impact on conformance testing parameters  **Observation 2**: PDSCH+DMRS should be enough for TM design on IAB-MT  **Observation 3**: For UE the TDD configuration is provided in conformance testing spec for both transmitter and receiver requirement.  **Observation 4**: For BS the TDD configuration is only predefined in Test model in conformance testing specification.  **Observation 5**: For FR1 the UE TDD configuration is the same as TDD configuration defined in BS TM for conformance testing.  **Proposal 1**: FRC for receiver requirements verified by throughput will be defined with TDD agnostic way as BS.  **Proposal 2**: Apply the BS FR1 TDD configuration for IAB-MT FR1 and update the duration accordingly.  **Proposal 3**: Determine the BS FR2 TDD configuration for IAB-MT with tradeoff of general duration and impact on core specification.  **Proposal 4**: Test model design for IAB-MT will follow the framework as gNB with update based on test condition and procedure to be agreed for requirements with delta compared BS. |
| R4-2101564 | Nokia, Nokia Shanghai Bell | **Proposal 1:** It is proposed to reuse NR FR1 test models and NR FR2 test models for IAB-DU using NR details for physical channel parameters.  **Proposal 2:** It is proposed to reuse NR FR1 test models and NR FR2 test models for IAB-MT taking into account respective physical channel parameters.  **Proposal 3:** It is proposed to design IAB test models that are equivalent of NR test models in terms of respective set of test and modulation for PDSCH used.  **Proposal 4:** It is proposed to include IAB-MT power control test to test models covering output power dynamics tests.  **Proposal 5:** It is proposed to define IAB test models for FR1 described in table 3.  **Proposal 6:** It is proposed to define IAB test models for FR2 described in table 4. |
| R4-2101961 | ZTE Corporation | **Proposal 1:** to remove in-band NB-IoT from test model for IAB-DU 1-H and 1-O.  **Proposal 2:** apply the same TDD DL-UL pattern for IAB-DU and IAB-MT. |
| R4-2102324 | Ericsson | **Proposal-1:** Discuss the above core requirement classification for IAB-MT different test model design. (*moderator comment: refers to unnumbered table in the beginning of the contribution*)  **Proposal-2:** Adopt the above common parameter configuration for IAB-MT test model. (*moderator comment: refers to table x.y.z-1 in the contribution*)  **Observation#1:** No PUCCH common configuration will be needed for UE test case if not to test PUCCH specifically.  **Proposal-3:** No PUCCH common configuration for IAB-MT test model.  **Proposal-4:** Adopt the above common physical channel parameter for the IAB type 1-H and 1-O. (*moderator comment: refers to table x.y.z-1 in the contribution, however this table is not the same is in proposal 2*)  **Observation#2:** uplink TM has no multiple user differentiation.  **Proposal#5:** No need to construct the power boosting PRB for DMRS signal in TM design of IAB-MT. |
| R4-2102325 | Ericsson | **Proposal-1:** Discuss the above core requirement classification for IAB-MT different test model design. (*moderator comment: refers to unnumbered table in the beginning of the contribution*)  **Proposal-2:** Adopt the above common parameter configuration for IAB-MT test model. (*moderator comment: refers to table x.y.z-1 in the contribution*)  **Observation#1:** No PUCCH common configuration will be needed for UE test case if not to test PUCCH specifically.  **Proposal-3:** No PUCCH common configuration for IAB-MT test model.  **Proposal-4:** Adopt the above common parameter configuration for IAB-MT test model for the IAB type 2-O. (*moderator comment: refers to table x.y.z-1 in the contribution, however this table is not the same is in proposal 2*)  **Observation#2:** uplink TM has no multiple user differentiation.  **Proposal-5:** No need to construct the power boosting PRB for DMRS signal in TM design of IAB-MT.  **Proposal-6:** Adopt the above common parameter configuration for IAB-MT test model for the IAB type 2-O. (*moderator comment: Not clear what this refers to*) |
| **FRC** | | |
| R4-2102331 | Ericsson | **Proposal-2:** Use the BS approach for the downlink FRC and also add missing parameter to complete the FRC design for RF receiver test. |
| R4-2102017 | Nokia, Nokia Shanghai Bell | **Proposal 1:** Adopt the BS Rx testing approach as described in [1] for IAB-MT. *(moderator comment, [1] refers to R4-2017672)*  **Proposal 2:** It is up to implementation how IAB-node gets timing synchronization in the test situation. |
| R4-2102328 | Ericsson | **Proposal-2:** Use the BS approach for the downlink FRC and also add missing parameter to complete the FRC design for RF receiver test. |
| R4-2100907 | Samsung | **Proposal 1**: FRC for receiver requirements verified by throughput will be defined with TDD agnostic way as BS. |

## Open issues summary

### Sub-topic 2-1: Test configurations

This sub-topic covers test configurations related proposals.

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

**Issue 2-1-1: Re-use of NR test configurations**

There seems to be good alignment between companies that NR test configurations should be re-used for IAB, but there are differences in views if some configurations can be left out.

* Proposals:
  + Option 1: As baseline, re-use NRTC1, NRTC2 and NRTC3 for IAB-MT, and NRTC1, NRTC2, NRTC3, NRTC4 and NRTC5 for IAB-DU
  + Option 2: As baseline, re-use NRTC1, NRTC2, NRTC3, NRTC4 and NRTC5 for both IAB-DU and IAB-MT
* Recommended WF
  + TBA

**Issue 2-1-2: Power allocation in test configurations**

Two companies propose that power allocation in all specified test configurations shall be the same for IAB-MT and IAB-DU.

* Proposals:
  + Option 1: power allocation for IAB-MT shall be the same as BS for each NRTC to be defined for IAB.
  + Option 2: TBA
* Recommended WF
  + TBA

**Issue 2-1-3: Channel bandwidths test configurations**

It has been agreed that IAB does not support 5 MHz channel bandwidth. Therefore, NR test configurations need to be adapted accordingly.

* Proposals for conducted specification
  + Option 1: instead of 5 MHz, use the narrowest supported channel bandwidth to build IAB test configurations signal for conformance tests for conducted IAB test specification for operating bands less than 100 MHz wide.
  + Option 2: TBA
* Proposals for radiated specification
  + Option 1: narrowest supported channel bandwidth according D.7 declaration should be used to build IAB test configurations signal for conformance tests for radiated IAB test specification.
  + Option 2: TBA
* Recommended WF
  + Option 1 for both conducted and radiated specification

**Issue 2-1-4: NB-IoT in test configurations**

It has been agreed that IAB does not support NB-IoT. Therefore, NR test configurations need to be adapted accordingly.

* Proposals:
  + Option 1: to remove in-band NB-IoT from test configurations for IAB-DU 1-H and 1-O.
  + Option 2: TBA
* Recommended WF
  + Option 1, but applied for both IAB-MT and IAB-DU.

**Issue 2-1-5: Declarations as basis for test configurations**

One company notes that there are a number of declarations related to building test configurations.

* Recommended WF
  + It is confirmed that manufacturer declarations shall continue to be the basis for building test configurations for both IAB-DU and IAB-MT, and testing shall not be performed for configurations which are not supported by the DUT. Possible detailed changes to these declarations can be further discussed in sub-topic 3-1, if needed.

#### Companies views’ collection for 1st round

##### Open issues

|  |  |  |
| --- | --- | --- |
| **Company** | **Comments** | |
| XXX | Issue 2-1-1:  Issue 2-1-2:  … | |
| CATT | | **Issue 2-1-1: Re-use of NR test configurations**  Considering IAB-MT supported features are based on declaration, option 2 may be ok.  **Issue 2-1-2: Power allocation in test configurations**  We didn’t see problem for option 1.  **Issue 2-1-3: Channel bandwidths test configurations**  Ok with the recommended WF.  **Issue 2-1-4: NB-IoT in test configurations**  Support the recommended WF.  **Issue 2-1-5: Declarations as basis for test configurations**  Ok with the recommended WF. | |
| Samsung | | **Issue 2-1-1: Re-use of NR test configurations**  Not against to take NRTC4 and NRTC5 for IAB-MT. But clarification needed on applicability of those scenarios first.  **Issue 2-1-2: Power allocation in test configurations**  Option 1 is aligned with our understanding.  **Issue 2-1-3: Channel bandwidths test configurations**  Option 1 for both conductive and radiated requirement are aligned with our understanding.  **Issue 2-1-4: NB-IoT in test configurations**  Support WF recommended by moderator  **Issue 2-1-5: Declarations as basis for test configurations**  Support WF recommended by moderator | |
| Ericsson | | **Issue 2-1-1: option 2. The test configuration is based on declaration.**  **Issue 2-1-2: Option 1.**  **Issue 2-1-3: Option 1. The question is that how to reflect this in specification. Whether to add a note as the same as BS spec or replace the 5MHz channel with descriptive wording. Either way is ok with us.**  **Issue 2-1-4: Option 1.**  **Issue 2-1-5: agree with WF.** | |

### Sub-topic 2-2: Test models

This sub-topic covers test models related proposals.

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

**Issue 2-2-1: Re-use of NR test models**

There is a proposal that NR BS test models can be re-used for both IAB-MT and IAB-DU, but re-using all physical layer parameters may need further consideration

* Proposals: *Note: multiple options can be selected*
  + Option 1: reuse NR FR1 test models and NR FR2 test models for IAB-DU using NR details for physical channel parameters.
  + Option 2: It is proposed to reuse NR FR1 test models and NR FR2 test models for IAB-MT taking into account respective physical channel parameters, i.e. TM design for IAB-MT shall follow same framework as BS, delta to BS spec to be agreed
  + Option 3: Common physical channel parameters can refer to TS 38.521 with the clarification that only the information for the used CBW is referred
* Recommended WF
  + TBA

**Issue 2-2-2: TDD pattern for IAB-MT**

Legacy BS NR test model includes TDD patterns (in FR1 and FR2) that are different compare to UE test specification. TDD pattern for IAB-MT needs to be agreed.

* Proposals: *Note: multiple options can be selected*
  + Option 1: Apply BS FR1 TDD configuration for IAB-MT in FR1
  + Option 2: Apply BS FR2 TDD configuration for IAB-MT in FR2
  + Option 3: Update the measurement duration due to changed UL-DL split
  + Option 4: Special slot configuration is left for implementation
* Recommended WF
  + TBA

**Issue 2-2-3: PUCCH configuration for IAB-MT**

Legacy BS NR test models includes PDCCH and PDSCH configuration.

* Proposals:
  + Option 1: No PUCCH common configuration is needed for IAB-MT test models
  + Option 2: TBA
* Recommended WF
  + TBA

**Issue 2-2-4: Multi-user considerations for IAB-MT**

Legacy BS NR test models includes multi-user both for FR1 and FR2. IAB-MT will have only single user transmition.

* Proposals:
  + Option 1: Multi-user operation does not need to be considered for IAB-MT test models
  + Option 2: TBA
* Recommended WF
  + TBA

**Issue 2-2-5: Power boosting for IAB-MT**

Power boosting was introduced to NR BS specifications to FR1 test models. There is no test model in FR2 with power boosting. Power boosting is introduced only in NR-FR1-TM1.2, NR-FR1-TM3.2 and NR-FR1-TM3.3.

* Proposals:
  + Option 1: Power boosting does not need to be considered for IAB-MT test models
  + Option 2: TBA
* Recommended WF
  + TBA

**Issue 2-2-6: NB-IoT**

It has been agreed that IAB does not support NB-IoT. Therefore, test models need to be adapted accordingly.

* Proposals:
  + Option 1: to remove in-band NB-IoT from test model for IAB-DU 1-H and 1-O.
  + Option 2: TBA
* Recommended WF
  + Option 1, but applied for both IAB-MT and IAB-DU.

#### Companies views’ collection for 1st round

##### Open issues

|  |  |
| --- | --- |
| **Company** | **Comments** |
| XXX | Issue 2-2-1:  Issue 2-2-2:  … |
| CATT | **Issue 2-2-1: Re-use of NR test models**  The listed options are a little general or not very clear to be approved. Some test models are not needed such as NR-FR1-TM3.2 and NR-FR1-TM3.3. So first, we would like to agree which ones are necessary which ones are not or need some modification. Like Table 1 in our contribution R4-2100371.  **Issue 2-2-2: TDD pattern for IAB-MT**  Option 1 can be agreed because BS and UE FR1 configurations are same. FR2 may need some discussion as UL time for BS configuration is small, TE vendors views may help.  **Issue 2-2-3: PUCCH configuration for IAB-MT**  We also think no PUCCH test may be ok.  **Issue 2-2-4: Multi-user considerations for IAB-MT**  Option 1 is obvious to us.  **Issue 2-2-5: Power boosting for IAB-MT**  We agree thus in **Issue 2-2-1,** NR-FR1-TM3.2 and NR-FR1-TM3.3 are not needed.  **Issue 2-2-6: NB-IoT**  Support recommended WF. |
| Samsung | **Issue 2-2-1: Re-use of NR test models**  Option 1 seems something we have already agreed last meeting to reuse BS definition for IAB-DU. But it’s fine if the preference is to capture this explicitly for this topic.  Further refinement on option2 may be needed but we tend to agree with the intention to follow the BS framework of Test mode design as three serious TMs to be introduced for IAB-MT according to the necessity and applicability. In addition, the conclusion on frequency error dynamic range and power control would also be addressed in TM agreement for common part.  **Issue 2-2-2: TDD pattern for IAB-MT**  Option 1 is fine for FR1. Whether option2 can be applied for FR2 should be decided based on the agreement on whether there is dependency on core requirement such as power control and dynamic range.  **Issue 2-2-3: PUCCH configuration for IAB-MT**  According to our understanding the PUSCH plus reference signal would be OK to occupy the UL channel. Hence it is fine to option 1.  **Issue 2-2-4: Multi-user considerations for IAB-MT**  Support option 1.  **Issue 2-2-5: Power boosting for IAB-MT**  Support that no power boosting for IAB-MT UL transmission  **Issue 2-2-6: NB-IoT**  Support WF recommended by moderator |
| Ericsson | **Issue 2-2-1: Option 2. I assume this is for the detail common or specific channel parameter and as it says in option 2, the detal to BS spec to be agreed so we are fine with option 2 in general.**  **Issue 2-2-2: Option 1 and option 2 and option 3. FR1 TDD config is the same with UE and BS side and option 1 is straightforward. For FR2, IAB-MT should work with any TDD config. TX dynamic range and TX power control should work even with 1 uplink time slot for higher SCS cases. Needs Test gear vendor input though to see if they prefer the pre-defined TDD pattern or the TDD pattern can be configured in test equipment.**  **Issue 2-2-3: option 1.**  **Issue 2-2-4: option 1.**  **Issue 2-2-5: option 1.**  **Issue 2-2-6: opion 1 and fine with Recommended WF.** |

### Sub-topic 2-3: Rx RFC

**Issue 2-3-1: Using BS approach**

Multiple companies propose to use BS approach and keep Rx requirements agnostic to TDD pattern. BS approach as defined in R4-2017672 is re-produced below:

BS approach: Include TDD pattern in the conformance spec, and Rx FRC definition is per slot basis without scheduling on special slots, meanwhile during test, the applied TDD pattern for testing is BS declaration basis and the requirements agnostic to TDD pattern and Duplex modes (For information)

* Proposals:
  + Option 1: Adopt BS approach is described above.
  + Option 2: TBA
* Recommended WF
  + Option 1

**Issue 2-3-2: Additional FRC parameters**

One company proposes to fill in additional FRC parameters

* Proposals:
  + Option 1: Fill in FRC parameters as proposed in R4-2102331 and R4-2102328.
  + Option 2: TBA
* Recommended WF
  + TBA

#### Companies views’ collection for 1st round

##### Open issues

|  |  |
| --- | --- |
| **Company** | **Comments** |
| XXX | Issue 2-3-1:  Issue 2-3-2:  … |
| CATT | **Issue 2-3-1: Using BS approach**  Seems ok for the recommended WF.  **Issue 2-3-2: Additional FRC parameters**  We don’t have clear view yet. |
| Samsung | **Issue 2-3-1: Using BS approach**  Support WF recommended by moderator  **Issue 2-3-2: Additional FRC parameters**  If it’s agreed to capture whether the annex of core spec will be updated accordingly? |
| Ericsson | **Issue 2-3-1: option 1**  **Issue 2-3-2: option 1.** |

### 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.*

All submitted example TPs are left for second round discussion, which will cover only comments to them as there is no place to capture the content and work split is not agreed yet.

## 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*

All submitted example TPs are left for second round discussion, which will cover only comments to them as there is no place to capture the content and work split is not agreed yet.

## 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: Declarations, TP/CR work

## Companies’ contributions summary

|  |  |  |
| --- | --- | --- |
| **T-doc number** | **Company** | **Proposals / Observations** |
| R4-2102421 | Huawei | *Summary by moderator:* Document is for discussion only. Highlights how manufacturer declarations could be captured in IAB specifications. |
| R4-2102016 | Nokia, Nokia Shanghai Bell | **Observation 1:** Agreements from previous meeting allow adding, removing or modifying existing BS declarations for them to be adapted for IAB-MT  **Observation 2:** This is not a complete set of modifications but to be considered as starting point to create the declarations for IAB-MT.  **Observation 3:** Declarations related to demodulation requirements are out of scope of this contribution.  **Proposal 1:** Declaration terminology needs to be adapted from BS to IAB and declarations applicable only to type 1-C removed. Also declaration D.1 from TS 38.141-1 does not apply for conducted requirements.  **Proposal 2:** It needs to be ensured that declarations address operating bands and requirements that are defined for IAB-MT  **Proposal 3:** Further discussion is needed whether reduction of test cases has impact also on declarations, e.g. having a new declaration to state whether IAB-MT and IAB-DU share the same RF parts.  **Proposal 4:** Consider either adopting applicability column principle for IAB-MT and IAB-DU similar to what is used for BS types in 38.141-1/2 or adding notes on declarations if it is applicable for IAB-MT or IAB-DU. The decision should be taken considering the number of declarations which are different for IAB-MT and IAB-DU |
| R4-2100908 | Samsung | *Summary by moderator:* Document is for discussion only. Main content is to highlight which declarations still require further attention |
| R4-2102329 | Ericsson | *Summary by moderator:* No proposals are directly related to declarations, but at the end of the contribution there is a table showing how declarations need to be modified to adapt to IAB case. |
| R4-2102332 | Ericsson | *Summary by moderator:* No proposals are directly related to declarations, but at the end of the contribution there is a table showing how declarations need to be modified to adapt to IAB case. |
| R4-2102331 | Ericsson | **Proposal-4:** Discuss the above points for the drafting rules to facilitate TP drafting. *(moderator comment: see section 2.2 of the contribution)* |
| R4-2102328 | Ericsson | **Proposal-4:** Discuss the above points for the drafting rules to facilitate TP drafting. *(moderator comment: see section 2.2 of the contribution)* |

## Open issues summary

### Sub-topic 3-1: Manufacturer declarations

This sub-topic covers manufacturer declarations.

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

**Issue 3-1-1: Re-use of NR declarations**

It has been observed that the terminology in BS specifications needs updates to be applicable for IAB-MT. There are also some declarations which may not be applicable for IAB, as e.g. type 1-C requirements are not specified for IAB. Therefore, a way forward how the IAB declaration framework is formed needs further clarifications

* Proposals: *Note: Multiple options can be selected*
  + Option 1: BS declarations are referred to (approach in R4-2102421) and terminology is clarified in IAB specification
  + Option 2: Declaration table is copy-pasted to IAB conformance specifications and terminology is updated in the table
  + Option 3: In case some declarations are not applicable for IAB, they shall be marked as void to keep declaration numbering align with NR BS. (Practice in R4-2102329)
  + Option 4: In case some declarations are not applicable for only IAB-MT or only IAB-DU, the applicability shall be made clear with added applicability column (R4-2102026)
* Recommended WF
  + TBA

**Issue 3-1-2: Identifying NR BS declarations not applicable for IAB.**

Some declarations have been identified in which may not be applicable for IAB or IAB-MT. Some declarations concern type 1-C requirements and some declarations concern bands which are not defined for IAB operation. The intention of this sub-topic is to identify all declarations which may not apply for IAB.

* Proposals: *Note: Multiple options can be selected*
  + Option 1: All type 1-C related declarations are not applicable for IAB
  + Option 2: All declarations for bands not defined for IAB are not applicable
  + Option 3: Please include free-form feedback which declarations are not applicable.
* Recommended WF
  + TBA

#### Companies views’ collection for 1st round

##### Open issues

|  |  |
| --- | --- |
| **Company** | **Comments** |
| XXX | Issue 3-1-1:  Issue 3-1-2:  … |
| CATT | **Issue 3-1-1: Re-use of NR declarations**  Our current understanding is that combination of option 2, 3 and 4 may be good. |
| Samsung | **Issue 3-1-1: Re-use of NR declarations**  In annex of R4-2100908 we provide the example tables for IAB-MT and IAB-DU declaration based on option 2, 3 and 4.  **Issue 3-1-2: Identifying NR BS declarations not applicable for IAB.**  Except option 1, we also share the view that below declarations need more consideration:  IAB-MT type 1-H: D.31 TAE groups should be n/a  Clarification needed on: D.25 for type 1-H and D.51 for type 1-O/2-O IAB-MT  Applicability of declarations on multiple band operation for IAB-MT at current stage. |
| Ericsson | **Issue 3-1-1: option 2&3&4. Maybe most companies have similar view but only difference is the formulation in the conformance specification. Seems direct reference cannot provide the clarity as the declaration table would be considerably modified, in terms of both terminology and some notes.**  **Issue 3-1-2: Option 1&2. Others like there is no NB-IoT declaration, no TAE related declaration for IAB-MT.** |

### Sub-topic 3-2: Work split on conformance TPs and drafting guidelines

This sub-topic covers the work split and guidelines on TP drafting to aim at aligned format and minimal overlaps in following meeting.

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

**Issue 3-2-1: Work split between conducted and radiated specifications**

Firstly, it is expected that there is a lot of commonality between conducted and radiated conformance specification. Therefore, it is proposed that same company takes care of same sections in both conducted and radiated specifications.

**Proposal 1: Same company takes care of same clauses in both conducted and radiated specification**

**Issue 3-2-2: Work split on requirement clauses 6 and 7**

There was an agreed work split for requirement clauses for core specification. This is re-produced below based on email on RAN4 reflector from April 1st, 2020, titled “Re: Updated IAB TS spec and splitting of IAB RF work load for preparing TPs”. It is proposed that same work split is applied for conformance specifications.

|  |
| --- |
| **Output power [Nokia]** |
| **TX dynamic range [Huawei]** |
| **On/off power [CATT]** |
| **TX signal quality [CATT]** |
| **Unwanted emission [Nokia]** |
| **TX IM [ZTE]** |
| **Sensitivity [Huawei]** |
| **RX Dynamic range [Huawei]** |
| **ACS and IBB [Ericsson]** |
| **OBB[Ericsson]** |
| **RX spurious emission[Ericsson]** |
| **RX IM [ZTE]** |
| **ICS [ZTE]** |

**Proposal 2: Apply the work split above for clauses 6 and 7**

**Issue 3-2-3: Work split on clauses 4 and 5**

Clauses 4 and 5 include roughly the sections below

4.1 Measurement uncertainties and test requirements

4.2 Radiated requirement reference points

4.3 Base station classes

4.4 Regional requirements

4.5 BS configuration

4.6 Manufacturer’s declarations

4.7 Test configurations

4.8 Applicability of requirements

4.9 RF channels and test models

4.10 Requirements for contiguous and non-contiguous spectrum

4.11 Requirements for BS capable of multi-band operation

4.12 Co-location requirements

4.13 Format and interpretation of tests

4.14 Reference coordinate system

The topic split is proposed as below, and companies are requested the volunteer:

|  |  |
| --- | --- |
| **Clause number** | **Company** |
| 4.1 |  |
| 4.2 – 4.5 |  |
| 4.6 |  |
| 4.7 – 4.8 | **CATT** |
| 4.9 | **Ericsson** |
| 4.10 – 4.14 |  |

**Issue 3-2-4: Work split on Annexes**

Annexes are expected as follows:

Annex A (normative): Reference measurement channels

Annex B (normative): Environmental requirements for the BS equipment

Annex C (informative): Test tolerances and derivation of test requirements

Annex D (normative): Calibration

Annex E (informative): OTA measurement system set-up

Annex F (normative): Void

Annex G (informative): Transmitter spatial emissions declaration

Annex H (normative): Characteristics of the interfering signals

Annex I (normative): TRP measurement procedures

Annex J (normative): Propagation conditions

Annex K (informative): Measuring noise close to noise-floor

Annex L (normative): In-channel TX tests

The work split within this issue considers only the RF related content in the annexes and ignores demodulation. Further coordination between demod and RF is likely needed, once the expected content is better known also from demod side.

It can be considered that the target in following meeting is to technically endorse the RF related content to the Annexes, and the detailed structure involving also demod content can be finalized later.

The topic split is proposed as below, and companies are requested the volunteer:

|  |  |
| --- | --- |
| **Clause number** | **Company** |
| Annex A |  |
| Annex B, C | **CATT** |
| Annex D, E |  |
| Annex G, H | **Ericsson** |
| Annex I, J, K |  |
| Annex L |  |

**Issue 3-2-5: Big CR/TP coordination**

Concerning the bigCR/TP split, the vice-chair has exchanged with the WI rapporteur, the TS editor, TR editor, and the RF/demod moderators. The following big “document” will be proposed in the Demod and RF session for the experts to evaluate:

* 38.174 Performance requirements
  + 1x bigCR, for RF
  + 1x bigCR, for Demod
* 38.???-1 Conducted conformance testing
  + 1x bigTP, for RF
  + 1x bigTP, for Demod
* 38.???-2 Radiated conformance testing
  + 1x bigTP, for RF
  + 1x bigTP, for Demod

Care needs to be taken for the appendices, where there might be overlap between RF and Demod. The specification editor needs support to merge the technical bigCRs from RF and Demod.

The topic split is proposed as below, and companies are requested the volunteer:

|  |  |
| --- | --- |
| **Clause number** | **Company** |
| 38.174 big CR for RF | QC continues? |
| 38.???-1 (conducted) big TP for RF |  |
| 38.???-2 (radiated) big TP for RF | **Ericsson** |

**Issue 3-2-6: TP drafting guidelines**

Contributions R4-2102331 and R4-2102328 propose drafting guidelines (identical in both contributions) and they are reproduced below.

1. Connection setup detail could be described in Annex which including both BS test equipment connection and UE test equipment connection, by doing so, there is no impact on the test case drafting.
2. Test configuration and test model needs to be agreed at least high level so the test case drafting may not be impacted by referring to the clause number.
3. The procedure for IAB-DU and IAB-MT preferably use different paragraph starting with “For IAB-DU…” and “For IAB-MT”.
4. The test requirement drafting with 3 options:
   1. if is the same with minimum requirement, it can refer to minimum requirement
   2. generically statement with considering both minimum requirement and referring to TT definition in annex
   3. Copy and paste the core requirement with further reflecting the TT definition in the test requirement.

Proposals:

* To align the format of TPs it is suggested to review the guidelines above and propose possible changes to them

#### Companies views’ collection for 1st round

##### Open issues

|  |  |
| --- | --- |
| **Company** | **Comments** |
| XXX | Issue 3-2-1:  Issue 3-2-2:  … |
| CATT | **Issue 3-2-1: Work split between conducted and radiated specifications**  And  **Issue 3-2-2: Work split on requirement clauses 6 and 7**  We support the recommended WF, but not sure if there’re conflicts with the contribution number cap rules.  **Issue 3-2-3: Work split on clauses 4 and 5**  And  **Issue 3-2-4: Work split on Annexes**  We added our companies’ name to the parts we can take.  **Issue 3-2-6: TP drafting guidelines**  Seems ok for the current guideline. |
| Samsung | In general we support the idea on work split and recommended WF from moderator. As TR38.809 editor we are happy to continue work on big CR for TR and it would make our discussion helpful and traceable for future release discussion if main consensus and technical background for RF conformance testing can be involved in TR. And we would like to be volunteer to work on this aspect if it’s fine for the group. But whether the conclusion for demodulation to be addressed in TR or not would be decision from demo experts. |
| Ericsson | **Issue 3-2-6: ok with proposal. This proposal is to have the same format on the drafting the test case and will be good to agree with it before new TP is proposed. Specifically in proposal, the 4-b is our preference to further simplify the test case.** |

### 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”* |