**3GPP TSG-RAN WG4 Meeting # 98-bis-e R4-210XXXX**

**Electronic Meeting, 12th – 20th April, 2021**

**Agenda item:** 5.3.2.3, 5.3.2.4

**Source:** Moderator (Nokia)

**Title:** Email discussion summary for [98-bis-e][305] NR\_IAB\_Conformance\_Part2

**Document for:** Information

# Introduction

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

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

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

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

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

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

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

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

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

Some Tdocs from agenda 5.3.2.3 and 5.3.2.4 are moved to [98-bis-e][304] NR\_IAB\_Conformance\_Part1 email thread, to treat with other papers in that email thread.

From submitted contributions there are following groups of papers:

**Topic #1: Dynamic range and power control test**

Tdocs submitted in context of agreed last RAN4#98e meeting WF R4-2103977 discussing dynamic range and power control. Some of them include TPs to conducted and OTA test specifications.

**Topic #2: TPs for TS 38.176-1 conducted tests specification**

In this topic, TPs to conducted test specification TS 38.176-1 are collected for companies’ comments.

Under this topic some TPs drafting issues are included, that are both for conducted and OTA specification.

**Topic #3: TPs for TS 38.176-2 OTA tests specification**

In this topic, TPs to OTA test specification TS 38.176-2 are collected for companies’ comments.

*Briefly introduce background, the scope of this email discussion (e.g. list of treated agenda items) and provide some guidelines for email discussion if necessary.*

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

* 1st round:
  + To discuss and agree dynamic range and power control test
  + To collect views on some TP drafting issues.
  + To collect companie’s comments on TPs
* 2nd round: TBA

# Topic #1: Dynamic range and power control test

*Main technical topic overview. The structure can be done based on sub-agenda basis.*

## Companies’ contributions summary

|  |  |  |
| --- | --- | --- |
| **T-doc number** | **Company** | **Proposals / Observations** |
| [**R4-2105038**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98bis_e/Docs/R4-2105038.zip) | Samsung | Title: “View on Local Area IAB-MT power control testing”  **Observation 1**: Relative power accuracy can be verified in power dynamic range  **Observation 2**: Aggregated power accuracy can be verified in transmitted power.  From contribution:  “Our observation is that relative power accuracy and aggregated power accuracy can be verified by other transmitter requirements. However, it is not against to go with explicitly test case if detail agreement can achieved during Apr meeting. But if no conclusion on that direction within this meeting, considering the leftover meeting cycle for REL-16 IAB, it is suggested not to define dedicated test case for power control requirement for IAB-MT.” |
| [**R4-2107231**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98bis_e/Docs/R4-2107231.zip) | Ericsson | Title: “On IAB-MT dynamic range and power control test for conduct test”  **Observation-1**: Power control requirement rely on TX dynamic range to provide the output power adjustability.  **Observation-2**: Power control requirement allow the TX output power uncertainty due to the TX gain setting change.  **Observation-3**: Output power accuracy for RB change is +/- 4 dB in TS 38.521-1 not considering the TT (test tolerance).  **Observation-4**: Output power accuracy for RB change is +/- 0 dB in TS 38.141-1 not considering the TT (test tolerance).  **Proposal-1**: Reuse the TS 38.521-1 to define the output power accuracy for Tx dynamic range related to RB change (Y dB).  **Proposal-2**: Introduce additional test points for Tx dynamic test so test point 2 power accuracy can be defined.  **Proposal-3**: Use the table 3 as the Tx dynamic test requirement.  **Proposal-4**: relative power control test can be combined with Tx dynamic power test.  **Proposal-5**: Reflect the power control function in Tx dynamic range requirement so the combination of the power control and Tx dynamic range is logic.  *Moderator’s note: TP for subclause 6.3.3.4.2(procedure for dynamic range test is included in this Tdoc.* |
| [**R4-2107232**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98bis_e/Docs/R4-2107232.zip) | Ericsson | Title: “On IAB-MT dynamic range and power control test for OTA test”  **Observation-1**: Power control requirement rely on TX dynamic range to provide the output power adjustability.  **Observation-2**: Power control requirement allow the TX output power uncertainty due to the TX gain setting change.  **Observation-3**: Output power accuracy for RB change is +/- 9 dB in TS 38.521-2 not considering the TT (test tolerance).  **Observation-4**: Output power accuracy for RB change is +/- 0 dB in TS 38.141-2 not considering the TT (test tolerance).  **Proposal-1**: Reuse the TS 38.521-2 to define the output power accuracy for Tx dynamic range related to RB change (Y dB).  **Proposal-2**: Introduce additional test points for Tx dynamic test so test point 2 power accuracy can be defined.  **Proposal-3**: Use the table 3 as the Tx dynamic test requirement.  **Proposal-4**: relative power control test can be combined with Tx dynamic power test.  **Proposal-5**: Reflect the power control function in Tx dynamic range requirement so the combination of the power control and Tx dynamic range is logic.  **Proposal-6**: No need to test the IAB-MT aggregate power control requirement. |
| [**R4-2107098**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98bis_e/Docs/R4-2107098.zip) | Huawei | Title: “TP to TS 38.176-1 - Tx dynamic range, clause 6.3”  This TP provides content for the TX dynamic range clause in the conducted requirement. |
| [**R4-2107099**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98bis_e/Docs/R4-2107099.zip) | Huawei | Title: “TP to TS 38.176-2 - OTA Tx dynamic range, clause 6.3”  This TP provides content for the TX dynamic range clause in the OTA requirement. |

## Open issues summary*.*

Tdocs submitted in context of agreed last RAN4#98e meeting WF R4-2103977 discussing dynamic range and power control. Some of them include TPs to conducted and OTA test specifications.

Following on dynamic range for IAB-MT was agreed last RAN4#98e meeting in WF R4-2103977:

**Agreement**: Test point on power control requirement for IAB-MT is agreed as:

* + - Test points 1: Maximum output power with full RB allocation and maximum output power
    - Test points 2: single RB allocation with 5/10 dB lower PSD as used in test point 1)
    - Test point 1- test point 2 = X+Y （+/- uncertainty FFS ）

Following on power control for IAB-MT was agreed in WF R4-2103977:

**For relative power control accuracy** Agreements:

Option 3: Partial PRB allocation to be considered in Test model design if to reuse the similar test configuration as UE.”

**For aggregated power control accuracy agreements**:

NO detailed conformance test cases for this requirement, FFS whether can be jointly verified or covered by dynamic range conformance test cases.

**WF on two-way signal**: below agreement applied for power control requirement.

|  |
| --- |
| **Issue 1-1-2: Two-way communication in IAB-MT tests in [306]**  Two-way communication is not specified for RF conformance tests, specification shall not preclude DL signals to be used e.g. for timing and frequency reference purposes during the test.  Companies further work on the clarification notes to conformance specifications for topic 1-1. |

### Sub-topic 1-1

**Issue 1-1: Dynamic range**

* Proposals (Multiple choice possible)
  + Option 1: Reuse the TS 38.521-1 to define the output power accuracy for Tx dynamic range related to RB change (Y dB). (Ericsson R4-2107231, R4-2107232)
  + Option 2: Introduce additional test points for Tx dynamic test so test point 2 power accuracy can be defined. (Ericsson R4-2107231, R4-21007232)
  + Option 3: Use the table 1 as the Tx dynamic test requirement, for conductive (Ericsson R4-2107231):
* Table 1: Test requirement of the Tx dynamic range/power control for LA IAB-MT

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Test point | RB allocation | PSD | Expected power step size (Down) | PUSCH (normal condition) | |
|  |  |  | ΔP [dB] | [dB] | |
| Test point 1 | Fixed = Maximum RB according to BW and SCS | Maximum PSD | 0 | Relative to the declared output power | f ≤ 3.0 GHz: ± 2.7 dB |
| 3.0 GHz < f ≤ 6.0 GHz: ± 3.0 dB |
| Test point 3 | 1RB | Maximum PSD | 10 log(Maximum RB) | Relative to the Test point 1 output power | 10 log(Maximum RB)+/- (4 + TT) |
| Test point 2 | 1RB | Maximum PSD - ΔP | 5 / 10 acc. to WA/LA IAB-MT Tx danymic range requirement | Relative to the Test point 2’ output power | 5.5 +/- TT |

* + Option 4: Use the table 2 as the Tx dynamic test requirement, for OTA (Ericsson R4-2107232).
* 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 |

* Recommended WF
  + TBA

### Sub-topic 1-2

**Issue 1-2: Power control**

* Proposals (Multiple choice possible)
  + Option 1: Relative power control test can be combined with Tx dynamic power test (Ericsson R4-2107231, Samsung R4-2105038)
  + Option 2: Reflect the power control function in Tx dynamic range requirement so the combination of the power control and Tx dynamic range is logic. (Ericsson R4-2107231)
* Recommended WF
  + TBA

## Companies views’ collection for 1st round

### Open issues

|  |  |
| --- | --- |
| **Company** | **Comments** |
| XXX | Sub topic 1-1:  Sub topic 1-2:  ….  Others: |
| CATT | **Issue 1-1: Dynamic range and Issue 1-2: Power control**  Maybe test point 1 and test point 2 can be ok? |
| Ericsson | **Issue 1-1: Dynamic range**  **Opton 1&2&3. It is difficult to relate the test point 1 and test point 2 accuracy definition without introducing a new test. We are open to accuracy definition without new introduced test points.**  **Issue 1-2: Power control**  **Option 1&2.** |
| ZTE | **Issue 1-1: Dynamic range**  Test point 3 has been excluded for IAB-MT,  **Issue 1-2: Power control**  Fine with option 1 |
| Huawei | **Issue 1-1: Test point 2 contains the information in TP3, did we not agree to use 2 test points last meeting?**  **Issue 1-2: option 1 is ok.** |
| Nokia, Nokia Shanghai Bell | Sub topic 1-1: It seems that the proposals in this sub-topic are going against the agreed WF R4-2103977. We do not see the need for the test point 3 introduced in table shown in this sub-topic. Our understanding is that that according to the WF the test point definition is as follows:   |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | | Test point | RB allocation | PSD | Expected change in total power [dB] | PUSCH (normal condition) | | | Test point 1 | Fixed = Maximum RB according to BW and SCS | Maximum PSD | 0 | Relative to the declared output power | f ≤ 3.0 GHz: ± 2.7 dB | | 3.0 GHz < f ≤ 6.0 GHz: ± 3.0 dB | | Test point 2 | 1RB | Maximum PSD - ΔP | ΔP + 10 log(Maximum RB) | Relative to the power measured at test point 1 | -(ΔP + 10 log(Maximum RB)) +/- [2] dB |   ΔP is 5 / 10 dB acc. to WA/LA IAB-MT dynamic range requirements  [2] dB is set as tolerance to measure power using 1 PRB at lower PSD. This tolerance likely needs further work and is here more as an example.  The table here illustrates FR1 conducted requirement, but the same principle should be applied in all cases both in FR1 and FR2, i.e. max power has a tolerance agree for output power. Then the expected power at low PSD and 1 PRB is relative to the measured power in test point 1. Some additional tolerance is allowed at lower power.  Sub topic 1-2: We would be fine to conclude that relative power control can be considered covered by the dynamic range test, but we dislike the idea of “combined test” because power control requirement does not exist for wide area IAB-MT. Therefore, it would be better to first agree on the dynamic range test, and then decide whether power control for LA IAB-MT is covered by it. |
| Samsung | **Issue 1-1: Dynamic range**  We are open to further discuss the detail on testing based on legacy agreement. However, we should retain and respect RAN4 agreement.  **Issue 1-2: Power control**  Option 1 preferred |

### 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.*

|  |  |
| --- | --- |
| **TP number** | **Comments collection** |
| XXX | Company A |
| Company B |
|  |
| YYY | Company A |
| Company B |
|  |
|  |  |

## Summary for 1st round

### Open issues

*Moderator tries to summarize discussion status for 1st round, list all the identified open issues and tentative agreements or candidate options and suggestion for 2nd round i.e. WF assignment.*

|  |  |
| --- | --- |
|  | **Status summary** |
| **Sub-topic #1** | *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: TPs for TS 38.176-1 conducted tests specification

*Main technical topic overview. The structure can be done based on sub-agenda basis.*

In this Topic #2, TPs to conducted test specification TS 38.176-1 are collected for companies’ comments. Please note that some of TP are moved to email thread [304] where some other Tdocs are submitted on the same issue (i.e. MUs/TTs, TS 38.176-1 skeleton).

## Companies’ contributions summary

|  |  |  |  |
| --- | --- | --- | --- |
| **T-doc number** | **Title** | **Company** | **Clause to TS 38.176-1** |
| [**R4-2107095**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98bis_e/Docs/R4-2107095.zip) | IAB conducted conformance specification skeleton  *Moderator note’s: This TS skeleton is moved to thread [304] to treat with OTA spec skeleton.* | Huawei | **-** |
| [**R4-2104787**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98bis_e/Docs/R4-2104787.zip) | TP for TS 38.176-1: Transmit ON/OFF power | CATT | 6.4 |
| [**R4-2104788**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98bis_e/Docs/R4-2104788.zip) | TP for TS 38.176-1: Transmitted signal quality | CATT | 6.5 |
| [**R4-2106315**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98bis_e/Docs/R4-2106315.zip) | TP to TS 38.176-1: Output power and Unwanted emission | Nokia, Nokia Shanghai Bell | 6.2, 6.6 |
| [**R4-2106597**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98bis_e/Docs/R4-2106597.zip) | TP to TS 38.xxx-1: TX IMD requirements | ZTE Corporation | 6.7 |
| [**R4-2107098**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98bis_e/Docs/R4-2107098.zip) | TP to TS 38.176-1 - Tx dynamic range, clause 6.3 | Huawei | 6.3 |
| [**R4-2106316**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98bis_e/Docs/R4-2106316.zip) | TP to TS 38.176-1 Annex A for IAB conducted test specification | Nokia, Nokia Shanghai Bell | Annex A |
| [**R4-2106599**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98bis_e/Docs/R4-2106599.zip) | TP to TS 38.xxx-1: RX IMD requirements | ZTE Corporation | 7.7 |
| [**R4-2106601**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98bis_e/Docs/R4-2106601.zip) | TP to TS 38.xxx-1: RX ICS requirements | ZTE Corporation | 7.8 |
| [**R4-2107100**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98bis_e/Docs/R4-2107100.zip) | TP to TS 38.176-1 - Sensitivity, clause 7.2 | Huawei | 7.2 |
| [**R4-2107102**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98bis_e/Docs/R4-2107102.zip) | TP to TS 38.176-1 - Rx dynamic range, clause 7.3 | Huawei | 7.3 |
| [**R4-2107235**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98bis_e/Docs/R4-2107235.zip) | TP for IBB, OBB and RX spurious of conducted receiver test | Ericsson | 7.4 |
| **[R4-2104789](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98bis_e/Docs/R4-2104789.zip)** | TP for TS 38.176-1: Annex B and C  *Moderator note’s: This TP is moved to thread [304] to treat with other MU related Tdocs.* | CATT | Annex B, Annex C |
| **[R4-2106314](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98bis_e/Docs/R4-2106314.zip)** | TP to TS 38.176-1 Clause 4.6 Declarations for IAB conducted test specification | Nokia, Nokia Shanghai Bell | 4.6 |
| [**R4-2107097**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98bis_e/Docs/R4-2107097.zip) | TP to TS 38.176-1 -Clause 4.1  *Moderator note’s: This TP is moved to thread [304] to treat with other MU related Tdocs.* | Huawei | 4.1 |

## 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: Drafting issue**

Some drafting rules for TP for IAB test specifications, are capture in WF from last RAN4#98e meeting R4-2103856:

|  |
| --- |
| When TPs are provided, following guidelines are recommended to be followed:  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 is written out in its own section with possible test tolerance reflected in the values |

However still there are some open (or not align between TPs) issues to be address, how to capture some details when drafting TP, these are listed in options below. These details are common for conductive and OTA specification, thus only discussion under this topic is needed. Definitely there are some specific issues related to given test, however some could be more universal.

* Open or not align between TPs drafting issues:
  + Issue 1: Usage of “IAB-DU/MT” form when text is for both IAB-DU and IAB-MT:
    1. use “IAB” or
    2. use “IAB-DU and IAB-MT”?
  + Issue 2: How to separate IAB-DU and IAB-MT requirements for respective test?
    1. Separate sections for IAB-DU and IAB-MT
    2. If yes, in all cases?
    3. Or, only when different requirements for IAB-DU and IAB-MT?
  + Issue 3: How to create reference to NR test specification?
    1. For IAB-DU reference to NR 38.141-1/-2 specifications
    2. Or copy directly 38.141-1/-2 text
  + Issue 4: Avoid double reference to NR core 38.104 specification
    1. When IAB core spec 38.174 has reference to NR core spec 38.104, copy respective part to IAB test spec?
  + Issue 5: Referencing to NR test models in test procedures (please note that IAB test models as such are discussed in [304])
  + Issue 6: Other companies’ views on TP drafting issues.
    1. TBD
* Recommended WF
  + TBA:

## Companies views’ collection for 1st round

### Open issues

**Example 1**

|  |  |
| --- | --- |
| **Company** | **Comments** |
| XXX | Sub topic 1:  ….  Others: |
| CATT | * + Issue 1: Usage of “IAB-DU/MT” form when text is for both IAB-DU and IAB-MT:     1. use “IAB” or     2. use “IAB-DU and IAB-MT”?   CATT: We prefer b) as it’s clearer.   * + Issue 2: How to separate IAB-DU and IAB-MT requirements for respective test?     1. Separate sections for IAB-DU and IAB-MT     2. If yes, in all cases?     3. Or, only when different requirements for IAB-DU and IAB-MT?   CATT: Currently support c) if it’s clear enough.   * + Issue 3: How to create reference to NR test specification?     1. For IAB-DU reference to NR 38.141-1/-2 specifications     2. Or copy directly 38.141-1/-2 text   CATT: We slightly prefer b) but don’t have strong opinion.   * + Issue 4: Avoid double reference to NR core 38.104 specification     1. When IAB core spec 38.174 has reference to NR core spec 38.104, copy respective part to IAB test spec?   CATT: We prefer to direct to TS 38.174 because it’s IAB requirement.   * + Issue 5: Referencing to NR test models in test procedures (please note that IAB test models as such are discussed in [304])   CATT: Our understanding is that IAB test models will be defined in 176. |
| Ericsson | Issue 1:Prefer b) use “IAB-DU and IAB-MT”  Issue 2: is this the minimum requirement? Prefer a)  Issue 3: b), for test requirement, it is better to use full text.  Issue 4: a), it is discussed last meeting how to handle the test requirements when considering the TT. In R4-2103856, it is said as below, for IAB-MT, only way to interpret the WF is to write full text on test requirement. For IAB-DU, it would be better to writte it out in case the TT would be changed (not sure for now, see MU/TT discussion separately in [304].)   1. The test requirement is written out in its own section with possible test tolerance reflected in the values   Issue 5: seem we need at least agree the naming of the IAB-DU and IAB-MT test model:  For IAB-DU, keep the naming of the test model as the same as BS  For IAB-MT, discuss whether the TP (2107229 and 2107230) is ok. |
| ZTE | Issue 1:Prefer b)  Issue 2: Prefer c)  Issue 3: a), also fine with further discuss with MU/TT for IAB-DU and MT  Issue 4: prefer to reference to TS 38.174  Issue 5: keep the same as the existing BS approach. |
| Huawei | o Issue 1: I see nothing wrong with a general term referring to both, it simplifies text which is already sometimes quite convoluted. However ok with using (b) if that’s the majority  o Issue 2: How to separate IAB-DU and IAB-MT requirements for respective test?  If the requirements are the same in the core spec then combining is best (i.e. option c), however we need to 1st make decision on MU, clearly if a TT is applied and its different for IAB-DU and IAB-MT then we will need to separate test requirements somehow  o Issue 3: How to create reference to NR test specification?  The idea of a test spec has always been to have all the test requirements written out so test engineers do not need to cross reference lots of documents. We do this in other test specs despite it making them sometimes quite large, I think we should continue. As such the test requirements should be copied out, option b.  o Issue 4: Avoid double reference to NR core 38.104 specification  Presumably this mostly occirs in the core requirement section where we generally reference the core specification. Normally I would be against double referencing, but in this case it might be better to reference 174.  o Issue 5: Referencing to NR test models in test procedures (please note that IAB test models as such are discussed in [304]).  I think this spec should have a test models and test configurations section which can be referenced from the procedures (otherwise there are many many times we have to write out long references in the procedures. If the models/configurations sections then reference NR specs that probably ok. |
| Samsung | Issue 1: option B preferred  Issue 2: option C preferred  Issue 3: Prefer to keep full text  Issue 4: Refer to IAB core spec  Issue 5: Since there would be dedicated general clause for IAB conformance testing spec it would be clear to refer to its own one. |
| Nokia | Issue 1: prefer option B  Issue 2: prefer option C, but agree with Huawei that if requirements are the same it could be single section – as this is similar in core spec.  Issue 3: Option B, specification will be much clearer with requirements included.  Issue 4: prefer reference to 38.174.  Issue 5: prefer to include own IAB test models and test configuration sections. |

### 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.*

Companies comments collection for submitted TPs to conducted test specification TS 38.176-1:

|  |  |
| --- | --- |
| **CR/TP number** | **Comments collection** |
| [**R4-2104787**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98bis_e/Docs/R4-2104787.zip)  CATT | Ericsson: typo, the mininum requriment reference to IAB-MT is different with IAB-DU  Huawei: 6.4.1 - This is usually a copy of the general section in the core spec. In this case you have copied NR BS and modified it slightly differently to 174, I would align with 174.  6.4.1.2 - Min requirement for IAB-MT is 6.4.1.4 (not 6.4.1.3)  6.4.2.1 – again this is not an exact copy of core general section.  6.4.2.2 – min req for IAB-MT is 6.4.2.3  6.4.2.4.2 – Opening paragraph is used in many procedure – should be same in all, so maybe worth optimizing. I think it’s not necessary to repeat “for IAB-DU and IAB-MT” after the annex reference. This is true in a number of places. Antenna connector has been removed but not Prated,c,AC.  Nokia: Different notation on IAB-DU or IAB-MT vs. IAB-DU/IAB-MT, should be aligned. In 6.4.2.4.2 type 1-C is removed but in some places extra "or" still exists, should be removed. |
| [**R4-2104788**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98bis_e/Docs/R4-2104788.zip)  CATT | Ericsson: need to add "The same source shall be used for RF frequency and data clock generation.", no need to add UE test procedure as it is general issue not specific to Frequecy error test.  Huawei: There is no 1-C. For the freq error test I think the procedure is general enough that both options don’t need to be mentioned. The test set up is referenced in the annex and this hopefully is general enough that it fits both options and step 2 - , measure EVM and frequency error is general enough. As the test requirements are different I think there should be separate IAB-DU and IAB-MT subclauses (as is the case in core spec). The frame structure information is more part of the set up than the test requirement? Should this be in the initial conditions Maybe referenced?  Nokia: Method of test for frequency error needs to be discussed further. Type 1-C still exists in section 6.2.5.1 and 6.5.3.1, 6.5.3.4.2 and many others. PUSCH instead of PDSCH in tabale 6.5.3.5-1b. Why these tables are 1a and 1b instead of 1 and 2? TM names need to be align. Not clear why we need procedure from UE spec for frequency error. While DL signals can be configured, there was agreement that they are not specified. |
| [**R4-2106315**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98bis_e/Docs/R4-2106315.zip)  Nokia | Huawei: 6.2.2, one reference s104 the other 174 – as discussed earlier maybe ref 174 is best.  6.2.5, in [302] there were a number of CR’s to remove the use of a general IAB term and use “IAB-DU and IAB-MT”. I notice that the output power requirement uses a general term (in 174 also maybe discuss also in [302]) Its maybe a bit out of place should we use the separate terms (in 174 also). Also the table assumes the same MU/TT for IAB-DU and IAB-MT which is ok with me but perhaps to be confirmed  6.6.3.2 – ALCR core is a little different it has 3 sub-clauses, maybe best to reference the next clause up 6.6.3  6.6.3.5 – no TT applied to relative ACLR values  6.6.4.2 – no TT applied to OBUE (not last value in table has no TT but other do). The tables have not been split into <3GHz and > 3GHz. This section is messy in test spec as there are different TT applied so we have many more tables. Best to start by copying from test spec not core spec.  6.6.5.2 – again best to specify the clause up, 6.6.5  6.6.5.4.1 – IAB RF BW is used are we separating these general terms? |
| [**R4-2106597**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98bis_e/Docs/R4-2106597.zip)  ZTE | Ericsson: "6.7.5.1.3 Additional requirements" can be removed in the end.  Huawei: again the general term is used for IAB (rather than “IAB-DU and IAB-MT”), we should agree on the correct way to do this.  Nokia: Is there need to final additional requirements clause(6.7.5.1.3) at all if it is empty? |
| [**R4-2107098**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98bis_e/Docs/R4-2107098.zip)  Huawei | CATT: typo “IAB-MU”. Does the requirements in Table 6.3.2.1.5-1 take the RB number change into acount?  Ericsson: Need to co-ordinate the discussion of the test points/test requirement discussion in R4-2107231  Nokia: to be align with discussion on test points. |
| [**R4-2106316**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98bis_e/Docs/R4-2106316.zip)  Nokia | Ericsson: NOTE 3 is missing in the explanation and the symbols in NOTE 1 shall be fixed properly.  Huawei: where will the IAB-DU (BS) one be captured? Or do we reference 141 directly? |
| [**R4-2106599**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98bis_e/Docs/R4-2106599.zip)  ZTE | CATT: it’s related to the discussion of referring 141 or 174.  Ericsson: test requirement may need to quote the full text to avoid double reference (relate to the drafting rule discussion in above session). In test procedure, the table 7.7.5-1 need reference.  Huawei: the way the IAB-DU and IAB-DU are split in the procedure is not ideal. I think 2 bullets with “for IAB-DU” and “for IAB-MT” should be used under step 2, the 2/2a is not clear.  Test requirements should be written out. |
| [**R4-2106601**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98bis_e/Docs/R4-2106601.zip)  ZTE | CATT: it’s related to the discussion of referring 141 or 174.  Ericsson: test precedure sub-clause 7.8.5.1 reference to test requirement. test requirement may need to quote the full text to avoid double reference (relate to the drafting rule discussion in above session).  Huawei: In procedure it refers to IAB, this is for IAB-DU only maybe it would be better to use the whole term. I think test requirements should be written out |
| [**R4-2107100**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98bis_e/Docs/R4-2107100.zip)  Huawei |  |
| [**R4-2107102**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98bis_e/Docs/R4-2107102.zip)  Huawei | CATT: “BS” exists. |
| [**R4-2107235**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98bis_e/Docs/R4-2107235.zip)  Ericsson | CATT: need some discussion on referring 104 or 174? Some "BS" exist. |
| [**R4-2106314**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98bis_e/Docs/R4-2106314.zip)  Nokia | CATT: Need to clarify the contiguous and non-contiguous feature, TS 38.174 clasue 4.8 only includes IAB-DU. Our understanding is that 174 may need to be corrected.  Ericsson: some delcaration would apply both IAB-MT and IAB-Du, D24, D29, D30, D37? D44 naming need a big number to avoid further conflict of the future BS declaration? I cannot find the WF to document this. The wording of the D44 may need more discussion before putting in spec.  Huawei: is it necessary to void declarations as this is new list? Obviously has advantage that same number is used in NR spec but this can become impossible to maintain in future and then becomes confusing maybe?  Nokia: numbering of declarations and alignment with BS can be further discuss, indeed there will be big issue with maintain this in future.4790 |

## 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”.*

# Topic #3: TPs for TS 38.176-2 OTA tests specification

*Main technical topic overview. The structure can be done based on sub-agenda basis.*

## Companies’ contributions summary

In this Topic #3, TPs to conducted test specification TS 38.176-1 are collected for companies’ comments. Please note that some of TP are moved to email thread [304] where some other Tdocs are submitted on the same issue (i.e. MUs/TTs)

|  |  |  |  |
| --- | --- | --- | --- |
| **T-doc number** | **Title** | **Company** | **Clause to TS 38.176-2** |
| [**R4-2104790**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98bis_e/Docs/R4-2104790.zip) | TP for TS 38.176-2: OTA transmit ON/OFF power | CATT | 6.5 |
| [**R4-2104791**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98bis_e/Docs/R4-2104791.zip) | TP for TS 38.176-2: OTA transmitted signal quality | CATT | 6.6 |
| [**R4-2106319**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98bis_e/Docs/R4-2106319.zip) | TP to TS 38.176-2: Output power and Unwanted emission | Nokia, Nokia Shanghai Bell | 6.1, 6.2, 6.3, 6.7 |
| [**R4-2106598**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98bis_e/Docs/R4-2106598.zip) | TP to TS 38.xxx-2: TX IMD requirements | ZTE Corporation | 6.8 |
| [**R4-2107099**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98bis_e/Docs/R4-2107099.zip) | TP to TS 38.176-2 - OTA Tx dynamic range, clause 6.3 | Huawei | 6.4 |
| [**R4-2106317**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98bis_e/Docs/R4-2106317.zip) | TP to TS 38.176-2 Annex A for IAB OTA test specification | Nokia, Nokia Shanghai Bell | Annex A |
| [**R4-2106600**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98bis_e/Docs/R4-2106600.zip) | TP to TS 38.xxx-2: RX IMD requirements | ZTE Corporation | 7.8 |
| [**R4-2106602**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98bis_e/Docs/R4-2106602.zip) | TP to TS 38.xxx-2: RX ICS requirements | ZTE Corporation | 7.9 |
| [**R4-2107101**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98bis_e/Docs/R4-2107101.zip) | TP to TS 38.176-2 - OTA Sensitivity, clause 7.2, 7.3 | Huawei | 7.2, 7.3 |
| [**R4-2107103**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98bis_e/Docs/R4-2107103.zip) | TP to TS 38.176-2 - OTA Rx dynamic range, clause 7.3 | Huawei | 7.4 |
| [**R4-2107236**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98bis_e/Docs/R4-2107236.zip) | TP on IBB, OBB and RX spurious for OTA receiver characteristic test | Ericsson | 7.5 |
| **[R4-2104792](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98bis_e/Docs/R4-2104792.zip)** | TP for TS 38.176-2: Annex B and C  *Moderator note’s: This TP is moved to thread [304] to treat with other MU related Tdocs.* | CATT | Annex B and C |
| **[R4-2106318](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98bis_e/Docs/R4-2106318.zip)** | TP to TS 38.146-2 Clause 4.6 Declarations for IAB radiated test specification | Nokia, Nokia Shanghai Bell | 4.6 |
| [**R4-2107105**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98bis_e/Docs/R4-2107105.zip) | TP to TS 38.176-2 - Annex D&E | Huawei | Annex D and E |

## 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 3-1

*Sub-topic description:*

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

**Issue 2-1: TBA**

* Proposals
  + Option 1: TBA
  + Option 2: TBA
* Recommended WF
  + TBA

## Companies views’ collection for 1st round

### Open issues

Companies comments and views on submitted TPs are welcome in next subsection.

### 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.*

Companies comments collection for submitted TPs to OTA test specification TS 38.176-2:

|  |  |
| --- | --- |
| **CR/TP number** | **Comments collection** |
| [**R4-2104790**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98bis_e/Docs/R4-2104790.zip)  CATT | Huawei: similar comments (to conducted part) about the def and applicability section matching the core general section.  Company B  Nokia: As commented in conducted, different notation on IAB-DU or IAB-MT vs. IAB-DU/IAB-MT, should be aligned. TM names need to be checked. |
| [**R4-2104791**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98bis_e/Docs/R4-2104791.zip)  CATT | Ericsson: need to add "The same source shall be used for RF frequency and data clock generation.", no need to add UE test procedure as it is general issue not specific to Frequecy error test. For EVM window, there some of slot # in notes and consider if they need to be differentiated for MT and DU.  Huawei: similar comment to conducted. The methods seems general enough we do not need to mention both options as both fit. The window length tables etc seem to be configuration not requirement so maybe can be in initial condictions?  Nokia: Not clear why we need procedure from UE spec for frequency error. While DL signals can be configured, there was agreement that they are not specified in R4-2103853. |
| [**R4-2106319**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98bis_e/Docs/R4-2106319.zip)  Nokia | CATT: The title of 6.7.3.5.3 seems not correct. They’re LA IAB-MT requirements in that clause.  Huawei: similar comments to conducted, most importantly the TT have not been added to ALCR relative |
| [**R4-2106598**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98bis_e/Docs/R4-2106598.zip)  ZTE | Ericsson: The formatting of text has several place “Errro!”, maybe it is good to have a clear format text.  Huawei: similar to conducted, the separation on IAB-DU and IAB-MT in procedure should be done differently.  Nokia: The numbering for alternative IAB-DU and IAB-MT steps in the procedure is not ideal (now using 9 and 9a to separate them). |
| [**R4-2107099**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98bis_e/Docs/R4-2107099.zip)  Huawei | CATT: Does the requirements in Table 6.3.2.1.5-1 take the RB number change into acount?.  Ericsson: Need to co-ordinate the discussion of the test points/test requirement discussion in R4-2107232.  Nokia: alignment with test points discussion. |
| [**R4-2106317**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98bis_e/Docs/R4-2106317.zip)  Nokia | Ericsson: NOTE 3 is missing in the explanation and the symbols in NOTE 1 shall be fixed properly. The payload size and number of the symbol need to be fixed. More detail can be reference to R4-2011034 |
| [**R4-2106600**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98bis_e/Docs/R4-2106600.zip)  ZTE | CATT: The requirements should refer 141 or 174?  Ericsson: test precedure sub-clause 7.8.5.1 reference to test requriement, test requirement may need to quote the full text to avoid double reference (relate to the drafting rule discussion in above session).  Huawei: I think the test requirement should be written out not referenced.  Nokia: Test requirement should be written explicitly, not referenced. This is essential for measurement engineers to manage with only IAB specs. This will also clarify the procedure which reference test requirement section. in test procedure "set the IAB to transmit..." applies only for FDD operation in BS spec -> should be removed here. |
| [**R4-2106602**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98bis_e/Docs/R4-2106602.zip)  ZTE | CATT: The requirements should refer 141 or 174?  Huawei: I think the test requirement should be written out not referenced.  Nokia: Test requirement should be written explicitly, not referenced. This is essential for measurement engineers to manage with only IAB specs. This will also clarify the procedure which reference test requirement section. In test procedure "set the IAB to transmit..." applies only for FDD operation in BS spec -> should be removed here |
| [**R4-2107101**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98bis_e/Docs/R4-2107101.zip)  Huawei | CATT: There're still some "BS" in the TP.  Ericsson: 7.3.5.2.2, title typo, BS to be replaced by IAB-DU  Nokia: Requirements below 3 GHz shall not be removed as we have band 41. MT type 1-H requirement missing. There are two clauses 7.2.5.2. Note 1 handled differently in the tables of this duplicated cluase. BS-> IAB change missing in many places. In test procedure "set the IAB to transmit..." applies only for FDD operation in BS spec -> should be removed here |
| [**R4-2107103**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98bis_e/Docs/R4-2107103.zip)  Huawei | Nokia: Requirements below 3 GHz shall not be removed as we have band 41. Clause 7.4.2 says AIB In test procedure "set the IAB to transmit..." applies only for FDD operation in BS spec -> should be removed here. |
| [**R4-2107236**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98bis_e/Docs/R4-2107236.zip)  Ericsson | CATT: Some "BS" and "base station" exist.  Nokia: Could ACS and in-band blocking test requirements be combined for MT and DU, as there is a lot of repetition. Just need to add new column to tables to separate interfering signal for DU and MT. Some tables have void notes like 7.7.5.1-1. Table 7.7.5.2-3 note 1 on EESS requirement entering into force needs to be corrected to latest spec.  There were updates in previous meeting also to blocking procedures where certain steps were removed and certain steps apply only for FDD -> can be removed |
| [**R4-2106318**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98bis_e/Docs/R4-2106318.zip)  Nokia | Ericsson: in last column , the IAB-DU and IAB-MT not differentiate separately, then in the text description of each decalration, it need to describe if it is for MT or DU or both. Seems some delcartion using this way of description, but some are not. D49 for example. Maybe a consistent way for declaration is good to have. Lastly, there is no Ncell for type 1-O IAB-MT or IAB-DU defined in TS 38.174 or I miss sth.  Huawei: in the conducted declarations table the IAB-DU and IAB-MT were separated and theer were applicability columns for each. In this table it has not be done the same? |
| [**R4-2107105**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98bis_e/Docs/R4-2107105.zip)  Huawei | Ericsson: Figure E.3-4 is for IAB-DU test setup, the Note in the end may be good to extend to IAB-MT not only for PUSCH  Nokia: Base station still mentioned in E.1.2 title. |

## 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