**3GPP TSG-RAN WG4 Meeting #100-e R4-211XXXX**

**Electronic Meeting, 16th Aug 2021 - 27th Aug 2021**

**Agenda item:** xx.xx.xx

**Source:** Moderator (Nokia, Nokia Shanghai Bell)

**Title:** Email discussion summary [100-e][322] NR\_IAB\_Demod\_Maintenance

**Document for:** Information

# Introduction

*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: TBA
* 2nd round: TBA

## Scope

This tdoc will be used to guide and summarize the email discussion for the topic of Rel-16 IAB demodulation and CSI requirements (AI 6.1.2.6), with the email thread identifier “[100-e][322] NR\_IAB\_Demod\_Maintenance”.

The scope of this email discussion are Rel-16 IAB demodulation and CSI requirements, and in particular the agenda items:

6.1.2.6 Demodulation and CSI requirements [NR\_IAB-Perf]

6.1.2.6.1 General [NR\_IAB-Perf]

6.1.2.6.2 IAB-DU performance requirements [NR\_IAB-Perf]

6.1.2.6.3 IAB-MT performance requirements [NR\_IAB-Perf]

Priority topics are marked directly in the open issues’ summaries.

## Notes on email discussions

From the meeting arrangement:

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| * Delegates are strongly encouraged to provide comments/concerns asap   + Silence within a reasonable timeframe means no objection * It is strongly encouraged that each company/delegate consolidate their comments/views and send them out in one email for each email thread * Length of file names shall be reduced, e.g.   + At the beginning of first round, moderators share / ftp / tsg\_ran / WG4\_Radio / TSGR4\_98\_e / Inbox / Drafts / [98e][101] NR\_NewRAT\_SysParameters\Summary\_101\_1st round\_v01.docx   + After update by company A: Summary\_101\_1st round\_v02\_companyA   + After update by company B: Summary\_101\_1st round\_v03\_companyA\_companyB   + After update by company C: Summary\_101\_1st round\_v04\_companyB\_companyC |

## Notes on completeness of this summary

Please note the guidance received by the RAN4 chair on the reflector on 2021/05/13 (for RAN4#99-e):

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| --- |
| [Xizeng]: It is encouraged for moderators to use email summary comments (initial version + revised versions) to organize the discussion, capture all the comments/responses and provide recommendations in both 1st round and 2nd round. Thus it is easy to track the progress afterwards since all the discussions are recorded in one document. Especial for the 2nd round, after the WF/LS/revised CR… are provided, delegates are encouraged to continue providing comments in the email summary document.  But considering that people may be used to directly comment in the reflector for 2nd round, we do not mandate the above approach. But if the moderators think it is better, they can follow it. |

This email summary will incorporate comments received by email on the reflector on a best effort basis.  
The contributors are invited to duplicate any email comments in this summary document, to order to be sure that these comments are captured.

# Topic #1: General and CRs

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

## Companies’ contributions summary

|  |  |  |
| --- | --- | --- |
| **T-doc number** | **Company** | **Proposals / Observations** |
| R4-20xxxxx | Company A | Proposal 1:  Observation 1: |
| R4-2114031 | Intel Corporation | Draft CR to TS 38.176-1: Correction of applicability rules for demodulation performance requirements  CR. |
| R4-2114032 | Intel Corporation | Draft CR to TS 38.176-2: Correction of applicability rules for demodulation performance requirements  CR. |
| R4-2112021 | Nokia Germany | draftCR to TS 38.176-2 IAB-DU performance requirements and parts of DU and MT appendix  CR. |
| R4-2113357 | Ericsson | Draft CR to 38.176-1: Antenna terminology  CR. |
| R4-2113802 | Huawei, HiSilicon | draftCR on IAB conducted conformance testing (Manufacturer declarations) to TS 38.176-1  CR. |
| R4-2114544 | Nokia Germany | On 5MHz CBW in the IAB Rel-16 Specifications  **Observation 1**: It seems impossible to serve either IAB-MTs or normal access UEs on bands that support 5MHz CBW.  **Observation 2**: The current CBW manufacturer declaration structure allows to keep 5MHz CBW demodulation performance requirements.  **Proposal 2: RAN4 to let 5MHz CBW IAB-DU demodulation performance requirements remain in the IAB specification, and do trust in the manufacturer declarations to have these requirements be non-applicable.** |
| R4-2114540 | Nokia Germany | draftCR to TS 38.176-1 IAB-DU performance requirements  CR. |
| R4-2113355 | Ericsson | Draft CR to 38.176-1: IAB-MT applicability and declarations  CR. |
| R4-2113356 | Ericsson | Draft CR to 38.176-2: IAB-MT applicability and declarations  CR. |
| R4-2113800 | Huawei, HiSilicon | draftCR on IAB-MT conducted performance requirements (General and Demodulation) in TS 38.174  CR. |
| R4-2113801 | Huawei, HiSilicon | draftCR on IAB-MT conducted conformance testing (CSI reporting and Interworking) to TS 38.176-1  CR. |
| R4-2113803 | Huawei, HiSilicon | draftCR on IAB-MT radiated conformance testing (General and Demodulation) to TS 38.176-2  CR. |
| R4-2114542 | Nokia Germany | draftCR to TS 38.174 IAB-MT CSI reporting radiated performance requirements  CR. |

## Open issues summary

*Before e-Meeting, moderators shall summarize list of open issues, candidate options and possible WF (if applicable) based on companies’ contributions.*

*Interested companies are expected to add their views directly under the respective issues in a dialogue-like form, i.e., identical to how the chair would record views during a f2f meeting.*

*Please add further table rows as required and do not change previous comments of your company or other companies. Answering to questions from other companies is encouraged.*

### Sub-topic 1-1: 5MHz CBW

*Sub-topic description:*

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

**Issue 1-1-1: Removal of requirements with 5MHz CBW**

* Background
  + The IAB RF session has removed all requirements with 5MHz CBW, since no 5MHz CBW bands are supported for IAB in the current RF spec.
* Proposals
  + Option 1 [Nokia, Ericsson]: Let 5MHz CBW IAB-DU demodulation performance requirements remain in the IAB specification and do trust in the manufacturer declarations to have these requirements be non-applicable.
  + Option 2 [Huawei]: Remove 5MHz CBW IAB-DU demodulation performance requirements to avoid any confusions.
  + Option 3: Other options not precluded.
* Recommended WF
  + Discuss in first round.

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| **Company** | **Comments** |
| Nokia, Nokia Shanghai Bell | We support Option 1 since the IAB-DU is acting almost like a regular BS, new bands might be added in the future for access UEs. Keeping 5MHz CBW will make the maintenance easier. |
| Ericsson | We’re OK for option 1 |
| Intel | We are fine with Option 1. |
| Huawei | We prefer Option 2. The unnecessary test cases will make confusions and inconsistence with the RF related requirements, so we prefer to remove those cases. We can add them again once the new bandwidth is introduced in the future. |
| Nokia 2 | If 5MHz CBW is decided to be removed, we need to decide what to do with AWGN power level at the IAB-DU input Table 8.1.2.2.4.2-2 in 38.176-2, where if 5MHz is removed, it will not be any AWGN power level for 15kHZ SCS. |

### Sub-topic 1-2: Other

*Sub-topic description:*

*In this sub-topic companies are invited to bring issues to the attention of the group, which have not been captured in the previous sub-topics.*

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

### CRs/TPs comments collection

*Major close-to-finalize WIs and Rel-15 maintenance, comments collections can be arranged for TPs and CRs. For Rel-16 on-going WIs, suggest to focus on open issues discussion on 1st round.*

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| --- | --- |
| **CR/TP number** | **Comments collection** |
| XXX | Title, Source |
| Company A |
| Company B |
|  |
| R4-2114031 | Draft CR to TS 38.176-1: Correction of applicability rules for demodulation performance requirements, Intel Corporation |
| [Nokia]:  Section 8.1.1.2.1  We have not found a background for then change in the IAB-DU applicability rule that  “Unless otherwise stated, for a IAB-DU supporting different numbers of *TAB connectors* (see D.37 in table 4.6-1), the tests with low MIMO correlation level shall apply only for the**~~lowest and~~**highest numbers of supported connectors, and the specific connectors used for testing are based on manufacturer declaration.” Such a change will result in a reduction of test coverage. Maybe, Intel could elaborate more on this change?  Section 8.2.1.1:  For IAB-DU it was an agreement on Carrier aggregation: “Follow Rel-15 approach and include notes that CA can be operated and is tested per carrier”. In our understanding, the intention is to follow BS-style approach. What is the ground of keeping only of the half of the text present in the BS TS? We think that the statement should be kept without changes.  PRACH formats (8.1.1.2.4.1): if “each” is exclude from the original BS applicability rule, then the text should be: “Unless otherwise stated, PRACH requirement tests shall apply only for PRACH formats declared to be supported (see D.103 in table 4.6-1).”  Section 8.2.2  Applicability of CSI reporting requirements is still under the discussion. Modifications might be introduces based on the achieved agreements. In particular, we think that it is sufficient to state explicitly that: “Testing of performance requirements for RI and PMI reporting is optional.” However, the declaration of testing is not needed.  Additionally, we have noticed the alignment of the Number of TX antennas and the Number of RX antennas in the tables of Section 8.1.2.1.5 got broken. Could it be possible for Intel as the editor of 38.176-1 Demod to check and possibly correct this issue? |
| Ericsson:  Section 8.1.1.2.1: Our understanding is that it was agreed to test only the highest number of connectors, or at least that was an intention. Checking the WF, slide 8 in R4-2017673 mentions this but is not a clear agreement. We are OK with this as it reduces test time without unreasonably reducing test coverage.  Section 8.2.1.1: It was agreed in slide 6 of R4-2103994 to include the sentences on CA for the IAB-DU. For the IAB-MT it was not explicitly agreed, but what would be the rationale to not apply the same principle in case of CA ?  Agree with Nokia about the “each” regarding PRACH formats; either “each” should be kept or the sentence modified slightly.  Section 8.1.1.2.3.2: The changed applicability for PUCCH is not aligned with |
| Intel:  Section 8.1.1.2.1: to @Nokia: As Ericsson mentioned we had such discussion but not enough maybe clear agreement. If some companies have concerns about it, we will not propose to revert such discussion. Otherwise, applicability rule should be updated.  Section 8.2.1.1: from UE perspective it is another story for CA requirements. UE DL CA requirements were defined explicitly in Rel-16 and we have never discussed reusing of them for IAB-MT. In this case we should not mix IAB-DU CA and IAB-MT CA operation.  Intel: Applicability rule for PRACH: We will update wording based on the suggestion from Nokia.  Section 8.1.1.2.3.2: to @Ericsson: we reached such agreement in RAN4 #98e-bis. Please check R4-2106088 slide 4.  Section 8.1.2.1.5: We will update wrong tables. |
| [Huawei]:  Section 8.1.1.2.1: We are fine to only test the highest number of supported connectors, it will reduce the number of test case without any test coverage loss.  Section 8.2.1.1: We agree with Intel about the CA for IAB-MT, it is different for the DL CA testing from the UL CA.  New sections of 8.2.2.2/3, 8.2.3.1.1.5/6 for optional IAB features and mandatory IAB-MT features with capability signalling: IAB-MT under test should interpret this kind of test applicability rules by reporting corresponding UE capability signalling to IAB-DU so that IAB-DU can decide to schedule the related function or not based on the received UE capability. But we have agreed to adopt BS style testing approach, no air singling will be used at all during the test, hardcode will be used for the related test configuration, how can IAB-MT report those capability to IAB-DU? If company’s concern is about whether RAN1/RAN2 features to be implemented or not, it can be verified by passing the related test cases or not finally. The manufacture declaration + text proposal in “Applicability of requirements for IAB-MT features” as proposed by Huawei in R4-2113802 and R4-2113801 are describing the same principle, we wonder what other RAN1/RAN2 features are not captured. |
| [Nokia2]:  Section 8.1.1.2.1: Taking into account that the proposed change is inline with other company understanding, we agree to update the applicability rule. |
| Intel2:  To Huawei on new sections 8.2.2.2/3, 8.2.3.1.1.5/6  Capability signalling mechanism is needed in real field to properly configure connection between different nodes. Test engineers do not need to decode DUT capability container to understand which test cases should not be applied. Such information is available before the test and used to configure TE in advance. It means that there is no impact on BS testing style approach.  As we mentioned in GTW session we are fine to use plain text in applicability sections instead of tables from UE spec. Reusing of sections from UE specification is simpler approach because we do not need to discuss exact wording. However, we are fine use similar as in CR from Huawei R4-2113801 with adding exact capabilities like:  “The performance requirements Table 8.2.2.2.5-1 (Test 1) shall apply only in case IAB-MT supports 256QAM modulation scheme for PDSCH for FR1 (pdsch-256QAM-FR1, see D.xxx)  The performance requirements Table 8.2.2.2.5.1 (Test 4, 5) shall apply only in case the number of NZP-CSI-RS ports in the test case satisfies IAB-MT capability on maximum number of NZP-CSI-RS ports (*maxConfigNumberPortsAcrossNZP-CSI-RS-PerCC*, see D.xxx)  The performance requirements Table 8.2.2.3.5.1 (Test 3, 4, 5) shall apply only in case the PDSCH MIMO rank in the test case does not exceed IAB-MT PDSCH MIMO layers capability (*maxNumberMIMO-LayersPDSCH*, see D.xxx)”  Also, we think that it is important to add section “8.2.2.3 Applicability of requirements for mandatory IAB-MT features with capability signalling” to make specification more visible and informative. General IAB-MT declarations do not connect to any capabilities and hence specific section should be added capture this specific case. |
| R4-2114032 | Draft CR to TS 38.176-2: Correction of applicability rules for demodulation performance requirements, Intel Corporation |
| [Nokia]:  PRACH formats (8.1.1.3.4.1): if “each” is exclude from the original BS applicability rule, then the text should be: “Unless otherwise stated, PRACH requirement tests shall apply only for PRACH formats declared to be supported (see D.103 in table 4.6-1).”  Applicability of CSI reporting requirements is still under the discussion. Modifications might be introduces based on the achieved agreements. In particular, we think that it is sufficient to state explicitly that: “Testing of performance requirements for RI and PMI reporting is optional.” However, the declaration of testing is not needed. |
| Intel: Applicability rule for PRACH: We will update wording based on the suggestion from Nokia. |
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| R4-2112021 | draftCR to TS 38.176-2 IAB-DU performance requirements and parts of DU and MT appendix, Nokia Germany |
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| R4-2113357 | Draft CR to 38.176-1: Antenna terminology, Ericsson |
| [Nokia2]: The presence of 5MHz CBW in the specification is pending on the results of the ongoing discussion. |
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| R4-2113802 | draftCR on IAB conducted conformance testing (Manufacturer declarations) to TS 38.176-1, Huawei, HiSilicon |
| [Nokia]:  The decision is pending on the coming agreements, but in our opining, Manufacturer’s declarations of testing D.204 and D.205 are not needed. |
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| R4-2114540 | draftCR to TS 38.176-1 IAB-DU performance requirements, Nokia Germany |
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| R4-2113355 | Draft CR to 38.176-1: IAB-MT applicability and declarations, Ericsson |
| [Nokia]:  The decision is pending on the coming agreements, but in our opining, Manufacturer’s declarations D.204 and D.205 are not needed. In applicability rules, we think that it is sufficient to state explicitly only that: “Testing of performance requirements for RI and PMI reporting is optional.” |
| [Huawei]: Similar comments as for R4-2114031 for the new sections of 8.2.2.1.1.4/5 and 8.2.3.1.1.5/6, the manufacture declarations of D.200~D.203 defined in Table 4.6-1 plus some additional text clarification in the requirement applicability section are enough. Include both in the specification will cause unnecessary confusions to specification reader, they are not sure what is the intention and essential difference to include the similar principle by using different formats and include in different places in the specification, maybe reader will try to figure out the difference between them, also they will bring maintenance burden with new applicability rules to be introduced in the future. |
|  |
| R4-2113356 | Draft CR to 38.176-2: IAB-MT applicability and declarations, Ericsson |
| [Nokia]:  [D.200] and D.200 seems to be the same declarations. Hence, [D.200] should be removed.  Similar comment as for the R4-2113355 above.  If Testing of PMI and RI declarations are decided to be kept, it would be better to align numbering between 38.176-1 and 38.176-2, i.e., use indexes D.204 and D.205. |
| [Nokia 2]: There are a few misprints in [D.103] declaration:   1. For *IAB type* ***2****-O*: 60 kHz, 120 kHz or both.    1. Please use italic for *IAB type 1/2-O*    2. It should be type 2-O 2. It is not clear which TS is referenced with [x]. |
|  |
| R4-2113800 | draftCR on IAB-MT conducted performance requirements (General and Demodulation) in TS 38.174, Huawei, HiSilicon |
| [Nokia]:  The Annex I Propagation conditions is empty in the latest version of 38.174. Up to our best knowledge, the Annex was allocated originally to Ericsson. However, Ericsson does not have any 38.174 CRs in this meeting. Shall the Annex be added to this CR? Alternatively, we can add it Nokia’s CR R4-2114542. |
| [Huawei]: We are OK to add the Annex I into our CR. |
|  |
| R4-2113801 | draftCR on IAB-MT conducted conformance testing (CSI reporting and Interworking) to TS 38.176-1, Huawei, HiSilicon |
| [Nokia]:  Beamforming models in table 8.2.3.3.4.2-2 are supposed to be specified in Annex F Propagation conditions, Section F.3 Beamforming model. However, it is currently missing in the TS (see also our comment on R4-2113800).  Applicability of requirements for CSI reporting is pending on meeting agreements. |
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| R4-2113803 | draftCR on IAB-MT radiated conformance testing (General and Demodulation) to TS 38.176-2, Huawei, HiSilicon |
| [Nokia]:  Formulation of applicability rule for IAB-MT is pending on meeting agreements. |
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| R4-2114542 | draftCR to TS 38.174 IAB-MT CSI reporting radiated performance requirements, Nokia Germany |
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## 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.*

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|  | **Status summary** |
| **Sub-topic#1** | *Tentative agreements:*  *Candidate options:*  *Recommendations for 2nd round:* |
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*Recommendations on WF/LS assignment*

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| --- | --- | --- |
|  | **WF/LS t-doc Title** | **Assigned Company,**  **WF or LS lead** |
| #1 |  |  |
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### 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.*

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

## 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*

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| **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”* |
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# Topic #2: IAB-MT

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

## Companies’ contributions summary

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| --- | --- | --- |
| **T-doc number** | **Company** | **Proposals / Observations** |
| R4-20xxxxx | Company A | Proposal 1:  Observation 1: |
| R4-2113358 | Ericsson | Declaration of IAB-MT optional features  **Proposal 1: Include both capability signaling related test applicability tables and feature declaration in declaration tables for IAB-MT.** |
| R4-2114033 | Intel Corporation | View on IAB-MT performance requirements applicability definition in conformance specifications  **Observation #1**: IAB-MT has mandatory features with capability signaling that control requirements applicability.  **Observation #2**: IAB-MT capability signaling does not impact BS test style.  **Observation #3**: Definition of IAB-MT declarations for IAB-MT mandatory features with capability signaling is not justified and leads to contentions between RAN2 and RAN4 agreements.  **Observation #4**: Defining PMI and RI reporting requirements as optional requirements in RAN4 spec requires changing such features from mandatory to optional  **Proposal #1: Adopt Option 1 on applicability rules definition in IAB-MT conformance specifications.** |
| R4-2114543 | Nokia Germany | On IAB-MT Performance Requirements  **Observation 1**: Section D.3.3 title from 38.176-1 mentions only CQI reporting, but the diagram shall cover all CSI reporting tests. There is no note on the feedback link under the Figure D.3.3-1 in TS 38.176-1, and the caption does not mention CSI feedback.  **Proposal 1: Do not introduce a new scheme for CSI reporting for IAB-MT, i.e., use the same scheme as for demodulation performance (including IAB-MT and IAB-DU) also for CSI reporting.  a. Keep only one feedback link on the scheme.  b. Add text in the Note that the feedback is also used for CSI reporting as follows: NOTE 1: The feedback could be done as an RF feedback, either using NR channels or using other means, or as a digital feedback. The HARQ Feedback should be error free. CSI feedback is used only in CSI reporting tests.  c. Add a synchronization source.**  **Proposal 2: RAN4 to add the synchronisation note as per prior agreement:  “In tests performed with signal generators, a synchronization signal may be provided between the IAB node and the signal generator, or a common (e.g., GNSS) source may be provided to both IAB node and the signal generator, to enable correct timing of the wanted signal.”**  **Proposal 3: RAN4 to add the synchronisation note as per prior agreement with the following change:  “In tests performed with signal generators, a synchronization signal may be provided between the IAB node and the signal generator, or a common (e.g., GNSS) source may be provided to both IAB node and the signal generator, to enable correct timing of the wanted signal. The method of synchronization with the TE is left to implementation.”**  **Observation 2**: As far PMI reporting is a mandatory IAB-MT feature, its support cannot be left for manufacture declaration.  **Proposal 4: RAN4 to copy paste the “Requirements applicability” tables from the UE test specs to the MT test specs. Replace “FDD” with “TDD”.**  **Proposal 5: RAN4 to include the phrase “Testing of performance requirements for RI and PMI reporting is optional” in the “General” subsection of each “Applicability of requirements” section.**  **Proposal 6: RAN4 to not add any declaration on this in the manufacturer declaration section.**  **Proposal 7: Clause 11.2.3.2.1.1 with Applicability of requirements for IAB-MT CSI reporting radiated shall be left void.** |

## Open issues summary

*Before e-Meeting, moderators shall summarize list of open issues, candidate options and possible WF (if applicable) based on companies’ contributions.*

*Interested companies are expected to add their views directly under the respective issues in a dialogue-like form, i.e., identical to how the chair would record views during a f2f meeting.*

*Please add further table rows as required and do not change previous comments of your company or other companies. Answering to questions from other companies is encouraged.*

### Sub-topic 2-1: Test setup for CSI reporting

*Sub-topic description:*

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

**Issue 2-1-1: Test setup figure in test specifications**

* Background
  + In RAN4#99-e it was left open how to represent the test setup for CSI reporting in the test specifications.
    - Option 1: Using the following test setup for CSI reporting for IAB-MT



* + - Option 2: Do not introduce a new scheme for CSI reporting for IAB-MT, i.e., use the same scheme as for demodulation performance (including IAB-MT and IAB-DU) also for CSI reporting.
      * Keep only one feedback link on the scheme, but add text or note that the feedback is used for CSI (only for PMI and RI reporting).
      * Add a synchronization source
      * Use "termination" for unused transceiver array boundary connectors.
    - Option 3: Other options not precluded.
* Proposals
  + Option 1 []:



* + Option 2 [Nokia]: Do not introduce a new scheme for CSI reporting for IAB-MT, i.e., use the same scheme as for demodulation performance (including IAB-MT and IAB-DU) also for CSI reporting.  
     a. Keep only one feedback link on the scheme.  
     b. Add text in the Note that the feedback is also used for CSI reporting as follows: NOTE 1: The feedback could be done as an RF feedback, either using NR channels or using other means, or as a digital feedback. The HARQ Feedback should be error free. CSI feedback is used only in CSI reporting tests.  
     c. Add a synchronization source.

transceiver unit array

#1

#2

#K

transceiver array boundary

Transceiver array boundary connector TAB(n)

Load

AWGN Generator

AWGN GeneratorAWGN Generator

IAB tester

Feedback

Synchronization source

* + Option 3 [Nokia]:

transceiver unit array

#1

#2

#K

transceiver array boundary

Transceiver array boundary connector TAB(n)

Load

AWGN Generator

AWGN GeneratorAWGN Generator

IAB tester

Feedback

Synchronization source (if used, see NOTE 2)

* + Option 4: Other options not precluded.
* Recommended WF
  + Discuss in first round.

|  |  |
| --- | --- |
| **Company** | **Comments** |
| Nokia, Nokia Shanghai Bell | In the latest version of 38.176-1 TS, the synchronization source is missing, and in Figure D.3.3-1 both the synchronization and Feedback link are not present.  In our view, it is essential to indicate the synchronization source in the schemes because it was agreed that this is BS testing approach-based testing setup.  Then, we also think that the feedback link shall be present, but we can omit the details and explain its functions in the Note. |
| Ericsson | We are OK with option 2, although it would be good to show the “synchronization source” as a dashed box as it may not be needed for some setups (e.g. if the IAB synchronizes to the IAB tester, or via SSB). |
| Intel | Synchronization link should be added, and it can be captured as a dashed box as suggested by Ericsson. As for CSI feedback link, we do not see big necessity to add it, maybe some clarifications from Huawei can help. |
| Huawei | To move forward, we are OK to use Option 2 and use the dashed box for synchronization source as suggested by Ericsson.  2021-08-19:  Actually the “synchronization source” connection in the diagram is causing confusion, people can have different understanding about it: a dashed box for synchronization source can be understood to exist or non-exist; the arrow direction of the connection line can be understood as IAB-tester or transceiver unit array as synchronize source for the synchronization between IAB-tester and IAB device under test, actually IAB-MT cannot be acted as synchronization source. It is better to keep consistent with the existing BS specification with the note about synchronization as proposed in Option 2 in next Issue 2-1-2 that is clear enough. |
| Nokia 2 | Following the GtW discussion, we would like to avoid a confusion with dashed lines for synchronization source and transceiver unit array since dash notations are not defined explicitly. We are proposing a new options 3 where solid lines are used for synchronization source, but the NOTE 2 on synchronization implementation is present. |
| Intel | Support newly proposed Option 3. |

**Issue 2-1-2: Synchronisation NOTE 2 text**

* Background
  + The notes “NOTE 2” pertaining to the testing setups on synchronization are inconsistent between specifications:
  + TS 38.176-2:  
    “In tests performed with signal generators, a synchronization signal may be provided between the IAB node and the signal generator, or a common (e.g., GNSS) source may be provided to both IAB node and the signal generator, to enable correct timing of the wanted signal.”
  + In 38.176-1:  
    “The method of synchronization with the TE is left to implementation. Neither the use of downlink signal configuration nor the use of proprietary means is precluded. In tests performed with signal generators, a synchronization signal may be provided between the IAB node and the signal generator, or a common (e.g., GNSS) source may be provided to both IAB node and the signal generator, to enable correct timing of the wanted signal.”
  + [R4-2103994]
    - Basis for test setup (from GtW)
      * Test setup and performance requirements based on the BS approach assumption, i.e., using a signal generator and assuming unidirectional Uu interface. Flexibility in connection/test setup is allowed by keeping the specified setup informative.
        + Further work on the texts to specification to align with RF conformance test assumption.
    - Synchronization in test procedure (from GtW)
      * Write the test procedure using the BS approach, i.e., no detailed synchronization configuration for synchronization is included in conformance specifications.   
        Add a note in conformance specifications to clarify that IAB-MT synchronization with the TE is left to implementation, i.e., neither the use of DL signal configuration nor the use of proprietary means is precluded.
        + “In tests performed with signal generators, a synchronization signal may be provided between the IAB node and the signal generator, or a common (e.g., GNSS) source may be provided to both IAB node and the signal generator, to enable correct timing of the wanted signal.”
* Proposals
  + Option 1 []: RAN4 to add the synchronisation note as per prior agreement:   
    “In tests performed with signal generators, a synchronization signal may be provided between the IAB node and the signal generator, or a common (e.g., GNSS) source may be provided to both IAB node and the signal generator, to enable correct timing of the wanted signal.”
  + Option 2 [Nokia]: RAN4 to add the synchronisation note as per prior agreement with the following change:   
    “In tests performed with signal generators, a synchronization signal may be provided between the IAB node and the signal generator, or a common (e.g., GNSS) source may be provided to both IAB node and the signal generator, to enable correct timing of the wanted signal. The method of synchronization with the TE is left to implementation.”
  + Option 2: Other options not precluded.
* Recommended WF
  + Discuss in first round.

|  |  |
| --- | --- |
| **Company** | **Comments** |
| Nokia, Nokia Shanghai Bell | Option 2 seems to us as a good compromise.  Additionally, the last statement of Option 2 can be modified as follows:  “The method of synchronization with the TE is left to **test** implementation.” |
| Ericsson | We agree to align the note and also think that it is good to add the sentence about test implementation as suggested by Nokia. |
| Intel | We are fine to add additional clarification and support wording suggested by Nokia. |
| Huawei | Option 2 is OK for us. |

### Sub-topic 2-2: Test applicability with respect to capabilities/features

*Sub-topic description*

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

**Issue 2-2-1: Include UE/MT capability signalling in manufacturer’s declaration table (TS 38.176-1/2 section 4.6)**

* Example of addition (not necessarily representative of the final CRs)

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| D.108 | Modulation order | Declaration of the supported modulation order, i.e. QPSK, 16QAM, 64QAM | x |  |
| D.109 | DFT-s-OFDM | Declaration of the supported of DFT-s-OFDM, i.e. supported or not supported. | x |  |
| D.20X | 256QAM for PDSCH for FR1 | Declaration of the supported of 256QAM modulation scheme for PDSCH for FR1, i.e. supported or not supported. |  | x |
| D.20Y | Maximum number of ports across all configured NZP-CSI-RS resources per CC | Declaration of the maximum number of ports across all configured NZP-CSI-RS resources per CC, i.e. 2, 4, 8, 12, 16, 24, 32, 40, 48 … ,256 or not supported. |  | x |
| D.20Z | Maximum number of PDSCH MIMO layers | Declaration of the maximum number of spatial multiplexing layer(s) supported by the UE for DL reception, i.e. 2, 4, 8 or not supported. |  | x |

* Proposals
  + Option 1 [Nokia, Ericsson, Huawei]: Yes, include.
  + Option 2 []: No don’t include.
* Recommended WF
  + Discuss in first round

|  |  |
| --- | --- |
| **Company** | **Comments** |
| Nokia, Nokia Shanghai Bell | As far as listed features parameters are not listed explicitly in TS 38.306 as mandatory for IAB-MT, we think that it is acceptable to include them in the manufacturer’s declaration tables. |
| Ericsson | We think these declarations should be included, since the declarations table should list the features and configurations that are needed for testing in one place. It is still needed and useful even if agreed to include the applicability section based on capability signalling as it would be unfortunate to spread the test configurations details between these tables and some signalling. (In fact, the baseband testing can be carried out without generating or reading the signalling). |
| Intel | We are fine to add such declarations as far as we capture these features in test applicability sections |
| Huawei | OK for Option 1 to include the manufacture declaration as did for BS testing. |

**Issue 2-2-2: Include declaration of PMI/RI testing in manufacturer’s declaration table (TS 38.176-1/2 section 4.6)**

* Example of addition (not necessarily representative of the final CRs)

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| D.108 | Modulation order | Declaration of the supported modulation order, i.e. QPSK, 16QAM, 64QAM | x |  |
| D.109 | DFT-s-OFDM | Declaration of the supported of DFT-s-OFDM, i.e. supported or not supported. | x |  |
| ~~D.20X~~ | ~~Testing of PMI reporting~~ | ~~Declaration on the testing of PMI reporting, i.e. tested or not tested.~~ |  | ~~x~~ |
| ~~D.20Y~~ | ~~Testing of RI reporting~~ | ~~Declaration on the testing of RI reporting, i.e. tested or not tested.~~ |  | ~~x~~ |

* Proposals
  + Option 1 []: Yes, include.
  + Option 2 [Nokia, Ericsson]: No don’t include.
* Recommended WF
  + Discuss in first round

|  |  |
| --- | --- |
| **Company** | **Comments** |
| Nokia, Nokia Shanghai Bell | We prefer not to list Testing of PMI/RI in the manufacturer’s declaration tables. The records in the tables are supposed to be provided by manufacturer **for** testing, i.e. they should indicate the features supported by the device. Therefore, indication of testing is not the aim of the table. On the other hand, PMI reporting is mandatory IAB-MT feature. Hence, there is no need to list it in manufacturer’s declaration table either.  It will be sufficient to state the optionality of the tests (see Issue 2-2-4). |
| Ericsson | It is very unusual to have requirements and then arbitrarily decide whether to test them or not (i.e. without an argumentation that tests can be skipped because other tests provide sufficient test coverage). The declaration tables list features and configurations for which requirements are supported and which should be tested. We do not think that a declaration of the choice of whether to carry out a test or not in this case should belong in the tables, so support to remove. |
| Intel | We have unique situation for PMI/RI reporting testing, and we share similar view as Ericsson that we should avoid such situations for future requirements. Technically there is no difference to capture testing approach of these requirements in declaration table or in applicability section. However, additional declarations look more visible and clearly define who is responsible for choice. With statement in applicability section, it is not transparent who will decide to test these requirements: IAB vendor or TE vendor or someone else. Can companies clarify their view on it?  We do not have strong preference on this issue if companies do not see problems with mentioned above issue. |
| Huawei | OK for Option 2 that does not include such declaration to avoid any confusion that one vendor just declares not to test the PMI/RI reporting testing but without any justifications. We can specify that the performance requirements are optional as specified for HST. |

**Issue 2-2-3: Include the “Requirements applicability” tables from the UE test specs to the MT test specs. Replace “FDD” with “TDD”.**

* Example of addition (not representative of all required additions, much larger impact expected from inclusion)

8.2.3.1.1.2 Applicability of requirements for number of RX antenna ports

The number of RX antenna ports for different RF operating bands is up to IAB-MT declaration.

The IAB-MT shall support 2 antenna ports for different RF operating bands. The IAB-MT requirements applicability is defined in Table 8.2.3.1.1.2-1.

**Table 8.2.3.1.1.2-1: Requirements applicability**

|  |  |  |
| --- | --- | --- |
| **Supported RX antenna ports** | **Test type** | **Test list** |
| IAB-MT supports 2RX | CQI | All tests in Clause 8.2.3.2 |
| PMI | All tests in Clause 8.2.3.3 |
| RI | All tests in Clause 8.2.3.4 |

* Proposals
  + Option 1 [~~Nokia~~]: Yes, include.
  + Option 2 [~~Nokia~~, Huawei]: No don’t include.
  + Option 3 [Nokia]: Include, using text format instead of tables in a “Applicability of requirements for IAB-MT features” section under the General applicability rule section.
* Recommended WF
  + Discuss in first round

|  |  |
| --- | --- |
| **Company** | **Comments** |
| Nokia, Nokia Shanghai Bell | In our opinion, applicability rules formulated as tables or as plain text, both serve the same goal, and the meaning is the same. Table format is traditionally used in UE testing. However, text format is used in BS testing. Therefore, both options are acceptable for us, with a slight preference on textual format because it was agreed to formulated IAB-MT test setup following BS approach. |
| Ericsson | We are OK to include the applicability tables in addition to declarations |
| Intel | We think it is important to follow RAN2 design and reusing of “requirements applicability” tables is the most secure way since the style and text of them were discussed for a long time in previous releases. Support Option 1. |
| Huawei | We prefer the current text format that is captured in the specification and also used by the BS specification. We already agreed to use BS style testing approach, also the related CRs have been agreed and implemented in the specification, it is clear enough, and we did not observe any motivation to must keep consistent with UE demodulation testing style. What’s more, all CRs need to be revised to include such table and duplicate the related applicability rules just by different format. |
| Nokia 2 | We would like to reconfirm based on the GtW discussion that we see a need in keeping Applicability of requirements sections for IAB-MT performance and CSI reporting. However, textual format is more preferred by us, so that all of the Allocability rules with the references to the Manufacture’s declaration are listed in the section “Applicability of requirements for IAB-MT features”. |

**Issue 2-2-4: Include statement on optionality of RI/PMI testing in “applicability of requirements” sections**

* Example of addition (not representative of all required additions, larger impact expected from inclusion)

8.2.3 CSI reporting requirements

8.2.3.1 General

8.2.3.1.1 Applicability of requirements

8.2.3.1.1.1 General

The minimum performance requirements are applicable to all FR1 operating bands defined in TS 38.101-1 [6].

The minimum performance requirements in Clause 8.2.3 are mandatory for IAB-MT supporting NR operation, except test cases listed in Clause 8.2.3.1.1.3, 8.2.3.1.1.4, 8.2.3.1.1.5.

If same test is listed for different IAB-MT features/capabilities in Clauses 8.2.3.1.1.3 and 8.2.3.1.1.4, then this test shall apply for IAB-MTs which support all corresponding IAB-MT features/capabilities.

Testing of performance requirements for RI and PMI reporting is optional.

* Proposals
  + Option 1 [Nokia, Ericsson]: Yes, include.
  + Option 2 []: No don’t include.
* Recommended WF
  + Discuss in first round

|  |  |
| --- | --- |
| **Company** | **Comments** |
| Nokia, Nokia Shanghai Bell | In our opinion, it is essential to introduce such a note based on the former agreement that testing of PMI and RI reporting is optional. |
| Ericsson | We don’t like the principle of arbitrarily making it optional whether to test requirements or not, but since this was the agreement reached in the GTW then it should be reflected in the specification. |
| Intel | Previous RAN4 agreement on optional PMI/RI testing should be reflected in specification and we have two options on table. If companies do dot see problem with issue mentioned in our comment for 2-2-2 we are fine with both options. However, at current stage we think additional declarations is more visible approach. |
| Huawei | OK for Option 1. It is enough that just specify the test applicability rule in the general and applicability part, no additional manufacture declaration needs to be defined. |

### Sub-topic 2-3: Other

*Sub-topic description:*

*In this sub-topic companies are invited to bring issues to the attention of the group, which have not been captured in the previous sub-topics.*

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

### CRs/TPs comments collection

*Major close-to-finalize WIs and Rel-15 maintenance, comments collections can be arranged for TPs and CRs. For Rel-16 on-going WIs, suggest to focus on open issues discussion on 1st round.*

|  |  |
| --- | --- |
| **CR/TP number** | **Comments collection** |
| XXX | Title, Source |
| Company A |
| Company B |
|  |
| YYY | Title, Source |
| 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:* |
|  |  |

*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*

*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)

## 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”* |
|  |  |

# 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

# Annex

Contact information

|  |  |  |
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Note:

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