**3GPP TSG-RAN WG4 Meeting # 98-e draftR4-2103935**

**Electronic Meeting, 25th Jan 2021 - 5th Feb 2021**

**Agenda item:** 7.4.8

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

**Title:** Email discussion summary for [98e][320] NR\_IAB\_Demod

**Document for:** Information

# Introduction

*Briefly introduce background, the scope of this email discussion 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

## Background and scope

This T-doc will be used to guide and summarize the email discussion for the topic of Rel-16 IAB demodulation and CSI requirements (AI 7.4.8), with the email thread identifier “[98e][320] NR\_IAB\_Demod”.

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

7.4.8 Demodulation and CSI requirements

7.4.8.1 General

7.4.8.2 IAB-DU performance requirements

7.4.8.3 IAB-MT performance requirements

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

## Email discussion guidelines

Unless different guidance is received from the session chairs, the moderator would like to ask companies to adhere to the following guidelines, when taking part in [98e][320] NR\_IAB\_Demod.

Please also check the “R4-21xxxxx RAN4#98-e e-meeting arrangements and guidelines v1.1”, available on the reflector, for fundamental guidelines and deadlines.

The preferred method of commenting is to add/update your company’s view directly in this email summary document (use change marks if appropriate) and upload it to [320] NR\_IAB\_Demod.

* Draft folder:
 [[98e][320] NR\_IAB\_Demod](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98_e/Inbox/Drafts/%5B98e%5D%5B320%5D%20NR_IAB_Demod)
https://www.3gpp.org/ftp/TSG\_RAN/WG4\_Radio/TSGR4\_98\_e/Inbox/Drafts/%5B98e%5D%5B320%5D%20NR\_IAB\_Demod
* It is expected delegates will download the latest version (including other companies’ versions) of the summary document, insert comments and upload it again.
To ensure the comments are captured timely and correctly, delegates are encouraged to:
	+ Rename the file by adding your company name.
	Example: “Summary\_320\_1st round v0**1\_CATT\_Nok**.docx”
	+ Send an email on the reflector informing that comments are made specifying the updated file name.
	+ Please check for possibly updated base document versions, right before uploading your updates.
* Please do not hesitate to mark your company as supporting a certain option directly in this document.
Please refrain from rewriting existing options and proposed WFs; ask the moderator (in your company’s comment) to modify/add.
* It is encouraged to give a short reasoning for each view expressed (1-2 sentences are recommended).
Please avoid statements like “Option X”, without further explication or reasoning (unless it is the last vote enabling acceptance of a proposal).
* The moderator is trying to provide a new “cleaned” revision of the base document once a day.
Example: “Summary\_320\_1st round v0**3**.docx”
	+ Comments only received by email will be merged into the summary document by the moderator on a best effort basis.

# Topic #1: General

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

## Companies’ contributions summary

|  |  |  |
| --- | --- | --- |
| **T-doc number** | **Company** | **Proposals / Observations** |
| R4-2102105 | Ericsson | Tdoc Title: IAB demodulation general considerations**Proposal 1: Do not specify how HARQ feedback is sent to the TE. (It could be via Uu or via proprietary means).****Proposal 2: Write the test procedure such that coarse synchronization is not specified. (It can be achieved by transmitting and detecting SSB or via proprietary means).****Proposal 3: Provide DM-RS for fine synchronization. Optionally, TRS can also be transmitted during the test for fine synchronization.**[Moderator]: Proposals captured in Topic #3: IAB-MT performance requirements |

## Open issues summary and views’ collection for 1st round

*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: DraftCR, bigCR, and bigTP work split

*Sub-topic description:*

The email discussion list shared by the chairs before the meeting, request for “CR/TP work split for Demod requirements and conformance testing expected” in [98e][320] NR\_IAB\_Demod.

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

38.174 Performance requirements

1x bigCR, for RF

1x bigCR, for Demod

38.???-1 Conducted conformance testing

1x bigTP, for RF

1x bigTP, for Demod

38.???-2 Radiated conformance testing

1x bigTP, for RF

1x bigTP, for Demod

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

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

**Issue 1-1-1: IAB demodulation draftCR, bigCR, bigTP work-split.**

* Proposals
	+ Option 1 (Moderator):

WORKSPLIT TABLE WITHOUT COMPANY NAMES WILL BE INCLUDED IN MONDAY’S KICK-OFF EMAIL (8am UTC).
Please volunteer on Monday by email for draftCR responsibilities.
Ultimately, the filled-in table will be included in this option.
There are 22 tasks to find volunteers for and 5 companies have been active in the discussion.
It is recommended for each company to volunteer for 4 tasks in a first round and then fill in the remaining ones in a second round.

Current allocation is summarized as

Intel x 6

Huawei x 6

Ericsson x 6

Nokia x4

The moderator is planning to ask in the GtW, if new companies would like to take over some of the highlighted cases to spread the load across 3GPP and not exclude potential newcomers and timezones.
So, please be prepared to re-check the highlighted allocations in the second round.

The following is the current detailed list:

|  |  |
| --- | --- |
| **IAB demodulation draftCR, bigCR, and bigTP work-splits - TS 38.174** | **Company** |
| TS 38.174 bigCR Demod | Huawei |
| TS 38.174 Performance requirements (draftCRs) |  |
|  | 8 Conducted performance requirements |  |
|  |  | IAB-DU performance requirements | Ericsson |
|  |  |   | General, PUSCH FR1, PUCCH FR1, PRACH FR1 |
|  |  | IAB-MT performance requirements | Huawei |
|  |  |   | General (all excluding radiated) |
|  |  |   | Demodulation (Conducted requirements/FR1) |
|  |  |   |  | General (incl. applicability, etc), PDSCH, PDCCH, PBCH, SDR, SDR CA |
|  |  |   | CSI reporting (Conducted requirements/FR1) | Intel |
|  |  |   |  | General, CQI, PMI, RI |
|  |  |   | Demod for interworking (verification in FR1) |
|  |  |   | CSI reporting for interworking (verification in FR1) |
|  | 11 Radiated performance requirements |  |
|  |  | IAB-DU performance requirements | Intel |
|  |  |   | General, PUSCH FR1&FR2, PUCCH FR1&FR2, PRACH FR1&FR2 |
|  |  | IAB-MT performance requirements | Intel |
|  |  |   | General (all excluding conducted) |
|  |  |   | Demodulation (Radiated requirements/FR2) |
|  |  |   |  | General (incl. applicability, etc), PDSCH, PDCCH, PBCH, SDR, SDR CA |
|  |  |   | CSI reporting (Radiated requirements/FR2) | Ericsson |
|  |  |   |  | General, CQI, PMI, RI |
|  |  |   | Demod for interworking (verification in FR2) |
|  |  |   | CSI reporting for interworking (verification in FR2) |
|  | Appendix |  |
|  |  | FRCs/RMCs, PRACH Test preambles, etc. [Note: MT setup/connection/environment/etc. included in ???-1/2.] | Ericsson |

|  |  |
| --- | --- |
| **IAB demodulation draftCR, bigCR, and bigTP work-splits - TS 38.???-1** | **Company** |
| TS 38.???-1 bigTR Demod | Intel |
| TS 38.???-1 Conducted conformance testing (draftCRs) |  |
|  | Manufacturer declarations | Huawei |
|  | 8 Conducted performance characteristics |  |
|  |  | IAB-DU performance requirements | Nokia |
|  |  |   | General (incl. applicability rule), PUSCH FR1, PUCCH FR1, PRACH FR1 |
|  |  | IAB-MT performance requirements | Ericsson |
|  |  |   | General (all excluding radiated) |
|  |  |   | Demodulation (Conducted requirements/FR1) |
|  |  |   |  | General (incl. applicability, etc), PDSCH, PDCCH, PBCH, SDR, SDR CA |
|  |  |   | CSI reporting (Conducted requirements/FR1) | Huawei |
|  |  |   |  | General, CQI, PMI, RI |
|  |  |   | Demod for interworking (verification in FR1) |
|  |  |   | CSI reporting for interworking (verification in FR1) |
|  | Appendix |  |
|  |  | FRCs/RMCs & PRACH Test preambles | Intel |
|  |  | Rest (incl. test setup/TT/etc.) | Ericsson |

|  |  |
| --- | --- |
| **IAB demodulation draftCR, bigCR, and bigTP work-splits - TS 38.???-2** | **Company** |
| TS 38.???-2 bigTR Demod | Nokia |
| TS 38.???-2 Radiated conformance testing (draftCRs) |  |
|  | Manufacturer declarations | Intel |
|  | 8 Radiated performance requirements |  |
|  |  | IAB-DU performance requirements | Nokia |
|  |  |   | General (incl. applicability rule), PUSCH FR1&FR2, PUCCH FR1&FR2, PRACH FR1&FR2 |
|  |  | IAB-MT performance requirements | Huawei |
|  |  |   | General (all excluding conducted) |
|  |  |   | Demodulation (Radiated requirements/FR2) |
|  |  |   |  | General (incl. applicability, etc), PDSCH, PDCCH, PBCH, SDR, SDR CA |
|  |  |   | CSI reporting (Radiated requirements/FR2) | Ericsson |
|  |  |   |  | General, CQI, PMI, RI |
|  |  |   | Demod for interworking (verification in FR2) |
|  |  |   | CSI reporting for interworking (verification in FR2) |
|  | Appendix |  |
|  |  | FRCs/RMCs & PRACH Test preambles | Huawei |
|  |  | Rest (incl. test setup/TT/etc.) | Nokia |

* + Option 2: Other options not precluded.
* Recommended WF
	+ Please check the proposed work-split categories concerning completeness and fill in your company name, where you see appropriate.
	It is often recommended to not sign up for the same sections in several different specifications, to allow for cross verification between different contributors. However, given the large amount of work to be done, the moderator will not push to adhere to this way of working.

|  |  |
| --- | --- |
| **Company** | **Comments** |
| Nokia, Nokia Shanghai Bell | We agree with the proposed work split. We already volunteered for 4 tasks in the reply to the moderator’s email. |
| YYY |  |
| XXX |  |

### 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.*

|  |  |
| --- | --- |
| **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 |
|  |
|  | Moderator: No CRs/TPs in this meeting. |
|  |
|  |
|  |

## 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:* |
| **Sub-topic 1-1** | **Sub-topic 1-1: DraftCR, bigCR, and bigTP work split** Issue 1-1-1: IAB demodulation draftCR, bigCR, bigTP work-split: *Tentative agreements:*Option 1 is agreeable, but can be further updated following GtW, to spread the load across 3GPP and not exclude potential newcomers and timezones.*Candidate options:*None*Recommendations for 2nd round:*Agree to the tentative agreement (option 1) and capture the tables in the WF. |
| **Sub-topic 1-2** | **Sub-topic 1-2: Other**No Issues |

*Recommendations on WF/LS assignment*

|  |  |  |
| --- | --- | --- |
|  | **WF/LS t-doc Title**  | **Assigned Company, WF or LS lead** |
| #1 | WF on Rel-16 NR IAB demodulation requirements | Nokia, Nokia Shanghai Bell |

### CRs/TPs

*Moderator tries to summarize discussion status for 1st round and provides recommendation on CRs/TPs Status update*

|  |  |
| --- | --- |
| **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”* |
|  | None |

## Discussion on 2nd round (if applicable)

Concerning open issues in this section, please capture your company views directly under the respective issues and treat the summary as a dialogue just as the chairperson would during a f2f, i.e., do not edit earlier responses but continue the discussion.
Please furthermore declare your company’s support for certain options, by capturing the company abbreviation directly after the option number.

### (2nd) Sub-topic 1-1: DraftCR, bigCR, and bigTP work split

Issue 1-1-1: IAB demodulation draftCR, bigCR, bigTP work-split:

No further open issues.

The following tables have been agreed in the first round, but the highlighted allocations can be further updated following GtW, in case it is required spread the load across 3GPP and to not exclude potential newcomers and timezones.
please be prepared to re-check the highlighted allocations in the second round.

Current allocation is summarized as:

Intel x 6
Huawei x 6
Ericsson x 6
Nokia x4

|  |  |
| --- | --- |
| **IAB demodulation draftCR, bigCR, and bigTP work-splits - TS 38.174** | **Company** |
| TS 38.174 bigCR Demod | Huawei |
| TS 38.174 Performance requirements (draftCRs) |  |
|  | 8 Conducted performance requirements |  |
|  |  | IAB-DU performance requirements | Ericsson |
|  |  |   | General, PUSCH FR1, PUCCH FR1, PRACH FR1 |
|  |  | IAB-MT performance requirements | Huawei |
|  |  |   | General (all excluding radiated) |
|  |  |   | Demodulation (Conducted requirements/FR1) |
|  |  |   |  | General (incl. applicability, etc), PDSCH, PDCCH, PBCH, SDR, SDR CA |
|  |  |   | CSI reporting (Conducted requirements/FR1) | Intel |
|  |  |   |  | General, CQI, PMI, RI |
|  |  |   | Demod for interworking (verification in FR1) |
|  |  |   | CSI reporting for interworking (verification in FR1) |
|  | 11 Radiated performance requirements |  |
|  |  | IAB-DU performance requirements | Intel |
|  |  |   | General, PUSCH FR1&FR2, PUCCH FR1&FR2, PRACH FR1&FR2 |
|  |  | IAB-MT performance requirements | Intel |
|  |  |   | General (all excluding conducted) |
|  |  |   | Demodulation (Radiated requirements/FR2) |
|  |  |   |  | General (incl. applicability, etc), PDSCH, PDCCH, PBCH, SDR, SDR CA |
|  |  |   | CSI reporting (Radiated requirements/FR2) | Ericsson |
|  |  |   |  | General, CQI, PMI, RI |
|  |  |   | Demod for interworking (verification in FR2) |
|  |  |   | CSI reporting for interworking (verification in FR2) |
|  | Appendix |  |
|  |  | FRCs/RMCs, PRACH Test preambles, etc. [Note: MT setup/connection/environment/etc. included in ???-1/2.] | Ericsson |

|  |  |
| --- | --- |
| **IAB demodulation draftCR, bigCR, and bigTP work-splits - TS 38.???-1** | **Company** |
| TS 38.???-1 bigTR Demod | Intel |
| TS 38.???-1 Conducted conformance testing (draftCRs) |  |
|  | Manufacturer declarations | Huawei |
|  | 8 Conducted performance characteristics |  |
|  |  | IAB-DU performance requirements | Nokia |
|  |  |   | General (incl. applicability rule), PUSCH FR1, PUCCH FR1, PRACH FR1 |
|  |  | IAB-MT performance requirements | Ericsson |
|  |  |   | General (all excluding radiated) |
|  |  |   | Demodulation (Conducted requirements/FR1) |
|  |  |   |  | General (incl. applicability, etc), PDSCH, PDCCH, PBCH, SDR, SDR CA |
|  |  |   | CSI reporting (Conducted requirements/FR1) | Huawei |
|  |  |   |  | General, CQI, PMI, RI |
|  |  |   | Demod for interworking (verification in FR1) |
|  |  |   | CSI reporting for interworking (verification in FR1) |
|  | Appendix |  |
|  |  | FRCs/RMCs & PRACH Test preambles | Intel |
|  |  | Rest (incl. test setup/TT/etc.) | Ericsson |

|  |  |
| --- | --- |
| **IAB demodulation draftCR, bigCR, and bigTP work-splits - TS 38.???-2** | **Company** |
| TS 38.???-2 bigTR Demod | Nokia |
| TS 38.???-2 Radiated conformance testing (draftCRs) |  |
|  | Manufacturer declarations | Intel |
|  | 8 Radiated performance requirements |  |
|  |  | IAB-DU performance requirements | Nokia |
|  |  |   | General (incl. applicability rule), PUSCH FR1&FR2, PUCCH FR1&FR2, PRACH FR1&FR2 |
|  |  | IAB-MT performance requirements | Huawei |
|  |  |   | General (all excluding conducted) |
|  |  |   | Demodulation (Radiated requirements/FR2) |
|  |  |   |  | General (incl. applicability, etc), PDSCH, PDCCH, PBCH, SDR, SDR CA |
|  |  |   | CSI reporting (Radiated requirements/FR2) | Ericsson |
|  |  |   |  | General, CQI, PMI, RI |
|  |  |   | Demod for interworking (verification in FR2) |
|  |  |   | CSI reporting for interworking (verification in FR2) |
|  | Appendix |  |
|  |  | FRCs/RMCs & PRACH Test preambles | Huawei |
|  |  | Rest (incl. test setup/TT/etc.) | Nokia |

Contributor Comments:
(Dialog; please do not modify earlier comments; add follow-up always at the bottom of the discussion.)

[XXX]:

[YYY]:

### (2nd) Sub-topic 1-2: Other

No further topics or issues were alerted in 1st round.

Contributor Comments:
(Dialog; please do not modify earlier comments; add follow-up always at the bottom of the discussion.)

[XXX]:

[YYY]:

## Summary on 2nd round (if applicable)

*Moderator tries to summarize discussion status for 2nd round and provided recommendation on CRs/TPs/WFs/LSs Status update suggestion*

|  |  |
| --- | --- |
| **CR/TP/LS/WF number** | **T-doc Status update recommendation**  |
| XXX | *Based on 2nd round of comments collection, moderator can recommend the next steps such as “agreeable”, “to be revised”* |

# Topic #2: IAB-DU performance requirements

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

## Companies’ contributions summary

|  |  |  |
| --- | --- | --- |
| **T-doc number** | **Company** | **Proposals / Observations** |
| R4-2101262 | Intel Corporation | Tdoc Title: Views on NR IAB-DU demodulation performance requirementsPUSCH**Proposal #1: For IAB-DU 16QAM 2T2R radiated test cases reuse Rel-16 gNB performance requirements.**PUSCH - Channel model**Proposal #2: All existing channel models used in Rel-15 BS testing should be re-used for IAB-DU.**PUSCH - Inclusion of CA notes**Proposal #3: Follow Rel-15 approach and clarify that CA can be operated but is tested per carrier.**PUSCH - MCS**Proposal #4: Keep all MCS from BS demodulation requirements for IAB-DU demodulation requirements.**PUSCH - Test requirements for PUSCH with 30% of maximum throughput**Proposal #5: All existing requirements for PUSCH with 30% of maximum throughput should be re-used for IAB-DU.**PUSCH - Transform precoding**Proposal #6: Include requirements for PUSCH with transform precoding enabled for IAB-DU testing.**PUSCH - Test requirements for UCI multiplexed on PUSCH**Proposal #7: All existing requirements for UCI multiplexed on PUSCH should be re-used for IAB-DU.**PUSCH - Applicability rule**Proposal #8: For IAB-DU performance requirements use existing applicability rule for CBW, SCS and mapping type. Besides that, define applicability rule to test only maximum number of antennas declared to be supported by the manufacturer for the respective BS type, i.e., up to 8Rx in conducted/hybrid testing and up to 2Rx in OTA testing.**PUCCH - Multi-slot**Proposal #9: All existing requirements for multi-slot PUSCH should be re-used for IAB-DU and corresponding declaration on supporting of this feature should be defined.**PUCCH - Number of test cases and applicability rule**Proposal #10:** **Keep all the PUCCH requirements and define the following applicability rule: • If IAB-DU declares to support more than two PUCCH formats and format 0 is supported, then limit the number of tests to format 0 and any other case chosen by the manufacturer.  • If IAB-DU declares to support more than two PUCCH formats and format 0 is not supported, then limit the number of tests to any two cases chosen by the manufacturer. • In any other cases apply requirements for declared PUCCH formats.**PRACH - Formats and applicability rule**Proposal #11: All existing requirements and applicability rules for PRACH should be re-used for IAB-DU and corresponding declaration on supporting of this feature should be defined. The following new one applicability rule should be added: “For IAB-DU declares to support more than one PRACH formats, limit the number of tests to any two cases chosen by the manufacturer. If IAB-DU declares to support more than one PRACH formats where formats for both long and short PRACH sequences are presented, require to choose formats with different sequences.”** |
| R4-2101293 | Huawei, HiSilicon | Tdoc Title: Discussion on NR IAB DU demodulation performance requirementsGeneral - Applicability rules (antennas)**Proposal 1: Define IAB-DU requirements with the general applicability rule that test only the highest number of supported antennas for conducted test.**General - Channel model (PUSCH, PUCCH, PRACH)**Proposal 2:** **Introduce all channel models used in Rel-15 except TDLB100-400 for FR1.**General - Inclusion of CA notes**Proposal 3: Follow Rel-15 approach and clarify that CA can be operated but is tested per carrier.**General - CBW/SCS**Proposal 4: For IAB-DU, specify requirements for 40MHz for 30 kHz, 50 MHz for 60 kHz, and 100 MHz for 120 kHz.**PUSCH MCS**Proposal 5: Keep all MCS for BS demodulation requirements.**PUSCH transform precoding**Proposal 6: Re-use only requirements for PUSCH with transform precoding disabled.**PUCCH multi-slot**Proposal 7: Skip cases for multi-slot PUCCH.**PUCCH number of test cases**Proposal 8: Keep all the PUCCH requirements and related test applicability rule, if BS declares to support more than one PUCCH formats, limit any one case to be tested chosen by the manufacturer using applicability rule.**PRACH - Formats**Proposal 9: Keep only typical preamble formats selected by companies and only fading cases with the applicability rule that for BS declares to support more than one PRACH formats, limit the number of tests to any one case chosen by the manufacturer using applicability rule.** |
| R4-2102092 | Nokia, Nokia Shanghai Bell | Tdoc Title: On NR IAB-DU demodulation requirementsGeneralObservation 1: IAB-MTs and access UEs will be served by the IAB-DU. Both use cases need to be covered by the IAB-DU specification.General - Propagation conditions (PUSCH, PUCCH)Observation 2: 300 and 400 maximum Doppler frequencies correspond to the typical urban speed of maximum 62 kmph. Coming back to Observation 1, we don’t see it possible to further down select the channel models without overly compromising performance for access UEs.**Proposal 1: RAN4 to re-use all existing channel models used in Rel-15 BS demodulation testing for IAB-DU PUSCH and PUCCH testing.**PUSCH - Carrier Aggregation**Proposal 2: Do not include performance requirements for CA.****Proposal 3: In case performance requirements for CA are decided to be included, follow the Re-15 approach and specification text.**PUSCH - MCS and dft-s-OFDM**Proposal 4: Concerning PUSCH MCS, keep all MCS for BS demodulation requirements, but with applicability rule that IAB-DU only needs to pass the test with the supported highest modulation order based on BS declaration.****Proposal 5: In general, copy all Rel-15 PUSCH BS demod requirements by default and discuss applicability rule inclusion or adaptation to reduce the number of tests.** [Moderator]: Too general to be included in a single place. Please propose this point during the discussions, where appropriate.**Proposal 6: Concerning PUSCH transform precoding, include requirement for PUSCH with transform precoding enabled, create a manufacture declaration to allow dft-s-OFDM support, and add applicability rule to only test, if dft-s-OFDM is supported.**PUCCH - Multi-slotNo proposals or observations.PUCCH - Number of test cases/PUCCH formats**Proposal 7: Only keep requirements for PUCCH formats that infrastructure manufacturers plan to implement/configure in IAB-nodes, but at least format 0 and format 2.**PRACH formats**Proposal 8: Only keep requirements for PRACH formats that infrastructure manufacturers plan to implement/configure in IAB-nodes, but at least formats 0, A2, and C0.****Proposal 9: Re-use the BS demodulation applicability rules for IAB-DU PRACH.**PRACH - Propagation condition**Proposal 10: For PRACH, copy-paste and test requirements for all propagation conditions, except for AWGN.** |
| R4-2102106 | Ericsson | Tdoc Title: IAB demodulation DU considerationsPUSCH channel models**Proposal 1: Adopt all release 15 propagation channels into the IAB requirements.**General - Carrier aggregation**Proposal 2: Include notes on carrier aggregation.**PUSCH configurations**Proposal 3: Include requirements for QPSK, 16QAM and DFT-s-OFDM (and declaration of support).**PUCCH configurations**Proposal 4: Include multi-slot PUCCH requirements (and declaration of support)**PRACH configurations**Proposal 5: Copy all PRACH requirements (and declaration of support)**Test applicability for IAB-DU (PUSCH and PUCCH)**Proposal 6: If 2 SCS are supported, test QPSK with highest SCS and other modulation orders with the lowest SCS. (If one SCS supported, test all modulation orders with the same SCS).****Proposal 7: If more than one PUCCH format and more than one SCS are supported, test each PUCCH format with one SCS only and ensure that all SCS are tested with at least one PUCCH format. If one PUCCH format and more than one SCS are supported, test the PUCCH format with both SCS.** [Moderator]: The Tdoc text states that all other rules should be kept. |

## Open issues summary and views’ collection for 1st round

*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: General

*Sub-topic description:*

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

**Issue 2-1-1: Applicability rule for number of antennas**

* Prior agreements (R4-2017673)
	+ General RX demodulation branches
		- All existing antenna configurations shall be kept, when re-using BS demod requirements. An applicability rule shall be defined to test only maximum number of antennas declared to be supported by the manufacturer for the respective BS type, i.e., up to 8Rx in conducted/hybrid testing and up to 2Rx in OTA testing.
* Proposals
	+ Option 1 (Huawei): Define applicability rule that test only the highest number of supported antennas for conducted test.
	+ Option 2 (Intel): Define applicability rule to test only maximum number of antennas declared to be supported by the manufacturer for the respective BS type, i.e., up to 8Rx in conducted/hybrid testing and up to 2Rx in OTA testing
* Recommended WF
	+ In the moderator’s opinion, option 1 is included in the prior agreements.
	Hence, recommended to not further discuss this topic and leave prior agreements in force.

|  |  |
| --- | --- |
| **Company** | **Comments** |
| Ericsson | Our understanding is that this is already agreed; if not we support option 2. |
| Nokia, Nokia Shanghai Bell | From our point of view, prior agreement already covers the new received proposals. We do not see a need to update the exiting agreement. |
| Huawei | Ok to keep the previous agreement. We were just confused with the agreements captured in slide#8 in R4-2017673. |
| Intel | Same comment as mentioned by Huawei.  |

**Issue 2-1-2: CBW/SCS**

* Prior agreements (R4-2017673)
	+ General SCS/CBW combinations
		- Keep existing full set of requirements, w.r.t. SCS/CBW combination.
		Test applicability rules can be updated, to reduce to number of tests required.
* Proposals
	+ Option 1 (Huawei): Specify requirements for 40MHz for 30 kHz, 50 MHz for 60 kHz, and 100 MHz for 120 kHz.
* Recommended WF
	+ Option 1 seems to overturn the prior agreement.
	It is recommended to keep prior agreements.

|  |  |
| --- | --- |
| **Company** | **Comments** |
| Ericsson | The requirements for the BS are already available and can be re-used. Only the highest bandwidth should be tested. |
| Nokia, Nokia Shanghai Bell | In our CR [R4-2100551] submitted to this meeting we are proposing to improve the formulation of applicability rule for different channel bandwidth in 38.141-1, section 8.1.2.1.2. Nevertheless, our preference is still to follow the existing BS applicability rules, i.e., the tests shall be done for the widest supported channel bandwidth of each supported subcarrier spacing. |
| Huawei | We are also OK to keep prior agreements. |
| Intel | It is more straightforward to reuse existing BS approach. We do not see any big efforts to reuse the whole set. Prefer to keep the prior agreement. |

**Issue 2-1-3: Carrier aggregation**

* Proposals
	+ Option 1 (Ericsson, Huawei, Intel): Follow Rel-15 approach and include notes that CA can be operated and is tested per carrier.
	+ Option 2 (Nokia): Do not include performance requirements for CA.
	In case performance requirements for CA are decided to be included, follow the Re-15 approach and specification text.
* Recommended WF
	+ Discuss in first round. Option 1 seems like a possible compromise.

|  |  |
| --- | --- |
| **Company** | **Comments** |
| Nokia, Nokia Shanghai Bell | We prefer Option 2 but can compromise to Option 1. |

### Sub-topic 2-2: PUSCH

*Sub-topic description*

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

**Issue 2-2-1: Rel-16 fixes to Rel-15 BS demodulation requirements**

* Prior agreements (R4-2017673)
	+ Inclusion of Rel-16 HST requirements
		- Do not include existing Rel-16 HST requirements (including UL TA).
	+ Other Rel-16 BS demod requirements
		- Do not include Rel-16 BS demod requirements, i.e., the following (HST discussed separately)
			* 30% TPUT requirements for PUSCH with transform precoding disabled.
			* 2-step RACH
			* NR-U
			* URLLC 0.001% BLER
			* URLLC high reliability
			* URLLC low latency
* Further Background:
	+ Addressing of testability issue for some radiated tests in NR\_newRAT: In Rel-16 it was identified that MCS configuration for 16QAM 2T2R radiated test cases was chosen too high that corresponding SNR cannot be reached during the OTA test (SNR<20dB). To address this issue, corresponding performance requirements were changed in Rel-16 and defined with lower MCS.
* Proposals
	+ Option 1 (Intel): For IAB-DU 16QAM 2T2R radiated test cases reuse BS performance requirements with Rel-16 fixes.
* Recommended WF
	+ Agree to option 1.

|  |  |
| --- | --- |
| **Company** | **Comments** |
| Ericsson | The Intel proposal makes sense; these requirements were a correction of rel-15 and not a new feature. They are mature and agreed. So we support option 1. |
| Nokia, Nokia Shanghai Bell | We agree to apply proposed Rel-16 fix for Rel-15 requirements, i.e., Option 1 is fine. |
| Huawei | OK with option 1.  |

**Issue 2-2-2: Channel model**

* Proposals
	+ Option 1 (Intel, Nokia, Ericsson): All existing channel models used in Rel-15 BS testing should be re-used.
	+ Option 2 (Huawei): Introduce all channel models used in Rel-15 except TDLB100-400 for FR1.
* Recommended WF
	+ Further discuss during first round.

|  |  |
| --- | --- |
| **Company** | **Comments** |
| Ericsson | One question is whether a deployment of an IAB next to a highway is ruled out, or why to rule it out ?  |
| Nokia, Nokia Shanghai Bell | Based on a simple calculation presented in our contribution, we show that 400 Hz maxim Doppler frequency in UL corresponds to the maximum speed of 62 kmph (3.5 GHz carrier frequency). In our opinion, it is still a typical city vehicle speed. Taking into account the DU serves both access UEs and MTs, the TDLB100-400 channel model can be kept in the requirements (Option 1). |
| Huawei | Considering both access and backhaul link, We can compromise to introduce TDLB100-400 channel. |
| Intel | We agree with Nokia’s calculations on UE speed if we assume LoS propagation with 400Hz Doppler frequency. For NLoS there is no double Doppler frequency in UL and UE speed will correspond to ~114 km/h. Nevertheless, we can assume that access link might be LoS with vehicle UE in urban scenario or with NLoS in highway. Nothing rules these scenarios out. Prefer Option 1. |

**Issue 2-2-3: MCS**

* Proposals
	+ Option 1 (Intel): Keep all MCS from BS demodulation requirements for IAB-DU demodulation requirements.
	+ Option 2 (Nokia, Huawei): Keep all MCS for BS demodulation requirements, but with applicability rule that IAB-DU only needs to pass the test with the supported highest modulation order based on BS declaration.
	+ Option 3 (Ericsson, Huawei, Nokia, Intel): Include requirements for QPSK, 16QAM (and declaration of support).
	Add applicability rule that highest modulation order is tested only with lowest supported SCS and other modulation orders only with highest supported SCS.
* Recommended WF
	+ Further discuss during first round.

|  |  |
| --- | --- |
| **Company** | **Comments** |
| Nokia, Nokia Shanghai Bell | In all Options, it is proposed to keep all MCSs from BS Demod in IAB requirements.We still prefer to reduce the testing effort, either with Option 2 or with Option 3. |
| Huawei | We are OK with Option 2 or Option 3 to reduce the number of test cases. |
| Intel | We believe that if we agree on option 2, QPSK and 16QAM will not be tested at all. We can compromise to option 3. |

**Issue 2-2-4: Requirements with 30% max TPUT**

* Prior agreements (R4-2017673)
	+ Inclusion of Rel-16 HST requirements
		- Do not include existing Rel-16 HST requirements (including UL TA).
	+ Other Rel-16 BS demod requirements
		- Do not include Rel-16 BS demod requirements, i.e., the following (HST discussed separately)
			* 30% TPUT requirements for PUSCH with transform precoding disabled.
			* 2-step RACH
			* NR-U
			* URLLC 0.001% BLER
			* URLLC high reliability
			* URLLC low latency
* Proposals
	+ Option 1 (Intel, Ericsson): All existing requirements for PUSCH with 30% of maximum throughput should be re-used for IAB-DU.
	+ Option 2 (Nokia, Huawei, Intel): Keep prior agreement. Do not include 30% TPUT requirements for IAB-DU.
* Recommended WF
	+ Option 1 seems to overturn the prior agreement.
	Note: No demod requirements for transform precoding enabled are current in BS demod specification.
	It is recommended to keep prior agreements.

|  |  |
| --- | --- |
| **Company** | **Comments** |
| Ericsson | The intel proposal makes sense; these requirements were not really a new feature but rather adding a loose end from rel-15. The requirements are available in the spec and mature. |
| Nokia, Nokia Shanghai Bell | We prefer not to step back and not to re-discuss previously achieved agreements. |
| Huawei | We prefer to keep prior agreements. |
| Intel | We do not see big efforts to reuse such requirements. Considering access link, it will be good to test IAB-DU on full HARQ buffer utilization. However, if companies have strong objections, we are fine to keep the prior agreement.  |

**Issue 2-2-5: Transform precoding**

* Proposals
	+ Option 1 (Intel): Include requirements for PUSCH with transform precoding enabled
	+ Option 2 (Huawei): Re-use only requirements for PUSCH with transform precoding disabled.
	+ Option 3 (Nokia, Ericsson, Intel): Include requirements, create a manufacture declaration to allow dft-s-OFDM support, and add applicability rule to only test, if dft-s-OFDM is supported.
* Recommended WF
	+ Further discuss during first round.

|  |  |
| --- | --- |
| **Company** | **Comments** |
| Nokia, Nokia Shanghai Bell | In our opinion, a viable IAB-node does not necessarily need to support dft-s-OFDM. Hence, transform precoding requirements should only be tested, if support of it is declared. |
| Huawei | In our view, IAB deployment has good coverage comparing to the normal base station. Also, typically scenario is to extend/fill coverage at areas where the coverage is not good for existing deployment network. So we think it is not necessary to define requirements for PUSCH with transform precoding enabled. |
| Intel | We are fine with Option 3 to make corresponding declaration and applicability rule. DFT-s-OFDM can further improve coverage hence there can be such implementations. |

**Issue 2-2-6: UCI multiplexed on PUSCH**

* Proposals
	+ Option 1 (Intel, Ericsson, Nokia, Huawei): All existing requirements for UCI multiplexed on PUSCH should be re-used.
	+ Option 2: Other options not precluded.
* Recommended WF
	+ It was not proposed in the last meetings to exclude UCI multiplexed on PUSCH.
	As such it is recommended to agree to option 1.

|  |  |
| --- | --- |
| **Company** | **Comments** |
| Ericsson | Support option 1 |
| Nokia, Nokia Shanghai Bell | We do not find any reasons to exclude UCI multiplexed on PUSCH requirements, Option 1 is fine. |
| Huawei | OK with Option 1. |

**Issue 2-2-7: Applicability rule on SCS**

* Proposals
	+ Option 1 (Intel, Nokia): Use existing applicability rule for SCS.
	+ Option 2: Other options not precluded.
* Recommended WF
	+ Further discuss during first round.

|  |  |
| --- | --- |
| **Company** | **Comments** |
| ~~XXX~~Ericsson | As indicated for 2-2-3, we think test coverage could still be reasonable if we would apply the rule of lowest SCS for highest MCS and highest SCS for the other MCS. |
| Nokia, Nokia Shanghai Bell | Agree with Option 1. |
| Huawei | This issue depends on Issue 2-2-3 agreement. If other options than Option 1 are agreed, the existing test applicability rule for SCS cannot be reused. |
| Intel | We are fine to combine existing applicability rule for tested SCS with newly proposed by Ericsson regarding tested MCSs. |

**Issue 2-2-8: Applicability rule on CBW**

* Proposals
	+ Option 1 (Intel, Ericsson): Use existing applicability rule for CBW.
	+ Option 2: Other options not precluded.
* Recommended WF
	+ Further discuss during first round.

|  |  |
| --- | --- |
| **Company** | **Comments** |
| Nokia, Nokia Shanghai Bell | Agree with Option 1. |
| Huawei | OK with Option 1. |

**Issue 2-2-9: Applicability rule on mapping type**

* Proposals
	+ Option 1 (Intel, Ericsson): Use existing applicability rule for mapping type.
	+ Option 2: Other options not precluded.
* Recommended WF
	+ Further discuss during first round.

|  |  |
| --- | --- |
| **Company** | **Comments** |
| Nokia, Nokia Shanghai Bell | Agree with Option 1. |
| Huawei | OK with Option 1. |

### Sub-topic 2-3: PUCCH

*Sub-topic description*

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

**Issue 2-3-1: Multi-slot**

* Proposals
	+ Option 1 (Intel, Ericsson, Nokia): Include multi-slot PUCCH cases and keep existing BS demodulation-based test applicability rule (“multi-slot PUCCH requirement tests shall apply only if the BS supports it”).
	+ Option 2 (Huawei): Skip cases for multi-slot PUCCH.
* Recommended WF
	+ Further discuss during first round.

|  |  |
| --- | --- |
| **Company** | **Comments** |
| Nokia, Nokia Shanghai Bell | We support Option 1. |
| Huawei | In our view, IAB deployment has good coverage comparing to the normal base station. Also, typically scenario is to extend/fill coverage at areas where the coverage is not good for existing deployment network. So we think it is not necessary to define requirements for multi-slot PUCCH. |
| Intel | Similar to DFT-s-OFDM we support to have multi-slot PUCCH requirements and apply test only if IAB node supports it. We should not preclude such implementation considering access link and different deployment scenarios.  |

**Issue 2-3-2: Channel model**

* Proposals
	+ Option 1 (Huawei, Nokia): All existing channel models used in Rel-15 BS testing should be re-used.
* Recommended WF
	+ Note: PUCCH channel models do not contain TDLB100-400.
	Agree on option 1.

|  |  |
| --- | --- |
| **Company** | **Comments** |
| Intel | Support Option 1. |

**Issue 2-3-3: Applicability rule on number of test cases and formats**

* Prior agreements (R4-2017673)
	+ Keep all the PUCCH requirements and related test applicability rule, if BS declares to support more than one PUCCH formats, limit the number of tests chosen by the manufacturer using applicability rule. FFS: Exact limiting of tests.
* Proposals
	+ Option 1 (Intel): Keep all the PUCCH requirements and define the following applicability rule:
		- If IAB-DU declares to support more than two PUCCH formats and format 0 is supported, then limit the number of tests to format 0 and any other case chosen by the manufacturer.
		- If IAB-DU declares to support more than two PUCCH formats and format 0 is not supported, then limit the number of tests to any two cases chosen by the manufacturer.
		- In any other cases apply requirements for declared PUCCH formats.
	+ Option 2 (Huawei): Keep all the PUCCH requirements and related test applicability rule, if BS declares to support more than one PUCCH formats, limit any one case to be tested chosen by the manufacturer using applicability rule.
	+ Option 3 (Nokia): Only keep requirements for PUCCH formats that infrastructure manufacturers plan to implement/configure in IAB-nodes, but at least format 0 and format 2.
	+ Option 4 (Ericsson): If more than one PUCCH format and more than one SCS are supported, test each PUCCH format with one SCS only and ensure that all SCS are tested with at least one PUCCH format. If one PUCCH format and more than one SCS are supported, test the PUCCH format with both SCS.
* Recommended WF
	+ Discuss during first round.
	+ For now, the proposals are quite diverse. Please indicate, if compromises are possible.

|  |  |
| --- | --- |
| **Company** | **Comments** |
| Ericsson | We do not see a justification to declare support for some formats, but then choose which ones to test. Our view is that if a format is supported it should be tested; but there is always the possibility not to declare support (which means no test).Our general view is that all formats could be included as requirements and support/testing declared. There is no cost to including formats, and it gives the advantage of providing a flexible toolbox for IAB solutions. |
| Nokia, Nokia Shanghai Bell | The idea of our proposal (Option 3) is to collect PUCCH formats possible for implementation in IAB and keep only those in the requirements. If other companies see a need for more flexibility, then we will also agree to keep all PUCCH formats in the requirements from BS, and formulate an applicability rule as a combination of Options 2 and 4:- If one PUCCH format and more than one SCS are supported, test the PUCCH format with both SCS.- If more than one PUCCH format and one SCS are supported, test any one format /two formats chosen by the manufacturer.- If more than one PUCCH format and more than one SCS are supported, ensure that all SCS are tested with at least one PUCCH format chosen by the manufacturer. |
| Huawei | OK with the new proposal by Nokia to ensure test coverage at the same time the number of test cases can be reduced, but with updated bullet 3:- If more than one PUCCH format and more than one SCS are supported, ensure that each declared SCS is tested with one different PUCCH format chosen by the manufacturer. |
| Intel | We can compromise to proposal from Nokia with rewording from Huawei but prefer to test at least two formats not one if IAB node supports more than 1. Suggest the following wording for consideration:- If one PUCCH format and more than one SCS are supported, test the PUCCH format with all SCS.- If more than one PUCCH format and one SCS are supported, test any two formats chosen by the manufacturer.- If more than one PUCCH format and more than one SCS are supported, ensure that each declared SCS is tested with one different PUCCH format chosen by the manufacturer. |

### Sub-topic 2-4: PRACH

*Sub-topic description*

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

**Issue 2-4-1: Channel model**

* Proposals
	+ Option 1 (Huawei, Nokia, Ericsson, Intel): All existing channel models used in Rel-15 BS testing should be re-used, except for AWGN (i.e., fading case only).
	+ Option 2 (Ericsson): Copy all PRACH requirements (and declaration of support).
* Recommended WF
	+ Note: PRACH channel models do not contain TDLB100-400.
	Discuss in first round.

|  |  |
| --- | --- |
| **Company** | **Comments** |
| Ericsson | Fading case only is Ok. |
| Nokia, Nokia Shanghai Bell | In our view, AWGN testing does not offer much additional insight into the receiver performance. Hence, we prefer Option 1. |
| Huawei | We prefer Option 1. |
| Intel | Since requirements on timing error tolerance for fading conditions include performance in AWGN, we are fine to reuse only requirements with fading channel model. Support Option 1. |

**Issue 2-4-2: Formats to include in specification**

* Proposals
	+ Option 1 (Huawei): Keep only typical preamble formats selected by companies.
	+ Option 2 (Nokia, Huawei): Only keep requirements for PRACH formats that infrastructure manufacturers plan to implement/configure in IAB-nodes, but at least formats 0, A2, and C0.
	+ Option 3 (Ericsson, Nokia, Intel): Copy all requirements for all PRACH formats. Vendor can declare which ones are supported/tested.
* Recommended WF
	+ Discuss in first round.

|  |  |
| --- | --- |
| **Company** | **Comments** |
| Ericsson | Including all of the formats and declaring which are supported/tested has no cost in terms of standardization effort and does not imply any greater testing effort than only supporting certain formats. Including all formats provides a toolbox for developing IAB that is flexible, which is important since the deployment plans for IAB have not yet matured so far that it is clear what will be the most effective scenarios for IAB. |
| Nokia, Nokia Shanghai Bell | We propose other companies to indicate typical preamble formats to be kept in the requirements. Our preference is Option 2. If other companies prefer more flexibility we can also consider Option 3.  |
| Huawei | We prefer Option 1 or Option 2. In Rel-15 we do not introduce all preamble formats and just keep several of them. For IAB-DU, further down selection is needed like we did in HST WI. So we prefer only keep typical preamble formats selected by companies, other preamble formats can be introduced in future release if they are specified to support effective scenarios for IAB. We think that formats 0 and C2 should be kept.  |
| Intel | We cannot guarantee that other vendors will also use typical formats as on which we can agree now. It is more reasonable to consider all from Rel-15. Support option 3. With this option we can limit further maintenance of IAB specification.  |

**Issue 2-4-3: Applicability rule for formats**

* Proposals
	+ Option 1 (Nokia): Re-use the BS demodulation applicability rules for IAB-DU PRACH.
	+ Option 2 (Huawei): Applicability rule that for BS declares to support more than one PRACH formats, limit the number of tests to any one case chosen by the manufacturer using applicability rule.
	+ Option 3 (Intel, Nokia, Huawei): All existing requirements and applicability rules for PRACH should be re-used for IAB-DU and corresponding declaration on supporting of this feature should be defined. The following new one applicability rule should be added:
	“For IAB-DU declares to support more than one PRACH formats, limit the number of tests to any two cases chosen by the manufacturer. If IAB-DU declares to support more than one PRACH formats where formats for both long and short PRACH sequences are presented, require to choose formats with different sequences.”
* Recommended WF
	+ Discuss in first round.

|  |  |
| --- | --- |
| **Company** | **Comments** |
| Ericsson | Our view is that if a format is declared to be supported then it should be tested. It should of course be possible to not declare support for (and hence not test) formats. |
| Nokia, Nokia Shanghai Bell | In addition to Option 1 we can also agree with Option 3. |
| Huawei | We prefer Option 2 or Option 3. |

### Sub-topic 2-5: Summary of requirement re-use (informative)

*Sub-topic description*

Using tables to track previously agreed and proposed main adaptations. Not all details are captured.
The agreements captured in the text of this summary document, as well as WFs, supersede the informative tables below.

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

Table: BS requirement re-use table - FR1 (Informative)
Previous state: End of RAN4#97-e

|  |  |  |
| --- | --- | --- |
| **Feature** | **Previous State** | **Adaptations** |
| Rel-15 |
| PUSCH with transform precoding disabled | MCS: 2, 16, 19Channel: TDLB100-400 Low, TDLC300-100 Low, TDLA30-10 Low |   |
| PUSCH with transform precoding enabled | MCS: 2Channel: TDLB100-400 Low |   |
| UCI multiplexed on PUSCH | MCS: 16Channel: TDLC300-100 Low |   |
| PUCCH | format 0-4Channel: TDLC300-100 Low |   |
| Multi-slot PUCCH | format 1 only |   |
| PRACH | format 0 (conducted only), A1, A2, A3, B4, C0, C2; unrestricted set onlyChannel: AWGN, TDLC300-100 Low FO=400Hz |   |
| Rel-16 |
| ~~PUSCH with transform precoding disabled (30% TPUT)~~ |   |   |
| ~~PUSCH for high speed train~~ |   |   |
| ~~UL timing adjustment~~ |   |   |
| ~~PRACH HST~~ |   |   |
| ~~2-step RACH~~ |   |   |
| ~~NR-U~~ |   |   |
| ~~URLLC 0.001% BLER~~ |   |   |
| ~~URLLC high reliability~~ |   |   |
| ~~URLLC low latency~~ |   |   |

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

Table: BS requirement re-use table - FR2 (Informative)
Previous state: End of RAN4#97-e

|  |  |  |
| --- | --- | --- |
| **Feature** | **Previous State** | **Adaptations** |
| Rel-15 |
| PUSCH with transform precoding disabled | MCS: 2, 16, 19Channel: TDLA30-300 Low, TDLA30-75 Low |   |
| PUSCH with transform precoding enabled | MCS: 2Channel: TDLA30-300 Low |   |
| UCI multiplexed on PUSCH | MCS: 16Channel: TDLA30-300 Low |   |
| PUCCH | format 0-4, no multi-slot for FR2Channel: TDLA30-300 Low |   |
|   |   |   |
| PRACH | A1, A2, A3, B4, C0, C2; unrestricted set onlyChannel: AWGN, TDLA30-300 Low FO=4000Hz |   |
| Rel-16 |
| ~~PUSCH with transform precoding disabled (30% TPUT)~~ |   |   |
| ~~2-step RACH~~ |   |   |
| ~~URLLC high reliability~~ |   |   |
| ~~URLLC low latency~~ |   |   |

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

### Sub-topic 2-6: 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 |
|  |
|  | Moderator: No CRs/TPs/etc. |
|  |
|  |
|  |

## 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#2** | *Tentative agreements:**Candidate options:**Recommendations for 2nd round:* |
| **Sub-topic 2-1** | **Sub-topic 2-1: General** Issue 2-1-1: Applicability rule for number of antennas *Tentative agreements:*Keep previous agreement [R4-2017673]* + General RX demodulation branches
		- All existing antenna configurations shall be kept, when re-using BS demod requirements. An applicability rule shall be defined to test only maximum number of antennas declared to be supported by the manufacturer for the respective BS type, i.e., up to 8Rx in conducted/hybrid testing and up to 2Rx in OTA testing.

*Candidate options:*None*Recommendations for 2nd round:*Tentative agreement is agreeable. Does not need to be captured in WF.Issue 2-1-2: CBW/SCS: *Tentative agreements:*Keep previous agreement [R4-2017673]* + General SCS/CBW combinations
		- Keep existing full set of requirements, w.r.t. SCS/CBW combination. Test applicability rules can be updated, to reduce to number of tests required.

*Candidate options:*None*Recommendations for 2nd round:*Tentative agreement is agreeable. Does not need to be captured in WF.Issue 2-1-3: Carrier aggregation: *Tentative agreements:*Follow Rel-15 approach and include notes that CA can be operated and is tested per carrier.*Candidate options:*None*Recommendations for 2nd round:*Tentative agreement is agreeable. |
| **Sub-topic 2-2** | **Sub-topic 2-2: PUSCH** Issue 2-2-1: Rel-16 fixes to Rel-15 BS demodulation requirements: *Tentative agreements:*For IAB-DU 16QAM 2T2R radiated test cases reuse BS performance requirements with Rel-16 fixes.*Candidate options:*None*Recommendations for 2nd round:*Tentative agreement is agreeable.Issue 2-2-2: Channel model: *Tentative agreements:*All existing channel models used in Rel-15 BS testing should be re-used (including TDLB100-400 for FR1).*Candidate options:*None*Recommendations for 2nd round:*Tentative agreement is agreeable.Issue 2-2-3: MCS: *Tentative agreements:*Include requirements for QPSK, 16QAM (and declaration of support).Add applicability rule that highest modulation order is tested only with lowest supported SCS and other modulation orders only with highest supported SCS.*Candidate options:*None*Recommendations for 2nd round:*All commenting and contributing companies have signalled compromise to option 3 (captured as tentative agreement).Tentative agreement is agreeable.Issue 2-2-4: Requirements with 30% max TPUT: *Tentative agreements:*None*Candidate options:** + Option 1 (Intel, Ericsson): All existing requirements for PUSCH with 30% of maximum throughput should be re-used for IAB-DU.
	+ Option 2 (Nokia, Huawei, Intel): Keep prior agreement. Do not include 30% TPUT requirements for IAB-DU.

*Recommendations for 2nd round:*Continue discussion in 2nd round.Option 2 is in line with prior agreements.Issue 2-2-5: Transform precoding: *Tentative agreements:*None*Candidate options:** + Option 2 (Huawei): Re-use only requirements for PUSCH with transform precoding disabled.
	+ Option 3 (Nokia, Ericsson, Intel): Include requirements, create a manufacture declaration to allow dft-s-OFDM support, and add applicability rule to only test, if dft-s-OFDM is supported.

*Recommendations for 2nd round:*Continue discussion in 2nd round.Option 3 has been used as a compromise.Issue 2-2-6: UCI multiplexed on PUSCH: *Tentative agreements:*All existing requirements for UCI multiplexed on PUSCH should be re-used.*Candidate options:*None*Recommendations for 2nd round:*All commenting and contributing companies have signalled compromise to option 3 (captured as tentative agreement).Tentative agreement is agreeable.Issue 2-2-7: Applicability rule on SCS: *Tentative agreements:*Combine existing applicability rule for tested SCS with newly proposed in issue 2-2-3.*Candidate options:*None*Recommendations for 2nd round:*Issue 2-2-3 already agreed on a new applicability rule, but it is compatible with the current one (“tests shall apply only for each subcarrier spacing declared to be supported”).Tentative agreement is agreeable.Issue 2-2-8: Applicability rule on CBW: *Tentative agreements:*Use existing applicability rule for CBW.*Candidate options:*None*Recommendations for 2nd round:*Tentative agreement is agreeable.Issue 2-2-9: Applicability rule on mapping type: *Tentative agreements:*Use existing applicability rule for mapping type.*Candidate options:*None*Recommendations for 2nd round:*Tentative agreement is agreeable. |
| **Sub-topic 2-3** | **Sub-topic 2-3: PUCCH**Issue 2-3-1: Multi-slot: *Tentative agreements:*None*Candidate options:** + Option 1 (Intel, Ericsson, Nokia): Include multi-slot PUCCH cases and keep existing BS demodulation-based test applicability rule (“multi-slot PUCCH requirement tests shall apply only if the BS supports it”).
	+ Option 2 (Huawei): Skip cases for multi-slot PUCCH.

*Recommendations for 2nd round:*Continue discussion in 2nd round.Issue 2-3-2: Channel model: *Tentative agreements:*All existing channel models used in Rel-15 BS testing should be re-used.*Candidate options:*None*Recommendations for 2nd round:*Tentative agreement is agreeable.Issue 2-3-3: Applicability rule on number of test cases and formats: *Tentative agreements:*None*Candidate options:** + Option 5 (Ericsson): Keep all the PUCCH requirements and related test applicability rule. Possibilty to not declare support, which means no test.
	+ Option 6a (Nokia): Keep all PUCCH formats in the requirements from BS, and formulate an applicability rule as
		- If one PUCCH format and more than one SCS are supported, test the PUCCH format with both SCS.
		- If more than one PUCCH format and one SCS are supported, test any one format /two formats chosen by the manufacturer.
		- If more than one PUCCH format and more than one SCS are supported, ensure that all SCS are tested with at least one PUCCH format chosen by the manufacturer.
	+ Option 6b (Huawei): Keep all PUCCH formats in the requirements from BS, and formulate an applicability rule as
		- If one PUCCH format and more than one SCS are supported, test the PUCCH format with both SCS.
		- If more than one PUCCH format and one SCS are supported, test any one format /two formats chosen by the manufacturer.
		- If more than one PUCCH format and more than one SCS are supported, ensure that each declared SCS is tested with one PUCCH format chosen by the manufacturer.
	+ Option 6b (Intel): Keep all PUCCH formats in the requirements from BS, and formulate an applicability rule as
		- If one PUCCH format and more than one SCS are supported, test the PUCCH format with all SCS.
		- If more than one PUCCH format and one SCS are supported, test any two formats chosen by the manufacturer.
		- If more than one PUCCH format and more than one SCS are supported, ensure that all SCS are tested with at least one PUCCH format chosen by the manufacturer.

*Recommendations for 2nd round:*Continue discussion in 2nd round. |
| **Sub-topic 2-4** | **Sub-topic 2-4: PRACH** Issue 2-4-1: Channel model: *Tentative agreements:*All existing channel models used in Rel-15 BS testing should be re-used, except for AWGN (i.e., fading case only).*Candidate options:*None*Recommendations for 2nd round:*All commenting and contributing companies have signalled compromise to option 1 (captured as tentative agreement).Tentative agreement is agreeable.Issue 2-4-2: Formats to include in specification: *Tentative agreements:*None*Candidate options:** + Option 1 (Huawei): Keep only typical preamble formats selected by companies.
	+ Option 2 (Nokia, Huawei): Only keep requirements for PRACH formats that infrastructure manufacturers plan to implement/configure in IAB-nodes, but at least formats 0, A2, C0 and C2.
	+ Option 3 (Ericsson, Nokia, Intel): Copy all requirements for all PRACH formats. Vendor can declare which ones are supported/tested.

*Recommendations for 2nd round:*Continue discussion in 2nd round.Issue 2-4-3: Applicability rule for formats: *Tentative agreements:*None*Candidate options:** + Option 3 (Intel, Nokia, Huawei): All existing requirements and applicability rules for PRACH should be re-used for IAB-DU and corresponding declaration on supporting of this feature should be defined. The following new one applicability rule should be added: “For IAB-DU declares to support more than one PRACH formats, limit the number of tests to any two cases chosen by the manufacturer. If IAB-DU declares to support more than one PRACH formats where formats for both long and short PRACH sequences are presented, require to choose formats with different sequences.”
	+ Option 4 (Ericsson): If a format is declared to be supported then it should be tested. It should of course be possible to not declare support for (and hence not test) formats.

*Recommendations for 2nd round:*Continue discussion in 2nd round. |
| **Sub-topic 2-5** | **Sub-topic 2-5: Summary of requirement re-use (informative)** Informative table will be updated in time for second round. |
| **Sub-topic 2-6** | **Sub-topic 2-6: Other** No issues raised. |

*Recommendations on WF/LS assignment*

|  |  |  |
| --- | --- | --- |
|  | **WF/LS t-doc Title**  | **Assigned Company, WF or LS lead** |
| #1 | None |  |

### CRs/TPs

*Moderator tries to summarize discussion status for 1st round and provides recommendation on CRs/TPs Status update*

|  |  |
| --- | --- |
| **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”* |
|  | *None* |

## Discussion on 2nd round (if applicable)

Concerning open issues in this section, please capture your company views directly under the respective issues and treat the summary as a dialogue just as the chairperson would during a f2f, i.e., do not edit earlier responses but continue the discussion.
Please furthermore declare your company’s support for certain options, by capturing the company abbreviation directly after the option number.

### (2nd) Sub-topic 2-1: General

No open topics or issues after 1st round.

Contributor Comments:
(Dialog; please do not modify earlier comments; add follow-up always at the bottom of the discussion.)

[XXX]:

[YYY]:

### (2nd) Sub-topic 2-2: PUSCH

Issue 2-2-4: Requirements with 30% max TPUT:

*Candidate options:*

* + Option 1: All existing requirements for PUSCH with 30% of maximum throughput should be re-used for IAB-DU.
	+ Option 2: Keep prior agreement. Do not include 30% TPUT requirements for IAB-DU.

*Recommendations for 2nd round:*

Continue discussion in 2nd round.
Option 2 is in line with prior agreements.

Contributor Comments:
(Dialog; please do not modify earlier comments; add follow-up always at the bottom of the discussion.)

[Huawei]: We prefer to keep prior agreements.

[YYY]:

Issue 2-2-5: Transform precoding:

*Candidate options:*

* + Option 2: Re-use only requirements for PUSCH with transform precoding disabled.
	+ Option 3: Include requirements, create a manufacture declaration to allow dft-s-OFDM support, and add applicability rule to only test, if dft-s-OFDM is supported.

*Recommendations for 2nd round:*

Continue discussion in 2nd round.
Option 3 has been compromised to by one company.

Contributor Comments:
(Dialog; please do not modify earlier comments; add follow-up always at the bottom of the discussion.)

[Intel]: Support option 3 which seems as a compromise. If IAB-DU node supports dft-s-OFDM we can ensure corresponding performance verification and same time do not mandate implementation of this feature for IAB.

[Huawei]: As comment in 1st round, we prefer Option 3. In our view, IAB deployment has good coverage comparing to the normal base station. Also, typically scenario is to extend/fill coverage at areas where the coverage is not good for existing deployment network. So we think it is not necessary to define requirements for PUSCH with transform precoding enabled.

### (2nd) Sub-topic 2-3: PUCCH

Issue 2-3-1: Multi-slot:

*Candidate options:*

* + Option 1: Include multi-slot PUCCH cases and keep existing BS demodulation-based test applicability rule (“multi-slot PUCCH requirement tests shall apply only if the BS supports it”).
	+ Option 2: Skip cases for multi-slot PUCCH.

*Recommendations for 2nd round:*

Continue discussion in 2nd round.

Contributor Comments:
(Dialog; please do not modify earlier comments; add follow-up always at the bottom of the discussion.)

[Intel]: Support option 1 which seems as a compromise. It is a similar story as requirements with enabled transform precoding. If IAB-DU node supports multi-slot PUCCH we can ensure corresponding performance verification and same time do not mandate implementation of this feature for IAB.

[Huawei]: As comment in 1st round, we prefer Option 3. In our view, IAB deployment has good coverage comparing to the normal base station. Also, typically scenario is to extend/fill coverage at areas where the coverage is not good for existing deployment network. So we think it is not necessary to define requirements for PUSCH with transform precoding enabled.

Issue 2-3-3: Applicability rule on number of test cases and formats:

*Candidate options:*

* + Option 5: Keep all the PUCCH requirements and related test applicability rule. Possibility to not declare support, which means no test.
	+ Option 6a: Keep all PUCCH formats in the requirements from BS, and formulate an applicability rule as
		- If one PUCCH format and more than one SCS are supported, test the PUCCH format with both SCS.
		- If more than one PUCCH format and one SCS are supported, test any one format/two formats chosen by the manufacturer.
		- If more than one PUCCH format and more than one SCS are supported, ensure that all SCS are tested with at least one PUCCH format chosen by the manufacturer.
	+ Option 6b: Keep all PUCCH formats in the requirements from BS, and formulate an applicability rule as
		- If one PUCCH format and more than one SCS are supported, test the PUCCH format with both SCS.
		- If more than one PUCCH format and one SCS are supported, test any one format/two formats chosen by the manufacturer.
		- If more than one PUCCH format and more than one SCS are supported, ensure that each declared SCS is tested with one PUCCH format chosen by the manufacturer.
	+ Option 6c: Keep all PUCCH formats in the requirements from BS, and formulate an applicability rule as
		- If one PUCCH format and more than one SCS are supported, test the PUCCH format with all SCS.
		- If more than one PUCCH format and one SCS are supported, test any two formats chosen by the manufacturer.
		- If more than one PUCCH format and more than one SCS are supported, ensure that all SCS are tested with at least one PUCCH format chosen by the manufacturer.
	+ Option 6d: Keep all PUCCH formats in the requirements from BS, and formulate an applicability rule as
		- If one PUCCH format and more than one SCS are supported, test the PUCCH format with all SCS.
		- If more than one PUCCH format and one SCS are supported, test any two formats chosen by the manufacturer.
		- If more than one PUCCH format and more than one SCS are supported, ~~ensure that~~ each declared SCS is tested with one different PUCCH format chosen by the manufacturer.

*Recommendations for 2nd round:*

Continue discussion in 2nd round.

Contributor Comments:
(Dialog; please do not modify earlier comments; add follow-up always at the bottom of the discussion.)

[Intel]: We are fine with option 5 and also can accept some possible test reduction as a target of options 6a-c. The main difference between options 6a-c is a max number of required to test PUCCH formats: one or two. To have better test coverage we prefer to consider two.

[Huawei]: We are OK with Option 6d with updated wording above based on our comment in 1st round and other options.

### (2nd) Sub-topic 2-4: PRACH

Issue 2-4-2: Formats to include in specification:

*Candidate options:*

* + Option 1: Keep only typical preamble formats selected by companies.
	+ Option 2: Only keep requirements for PRACH formats that infrastructure manufacturers plan to implement/configure in IAB-nodes, but at least formats 0, A2, C0 and C2.
	+ Option 3: Copy all requirements for all PRACH formats. Vendor can declare which ones are supported/tested.

*Recommendations for 2nd round:*

Continue discussion in 2nd round.

Contributor Comments:
(Dialog; please do not modify earlier comments; add follow-up always at the bottom of the discussion.)

[Intel]: Format A1 which is captured in BS PRACH requirements was defined for operation in small cells. Using of other formats like mentioned in Option 2 might result of wasting time resources. Are proponents of Option 2 going to use these formats even for local areas?

[Huawei]: Proponent of different PRACH formats can raise the interested formats as did in NR Rel-15 and other WI, if some company is interested in other PRACH formats, RAN4 can discuss to add them.

Issue 2-4-3: Applicability rule for formats:

*Candidate options:*

* + Option 3: All existing requirements and applicability rules for PRACH should be re-used for IAB-DU and corresponding declaration on supporting of this feature should be defined. The following new one applicability rule should be added:
	“For IAB-DU declares to support more than one PRACH formats, limit the number of tests to any two cases chosen by the manufacturer. If IAB-DU declares to support more than one PRACH formats where formats for both long and short PRACH sequences are presented, require to choose formats with different sequences.”
	+ Option 4: If a format is declared to be supported then it should be tested. It should of course be possible to not declare support for (and hence not test) formats.

*Recommendations for 2nd round:*

Continue discussion in 2nd round.

Contributor Comments:
(Dialog; please do not modify earlier comments; add follow-up always at the bottom of the discussion.)

[Huawei]: Option3 is agreeable.

[YYY]:

### (2nd) Sub-topic 2-5: Summary of requirement re-use (informative)

*Sub-topic description*

Using tables to track previously agreed and proposed main adaptations. Not all details are captured.
The agreements captured in the text of this summary document, as well as WFs, supersede the informative tables below.

*Open issues and candidate options before 2nd round::*

Table: BS requirement re-use table - FR1 (Informative)
Previous state: End of 1st round

|  |  |  |
| --- | --- | --- |
| **Feature** | **Previous State** | **Adaptations** |
| Rel-15 |
| PUSCH with transform precoding disabled | MCS: 2, 16, 19Channel: TDLB100-400 Low, TDLC300-100 Low, TDLA30-10 Low16QAM 2T2R radiated test cases reuse BS performance requirements with Rel-16 fixes | 30%TPUT still under discussion. |
| PUSCH with transform precoding enabled | MCS: 2Channel: TDLB100-400 Low | Inclusion still under discussion. |
| UCI multiplexed on PUSCH | MCS: 16Channel: TDLC300-100 Low |   |
| PUCCH | format 0-4Channel: TDLC300-100 Low |   |
| Multi-slot PUCCH | format 1 only | Inclusion still under discussion. |
| PRACH | format 0 (conducted only), A1, A2, A3, B4, C0, C2; unrestricted set onlyChannel: AWGN, TDLC300-100 Low FO=400Hz |  |
| Carrier aggregation | Follow Rel-15 approach and include notes that CA can be operated and is tested per carrier. |   |
| Rel-16 |
| ~~PUSCH with transform precoding disabled (30% TPUT)~~ |   |   |
| ~~PUSCH for high speed train~~ |   |   |
| ~~UL timing adjustment~~ |   |   |
| ~~PRACH HST~~ |   |   |
| ~~2-step RACH~~ |   |   |
| ~~NR-U~~ |   |   |
| ~~URLLC 0.001% BLER~~ |   |   |
| ~~URLLC high reliability~~ |   |   |
| ~~URLLC low latency~~ |   |   |

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

Table: BS requirement re-use table - FR2 (Informative)
Previous state: End of 1st round

|  |  |  |
| --- | --- | --- |
| **Feature** | **Previous State** | **Adaptations** |
| Rel-15 |
| PUSCH with transform precoding disabled | MCS: 2, 16, 19Channel: TDLA30-300 Low, TDLA30-75 Low | 30%TPUT still under discussion. |
| PUSCH with transform precoding enabled | MCS: 2Channel: TDLA30-300 Low | Inclusion still under discussion. |
| UCI multiplexed on PUSCH | MCS: 16Channel: TDLA30-300 Low |   |
| PUCCH | format 0-4, no multi-slot for FR2Channel: TDLA30-300 Low |   |
|   |   | [No FR2 multi-slot PUCCH in Rel-15.] |
| PRACH | A1, A2, A3, B4, C0, C2; unrestricted set onlyChannel: AWGN, TDLA30-300 Low FO=4000Hz |   |
| Rel-16 |
| ~~PUSCH with transform precoding disabled (30% TPUT)~~ |   |   |
| ~~2-step RACH~~ |   |   |
| ~~URLLC high reliability~~ |   |   |
| ~~URLLC low latency~~ |   |   |

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

### (2nd) Sub-topic 2-6: Other

No further topics or issues were alerted in 1st round.

Contributor Comments:
(Dialog; please do not modify earlier comments; add follow-up always at the bottom of the discussion.)

[XXX]:

[YYY]:

## Summary on 2nd round (if applicable)

*Moderator tries to summarize discussion status for 2nd round and provided recommendation on CRs/TPs/WFs/LSs Status update suggestion*

|  |  |
| --- | --- |
| **CR/TP/LS/WF number** | **T-doc Status update recommendation**  |
| XXX | *Based on 2nd round of comments collection, moderator can recommend the next steps such as “agreeable”, “to be revised”* |

# Topic #3: IAB-MT performance requirements

*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 | Tdoc Title: Proposal 1:Observation 1: |
| R4-2102105 | Ericsson | Tdoc Title: IAB demodulation general considerations**Proposal 1: Do not specify how HARQ feedback is sent to the TE. (It could be via Uu or via proprietary means).****Proposal 2: Write the test procedure such that coarse synchronization is not specified. (It can be achieved by transmitting and detecting SSB or via proprietary means).****Proposal 3: Provide DM-RS for fine synchronization. Optionally, TRS can also be transmitted during the test for fine synchronization.**Moderator note: Tdoc submitted to AI 7.4.8.1 (General). |
| R4-2101263 | Intel Corporation | Tdoc Title: Views on NR IAB-MT demodulation performance requirementsPDSCH - MCS**Proposal #1: 16QAM shall be tested for IAB-MT.****Proposal #2: Reuse UE FR1 256QAM performance requirements for IAB-MT. Further discuss 256QAM requirements for FR2 after completion of Rel-16 UE FR2 256QAM requirements definition.**PDSCH - Mapping type**Proposal #3 Include requirements for mapping type A and B without applicability rules.**PDSCH - PRB bundling size**Proposal #4: Only keep requirements with wideband PRB bundling size and PRB bundling size 2.**PDSCH - Enhanced receiver**Proposal #5: Include requirements for enhanced receiver Type 1 but allow to declare support of it.**PDSCH - Overlapped CSI-RS**Proposal #6: Skip PDSCH cases for CSI-RS overlapped with PDSCH.**PDSCH - Co-existence with LTE CRS**Proposal #7: Skip PDSCH cases for co-existence with LTE CRS.**PDCCH - Aggregation level**Proposal #8: Include all PDCCH requirements and require IAB-MT to pass all of them.**PDCCH - Test parameters simplification**Proposal #9: Keep the CSI-RS for tracking parameters for IAB-MT node PDCCH test cases from the UE PDCCH performance requirements.**PBCH**Proposal #10: Reuse UE PBCH requirements for IAB-MT node.**CSI - Requirements down-scoping**Proposal #11: Reuse all CQI reporting test cases which were defined for TDD duplex mode for 4 Rx conducted and 2 Rx radiated requirements except conducted test case with sub-band CQI reporting granularity.**[Moderator]: Tdoc makes observation of “conducted test case with sub-band CQI reporting granularity” being 2 tap channel model.**Proposal #12: Reuse all PMI reporting test cases which were defined for TDD duplex mode for 4 Rx conducted and 2 Rx radiated requirements but change report configuration and CSI-RS resource type from aperiodic to periodic.****Proposal #13: Reuse all RI reporting test cases which were defined for TDD duplex mode for 4 Rx conducted and 2 Rx radiated requirements but change report configuration and CSI-RS resource type from aperiodic to periodic.**CSI - Test parameter simplification**Proposal #14: Do not remove the following parameters from CSI reporting requirements and leave them up to implementation: PDCCH configuration, CSI-RS for tracking, ZP CSI-RS.** |
| R4-2101294 | Huawei, HiSilicon | Tdoc Title: Discussion on NR IAB MT demodulation performance requirementsGeneral - General approach**Proposal 1: Consider IAB-MT as a part of a network node with test setup and performance requirements based on the BS approach.**General - Detailed test setup**Proposal 2: For IAB-MT, use the testing method same as normal BS and synchronization provided via the digital feedback link from the tester or by a common (e.g., GNSS) source.**General - Basis for requirement re-use**Proposal 3: Define IAB MT performance requirements solely based on Rel-15 UE performance requirements. Test cases can be further down selection, configurations which has no influence on performance can be further discussed to kept or removed; configurations which has influence on performance can be further discussed to changed, kept or removed.****Proposal 4: For IAB-MT, only define cases with propagation condition of TDLA30-10 for FR1 and TDLA30-75 for FR2.****Proposal 5: For IAB-MT, only define cases with low antenna correlation.**Observation 1: Only 10 cases to be re-simulated for IAB-MT.**Proposal 6: Re-simulate cases that propagation condition and/or antenna correlation is changed.****Proposal 7: Do not introduce PBCH requirements for IAB-MT.** [Moderator]: Captured in “PBCH” section.General - Requirements for MT types and classes**Proposal 8: For most of cases, the same requirements apply for all classes. For other cases, if companies think applicability rule can be defined for different classes, discuss them case by case.**General - TDD patternObservation 2: With other configurations same, there is negligible performance difference between different TDD UL-DL patterns.**Proposal 9: Reuse default TDD UL-DL pattern from BS requirements for IAB MT requirements definition (15, 60, 120 kHz SCS: 3D1S1U, S=10D:2G:2U; 30 kHz SCS: 7D1S2U, S=6D:4G:4U) and the same requirements are applicable to FDD and TDD with different UL-DL patterns.****Proposal 10: PDSCH is scheduled only on ‘D’ slots without CSI-RS resource (include TRS) allocated.**General - Testing in both conducted and radiated testing**Proposal 11: Define applicability rule same as UE, i.e. the conducted minimum requirements specified in this specification shall be met in all applicable scenarios for FR1. The radiated minimum requirements specified in this specification shall be met in all applicable scenarios for FR2.**PDSCH - MCS**Proposal 12: For IAB-MT, define PDSCH requirement without considering 16QAM.****Proposal 13: Do not define 256QAM requirements for IAB-MT.**PDSCH - Mapping Type**Proposal 14: Only keep PDSCH performance requirements for mapping Type-A.**PDSCH - Enhanced receiver**Proposal 15: Skip PDSCH cases for enhanced receiver Type 1.**PDSCH - CSI-RS overlapped with PDSCH**Proposal 16: Skip PDSCH cases for CSI-RS overlapped with PDSCH.**PDSCH - Relative TPUT and slot configuration**Proposal 17: The SNR of achieving relative throughput (e.g. 70%) can be independent on the slot configuration.** [Moderator]: Merged in “General” section.PDSCH - Test parameters specification simplification**Proposal 18: Remove the following parameters from the UE demod PDSCH requirements and leave them up to implementation: − PDCCH configuration,  − CSI-RS for tracking,  − ZP CSI-RS.**PDSCH - PDSCH co-existence with LTE CRS**Proposal 19: Skip PDSCH cases for co-existence with LTE CRS.**PDCCH - Aggregation level**Proposal 20: Keep one PDCCH performance requirements selected by companies (such as 8), or include all PDCCH requirements with applicability rule with different aggregation level that any one PDCCH case has passed can be considered that all PDCCH cases are passed.**PDCCH - Test parameters specification simplification**Proposal 21: Remove the CSI-RS for tracking parameters from the UE demod PDCCH requirements and leave them up to implementation.**SDR - Inclusion of SDR requirements**Proposal 22: Do not include SDR requirements in IAB-MT demodulation.**CSI - Inclusion of CSI requirements**Proposal 23: Only keep CQI AWGN requirements for IAB MT.**CSI - CSI-RS resource type**Proposal 24: Only keep periodic NZP CSI-RS resource type for CQI/PMI/RI reporting cases.**CSI - CQI reporting granularity**Proposal 25: Only keep wideband CQI reporting granularity for CQI/PMI/RI reporting cases.**CSI - CQI/PMI/RI reporting type**Proposal 26: Only keep periodic CSI reporting type for CQI/PMI/RI reporting cases.**CSI - Test parameters specification simplification**Proposal 27: Remove the following parameters from CSI reporting requirements and leave them up to implementation: PDCCH configuration, CSI-RS for tracking, ZP CSI-RS.**CSI - CQI two tap channel model**Proposal 28: Skip two tap channel model for CQI test cases.**Interworking - Inclusion**Proposal 29: Skip LTE-NR coexistence/DC/etc. requirements.** |
| R4-2102097 | Nokia, Nokia Shanghai Bell | Tdoc Title: On NR IAB-MT testing setup and demodulation requirementsIAB-MT conformance testing setupObservation 1: An RMC can be represented as a succession of various FRCs. Leaving non-FRC slots, slots with T-RS, and special slots unallocated does not impact the measure performance in a meaningful way.Observation 2: It is agreed that the IAB node can also treat RAT-independent sources as a separate synchronization source. Fine time synchronization can be provided to the IAB-MT from the GNSS based PRTC with a necessary level of accuracy. Reasonably small time offsets (less than a CP) can be tolerated using only DMRS without meaningful impact on the demodulation performance.**Proposal 1: Consider IAB-MT as a part of a network node with test setup and performance requirements based on the BS approach. Apply the following principles for IAB-MT BS-style testing: a. TE definition is based on the assumption of using a signal generator b. IAB-MT shall be in a L1/L2 testing mode with an established RRC configuration c. Uni-directional Uu interface shall be used d. Testing is based on FRC definitions.** Moderator: Captured in “General” **e. HARQ feedback shall be provided from IAB-MT to the TE via an error-free link f. An external synchronization source for the TE and DUT is assumed**Observation 3: All of the proposed BS-style testing setup principles can also be implemented using the UE-style test setup. Observation 4: Optional provisions for sending reference signals can be made as a note in the FRC description. Observation 5: It is advantageous to standardize on a single realization of the test setup, and functionally equivalent implementations of the setup are not precluded.PDSCH - Propagation conditionsObservation 6: Down-scoping of TDLC300-100 propagation conditions in FR1 and TDLA30-300 in FR2 will result in insufficient test coverage.**Proposal 2: Keep propagation conditions TDLC300-100 in FR1 and TDLA30-300 in FR2.**PDSCH - MCS and Mapping typeObservation 7: FR1 PDSCH requirements for rank 3 and rank 4 transmission are only available for 16QAM.**Proposal 3: Include 16QAM in PDSCH requirements.**Observation 8: Mapping type B testing is already excluded by the previous decision to not test QPSK.PDSCH - Advanced test cases**Proposal 4: Do not include PDSCH cases for enhanced receiver Type 1, as this feature is of little interest to IAB-MTs.****Proposal 5: Do not include PDSCH cases for CSI-RS overlapped with PDSCH, as this is not a commonly required configuration in Rel-16 IAB.**PDSCH co-existence with LTE CRSNo opinionPDSCH - Impact of various configurations on testingObservation 9: If optimal synchronization is assumed, there is not meaningful difference between running the test configured in UE demod with or without T-RS/SSB.**Proposal 6: Do not specify the following parameters in IAB-MT PDSCH test configurations and leave them up to implementation: a. SSB, b. PDCCH configuration,  c. CSI-RS for tracking, d. ZP CSI-RS.**Observation 10: There is no meaningful difference between running the test configured in UE demod with or without data present in special slots.**Proposal 7: Give the TDD pattern assumed by the RMC/FRC for simulation in the PDSCH configuration table. Add a note that makes the requirements applicable to all TDD patterns chosen for testing (similar to BS demodulation specification).** [Moderator]: Merged into “General” section.PDCCH - Aggregation level**Proposal 8: Include all TDD PDCCH requirements except for AL 16.**PDCCH - Propagation conditions**Proposal 9: RAN4 to not down-select requirements for PDCCH from UE demod due to propagation conditions.**PDCCH - Test coverage of SCSObservation 11: Following the agreement of not specifying FDD requirements, it is unclear if 15kHz SCS PDCCH FDD requirements can be re-used in IAB-MT, or if it is required to have 15kHz SCS PDCCH requirement at all.PDCCH - Impact of various configurations on testing**Proposal 10: Add the T-RS configuration assumed by the RMC/FRC for simulation in the PDCCH configuration table. Add a note to the RMC/FRC that it is up to test setup and test implementation if the T-RS is transmitted and/or demodulated.**PBCH **Proposal 11: Re-use and test the TDD UE demodulation minimum performance requirements for the case of “SS/PBCH block index is known”. Skip the cases of unknown index.**SDR Observation 12: SDR testing required L3/PDCP data loopback functionality in the TE.**Proposal 12: Do not use the data loopback test function and consequently do not specify SDR tests for IAB-MT.**CSI - Resource and report type**Proposal 13: Limit requirements to only include periodic NZP CSI-RS and reporting.****Proposal 14: Limit CSI reporting requirements to reporting of CQI only.**CSI - CQI reporting**Proposal 15: It is sufficient to limit requirements for CQI reporting to the wideband case.****Proposal 16: Limit the propagation conditions in CQI reporting to re-use AWGN.****Proposal 17: Limit the propagation conditions in CQI reporting to re-use AWGN and TDLA.**CSI - Impact of various configurations on testing**Proposal 18: Do not specify a PDCCH configuration for CSI reporting testing.****Proposal 19: Do not specify ZP CSI-RS configuration for CSI reporting testing.****Proposal 20: Give the TDD pattern assumed by the RMC/FRC for simulation in the CSI reporting configuration table. Add a note that makes the requirements applicable to all TDD patterns chosen for testing (similar to BS demodulation specification).****Proposal 21: Give the T-RS configuration assumed by the RMC/FRC for simulation in the CSI reporting configuration table. Add a note to the RMC/FRC that it is up to test setup and test implementation if the T-RS is transmitted and/or demodulated.**Interworking requirements**Proposal 22: If interworking requirements are agreed to be included, all agreements taken on channels and features outside the interworking context, also apply to the interworking requirements.****Proposal 23: Do not re-use the interworking requirements for the IAB-MT requirement specification.** |
| R4-2102107 | Ericsson | Tdoc Title: IAB demodulation MT considerationsGeneral - FRC and reference signals**Proposal 1: IAB-MT demodulation requirements are defined based on single-slot FRCs****Proposal 2: No need to specify SSB, TRS, CSI-RS in the test parameters and FRCs, but configurations can be defined, and they can be transmitted if deemed needed during the test by the IAB manufacturer.**PDSCH - MCS**Proposal 3: Include requirements for PDSCH with 16QAM, at least for the local area IAB-MT.**PDSCH - Mapping**Proposal 4: Define requirements for PDSCH mapping type A only.**PDSCH - Remaining requirements**Proposal 5: Support for Enhanced Type 1 receiver, CSI-RS overlapping PDSCH and CRS rate matching should be declared.**PDCCH - Aggregation level**Proposal 6: For PDCCH, either (i) include only AL4 and AL8 with 1Tx/2Tx or (ii) include all UE tests.**PDCCH - CSI-RS**Proposal 7: No need to transmit CSI-RS, but configurations can be defined, and they can be transmitted if deemed needed during the test by the IAB manufacturer.**SDR**Proposal 8: Do not include SDR requirements for the IAB-MT**CSI - CQI**Proposal 9: For FR1 CQI, use periodic reporting for both the AWGN and the wideband fading CQI requirements.****Proposal 10: For FR2 CQI, use periodic AWGN and wideband aperiodic CQI requirements.**CSI - PMI**Proposal 11: For PMI, re-use UE requirements.**CSI - RI**Proposal 12: For RI, re-use UE requirements** |

## Open issues summary and views’ collection for 1st round

*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 3-1: Conformance testing setup

*Sub-topic description:*

Prior agreements (R4-2017673)

* Conformance testing setup
	+ Left up to implementation on how L1/L2 is configured for testing
	+ Detailed test setup:
		- Use a test setup that offers the alternative options for testing with a unidirectional (BS like approach) or bidirectional (UE like approach) Uu interface between TE and IAB-MT. The DUT being allowed to knowingly be in a L1/L2 test mode configured using RRC or alternative propriety means and using TDD pattern independent FRC-like requirements to describe the KPI relevant channel structure. **FFS** whether coarse or fine time synchronization can be provided via the digital feedback link from the tester or by a common (e.g., GNSS) source, or by Uu interface
		- unidirectional (BS like approach) means
			* TE to IAB-MT linkage： DL by Uu interface
			* IAB-MT to TE linkage： Not through Uu interface
		- bidirectional (UE like approach) means
			* TE to IAB-MT linkage： DL by Uu interface
			* IAB-MT to TE linkage： UL by Uu interface
		- Note: Companies can **further clarify** BS approach
	+ Questions on performance aspects
		- Q1: Which configurations of the Uu interface (i.e., channels and signals) are required for performance testing, that are not the channel/signal under test?
			* E.g., in PDSCH demodulation testing with TPUT KPI, is there a meaningful difference between running the test with T-RS/SSB as configured in UE demod, and using optimal synchronization without transmitting T-RS/SSB?
			* This question also partially encompasses enquiries and responses regarding the rationale behind the manifold proposals to remove test parameters from UE demod derived requirements.
	+ DUT placement reference point and orientation
		- Coordinate reference point and orientation of the IAB-MT under test is for manufacture declaration.
	+ DUT feedback
		- HARQ/RV feedback done via an error-free digital feedback, the feedback linkage to TE still **FFS**.
	+ KPI deriving entity
		- No need to be specified in the specification for KPI deriving entity.

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

**Issue 3-1-1: Basis for test setup**

* For information: Prior agreement from the IAB **RF** conformance session (R4-2017671)
	+ Using BS test structure to generate the test set-up including test configurations, test models, RF channels
* For information: GTW agreement on Jan 26th in thread [306] (Rel-16 NR IAB \***RF**\* conformance general and common issues)
	+ Issue 1-1-2: Two-way communication in IAB-MT tests
		- Agreement:
		- 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.
	+ Issue 1-1-3: Description of connection/measurement setup in specification annex
		- Agreements: Option 1: Flexibility in connection / measurement setup is allowed by keeping the specified setup informative
* Proposals
	+ Option 1 (Huawei, Nokia): Consider IAB-MT as a part of a network node with test setup and performance requirements based on the BS approach.
	+ Option 2 (Nokia): TE definition is based on the assumption of using a signal generator.
	+ Option 3: 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, e.g., to use bi-directional Uu links and system simulators, like in the UE approach.
* Recommended WF
	+ Collect further views in first round.
	+ [Updated moderator recommendation following **RF** conformance testing GtW and comments by Ericsson, Qualcomm and Nokia]
		- The agreements concerning the test setup taken in RF seem applicable as a compromise in demod as well.
		Please check, if option 3 is acceptable to all.

|  |  |
| --- | --- |
| **Company** | **Comments** |
| Ericsson | We support option 1; the IAB is a network node. |
| Qualcomm | We would want the test approach to permit the option of bi-directional link like in a UE test setup and a test equipment that emulates the parent node. |
| Nokia, Nokia Shanghai Bell | In the spirit of standardization, we should have one exact test setup in mind when taking decisions and writing the specification. Given that IAB-MTs are a part of the network and will re-use the BS testing facilities, the baseline of BS testing should be applied to IAB-MT. I.e. testing using a signal generator.Alternatively, functionally equivalent test setups/implementations should not be excluded, however the default standard to match is the lowest common denominator of testing using a signal generator.Hence, we propose to agree on Option 2, which encompasses Option 1. |
| Ericsson | OK with option 3 |
| Huawei | We prefer Option 1. Considering IAB is a network node, it is not necessary to perform the test like a UE. Also from the perspective of standardization, it is beneficial to specify one test setup to unify the test among all IAB vendors and TE vendors to facilitate the whole ecosystem development.We have different understanding about the agreements made during RG GTW meeting “Flexibility in connection / measurement setup is allowed by keeping the specified setup informative”. It means to keep the current measurement system sett-up in current TS 38.141-1/2 Annex D in IAB specification.[Moderator]: This is also the moderators understanding.We cannot understand the example given in Option 3 “e.g., to use bi-directional Uu links and system simulators, like in the UE approach.” Based on the agreement on BS approach assumptions for test setup and performance requirements. |

**Issue 3-1-2: Synchronization in test procedure**

* For information: GTW agreement on Jan 26th in thread [306] (Rel-16 NR IAB \***RF**\* conformance general and common issues)
	+ Issue 1-1-1: Synchronization
		- Agreement:
		- Using same BS approach (no detailed synchronization configuration in conformance specifications; meanwhile add a note in conformance specs to clarify (IAB-MT sync with IAB-DU with DL signal configuration not precluded).
* Proposals
	+ Option 1 (Ericsson, QC): Write the test procedure such that coarse synchronization is not specified. (It can be achieved by transmitting and detecting SSB or via proprietary means).
	+ Option 2 (Huawei, Nokia, Ericsson): Synchronization provided via the digital feedback link from the tester or by a common (e.g., GNSS) source.
	+ Option 2b (Ericsson): Synchronization provided via the digital feedback link to or from the tester or by a common (e.g., GNSS) source.
	+ Option 3 (Moderator, Ericsson): Write the test procedure using the BS approach, i.e., no detailed synchronization configuration for coarse 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.
	+ Option 3b (Huawei): 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.
* Recommended WF
	+ It is the moderator’s understanding that option 1 and 2 differ in the way that the synchronization procedure is captured in the specification.
	Please discuss in first round and see, if alignment is possible.
	+ [Updated moderator recommendation following **RF** conformance testing GtW and comments by Ericsson, Qualcomm and Nokia]
		- The agreements concerning the test setup taken in RF seem applicable as a compromise in demod as well.
		Please check, if option 3 is acceptable to all.

|  |  |
| --- | --- |
| **Company** | **Comments** |
| Ericsson | We should take care that the specification is not restrictive. Option 2 is generally OK; it would be more general if it would state “**to or** from the tester”. |
| Qualcomm | Option 1 (Ericsson) is agreeable. More specifically, the test setup should permit both proprietary means, such as digital feedback or common source, and also Uu based methods, such as SSB transmission. To this end, the test procedure can either not specify the method of coarse synchronization, or it can specify that coarse synchronization can be achieved by proprietary means or via SSB, etc. |
| Nokia, Nokia Shanghai Bell | In our opinion, it is important to capture in the specification that TE and DUT are in synch. In our understanding, a common synchronization source shall be present in the system in any case. Hence, we agree with a comment from Ericsson. |
| Ericsson | OK with option 3 |
| Huawei | To avoid misunderstanding based on RF conclusion, we would like to update Option 3 as following:* Option 3: Write the test procedure using the BS approach, i.e., no detailed synchronization configuration (e.g. SSB and TRS) for ~~coarse~~ 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.
 |

**Issue 3-1-3: Synchronization configuration**

* Proposals
	+ Option 1 (Ericsson, QC): Proposal 3: Provide DM-RS for fine synchronization. Optionally, TRS can also be transmitted during the test for fine synchronization.
	+ Option 2: Other options not precluded.
* Recommended WF
	+ Collect further views in first round.

|  |  |
| --- | --- |
| **Company** | **Comments** |
| Qualcomm | Option 1 (Ericsson) is agreeable. |
| Nokia, Nokia Shanghai Bell | In our opinion, there is no need to specify specifically that fine synchronization is achieved based on reference signals. DM-RS signals are always present in FRCs, and in our contribution we demonstrate that the time offsets on the level of CP do not have any significant impact on demodulation performance. |
| Ericsson | We do not plan to specify how the DM-RS is used. DM-RS will be included in the configuration and TRS optionally transmitted and implicitly it/they is/are then available for fine synchronization. |
| Huawei | Synchronization configuration is covered in Issue 3-1-2. |

**Issue 3-1-4: HARQ Feedback**

* Proposals
	+ Option 1 (Ericsson, QC): Do not specify how HARQ feedback is sent to the TE. (It could be via Uu or via proprietary means).
	+ Option 2 (Nokia): HARQ feedback shall be provided from IAB-MT to the TE via an error-free link. Unidirectional Uu interface shall be used.
	+ Option 3 (Ericsson, Nokia): HARQ feedback shall be provided from IAB-MT to the TE via an error-free link; the means by which the link is achieved is not specified
	+ Option 4 (Huawei) Note in BS specification can be reused: The HARQ Feedback could be done as an RF feedback or as a digital feedback. The HARQ Feedback should be error free.
* Recommended WF
	+ Collect further views in first round.

|  |  |
| --- | --- |
| **Company** | **Comments** |
| Ericsson | Our understanding is that option 1 and the first sentence of option 2 are basically the same except that option 1 would include the possibility of a non-error free link (which would not make sense). Perhaps option 2 could be worded as “HARQ feedback shall be provided from IAB-MT to the TE via an error-free link; the means by which the link is achieved is not specified” |
| Qualcomm | Option 1 (Ericsson) is agreeable. The test procedure should permit any of (i) a clean Uu based feedback from IAB-MT to test equipment, and (ii) proprietary means of feedback. To this end, the test procedure can either not specify the method of feedback, or it can indicate that both propriatery means, and clean Uu-based feedback are permitted. |
| Nokia, Nokia Shanghai Bell | We still see it important to specify specifically that HARQ feedback is provided over error-free link. Moreover, as we follow the BS approach in IAB-MT testing as a baseline, unidirectional Uu interface shall be used. Our preference is still slightly more on Option 2. |
| Huawei | In our view, considering BS based approach, the existing Note in BS specification can be reused: The HARQ Feedback could be done as an RF feedback or as a digital feedback. The HARQ Feedback should be error free.  |

**Issue 3-1-5: L1/L2 testing mode**

* Prior agreements (R4-2017673)
	+ Conformance testing setup
		- Left up to implementation on how L1/L2 is configured for testing
* Proposals
	+ Option 1 (Nokia, QC): IAB-MT shall be in a L1/L2 testing mode with an established RRC configuration.
	+ Option 2 (Ericsson): Establishment of an RRC connection should be necessary; it is sufficient if the L1/L2 is active enough to do the PHY processing and do measurements.
	+ Option 3 (Huawei, Nokia): Up to implementation. Only keep prior agreements.
* Recommended WF
	+ It is the moderators understanding that the question of how a DUT receives L1/L2 configuration before testing was already agreed as “left up to implementation”.
	It is unclear if option 1 aims to change this agreement.

|  |  |
| --- | --- |
| **Company** | **Comments** |
| Ericsson | We do not think that establishment of an RRC connection should be necessary; it is sufficient if the L1/L2 is active enough to do the PHY processing and measure the BLER etc. |
| Qualcomm | Option 1 (Nokia) is agreeable. |
| Nokia, Nokia Shanghai Bell | We agree that the exact way how L1/L2 testing mode and RRC configuration (if found to by needed in a particular realization) are established is up to implementation. We just wanted to emphasize that this shall be done before the actual performance test is started.We can proceed with the prior agreement. |
| Huawei | In our view, RRC establishment should be up to implementation. We prefer to keep prior agreements. |

### Sub-topic 3-2: General

*Sub-topic description*

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

**Issue 3-2-1: Reference channels**

* Proposals
	+ Option 1 (Ericsson, Nokia): Demodulation requirements are defined based on single-slot FRCs.
	+ Option 2 (Huawei): PDSCH is scheduled only on ‘D’ slots without CSI-RS resource allocated.
* Recommended WF
	+ All received proposals request the use of BS-like FRCs instead of RMCs.
	Discuss in first round. It is recommended to try and align option 1 and 2.

|  |  |
| --- | --- |
| **Company** | **Comments** |
| Ericsson | As well as option 1, we also agree with option 2 in general. What does the (include TRS) in parentheses mean though ? That the PDSCH FRC includes TRS ? |
| Nokia, Nokia Shanghai Bell | In general, there is no contradiction between Options 1 and Options 2, if multiple FRC types per test are specified (see Figure 1 in our contribution R4-2102097 for details).However, the results of the simulations, also presented in the same contribution, demonstrate that in the tests typical for IAB-MT, TRS does not have meaningful impact on the PDSCH demodulation performance. Hence, it is sufficient to consider only full D slots (i.e. only one type of FRC). If in the future new scenarios are found, where TRS can have a significant impact, a new FRC type (e.g., D slot with TRS) can be added. |
| Huawei | Our proposal is that NZP CSI-RS, ZP CSI-RS and TRS is not included in FRC. For clarification, we updated Option 2. We also think that Option 1 and Option 2 have no confliction, and Option 2 is more specific. |
| Intel | We are fine to define requirements based on single-slot FRC. However, it is not clear how to reuse existing requirements if we agree to schedule PDSCH only on ‘D’ slots since for UE requirements PDSCHs with different effective code-rates were accumulated for total statistic. Further link-level confirmation is needed. As for results provided by Nokia the effective code-rate is same as in UE test setup since PDSCH is allocated in TRS resources. Same time it is not the same as proposed in option 2. |

**Issue 3-2-2: TDD pattern**

* Prior agreement (R4-2017673)
	+ FDD and TDD requirements
		- Do not specify FDD requirements.
* Proposals
	+ Option 1 (Huawei, Intel): Reuse default TDD UL-DL pattern from BS requirements for IAB MT requirements definition (60, 120 kHz SCS: 3D1S1U, S=10D:2G:2U; 30 kHz SCS: 7D1S2U, S=6D:4G:4U) and the same requirements are applicable to TDD with different UL-DL patterns.
	The SNR of achieving PDSCH relative throughput (e.g. 70%) can be independent on the slot configuration.
	+ Option 2 (Nokia, Intel, Ericsson?): For PDSCH and CSI reporting, give the TDD pattern assumed by the RMC/FRC for simulation in the PDSCH/CSI reporting configuration table. Add a note that makes the requirements applicable to all TDD patterns chosen for testing (similar to BS demodulation specification).
	+ Option 3 (QC): Keep all TDD patterns and requirements applicable to a normal UE.
	+ Option 4 (Ericsson): Requirements apply for all TDD configurations.
* Recommended WF
	+ Discuss in first round.
	Can the proponents of option 1 comment on the inclusion of FDD, with respect the prior agreement?
	Can the proponents of option 2 comment on the applicability of observations outside PDSCH?

|  |  |
| --- | --- |
| **Company** | **Comments** |
| Qualcomm | We prefer to keep all TDD patterns and requirements applicable to a normal UE. |
| Ericsson | An IAB-MT may have a different configuration to a UE. The important thing is that we specify that the requirements apply for all TDD configurations. |
| Huawei | There is a typo that FDD is included. We update Option 1 for clarification.Also, as per simulation results provided by companies, negligible performance can be observed between different TDD patterns. We don’t think it is necessary to keep all TDD patterns and requirements. |
| Intel | We are fine with both options (they are pretty similar and can be merged) considering negligible difference between different TDD patterns from demodulation performance perspective.  |

**Issue 3-2-3: Reference signals in test parameters and reference channels**

* Proposals
	+ Option 1 (Ericsson): No need to specify SSB, TRS, CSI-RS in the test parameters and FRCs, but configurations can be defined, and they can be transmitted if deemed needed during the test by the IAB manufacturer.
	+ Option 2: Other options not precluded.
* Recommended WF
	+ Discuss in first round.
	Similar proposals exist limited to certain channels/signals in the respective subsections.
	Discussions will be merged or separated based on first round progress.

|  |  |
| --- | --- |
| **Company** | **Comments** |
|  Nokia, Nokia Shanghai Bell | Based on our simulation results reported in [R4-2102097], we do not see a need to specify SSB, TRS, and CSI-RS. Moreover, FRC-based requirements do not generally prohibit sending additional non-FRC slots that can include, for example, SSB or CSI-RS. If found to be needed, configurations for SSB, TRS, CSI-RS can be defined, but we do not see a strong reasons for that. |
| Huawei | SSB, TRS, CSI-RS should not be specified and just leave them to implementation. |
| Intel | We are fine with option 1. |

**Issue 3-2-4: Down scoping and changing of propagation conditions**

* Prior agreements (R4-2017673)
	+ High speed scenarios
		- Skip test cases that are related to high speed scenario such as cases with TDLB100-400 Low, TDLC300-100 Low, HST for FR1 and TDLC60-300 Low, TDLA30-300 Low for FR2.
* Proposals
	+ Option 1 (Nokia, Ericson, Intel): Keep propagation conditions TDLC300-100 in FR1 and TDLA30-300 in FR2. Thus, changing the prior agreement as follows:
	Skip test cases that are related to high speed scenario such as cases with TDLB100-400 Low, ~~TDLC300-100 Low~~, HST for FR1 and TDLC60-300 Low, ~~TDLA30-300 Low~~ for FR2.
	+ Option 2 (Huawei, Intel): Only define cases with propagation condition of TDLA30-10 for FR1 and TDLA30-75 for FR2. Only define cases with low antenna correlation.
	Re-simulate cases that propagation condition and/or antenna correlation is changed
* Recommended WF
	+ Two companies have expressed concerns about the test coverage, given the prior agreements.
	Please discuss/comment in first round, if the prior agreement is to be kept or needs to be changed; and how to change.
	Note that the prior agreement specifically mentioned the “low” correlation variants of the propagation conditions. There are also “med” and “high variants that were not discussed or agreed (e.g., TDLA30-300 med in FR2 PDSCH rank 1). The prior agreement might need to be adjusted to capture independence of correlation.

|  |  |
| --- | --- |
| **Company** | **Comments** |
| Ericsson | We understand the desire to use the TDLA30-75 channel for all requirements. Being pragmatic though, including TDLC300-100 and TDLA30-300 would probably not cause an unnecessary change in implementations to meet, but would avoid the need for further simulations. So we have some preference to take the pragmatic approach of keeping TDLC300-100 and TDLA30-300 to avoid the need for new simulations. |
| Nokia, Nokia Shanghai Bell | Down-scoping of TDLC300-100 propagation conditions in FR1 and TDLA30-300 in FR2 will result in insufficient test coverage. Additionally, representative enough simulation campaign for new channels may not be possible with the current number of contributing companies.For these reasons, we proposed Option 1. |
| Huawei | We prefer Option 2. At last meeting, the agreement is achieved that “*Skip test cases that are related to high speed scenario such as cases with TDLB100-400 Low, TDLC300-100 Low, HST for FR1 and TDLC60-300 Low, TDLA30-300 Low for FR2*”. However, there may be no valid case for AL4 or AL8. We don’t think it is a good way to keep high speed cases for IAB-MT since it is not typical scenario, also as per TS38.874, fixed relay is assumed in Rel-15. Therefore, we prefer to change high speed propagation condition to TDLA30-10 for FR1 and TDLA30-75 for FR2. Necessary simulations cannot be precluded for any new WIs, also based on our analysis, we did not think that it is heavy burden to simulate very limited number of test cases. |
| Intel | We should keep TDL300-100 requirements since rank 1 test cases for modulation order higher than QPSK were defined only for this channel model. Same time we are fine to modify channel model to TDLA30-10 and re-simulate requirements.  |

**Issue 3-2-5: Basis for requirement re-use**

* Prior agreements (R4-2017673)
	+ Use Rel-15 UE demodulation requirements as a basis for requirement development.
	+ FFS:
		- Option 1: Define IAB MT performance requirements solely based on Rel-15 UE performance requirements. Configurations cannot be changed, only removed.
		- Option 2: Define IAB MT performance requirements based on Rel-15 UE performance requirements; Rel-16 requirements can be added according to operator request. Configurations cannot be changed, only removed.
		- Option 3: Define IAB MT performance requirements as a strict down selection from Rel-15 and 16 UE performance requirements. Only channel models can be changed.
		- Option 4: Define IAB MT performance requirements solely based on Rel-15 UE performance requirements. Test cases can be further down selection, the related test configurations (in test parameter table) can be further discussed to remove or update. Configurations (in minimum performance table) cannot be changed, only removed.
* Proposals
	+ Option 1 (Huawei): Define IAB MT performance requirements solely based on Rel-15 UE performance requirements. Test cases can be further down selection, configurations which has no influence on performance can be further discussed to kept or removed; configurations which has influence on performance can be further discussed to changed, kept or removed.
	+ Option 2: Other options not precluded.
* Recommended WF
	+ The first part of option 1 seems to be already covered by previous agreement.
	Discuss second part in first round.
	Please also comment, if it is necessary to make an agreement here to move forward.

|  |  |
| --- | --- |
| **Company** | **Comments** |
| Ericsson | For the second part, we can discuss which configurations to keep/remove on a case by case basis. |
| Nokia, Nokia Shanghai Bell | Regarding the configurations which have influence on the performance, we would prefer to leave them unchanged as much as possible. |
| Huawei | It can be discussed case by case, but we should not preclude the possibility to keep/remove/change some configurations to avoid the issues happened to PDCCH. |

**Issue 3-2-6: MT types and classes**

* Proposals
	+ Option 1 (Huawei): For most of cases, the same requirements apply for all classes. For other cases, if companies think applicability rule can be defined for different classes, discuss them case by case.
	+ Option 2: Other options not precluded.
* Recommended WF
	+ Discuss in first round.

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

**Issue 3-2-7: Conducted and radiated testing**

* Proposals
	+ Option 1 (Huawei): Define applicability rule same as UE, i.e. the conducted minimum requirements specified in this specification shall be met in all applicable scenarios for FR1. The radiated minimum requirements specified in this specification shall be met in all applicable scenarios for FR2.
	+ Option 2: Other options not precluded.
* Recommended WF
	+ Discuss in first round.

|  |  |
| --- | --- |
| **Company** | **Comments** |
| Ericsson | It is important to define 1-O radiated requirements; otherwise there is no point in having a 1-O IAB in the specification since connectors would need to be provided just to meet the demodulation requirement. It is trivial to define the OTA requirements; they are exactly the same as the conducted requirements.  |
| Nokia, Nokia Shanghai Bell | We agree with Ericsson that 1-O radiated requirements shall be defined. |
| Huawei | We are fine to define 1-O radiated requirements with 2Rx. |
| Intel | 1-O radiated requirements should be defined. |

**Issue 3-2-8: MT nomenclature**

* Question
	+ (Moderator): Do IAB-MTs adhere to a similar nomenclature as BSs/IAB-DUs? I.e., does the description “Type 1-O MT” make sense in the specifications?
	TS 38.174 section 4.4.2 points toward the case of IAB MTs and DUs needing to be of the same *type*, but can be of different *class*.
	Type 1-O represents a worst case, where no radiated testing requirements are available for FR1 MTs. However, a Type 1-O DU is probably combined together with a Type 1-O MT, which would make testing of the full system challenging.
* Recommended WF
	+ Please check the question and comment, if this requires action.

|  |  |
| --- | --- |
| **Company** | **Comments** |
| Ericsson | We do not see where is the challenge to test both DU and MT OTA. For demodulation performance, it should be the same test setup ? (Possibly the DUT may need rotating if there are different antennas; this is anyhow needed for other RF requirements that are based on multiple directions or TRP measurement) |
| Huawei | Based on our understanding in TS 38.174 about IAB type, it means the IAB-DU and IAB-MT should be the same type.Radiated requirements for FR1 MT can reuse the same performance requirements for conducted with 2Rx but just with different test setup, that should be same as BS.Different performance requirements defined for IAB-MT and IAB-DU, we do not know the motivation to do full system testing. |
| Intel | 1-O MT can reuse conducted 2Rx performance requirements. |

### Sub-topic 3-3: PDSCH

*Sub-topic description*

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

**Issue 3-3-1: MCS**

* Prior agreements (R4-2017673)
	+ MCS
		- QPSK shall not be tested.
		- 64QAM shall be tested
* Proposals
	+ Option 1 (Intel, Ericsson): 16QAM and 256QAM (FR1) shall be tested.
	+ Option 2 (Huawei): 16QAM and 256QAM (FR1) shall not be tested.
	+ Option 3 (Nokia, Ericsson): 16QAM shall be tested.
	+ Option 4 (Ericsson): 16QAM shall be tested, at least for local area IAB-MT.
* Recommended WF
	+ Discuss in first round.
	It is recommended that proponents of options 1, 2, and 4, check if a common option formulation is possible.

|  |  |
| --- | --- |
| **Company** | **Comments** |
| Ericsson | Actually, 256QAM could be an important use case for IAB, since the backhaul link needs to have high spectral efficiency for the IAB to be useful. |
| Huawei | Considering good coverage and even LOS propagation condition, higher MCS is expected and 64QAM is enough. Also as per TS 38.306, 64QAM is mandatory feature for both FR1 and FR2 for IAB-MT that means 64QAM can be ensured to be tested, so we prefer that 16QAM shall not be tested.As per TS38.101-4, FR1 2Rx cases are defined for conducted test. However, at last meeting we reached the agreement that “*2Rx for radiated test only for FR1*”. Considering required SNR is too high, testing requirements for 256QAM for IAB type 1-O is very challenge, so we don’t think it is necessary to define 256QAM requirements for IAB-MT. |
| Intel | Rank 1 requirements are not defined for 64QAM. Besides that, important for backhaul link Rank 3 and Rank 4 test cases were defined only with 16QAM. In this case we support Option 3. As for 256QAM we would like to keep it open and discuss for both FR1 and FR2 further.  |

**Issue 3-3-2: Rel-16 MCS**

* Prior agreements (R4-2017673)
	+ Do not include Rel-16 UE demod requirements, i.e., the following (HST is excluded)
		- FR2 256 QAM
		- […]
* Proposals
	+ Option 1 (Intel): Further discuss 256QAM requirements for FR2 after completion of Rel-16 UE FR2 256QAM requirements definition.
	+ Option 2: Other options not precluded.
* Recommended WF
	+ Option 1 seems to overturn the prior agreement.
	Please discuss in first round. It is recommended to keep prior agreements.

|  |  |
| --- | --- |
| **Company** | **Comments** |
| Huawei | We prefer to keep prior agreements that do not include any Rel-16 UE demod requirements. |
| Intel | If we agree to define 256QAM requirements for FR1 it will be better also do it for FR2 in same release if time allows. |

**Issue 3-3-3: Mapping type**

* Proposals
	+ Option 1 (Intel): Include requirements for mapping type A and B without applicability rules.
	+ Option 2 (Huawei, Ericsson, Intel, Nokia): Only keep PDSCH performance requirements for mapping Type-A.
	+ Option 3 (Moderator, Ericsson, Intel, Huawei): Only mapping type A has requirements based on prior agreement that QPSK is excluded from testing.
* Recommended WF
	+ Please verify, if option 3 is a correct observation, and comment in first round.

|  |  |
| --- | --- |
| **Company** | **Comments** |
| Ericsson | Our understanding is also that with no QPSK only type A is defined in the UE specification. |
| Nokia, Nokia Shanghai Bell | Following our previous agreements, type B should not be tested because QPSK is used in the only present UE test. |
| Huawei | We are OK with both Option 2 and Option 3. |
| Intel | We are fine with Options 2/3. |

**Issue 3-3-4: PRB bundling size**

* Prior agreements (R4-2017673)
	+ PRB bundling size
		- Only keep requirements with PRB bundling size 2.
* Proposals
	+ Option 1 (Intel): Change prior agreement: Only keep requirements with wideband PRB bundling size and PRB bundling size 2.
	+ Option 2 (Huawei): Keep prior agreements that only keep requirements with PRB bundling size 2.
* Recommended WF
	+ Option 1 seems to be changing the prior agreement from “only 2” to “only 2 and WB”.
	Please discuss in first round.
	Note: PRB wideband bundling seems to be configured for TDD in one instance of PDSCH 16QAM Rank 3 TDLA30-10 Test 3-1 (TS 38.101-4 Table 5.2.3.2.1-5: Minimum performance for Rank 3).

|  |  |
| --- | --- |
| **Company** | **Comments** |
| Huawei | We prefer to keep prior agreements that only keep requirements with PRB bundling size 2. |
| Intel | We think Rank3 test case is one of the important tests for backhaul link. We prefer to change previous agreement considering that we propose to revert only one test case. Same time we can comeback to this issue after agreement on 16QAM requirements reusing. |

**Issue 3-3-5: Enhanced Receiver**

* Proposals
	+ Option 1 (Huawei, Nokia, Ercicsson, Intel): Skip PDSCH cases for enhanced receiver Type 1.
	+ Option 2 (Intel, Ericsson): Include requirements for enhanced receiver Type 1 but allow to declare support of it.
* Recommended WF
	+ Please discuss in first round.

|  |  |
| --- | --- |
| **Company** | **Comments** |
| Nokia, Nokia Shanghai Bell | Enhanced receivers are optional UE features and outperform normal receiver in interference rich scenarios. Firstly, for IAB-MT nodes we don’t see it necessary to incorporate optional UE features. Secondly, the IAB network node placement is planned and will take interference management into account.Hance, we prefer not to have requirements that have little use in IAB deployments (Option 1). |
| Ericsson | We can compromise to option 1. |
| Huawei | We prefer Option 1. In the first release for IAB-MT performance requirements definition, we prefer not to consider optional feature, this should be the basis for the following discussion.  |
| Intel | We can compromise to Option 1, but we need to capture that we can define such requirements in future releases. |

**Issue 3-3-6: Overlapped CSI-RS**

* Proposals
	+ Option 1 (Intel, Huawei, Nokia, Ericsson): Skip PDSCH cases for CSI-RS overlapped with PDSCH.
	+ Option 2 (Ericsson): Include requirements but allow to declare support.
* Recommended WF
	+ Please discuss in first round.

|  |  |
| --- | --- |
| **Company** | **Comments** |
| Ericsson | We can compromise to option 1. |

**Issue 3-3-7: Co-existence with LTE CRS**

* Proposals
	+ Option 1 (Intel, Huawei): Skip PDSCH cases for co-existence with LTE CRS.
	+ Option 2 (Ericsson): Include requirements but allow to declare support.
* Recommended WF
	+ Please discuss in first round.

|  |  |
| --- | --- |
| **Company** | **Comments** |
| Huawei | We prefer Option 1. For our understanding, it is not typical in real deployment for such scenario. Now we only consider 30kHz SCS for IAB-MT, no corresponding co-existence with LTE CRS test case defined for UE performance requirements. |
| Intel | LTE-NR co-existence requirements are only defined for 15 kHz FDD. In this case we cannot reuse them since we are considering only TDD. |

**Issue 3-3-8: Test parameters specification simplification**

* Proposals
	+ Option 1 (Huawei, Intel): Remove the following parameters from the UE demod PDSCH requirements and leave them up to implementation:
		- PDCCH configuration,
		- CSI-RS for tracking,
		- ZP CSI-RS.
	+ Option 2 (Nokia, Ericsson, Huawei, Intel): Do not specify the following parameters in IAB-MT PDSCH test configurations and leave them up to implementation:
		- SSB,
		- PDCCH configuration,
		- CSI-RS for tracking,
		- ZP CSI-RS.
* Recommended WF
	+ Please discuss in first round.
	Please clarify what “remove/not specify and leave up to implementation” means in terms of capturing in the specification.

|  |  |
| --- | --- |
| **Company** | **Comments** |
| Ericsson | We think these can be transmitted if needed but do not have to be transmitted. We are OK not to specify them. |
| Huawei | In our view, “remove” is equivalent to “not specify and leave up to implementation”. Therefore, we are OK with both Option 1 and Option 2. i.e. “remove” the related test configurations from the specification. |
| Intel | We are fine with both options to add all captured configurations up to implementation. However, we are not clear why TRS might be not transmitted. In this case how IAB-MT can do fine time/frequency synchronization (e.g. on sample level)? |

### Sub-topic 3-4: PDCCH

*Sub-topic description*

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

**Issue 3-4-1: Aggregation Level**

* Proposals
	+ Option 1 (Intel, Ericsson): Include all PDCCH requirements and require IAB-MT to pass all of them.
	+ Option 2 (Huawei): Keep one PDCCH performance requirements selected by companies (such as 8), or include all PDCCH requirements with applicability rule with different aggregation level that any one PDCCH case has passed can be considered that all PDCCH cases are passed.
	+ Option 3 (Nokia, Intel): Include all TDD PDCCH requirements except for AL 16.
	+ Option 4 (Ericsson, Nokia): Include only AL4 and AL8 with 1Tx/2Tx
* Recommended WF
	+ Discuss in first round.

|  |  |
| --- | --- |
| **Company** | **Comments** |
| Nokia, Nokia Shanghai Bell | Looking at the list of existing PDCCH UE tests, we can observe that including only AL4 and AL8 will leave only one test per TX x RX combination. We have not found any tests with the number of TX different from 1 and 2. This makes Options 2 (second part) and 4 rather close. We can also agree with Option 4. |
| Huawei | We prefer Option2. However, propagation condition issue 3-4-3 should be solved firstly before we discuss this issue. |
| Intel | Besides different AL different DCI formats are used in each test. We prefer to reuse all test cases but can compromise to Option 3. |

**Issue 3-4-2: Test parameter specification simplification**

* Proposals
	+ Option 1 (Intel): Keep the CSI-RS for tracking parameters for IAB-MT node PDCCH test cases from the UE PDCCH performance requirements.
	+ Option 2 (Huawei): Remove the CSI-RS for tracking parameters from the UE demod PDCCH requirements and leave them up to implementation.
	+ Option 3 (Nokia): Add the T-RS configuration assumed by the RMC/FRC for simulation in the PDCCH configuration table. Add a note to the RMC/FRC that it is up to test setup and test implementation if the T-RS is transmitted and/or demodulated.
	+ Option 4 (Ericsson, Nokia): No need to transmit CSI-RS, but configurations can be defined, and they can be transmitted if deemed needed during the test by the IAB manufacturer.
* Recommended WF
	+ Discuss in first round.
	The only difference between option 3 and 4 seems to be “T-RS” or “all CSI-RS”.

|  |  |
| --- | --- |
| **Company** | **Comments** |
| Nokia, Nokia Shanghai Bell | In our opinion, Options 3 and 4 can be joined. |
| Huawei | Based on the RF GTW agreements for synchronization, “Using same BS approach (no detailed synchronization configuration in conformance specifications; meanwhile add a note in conformance specs to clarify (IAB-MT sync with IAB-DU with DL signal configuration not precluded).”, it is not necessary to configure CSI-RS and TRS. |

**Issue 3-4-3: Propagation condition**

* Proposals
	+ Option 1 (Nokia): Not down-select requirements for PDCCH from UE demod due to propagation conditions.
	+ Option 2: Other options not precluded.
* Recommended WF
	+ Discuss in first round.
	Overlap with the general discussion on propagation conditions.

|  |  |
| --- | --- |
| **Company** | **Comments** |
| Huawei | We prefer Option 2. At last meeting, the agreement is achieved that “*Skip test cases that are related to high speed scenario such as cases with TDLB100-400 Low, TDLC300-100 Low, HST for FR1 and TDLC60-300 Low, TDLA30-300 Low for FR2*”. However, there may be no valid case for AL4 or AL8. We don’t think it is a good way to keep high speed cases for IAB-MT since it is not typical scenario, also as per TS38.874, fixed relay is assumed in Rel-15. Therefore, we prefer to change high speed propagation condition to TDLA30-10 for FR1 and TDLA30-75 for FR2. Necessary simulations cannot be precluded for any new WIs, also based on our analysis, we did not think that it is heavy burden to simulate very limited number of test cases. |
| Intel | No strong preference, both options acceptable for us. |

**Issue 3-4-4: Test coverage of SCS**

* Observation
	+ (Nokia): Following the agreement of not specifying FDD requirements, it is unclear if 15kHz SCS PDCCH FDD requirements can be re-used in IAB-MT, or if it is required to have 15kHz SCS PDCCH requirement at all
* Recommended WF
	+ Please be invited to check the observation and comment, if this requires action.

|  |  |
| --- | --- |
| **Company** | **Comments** |
| Ericsson | We do not see any need to include 15kHz requirements as they are linked to FDD. |
| Huawei | As per current TS 38.101-4, there is no TDD cases with 15kHz SCS. Therefore, we prefer not include 15kHz SCS requirements for all cases. |

### Sub-topic 3-5: PBCH

*Sub-topic description*

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

**Issue 3-5-1: Inclusion of PBCH**

* Proposals
	+ Option 1 (Intel): Reuse UE PBCH requirements for IAB-MT node.
	+ Option 2 (Huawei): Do not introduce PBCH requirements for IAB-MT.
	+ Option 3 (Nokia): Re-use and test the TDD UE demodulation minimum performance requirements for the case of “SS/PBCH block index is known”. Skip the cases of unknown index.
* Recommended WF
	+ Discuss in first round.

|  |  |
| --- | --- |
| **Company** | **Comments** |
| Ericsson | Inclusion of PBCH is not essential. If it is included, support for PBCH detection should be declared, since it may be possible that an IAB can operate without detecting PBCH. |
| Nokia, Nokia Shanghai Bell | If the implementations without PBCH detections are foreseen by other companies then we agree on declaration. We still prefer to skip the cases of unknown index. |
| Huawei | As per TS 38.521-4, PBCH requirements are specified for UE but do not need to be tested. So we don’t think it is necessary to introduce such requirements. |
| Intel | For UE it is not possible to test PBCH since there is no feedback link for this channel. However, considering BS testing approach we think it is possible to calculate PBCH miss detection rate using testing mode. More discussion is needed on this issue. |

### Sub-topic 3-6: SDR

*Sub-topic description*

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

**Issue 3-6-1: Inclusion**

* Proposals
	+ Option 1 (Ericsson, Nokia, Huawei): Do not include SDR requirements for the IAB-MT
* Recommended WF
	+ Option 1 seems agreeable; no counterproposals have been submitted.

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

### Sub-topic 3-7: CSI Reporting

*Sub-topic description*

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

**Issue 3-7-1: Test parameter specification simplification**

* Proposals
	+ Option 1 (Intel): Do not remove the following parameters from CSI reporting requirements and leave them up to implementation: PDCCH configuration, CSI-RS for tracking, ZP CSI-RS.
	+ Option 2 (Nokia, Intel):
		- Do not specify a PDCCH and ZP CSI-RS configuration for CSI reporting testing.
		- Give the T-RS configuration assumed by the RMC/FRC for simulation in the CSI reporting configuration table. Add a note to the RMC/FRC that it is up to test setup and test implementation if the T-RS is transmitted and/or demodulated.
	+ Option 3 (Huawei): Remove the following parameters from CSI reporting requirements and leave them up to implementation: PDCCH configuration, CSI-RS for tracking, ZP CSI-RS.
* Recommended WF
	+ Collect further views in first round.
	+ Check, if compromises including “notes” or “optional tags” are feasible.

|  |  |
| --- | --- |
| **Company** | **Comments** |
| Huawei | Based on the RF GTW agreements for synchronization, “Using same BS approach (no detailed synchronization configuration in conformance specifications; meanwhile add a note in conformance specs to clarify (IAB-MT sync with IAB-DU with DL signal configuration not precluded).”, it is not necessary to configure CSI-RS and TRS. |
| Intel | Considering RF GTW agreement, we support option 2. However, it is not clear how IAB-MT will make fine time/frequency synchronization if TRS are not transmitted.  |

**Issue 3-7-2: CQI inclusion**

* Proposals
	+ Option 1 (Intel): Reuse all CQI reporting test cases which were defined for TDD duplex mode for 4 Rx conducted and 2 Rx radiated requirements except conducted test case with sub-band CQI reporting granularity.
	+ Option 2 (Nokia): Limit CSI reporting requirements to reporting of CQI only
	+ Option 3 (Moderator, Intel, Nokia): Include CQI reporting test cases, with limitations discussed in the following issues.
* Recommended WF
	+ Discuss in first round. Option 3 is recommended by the moderator.

|  |  |
| --- | --- |
| **Company** | **Comments** |
| Intel | Support Option 3 from moderator. |

**Issue 3-7-3: CQI CSI-RS Resource type and report config**

* Proposals
	+ Option 1 (Ericsson):
		- For FR1, use periodic reporting for both AWGN and fading conditions.
		- For FR2, use periodic reporting for AWGN and aperiodic reporting for fading conditions.
	+ Option 2 (Huawei, Nokia): Limit requirements to only include periodic NZP CSI-RS and reporting.
* Recommended WF
	+ Please verify, if contradictions are present in proposals and collect further views in first round.

|  |  |
| --- | --- |
| **Company** | **Comments** |
| Ericsson | Note that aperiodic reporting is only proposed for FR2 & fading because that is the only requirements available right now. Possibly the same requirements could be re-used but declared as periodic. |
| Huawei | We prefer Option 2. Both periodic and aperiodic configuration for NZP CSI-RS resource type are included in the existing CQI/PMI/RI reporting cases, but same NZP CSI-RS resource allocation and CSI-RS measurement periodicity are configured. From the view of test, there is no any performance difference between periodic and aperiodic CSI-RS configuration but periodic CSI-RS configuration can reduce test complexity, therefore only periodic configuration is enough. |
| Intel | Similar view as Ericsson. If needed there is no problems to change aperiodic to periodic configuration - same requirements can be used. |

**Issue 3-7-4: CQI reporting granularity**

* Proposals
	+ Option 1 (Ericsson):
		- For FR1, use wideband granularity for both AWGN and fading conditions.
		- For FR2, only wideband granularity requirements are defined.
	+ Option 2 (Huawei, Nokia, Intel): Limit requirements for CQI reporting to the wideband case.
* Recommended WF
	+ Option 1 and option 2 seem to be functionally identical.
	Confirm in first round and agreeable if no counter-opinions are received.

|  |  |
| --- | --- |
| **Company** | **Comments** |
| Ericsson | The options seem to be the same |
| Huawei | For CQI reporting granularity, Option 1 and Option 2 seems to be aligned. |
| Intel | Agree with recommended WF. |

**Issue 3-7-5: CQI propagation condition**

* Proposals
	+ Option 1 (Ericsson): Use both AWGN and fading conditions.
	+ Option 2 (Huawei, Nokia, Intel, Ericsson): Limit the propagation conditions in CQI reporting to re-use AWGN and TDLA, skip two tap channel.
	+ Option 3 (Huawei, Intel): Only keep CQI AWGN requirements.
* Moderator comment: Intel’s Tdoc makes the observation of “conducted test case with sub-band CQI reporting granularity” being 2 tap channel model, so the proposal on “CQI inclusion” is interpreted as supporting option 2 here. Please correct this understanding if needed.
* Recommended WF
	+ Discuss in first round.

|  |  |
| --- | --- |
| **Company** | **Comments** |
| Ericsson | We are OK for option 2 on the basis that the backhaul link will most likely be LOS. |
| Huawei | As per current specification TS 38.101-4, PUCCH or PUSCH is used for CSI reporting. However, considering BS-like testing, the related feedback should be left up to implementation. For CQI fading cases, PMI/RI cases, test metric is defined as ratio of throughput with each reporting and that with fixed/random value, test complexity will be increased. At the same time, considering rather stable environment between different IABs, it is not necessary to report PMI and RI. Therefore, we propose to only keep CQI AWGN requirements for IAB MT. |
| Intel | We can compromise to option 3 considering stable LoS link for IAB-MT and test purpose for fading channel model: ensure that DUT can track channel variations.  |

**Issue 3-7-6: PMI inclusion**

* Proposals
	+ Option 1 (Ericsson): For PMI, re-use UE requirements.
	+ Option 2 (Intel, Ercisson): Reuse all PMI reporting test cases which were defined for TDD duplex mode for 4 Rx conducted and 2 Rx radiated requirements but change report configuration and CSI-RS resource type from aperiodic to periodic.
	+ Option 3 (Huawei, Nokia): Not to include PMI requirements for IAB-MT.
* Recommended WF
	+ Collect further views in first round.

|  |  |
| --- | --- |
| **Company** | **Comments** |
| Ericsson | OK to change aperiodic to periodic as long as it does not change the requirement. |
| Nokia, Nokia Shanghai Bell | We expect that the deployment of IAB functionality is not random but can leverage network planning to favour LOS conditions with stable link quality. In such stable radio environments, the usefulness of PMI is limited. Assuming a realistic test is devised, the PMI values would change very rarely and, thus, the overall performance metrics would barely show the difference between better and normal demodulation performance.We prefer not to include PMI requirements for IAB-MT. |
| Huawei | Considering rather stable environment for between different IABs, it is not so necessary to report PMI and RI in the real NW. |
| Intel | Especially for FR2 it is rather important to select proper PMI. Can companies clarify how the are planning to do it? During the planning stage or by using UL signals? |

**Issue 3-7-7: PMI CSI-RS Resource type and report config**

* Proposals
	+ Option 1 (Intel, Ericsson): Change report configuration and CSI-RS resource type from aperiodic to periodic
	+ Option 2 (Huawei, Nokia): Limit requirements to only include periodic NZP CSI-RS and reporting.
* Recommended WF
	+ Collect further views in first round.

|  |  |
| --- | --- |
| **Company** | **Comments** |
| Ericsson | OK to change aperiodic to periodic as long as it does not change the requirement. |

**Issue 3-7-8: RI inclusion**

* Proposals
	+ Option 1 (Ericsson): For RI, re-use UE requirements.
	+ Option 2 (Intel, Ericsson): Reuse all RI reporting test cases which were defined for TDD duplex mode for 4 Rx conducted and 2 Rx radiated requirements but change report configuration and CSI-RS resource type from aperiodic to periodic.
	+ Option 3 (Huawei, Nokia): Not to include RI requirements for IAB-MT.
* Recommended WF
	+ Collect further views in first round.

|  |  |
| --- | --- |
| **Company** | **Comments** |
| Ericsson | OK to change aperiodic to periodic as long as it does not change the requirement. |
| Nokia, Nokia Shanghai Bell | We expect that the deployment of IAB functionality is not random but can leverage network planning to favour LOS conditions with stable link quality. In such stable radio environments, the usefulness of RI is limited. Assuming a realistic test is devised, the RI values would change very rarely and, thus, the overall performance metrics would barely show the difference between better and normal demodulation performance. |
| Huawei | We share the similar view with Nokia. Considering rather stable environment between different IABs, it is not necessary to report PMI and RI. |

**Issue 3-7-9: RI CSI-RS Resource type and report config**

* Proposals
	+ Option 1 (Intel, Ericsson): Change report configuration and CSI-RS resource type from aperiodic to periodic
	+ Option 2 (Huawei, Nokia): Limit requirements to only include periodic NZP CSI-RS and reporting.
* Recommended WF
	+ Collect further views in first round.

|  |  |
| --- | --- |
| **Company** | **Comments** |
| Ericsson | OK to change aperiodic to periodic as long as it does not change the requirement. |

### Sub-topic 3-8: Interworking

*Sub-topic description*

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

**Issue 3-8-1: Interworking inclusion**

* Proposals
	+ Option 1 (Huawei, Nokia): Do not re-use the interworking requirements for the IAB-MT requirement specification.
	+ Option 2 (Nokia): If interworking requirements are agreed to be included, all agreements taken on channels and features outside the interworking context, also apply to the interworking requirements.
* Recommended WF
	+ Option 1 seems agreeable; no counterproposals submitted.

|  |  |
| --- | --- |
| **Company** | **Comments** |
| Ericsson | It is not obvious that interworking is needed for the backhaul link in rel-16. |
| Huawei | We prefer Option 1. For our understanding, it is not typical in real deployment for such scenario. |
| Intel | In Rel-16 timeframe we can skip interworking requirements since application scenario for IAB is not clear.  |

### Sub-topic 3-9: Summary of requirement re-use (informative)

*Sub-topic description*

Using tables to track previously agreed and proposed main adaptations. Not all details are captured.
The agreements captured in the text of this summary document, as well as WFs, supersede the informative tables below.

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

Table: UE requirement re-use table - FR1 (Informative)
Previous state: End of RAN4#97-e

|  |  |  |
| --- | --- | --- |
| **Feature** | **Previous State** | **Adaptations** |
| Rel-15 |
| PDSCH | MCS: ~~4,~~ 13, 19, 24(Table2)Mapping Type A, Type BChannel: ~~TDLB100-400 Low, TDLC300-100 Low~~, TDLA30-10 Low, ~~HST-750, HST-1000,~~ TDLA30-10 **Med** (enhRX)Incl. ~~HARQ soft combining,~~Enhanced Receiver Type 1, CSI-RS overlapped with PDSCH,LTE-NR coexistence |   |
| PDCCH | Channel: TDLA30-10 Low, ~~TDLC300-100 Low~~, TDLA30-10 **Med** |   |
| PBCH | Channel: ~~TDLC300-100 Low~~, TDLA30-10 Low |   |
| SDR | Incl. CA |   |
| CQI | Channel: AWGN, TDLA30-5 **high**, Two tapReporting: wideband, sub-bandCSI-RS type: periodicReport type: periodic, aperiodic |   |
| PMI | Channel: TDLA30-5 **high**Reporting: widebandCSI-RS type: periodic, aperiodicReport type: aperiodic |   |
| RI | Channel: TDLA30-5 Low**/high**CSI-RS type: periodicReport type: periodic |   |
| Interworking | Subset of "verification in FR1" only |   |
| Rel-16 |
| ~~URLLC ultra-low BLER~~ |   |   |
| ~~URLLC high reliability~~ |   |   |
| ~~URLLC low latency~~ |   |   |

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

Table: UE requirement re-use table - FR2 (Informative)
Previous state: End of RAN4#97-e

|  |  |  |
| --- | --- | --- |
| **Feature** | **Previous State** | **Adaptations** |
| Rel-15 |
| PDSCH | MCS: ~~4,~~ 13, 17, 18Mapping Type AChannel: ~~TDLC60-300 Low~~, ~~TDLA30-300 Low~~**/Med**, TDLA30-75 LowIncl. ~~HARQ soft combining,~~Enhanced Receiver Type 1 |   |
| PDCCH | Channel: TDLA30-75 Low, ~~TDLA30-300 Low~~ |   |
| PBCH | Channel: TDLA30-75 Low, ~~TDLA30-300 Low~~ |   |
| SDR | Incl. CA |   |
| CQI | Channel: AWGN, TDLA30-35 **high**Reporting: widebandCSI-RS type: periodic, aperiodicReport type: periodic, aperiodic |   |
| PMI | Channel: TDLA30-35 LowReporting: widebandCSI-RS type: periodic, aperiodicReport type: aperiodic |   |
| RI | Channel: TDLA30-35 Low**/high**CSI-RS type: periodic, aperiodicReport type: aperiodic |   |
| Interworking | Subset of "verification in FR2" only |   |
| Rel-16 |
| ~~256 QAM~~ |   |   |
| ~~URLLC high reliability~~ |   |   |
| ~~URLLC low latency~~ |   |   |

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

### Sub-topic 3-10: 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 |
|  |
|  | Moderator: No CRs/TPs/etc. |
|  |
|  |
|  |

## 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:* |
| **Sub-topic 3-1** | **Sub-topic 3-1: Conformance testing setup** Issue 3-1-1: Basis for test setup: *Tentative agreements:*None.*Candidate options:** + Option 1 (Huawei, Nokia): Consider IAB-MT as a part of a network node with test setup and performance requirements based on the BS approach.
	+ Option 2 (Nokia): TE definition is based on the assumption of using a signal generator.
	+ Option 3 (Moderator, Ericsson): 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, e.g., to use bi-directional Uu links and system simulators, like in the UE approach.
	+ Option 3b (Moderator): 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, i.e., it is not precluded to use bi-directional Uu links and system simulators, to realize a test setup that is functionally equivalent with the BS approach.

*Recommendations for 2nd round:*There are some questions about the meaning of the last sentence of the compromise proposal in option 3. Please clarify in second round, a first tentative is given as option 3b. Keep discussion open and try to find commonly acceptable wording.Candidate for GtW discussion.Issue 3-1-2: Synchronization in test procedure: *Tentative agreements:*None*Candidate options:** + Option 1 (Ericsson, QC): Write the test procedure such that coarse synchronization is not specified. (It can be achieved by transmitting and detecting SSB or via proprietary means).
	+ Option 2 (Huawei, Nokia, Ericsson): Synchronization provided via the digital feedback link from the tester or by a common (e.g., GNSS) source.
	+ Option 2b (Ericsson): Synchronization provided via the digital feedback link to or from the tester or by a common (e.g., GNSS) source.
	+ Option 3 (Moderator, Ericsson): Write the test procedure using the BS approach, i.e., no detailed synchronization configuration for coarse 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.
	+ Option 3b (Huawei): 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.

*Recommendations for 2nd round:*Please express your opinion on option 3b, which was proposed (in one version or another) as compromise from 3 companies.Issue 3-1-3: Synchronization configuration: *Tentative agreements:*None*Candidate options:** + Option 1 (Ericsson, QC): Provide DM-RS for fine synchronization. Optionally, TRS can also be transmitted during the test for fine synchronization.
	+ Option 2: Agreement on this matter is not required.

*Recommendations for 2nd round:*Continue discussion in second round.Issue 3-1-4: HARQ Feedback: *Tentative agreements:*None*Candidate options:** + Option 1 (Ericsson, QC): Do not specify how HARQ feedback is sent to the TE. (It could be via Uu or via proprietary means).
	+ Option 2 (Nokia): HARQ feedback shall be provided from IAB-MT to the TE via an error-free link. Unidirectional Uu interface shall be used.
	+ Option 3 (Ericsson, Nokia): HARQ feedback shall be provided from IAB-MT to the TE via an error-free link; the means by which the link is achieved is not specified
	+ Option 4 (Huawei) Note in BS specification can be reused: The HARQ Feedback could be done as an RF feedback or as a digital feedback. The HARQ Feedback should be error free.

*Recommendations for 2nd round:*Continue discussion in 2nd round.Candidate for GtW discussion.Issue 3-1-5: L1/L2 testing mode: *Tentative agreements:*None*Candidate options:** + Option 1 (Nokia, QC): IAB-MT shall be in a L1/L2 testing mode with an established RRC configuration.
	+ Option 2 (Ericsson): Establishment of an RRC connection should be necessary; it is sufficient if the L1/L2 is active enough to do the PHY processing and do measurements.
	+ Option 3 (Huawei, Nokia): Up to implementation. Only keep prior agreements.

*Recommendations for 2nd round:*Please discuss in second round, if further clarification of prior agreement is necessary and/or helpful.Candidate for GtW discussion. |
| **Sub-topic 3-2** | **Sub-topic 3-2: General**Issue 3-2-1: Reference channels: *Tentative agreements:*Demodulation requirements are defined based on single-slot FRCs.FFS: How to reuse existing requirements and configuration, since for UE requirements PDSCHs with different effective code-rates were accumulated for total statistic.*Candidate options:*o Option 2 (Huawei): PDSCH is scheduled only on ‘D’ slots without CSI-RS resource and TRS allocated.*Recommendations for 2nd round:*Please continue to discuss the remaining FFS and option 2 in the second round.Tentative agreements are agreeable.Issue 3-2-2: TDD pattern: *Tentative agreements:*None*Candidate options:** + Option 1 (Huawei, Intel): Reuse default TDD UL-DL pattern from BS requirements for IAB MT requirements definition (60, 120 kHz SCS: 3D1S1U, S=10D:2G:2U; 30 kHz SCS: 7D1S2U, S=6D:4G:4U) and the same requirements are applicable to TDD with different UL-DL patterns.The SNR of achieving PDSCH relative throughput (e.g. 70%) can be independent on the slot configuration.
	+ Option 2 (Nokia, Intel, Ericsson?): For PDSCH and CSI reporting, give the TDD pattern assumed by the RMC/FRC for simulation in the PDSCH/CSI reporting configuration table. Add a note that makes the requirements applicable to all TDD patterns chosen for testing (similar to BS demodulation specification).
	+ Option 3 (QC): Keep all TDD patterns and requirements applicable to a normal UE.
	+ Option 4 (Ericsson): Requirements apply for all TDD configurations.

*Recommendations for 2nd round:*Continue discussion in second round.Candidate for GtW discussion.Issue 3-2-3: Reference signals in test parameters and reference channels: *Tentative agreements:*No need to specify SSB, TRS, CSI-RS in the test parameters and FRCs.FFS: Configurations for SSB, TRS, CSI-RS can be defined.*Candidate options:** + Option 3 (Ericsson): Configurations for SSB, TRS, CSI-RS can be defined, and they can be transmitted if deemed needed during the test by the IAB manufacturer.
	+ Option 4 (Nokia, Huawei, Intel): Configurations for SSB, TRS, CSI-RS do not need to be defined, they are left open to implementation.

*Recommendations for 2nd round:*Please continue to discuss the remaining FFS using the candidate options in the second round.Tentative agreements are agreeable.Issue 3-2-4: Down scoping and changing of propagation conditions: *Tentative agreements:*None.*Candidate options:** + Option 1 (Nokia, Ericson, Intel): Keep propagation conditions TDLC300-100 in FR1 and TDLA30-300 in FR2. Thus, changing the prior agreement as follows:Skip test cases that are related to high speed scenario such as cases with TDLB100-400 Low, ~~TDLC300-100 Low~~, HST for FR1 and TDLC60-300 Low, ~~TDLA30-300 Low~~ for FR2.
	+ Option 2 (Huawei, Intel): Only define cases with propagation condition of TDLA30-10 for FR1 and TDLA30-75 for FR2. Only define cases with low antenna correlation.Re-simulate cases that propagation condition and/or antenna correlation is changed

*Recommendations for 2nd round:*Continue discussion in second round.Candidate for GtW discussion.Issue 3-2-5: Basis for requirement re-use: *Tentative agreements:*Discuss which configurations to keep/remove on a case by case basis.*Candidate options:*None.*Recommendations for 2nd round:*Tentative agreements are agreeable.Issue 3-2-6: MT types and classes: *Tentative agreements:*None*Candidate options:** + Option 1 (Huawei): For most of cases, the same requirements apply for all classes. For other cases, if companies think applicability rule can be defined for different classes, discuss them case by case.
	+ Option 2: Other options not precluded.

*Recommendations for 2nd round:*No comments received. Candidate option 1 seems to not result in actionable decision.Please comment in second round, if this agreement is needed.Issue 3-2-7: Conducted and radiated testing: *Tentative agreements:*IAB type 1-O radiated requirements shall be defined.FFS: Further constraints*Candidate options:** + Option 1: IAB type 1-O radiated requirements shall be defined for all 2Rx and 1Rx.
	+ Option 2 (Huawei): Define IAB type 1-O radiated requirements with 2Rx.

*Recommendations for 2nd round:*Tentative agreements are agreeable.Continue discussion in 2nd round.Issue 3-2-8: MT nomenclature: *Tentative agreements:*None*Candidate options:*None*Recommendations for 2nd round:*The moderator’s question was answered by the tentative agreement in Issue 3-2-7 and the comments provided. |
| **Sub-topic 3-3** | **Sub-topic 3-3: PDSCH** Issue 3-3-1: MCS: *Tentative agreements:*None*Candidate options:** + Option 1 (Intel, Ericsson): 16QAM and 256QAM (FR1) shall be tested.
	+ Option 2 (Huawei): 16QAM and 256QAM (FR1) shall not be tested.
	+ Option 3 (Nokia, Ericsson): 16QAM shall be tested.

*Recommendations for 2nd round:*Continue discussion in 2nd round.Candidate for GtW.Issue 3-3-2: Rel-16 MCS: *Tentative agreements:*None*Candidate options:** + Option 1 (Intel): Further discuss 256QAM requirements for FR2 after completion of Rel-16 UE FR2 256QAM requirements definition.
	+ Option 2 (Huawei): Keep prior agreements that do not include any Rel-16 UE demod requirements

*Recommendations for 2nd round:*Continue discussion in 2nd round.Candidate for GtW.Issue 3-3-3: Mapping type: *Tentative agreements:*Only keep PDSCH performance requirements for mapping Type-A.*Candidate options:*None*Recommendations for 2nd round:*Tentative agreements are agreeable.Issue 3-3-4: PRB bundling size: *Tentative agreements:*None.*Candidate options:** + Option 1 (Intel): Change prior agreement: Only keep requirements with wideband PRB bundling size and PRB bundling size 2.
	+ Option 2 (Huawei): Keep prior agreements that only keep requirements with PRB bundling size 2.

*Recommendations for 2nd round:*Come back after agreement on 16QAM requirement re-use.Note that unless an agreement is reached, this topic is not captured in WF and proponents in favour of changing the prior agreement, need to re-open the discussion next meeting.Issue 3-3-5: Enhanced Receiver: *Tentative agreements:*Skip PDSCH cases for enhanced receiver Type 1.Definition of such requirements in future releases is not precluded.*Candidate options:*None*Recommendations for 2nd round:*Tentative agreements are agreeable.Issue 3-3-6: Overlapped CSI-RS: *Tentative agreements:*Skip PDSCH cases for CSI-RS overlapped with PDSCH.*Candidate options:*None*Recommendations for 2nd round:*Tentative agreements are agreeable.Issue 3-3-7: Co-existence with LTE CRS: *Tentative agreements:*Skip PDSCH cases for co-existence with LTE CRS, as they are only defined for FDD.*Candidate options:*None*Recommendations for 2nd round:*Tentative agreements are agreeable.Issue 3-3-8: Test parameters specification simplification: *Tentative agreements:*Do not specify the following parameters in IAB-MT PDSCH test configurations and leave them up to implementation:* + - SSB,
		- PDCCH configuration,
		- CSI-RS for tracking,
		- ZP CSI-RS.

FFS: Clarify what “remove/not specify and leave up to implementation” means in terms of capturing in the specification. *Candidate options:** + Option 1: Keep the corresponding rows in specification tables and mark “up to implementation”.
	+ Option 2: Remove the corresponding rows in specification tables.
	+ Option 3: Other options not precluded.

*Recommendations for 2nd round:*Tentative agreements are agreeable.Continue to discuss the FFS in second round and be aware about potential overlap with Issue 3-2-3. Please also answer the raised question “we are not clear why TRS might be not transmitted. In this case how IAB-MT can do fine time/frequency synchronization (e.g. on sample level)?” |
| **Sub-topic 3-4** | **Sub-topic 3-4: PDCCH** Issue 3-4-1: Aggregation Level: *Tentative agreements:*None*Candidate options:** + Option 1 (Intel, Ericsson): Include all PDCCH requirements and require IAB-MT to pass all of them.
	+ Option 2 (Huawei): Keep one PDCCH performance requirements selected by companies (such as 8), or include all PDCCH requirements with applicability rule with different aggregation level that any one PDCCH case has passed can be considered that all PDCCH cases are passed.
	+ Option 3 (Nokia, Intel): Include all TDD PDCCH requirements except for AL 16.
	+ Option 4 (Ericsson, Nokia): Include only AL4 and AL8 with 1Tx/2Tx

*Recommendations for 2nd round:*Continue discussion in 2nd round, preferable after agreement on Issue 3-4-3.Candidate for GtW.Issue 3-4-2: Test parameter specification simplification: *Tentative agreements:*Follow tentative agreement from Issue 3-2-3:No need to specify SSB, TRS, CSI-RS in the test parameters and FRCs.FFS: Configurations for SSB, TRS, CSI-RS can be defined.*Candidate options:*None*Recommendations for 2nd round:*Please continue to discuss the remaining FFS in Issue 3-2-3.Tentative agreements are agreeable.Issue 3-4-3: Propagation condition: *Tentative agreements:*None*Candidate options:** + Option 1 (Nokia, Intel): Not down-select requirements for PDCCH from UE demod due to propagation conditions.
	+ Option 2 (Huawei, Intel): Change high speed propagation condition to TDLA30-10 for FR1 and TDLA30-75 for FR2.

*Recommendations for 2nd round:*Continue discussion in second round.Take progress and agreements from Issue 3-2-4 into account.Issue 3-4-4: Test coverage of SCS: *Tentative agreements:*Not include 15kHz SCS requirements for all cases.*Candidate options:*None*Recommendations for 2nd round:*Tentative agreements are agreeable. |
| **Sub-topic 3-5** | **Sub-topic 3-5: PBCH**Issue 3-5-1: Inclusion of PBCH: *Tentative agreements:*None*Candidate options:** + Option 1 (Intel): Reuse UE PBCH requirements for IAB-MT node.
	+ Option 2 (Huawei): Do not introduce PBCH requirements for IAB-MT.
	+ Option 3 (Nokia): Re-use and test the TDD UE demodulation minimum performance requirements for the case of “SS/PBCH block index is known”. Skip the cases of unknown index.

*Recommendations for 2nd round:*More discussion is needed on this issue. Especially considering the advantages provided by BS style testing:“For UE it is not possible to test PBCH since there is no feedback link for this channel. However, considering BS testing approach it might be possible to calculate PBCH miss detection rate using testing mode” |
| **Sub-topic 3-6** | **Sub-topic 3-6: SDR** Issue 3-6-1: Inclusion: *Tentative agreements:*Do not include SDR requirements for the IAB-MT*Candidate options:*None*Recommendations for 2nd round:*Tentative agreements are agreeable. |
| **Sub-topic 3-7** | **Sub-topic 3-7: CSI Reporting** Issue 3-7-1: Test parameter specification simplification: *Tentative agreements:*Follow tentative agreement from Issue 3-2-3:No need to specify SSB, TRS, CSI-RS in the test parameters and FRCs.FFS: Configurations for SSB, TRS, CSI-RS can be defined.*Candidate options:*None*Recommendations for 2nd round:*Please continue to discuss the remaining FFS in Issue 3-2-3.Tentative agreements are agreeable.Issue 3-7-2: CQI inclusion: *Tentative agreements:*Include CQI reporting test cases, with limitations discussed in the following issues*Candidate options:*None*Recommendations for 2nd round:*Tentative agreements are agreeable.Issue 3-7-3: CQI CSI-RS Resource type and report config: *Tentative agreements:*None*Candidate options:** + Option 1 (Ericsson):
		- For FR1, use periodic reporting for both AWGN and fading conditions.
		- For FR2, use periodic reporting for AWGN and aperiodic reporting for fading conditions.
	+ Option 2 (Huawei, Nokia): Limit requirements to only include periodic NZP CSI-RS and reporting.
	+ Option 3: Requirements building on aperiodic reporting can be re-used for periodic reporting.

*Recommendations for 2nd round:*Continue discussion in 2nd round.Candidate for GtW.Issue 3-7-4: CQI reporting granularity: *Tentative agreements:*Limit requirements for CQI reporting to the wideband case.*Candidate options:*None*Recommendations for 2nd round:*Tentative agreements are agreeable.Issue 3-7-5: CQI propagation condition: *Tentative agreements:*Skip two tap channel.*Candidate options:** + Option 2 (Huawei, Nokia, Intel, Ericsson): Limit the propagation conditions in CQI reporting to re-use AWGN and TDLA, skip two tap channel.
	+ Option 3 (Huawei, Intel): Only keep CQI AWGN requirements.

*Recommendations for 2nd round:*Tentative agreements are agreeable.Continue discussion on candidate options in second round.Issue 3-7-6: PMI inclusion: *Tentative agreements:*None*Candidate options:** + Option 2 (Intel, Ercisson): Reuse all PMI reporting test cases which were defined for TDD duplex mode for 4 Rx conducted and 2 Rx radiated requirements but change report configuration and CSI-RS resource type from aperiodic to periodic.
	+ Option 3 (Huawei, Nokia): Not to include PMI requirements for IAB-MT.

*Recommendations for 2nd round:*Continue discussion in 2nd round.Issue 3-7-7: PMI CSI-RS Resource type and report config: *Tentative agreements:*None*Candidate options:** + Option 1 (Intel, Ericsson): Change report configuration and CSI-RS resource type from aperiodic to periodic
	+ Option 2 (Huawei, Nokia): Limit requirements to only include periodic NZP CSI-RS and reporting.

*Recommendations for 2nd round:*Continue discussion in 2nd round.Issue 3-7-8: RI inclusion: *Tentative agreements:*None*Candidate options:** + Option 2 (Intel, Ericsson): Reuse all RI reporting test cases which were defined for TDD duplex mode for 4 Rx conducted and 2 Rx radiated requirements but change report configuration and CSI-RS resource type from aperiodic to periodic.
	+ Option 3 (Huawei, Nokia): Not to include RI requirements for IAB-MT.

*Recommendations for 2nd round:*Continue discussion in 2nd round.Issue 3-7-9: RI CSI-RS Resource type and report config: *Tentative agreements:*None*Candidate options:** + Option 1 (Intel, Ericsson): Change report configuration and CSI-RS resource type from aperiodic to periodic
	+ Option 2 (Huawei, Nokia): Limit requirements to only include periodic NZP CSI-RS and reporting.

*Recommendations for 2nd round:*Continue discussion in 2nd round. |
| **Sub-topic 3-8** | **Sub-topic 3-8: Interworking** Issue 3-8-1: Interworking inclusion: *Tentative agreements:*Do not re-use the interworking requirements for the IAB-MT requirement specification.*Candidate options:*None.*Recommendations for 2nd round:*Tentative agreements are agreeable. |
| **Sub-topic 3-9** | **Sub-topic 3-9: Summary of requirement re-use (informative)** Informative table will be updated in time for second round. |
| **Sub-topic 3-10** | **Sub-topic 3-10: Other**No issues raised. |

*Recommendations on WF/LS assignment*

|  |  |  |
| --- | --- | --- |
|  | **WF/LS t-doc Title**  | **Assigned Company, WF or LS lead** |
| #1 | None |  |

### CRs/TPs

*Moderator tries to summarize discussion status for 1st round and provides recommendation on CRs/TPs Status update*

|  |  |
| --- | --- |
| **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”* |
|  | None |

## Discussion on 2nd round (if applicable)

Concerning open issues in this section, please capture your company views directly under the respective issues and treat the summary as a dialogue just as the chairperson would during a f2f, i.e., do not edit earlier responses but continue the discussion.
Please furthermore declare your company’s support for certain options, by capturing the company abbreviation directly after the option number.

### (2nd) Sub-topic 3-1: Conformance testing setup

Issue 3-1-1: Basis for test setup:

*Candidate options:*

* + Option 1: Consider IAB-MT as a part of a network node with test setup and performance requirements based on the BS approach.
	+ Option 2: TE definition is based on the assumption of using a signal generator.
	+ Option 3: 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, e.g., to use bi-directional Uu links and system simulators, like in the UE approach.
	+ Option 3b (Moderator): 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, i.e., it is not precluded to use bi-directional Uu links and system simulators, to realize a test setup that is functionally equivalent with the BS approach.
	+ Option 3c (Nokia, Huawei): 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.

*Recommendations for 2nd round:*

There are some questions about the meaning of the last sentence of the compromise proposal in option 3. Please clarify in second round, a first tentative is given as option 3b.
Keep discussion open and try to find commonly acceptable wording.
Candidate for GtW discussion.

Contributor Comments:
(Dialog; please do not modify earlier comments; add follow-up always at the bottom of the discussion.)

[Qualcomm]: Options 3 or 3b are agreeable.

[YYY]:

[Nokia]: In our opinion, the first sentence of Options 3 and 3a reflects well the principle of IAB conformance testing setup from Options 1 and 2: “Test setup and performance requirements based on the BS approach assumption, i.e., using a signal generator and assuming unidirectional Uu interface”. Then, it is enough to state that “Flexibility in connection/test setup is allowed by keeping the specified setup informative”. The details of the alternative testing setups can be omitted.

[Huawei]: We share similar view as Nokia. There is no need to explicit specify other test setup that is not precluded, just keep the RF agreement is enough to avoid any possible confusion and misunderstanding. Therefore, we prefer “Using a signal generator and assuming unidirectional Uu interface. Flexibility in connection/test setup is allowed by keeping the specified setup informative.”

[Intel] We are fine to not explicitly specify other test approaches besides baseline. Same time, by “Flexibility” we assume some small changes in test setup, not another approach which is target intention. Suggest modifying the last sentence in Option 3c as follows: Another connection/test setup approaches are allowed by keeping the specified setup enough informative.

-----------------------GTW Note------------------------

Huawei: We support 3c, both 3b,3c is similar and aligned with RF agreements.

Intel: we prefer 3b, on the specification we can based on 3c to further improve the wording.

E///: Either 3b or 3c is OK, we are OK to improve the wording.

Qualcomm: We are preferring with option 3b. Also fine with 3c.

Nokia: Our preference is 3c.

Agreement:

Option 3c, further work one the texts to specification to align with RF conformance test assumption.

------------------------End----------------------

Issue 3-1-2: Synchronization in test procedure:

*Tentative agreements:*

None

*Candidate options:*

* + Option 1: Write the test procedure such that coarse synchronization is not specified. (It can be achieved by transmitting and detecting SSB or via proprietary means).
	+ Option 2: Synchronization provided via the digital feedback link from the tester or by a common (e.g., GNSS) source.
	+ Option 2b: Synchronization provided via the digital feedback link to or from the tester or by a common (e.g., GNSS) source.
	+ Option 3 (Moderator): Write the test procedure using the BS approach, i.e., no detailed synchronization configuration for coarse 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.
	+ Option 3b: 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.
	+ Option 3c (Huawei): ~~Write the test procedure using the BS approach, i.e. add a note in conformance specifications:~~
	+ 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.”

*Recommendations for 2nd round:*

Please express your opinion on option 3b, which was proposed (in one version or another) as compromise from 3 companies.

Contributor Comments:
(Dialog; please do not modify earlier comments; add follow-up always at the bottom of the discussion.)

[Qualcomm]: Option 3b is agreeable.

[YYY]:

[Nokia]: In general, we agree with Option 3b proposed by Huawei. However, we still see it important to reflect in the testing setup schemes that DUT and TE are in synch. Thus, the first sentence can be reformulated:
Write the test procedure using the BS approach, i.e., synchronization provided via the digital feedback link from the tester or by a common (e.g., GNSS) source, no detailed synchronization configuration for synchronization is included in conformance specifications.

[Huawei]: We prefer to reuse and modify the synchronization instruction as did in section 8.1.0 TS 38.141-2:

Write the test procedure using the BS approach, i.e. add a note in conformance specifications:

“In tests performed with signal generators, a synchronization signal may be provided from the IAB node to 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.”

[Intel] We are fine with wording suggested by Nokia. Same time we need to clarify that we assume coarse synchronization, not fine as based on DMRS or TRS.

--------GTW Note-----

QC: we prefer 3b, 3c also can be combined with 3b for candidate options.

Nokia: We prefer 3b.

E///: we prefer 3b, we are also fine to modify 3c.

Huawei: option 3c we already include the candidate solution in 3b.

QC: The wording unclear in option 3c.

Nokia:141-2, already existing the wording and we can take a look.

Intel: We are fine both options 3b and 3c. Whether we consider coarse and fine sync, this is applied for coarse only, we need another note for fine.

Huawei: The 3c based on existing wording from specifications. We don’t need to split coarse and fine sync.

Nokia: No need to mention fine sync, fine sync based on DMRS which will be included in FRC/MRC, no need to explicitly mention here fine or coarse.

E///: Agree with Nokia, no need to explicitly mention fine or coarse here.

QC: We aslo think no need to explicitly mention fine or coarse sync here.

Intel: we are fine based on the common understanding.

Agreement:

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.”

--------------------------End ------------------------

Issue 3-1-3: Synchronization configuration:

*Candidate options:*

* + Option 1: Provide DM-RS for fine synchronization. Optionally, TRS can also be transmitted during the test for fine synchronization.
	+ Option 2: Agreement on this matter is not required.

*Recommendations for 2nd round:*

Continue discussion in second round.

Contributor Comments:
(Dialog; please do not modify earlier comments; add follow-up always at the bottom of the discussion.)

[XXX]:

[YYY]:

[Nokia]: We do not see any need to make a connection here between reference signal configuration and synchronization. As it is discussed in the previous issue, no detailed synchronization configuration for synchronization is included in the conformance specification. Thus, Option 2 is preferable.

[Huawei]: As we comment in 1st round, this issue is covered in Issue 3-1-2.

[Intel]: We support option 1. We need such agreement to clarify why TRS configuration is not specified for IAB-MT node.

Issue 3-1-4: HARQ Feedback:

*Candidate options:*

* + Option 1: Do not specify how HARQ feedback is sent to the TE. (It could be via Uu or via proprietary means).
	+ Option 2: HARQ feedback shall be provided from IAB-MT to the TE via an error-free link. Unidirectional Uu interface shall be used.
	+ Option 3: HARQ feedback shall be provided from IAB-MT to the TE via an error-free link; the means by which the link is achieved is not specified
	+ Option 4 Note in BS specification can be reused: The HARQ Feedback could be done as an RF feedback or as a digital feedback. The HARQ Feedback should be error free.

*Recommendations for 2nd round:*

Continue discussion in 2nd round.
Candidate for GtW discussion.

Contributor Comments:
(Dialog; please do not modify earlier comments; add follow-up always at the bottom of the discussion.)

[Qualcomm]: Options 3 and 4 are agreeable.

[YYY]:

[Nokia]: We are fine both with Options 3 and 4.

[Huawei]: We prefer Option 4 since it is more detailed.

[Intel]: Fine with Option 4 which is clearer than Option 3.

----------------GTW Note------------

Agreements:

Note in BS specification can be reused: The HARQ Feedback could be done as an RF feedback or as a digital feedback. The HARQ Feedback should be error free.

Issue 3-1-5: L1/L2 testing mode:

*Candidate options:*

* + Option 1: IAB-MT shall be in a L1/L2 testing mode with an established RRC configuration.
	+ Option 2: Establishment of an RRC connection should be necessary; it is sufficient if the L1/L2 is active enough to do the PHY processing and do measurements.
	+ Option 3: Up to implementation. Only keep prior agreements.

*Recommendations for 2nd round:*

Please discuss in second round, if further clarification of prior agreement is necessary and/or helpful.
Candidate for GtW discussion.

Contributor Comments:
(Dialog; please do not modify earlier comments; add follow-up always at the bottom of the discussion.)

[Qualcomm]: Option 3 is agreeable.

[YYY]:

[Nokia]: We agree that the establishment of an RRC connection may not be necessary. Thus, it is fine to keep prior agreement, i.e., Option 3.

[Huawei]: Prefer Option 3 to keep prior agreements.---------GTW Note------------

Agreements:

Up to implementation. Only keep prior agreements.

### (2nd) Sub-topic 3-2: General

Issue 3-2-1: Reference channels:

*Round 1 agreements:*

Demodulation requirements are defined based on single-slot FRCs.
FFS: How to reuse existing requirements and configuration, since for UE requirements PDSCHs with different effective code-rates were accumulated for total statistic.

*Candidate options:*

o Option 2 (Huawei): PDSCH is scheduled only on ‘D’ slots without CSI-RS resource and TRS allocated.

*Recommendations for 2nd round:*

Please continue to discuss the remaining FFS and option 2 in the second round.

Contributor Comments:
(Dialog; please do not modify earlier comments; add follow-up always at the bottom of the discussion.)

[XXX]:

[YYY]:

[Nokia]: The PDSCH performance requirements are defined relatively to the maximum throughput (e.g. 70% or 30% of maximum throughput). Our simulation results demonstrate that there is no meaningful difference in performance whether special slots are used for data or not. The difference in conding rates between full DL slots and special slots is much larger than between full DL slots and DL slots with T-RS. Therefore, we do not see a need for FFS. We agree on Option 2.

[Huawei]: Considering there is only low speed propagation condition requirements are defined for IAB-MT, also based on our simulation results, there is negligible performance difference between different slot configurations. Therefore we are OK with Option 2.

[Intel]: After companies’ clarifications we are fine with Option 2. Changes in effective code rate are too small to change existing requirements.

Issue 3-2-2: TDD pattern:

*Candidate options:*

* + Option 1: Reuse default TDD UL-DL pattern from BS requirements for IAB MT requirements definition (60, 120 kHz SCS: 3D1S1U, S=10D:2G:2U; 30 kHz SCS: 7D1S2U, S=6D:4G:4U) and the same requirements are applicable to TDD with different UL-DL patterns.
	The SNR of achieving PDSCH relative throughput (e.g. 70%) can be independent on the slot configuration.
	+ Option 2: For PDSCH and CSI reporting, give the TDD pattern assumed by the RMC/FRC for simulation in the PDSCH/CSI reporting configuration table. Add a note that makes the requirements applicable to all TDD patterns chosen for testing (similar to BS demodulation specification).
	+ Option 3: Keep all TDD patterns and requirements applicable to a normal UE.
	+ Option 4: Requirements apply for all TDD configurations.

*Recommendations for 2nd round:*

Continue discussion in second round.
Candidate for GtW discussion.

Contributor Comments:
(Dialog; please do not modify earlier comments; add follow-up always at the bottom of the discussion.)

[Qualcomm]: A compromise among Options 1, 2, and 4 can be considered.

[YYY]:

[Nokia]: Taking into account that the tests and the requirements are re-used from the UE specification, it might be easier to copy the TDD patterns from there and also to keep record of the original TDD pattern (Option 2). However, we do not see any problems in following Option 1 either. In this case the benefit is that only one reference TDD per SCS can be present in the specification. We prefer Option 1 slightly more than Option 2.

[Huawei]: Considering there is only low speed propagation condition requirements are defined for IAB-MT, also based on our simulation results, there is negligible performance difference between different slot configurations. Therefore we are OK with Option 1.

[Intel] We are fine with Option 1 to reuse TDD UL-DL pattern from BS requirements.

---------------------GTW Note ------------------

Agreements:

Reuse default TDD UL-DL pattern from BS requirements for IAB MT requirements definition (60, 120 kHz SCS: 3D1S1U, S=10D:2G:2U; 30 kHz SCS: 7D1S2U, S=6D:4G:4U) and the same requirements are applicable to TDD with different UL-DL patterns.
The SNR of achieving PDSCH relative throughput (e.g. 70%) can be independent on the slot configuration.

Issue 3-2-3: Reference signals in test parameters and reference channels:

*Round 1 agreements:*

No need to specify SSB, TRS, CSI-RS in the test parameters and FRCs.
FFS: Configurations for SSB, TRS, CSI-RS can be defined.

*Candidate options:*

* + Option 3: Configurations for SSB, TRS, CSI-RS can be defined, and they can be transmitted if deemed needed during the test by the IAB manufacturer.
	+ Option 4: Configurations for SSB, TRS, CSI-RS do not need to be defined, they are left open to implementation.

*Recommendations for 2nd round:*

Please continue to discuss the remaining FFS using the candidate options in the second round.

Contributor Comments:
(Dialog; please do not modify earlier comments; add follow-up always at the bottom of the discussion.)

[XXX]:

[YYY]:

[Nokia]: Assuming that the performance requirements are defined in FRC manner (Issue 3-2-1), the configuration of SSB, T-RS, CSI-RS is not that important and can be left for implementation.
In our opinion, the best solution would be not to have this excessive information in the specification but just to add a comment that transmission of SSB, TRS, CSI-RS is not precluded

[Huawei]: We prefer Option 4. These parameters should be implementation.

[Intel]: We support to left these configurations for implementation but clarification in specification that Tx of SSB, TRS, CSI-RS is not precluded should be added.

Issue 3-2-4: Down scoping and changing of propagation conditions:

*Candidate options:*

* + Option 1: Keep propagation conditions TDLC300-100 in FR1 and TDLA30-300 in FR2. Thus, changing the prior agreement as follows:
	Skip test cases that are related to high speed scenario such as cases with TDLB100-400 Low, ~~TDLC300-100 Low~~, HST for FR1 and TDLC60-300 Low, ~~TDLA30-300 Low~~ for FR2.
	+ Option 2: Only define cases with propagation condition of TDLA30-10 for FR1 and TDLA30-75 for FR2. Only define cases with low antenna correlation.
	Re-simulate cases that propagation condition and/or antenna correlation is changed

*Recommendations for 2nd round:*

Continue discussion in second round.
Candidate for GtW discussion.

Contributor Comments:
(Dialog; please do not modify earlier comments; add follow-up always at the bottom of the discussion.)

[XXX]:

[YYY]:

[Nokia]: Option 1 is fine for us in the updated form “Keep propagation conditions TDLC300-100 in FR1 and TDLA30-300 in FR2”. We think that the test coverage is sufficient with these channels and there is not need for new propagation conditions.

[Huawei]: We prefer Option 2. We don’t think it is reasonable to keep high speed cases for IAB-MT since it is not typical scenario and not considered in the first release for IAB during the core specification discussion as per TS38.874, fixed relay is assumed in Rel-15. Therefore, we prefer to change high speed propagation condition to TDLA30-10 for FR1 and TDLA30-75 for FR2. Necessary simulations cannot be precluded for any new WIs, also based on our analysis, we did not think that it is heavy burden to simulate very limited number of test cases.

-------------GTW Note----------------

E///: I understand the point from Huawei for option 2, the channel model maybe not impact IAB-MT receiver processing, meanwhile we can ensure the test coverage without simulation effort.

Huawei: For any new WI, the simulation work can’t excluded if needed. For Rel-16 IAB WI, the assumption is fixed IAB node without mobility. Considering 5 /6 companies involved in this topic, with well control limited simulation cases, the work still manageable.

Nokia: We should follow the pragmatic approach. Now we copy the UE requirements, in the future we can need to add new channels as well.

Huawei: The channel model already existing there, we think the channel model is key factor from demodulation performance aspect. We agree to use UE requirements as basis, but still matched with IAB-MT usage scenario in a proper way.

Intel: We are fine with both options. The existing channel model not aligned with typical IAB-MT scenario. Meanwhile option 2 also not aligned with IAB-MT backhaul ,which typical should be LOS channel.

Intel: if we go with option 2, then we can bring simulation results.

Nokia: We prefer option 1, but capable to do the evaluation.

E///: We prefer option 1, but if needed we can bring the evaluation.

Agreement:

RAN4 realized removing the test cases for TDLC300-100 in FR1 and TDLA30-300 (Low and medium) in FR2 will bring test coverage issues since some features only verified by these channel models, RAN4 will further discuss the solution to address test coverage issue with candidate options as following:

-Option 1: Keep propagation conditions TDLC300-100 in FR1 and TDLA30-300 (Low and medium) in FR2.

-Option 2: Replace the channel model of the test cases corresponding to TDLC300-100 in FR1 and TDLA30-300 (Low and medium) in FR2 with following candidate channel model: TDLA30-10 (Low) for FR1 and TDLA30-75 (Low) for FR2

Companies who support option 2 need to provide a plan how to ensure we can complete the work with manageable simulation effort in time.

Issue 3-2-6: MT types and classes:

*Candidate options:*

* + Option 1 (Huawei): For most of cases, the same requirements apply for all classes. For other cases, if companies think applicability rule can be defined for different classes, discuss them case by case.
	+ Option 2: Other options not precluded.

*Recommendations for 2nd round:*

No comments received. Candidate option 1 seems to not result in actionable decision.
Please comment in second round, if this agreement is needed.

Contributor Comments:
(Dialog; please do not modify earlier comments; add follow-up always at the bottom of the discussion.)

[XXX]:

[YYY]:

[Nokia]: So far, none of the companies have proposed any cases with applicability rules that are different depending on the device class. We do not see a strong need in this agreement.

Issue 3-2-7: Conducted and radiated testing:

*Round 1 agreements:*

IAB type 1-O radiated requirements shall be defined.
FFS: Further constraints

*Candidate options:*

* + Option 1: IAB type 1-O radiated requirements shall be defined for all 2Rx and 1Rx.
	+ Option 2: Define IAB type 1-O radiated requirements with 2Rx.

*Recommendations for 2nd round:*

Continue discussion in 2nd round.

Contributor Comments:
(Dialog; please do not modify earlier comments; add follow-up always at the bottom of the discussion.)

[XXX]:

[YYY]:

[Nokia]: Currently UE spec does not have any 1Rx requirements. Options should be selected.

[Huawei]: We think it is not necessary to define 1Rx requirements for IAB-type 1-O, so we prefer Option 2.

### (2nd) Sub-topic 3-3: PDSCH

Issue 3-3-1: MCS:

*Candidate options:*

* + Option 1: 16QAM and 256QAM (FR1) shall be tested.
	+ Option 2: 16QAM and 256QAM (FR1) shall not be tested.
	+ Option 3: 16QAM shall be tested.

*Recommendations for 2nd round:*

Continue discussion in 2nd round.
Candidate for GtW.

Contributor Comments:
(Dialog; please do not modify earlier comments; add follow-up always at the bottom of the discussion.)

[Intel]: Conducted requirements with Rank 1,3 and 4 were defined only for 16QAM. If we agree to reuse only 64QAM requirements, the test coverage will be insufficient since only rank 2 will be tested. In our understanding rank 3 and rank 4 operation as well as 256QAM is a typical configuration for backhaul link and we prefer to have corresponding requirements. As for 256QAM testing limitation for O-1 IAB type, it requires additional analysis and we prefer to keep reusing of 256QAM requirements open.

[YYY]:

[Nokia]: It is necessary to keep 16QAM MCS to provide necessary test coverage. We agree with the arguments presented by Huawei in the first round and our preference is not to define 256QAM requirements in FR1, i.e. Option 3.

[Huawei]: As we commented in 1st round, we prefer Option 2. For test coverage, maybe we can re-simulate some cases with specific parameter changed.

--------------------GTW Note ------------------

Intel: we prefer option 1, for backhaul, high rank and high modulation order should be typical usage cases, we can reuse same as Rel-15 UE, FR1 256QAM and no 256 QAM in FR2.

E///: The backhaul link will LOS channel, we think we can introduce 256QAM test cases for spectrum efficiency. And the supporting should be declared basis.

Option 4: 256QAM requirements at least for FR1 should be defined and the supporting can be declaration basis.

Nokia: This issue is for FR1 only, next one is for FR2. We agree with the suggestion from E///. But we still need to have 16QAM as well.

Huawei: We agree with Nokia, this should be for FR1 only , 256QAM in FR2 is Rel-16 WI which still on discussion.

We suggest to focus on mandatory feature first, the SNR in FR2 probably not testable. For Type 1-O test issue need to be checked.

For 2Rx, applicable for both conducted and radiated requirements from test feasibility aspect.

Nokia: Only Type 2-O have test issue; could you clarify?

E///: FR1 link-budget, no issue for 256QAM testing.

Agreements:

16QAM and 256QAM (FR1 only) need to be covered.

* The supporting of 256QAM requirements should be declaration basis.
* The supporting of 256QAM requirements based on the assumption of 256QAM supporting for 1-O is testable
* Further checking 256QAM supporting for 1-O considering test link-budget issue.

Issue 3-3-2: Rel-16 MCS:

*Candidate options:*

* + Option 1: Further discuss 256QAM requirements for FR2 after completion of Rel-16 UE FR2 256QAM requirements definition.
	+ Option 2: Keep prior agreements that do not include any Rel-16 UE demod requirements

*Recommendations for 2nd round:*

Continue discussion in 2nd round.
Candidate for GtW.

Contributor Comments:
(Dialog; please do not modify earlier comments; add follow-up always at the bottom of the discussion.)

[XXX]:

[YYY]:

[Nokia]: We prefer not to change the prior agreements unless any errors are found in those (Option 2).

[Huawei]: We prefer to keep prior agreements.----------GTW Note-------

Agreements: Keep prior agreements that do not include any Rel-16 UE demod requirements

Issue 3-3-4: PRB bundling size:

*Candidate options:*

* + Option 1: Change prior agreement: Only keep requirements with wideband PRB bundling size and PRB bundling size 2.
	+ Option 2: Keep prior agreements that only keep requirements with PRB bundling size 2.

*Recommendations for 2nd round:*

Come back after agreement on 16QAM requirement re-use.
Note that unless an agreement is reached, this topic is not captured in WF and proponents in favour of changing the prior agreement, need to re-open the discussion next meeting.

Contributor Comments:
(Dialog; please do not modify earlier comments; add follow-up always at the bottom of the discussion.)

[XXX]:

[YYY]:

[Nokia]: Agree to include wideband PRB bundling size. Otherwise, no Rank 3 test cases will be defined.

[Huawei]: Prefer to keep prior agreements.[Intel]: High order modulation and high number of MIMO layers is a typical configuration for backhaul link. In this case Rank 3 test case is in important test for IAB-MT. Also, it was defined with TDLA30-10 channel model so additional simulations for this test will not be needed unrespect of issue 3-2-4.

Issue 3-3-8: Test parameters specification simplification:

*Round 1 agreements:*

Do not specify the following parameters in IAB-MT PDSCH test configurations and leave them up to implementation:

* + - SSB,
		- PDCCH configuration,
		- CSI-RS for tracking,
		- ZP CSI-RS.

FFS: Clarify what “remove/not specify and leave up to implementation” means in terms of capturing in the specification.

*Candidate options:*

* + Option 1: Keep the corresponding rows in specification tables and mark “up to implementation”.
	+ Option 2: Remove the corresponding rows in specification tables.
	+ Option 3: Other options not precluded.

*Recommendations for 2nd round:*

Continue to discuss the FFS in second round and be aware about potential overlap with Issue 3-2-3.

Please also answer the raised question “we are not clear why TRS might be not transmitted. In this case how IAB-MT can do fine time/frequency synchronization (e.g. on sample level)?”

Contributor Comments:
(Dialog; please do not modify earlier comments; add follow-up always at the bottom of the discussion.)

[XXX]:

[YYY]:

[Nokia]: Similarly, to Issue 3-2-3, we think that the optimal solution would be to exclude excessive information from the specification. However, a commend can be added that SSB, PDCCH, CSI-RS and ZP CSI-RS parameters are left up to implementation.

[Huawei]: Same view as Issue 3-2-3, we prefer Option 2.[Intel]: We are fine with Option 2 but prefer to have note in specification as transmission of SSB, TRS, CSI-RS is not precluded.

### (2nd) Sub-topic 3-4: PDCCH

Issue 3-4-1: Aggregation Level:

*Candidate options:*

* + Option 1: Include all PDCCH requirements and require IAB-MT to pass all of them.
	+ Option 2: Keep one PDCCH performance requirements selected by companies (such as 8), or include all PDCCH requirements with applicability rule with different aggregation level that any one PDCCH case has passed can be considered that all PDCCH cases are passed.
	+ Option 3: Include all TDD PDCCH requirements except for AL 16.
	+ Option 4: Include only AL4 and AL8 with 1Tx/2Tx

*Recommendations for 2nd round:*

Continue discussion in 2nd round, preferable after agreement on Issue 3-4-3.
Candidate for GtW.

Contributor Comments:
(Dialog; please do not modify earlier comments; add follow-up always at the bottom of the discussion.)

[Intel]: We do not prefer to consider AL4 and AL8 without AL2 since test cases with first two configurations were defined with DCI format 1\_1 and with AL2 with DCI format 1\_0. We prefer to have better test coverage and require IAB-MT to pass all of them.

[YYY]:

----------------GTW Note--------------

Huawei: We are fine with option 3. Same issue for propagation conditions?

Nokia: Issue 3-4-3.

Agreements:

Include all TDD PDCCH requirements except for AL 16.

Issue 3-4-2: Test parameter specification simplification:

*Round 1 agreements:*

Follow tentative agreement from Issue 3-2-3:

No need to specify SSB, TRS, CSI-RS in the test parameters and FRCs.
FFS: Configurations for SSB, TRS, CSI-RS can be defined.

*Candidate options:*

None

*Recommendations for 2nd round:*

Please continue to discuss the remaining FFS in Issue 3-2-3.
I.e., no need to continue discussion here.

Contributor Comments:
(Dialog; please do not modify earlier comments; add follow-up always at the bottom of the discussion.)

[XXX]:

[YYY]:

Issue 3-4-3: Propagation condition:

*Candidate options:*

* + Option 1: Not down-select requirements for PDCCH from UE demod due to propagation conditions.
	+ Option 2: Change high speed propagation condition to TDLA30-10 for FR1 and TDLA30-75 for FR2.

*Recommendations for 2nd round:*

Continue discussion in second round.
Take progress and agreements from Issue 3-2-4 into account.

Contributor Comments:
(Dialog; please do not modify earlier comments; add follow-up always at the bottom of the discussion.)

[XXX]:

[YYY]:

---------------GTW Note ---------------

Huawei: We prefer apply the same approach as PDSCH. For simulation work, we think still manageable.

Intel: we define the propagation in general section, we prefer to take same approach as PDSCH and PDCCH.

Nokia: There are many cases include several channel models, the simulation work load need to be considered.

Agreements: Apply same approach as PDSCH.

### (2nd) Sub-topic 3-5: PBCH

Issue 3-5-1: Inclusion of PBCH:

*Tentative agreements:*

None

*Candidate options:*

* + Option 1: Reuse UE PBCH requirements for IAB-MT node.
	+ Option 2: Do not introduce PBCH requirements for IAB-MT.
	+ Option 3: Re-use and test the TDD UE demodulation minimum performance requirements for the case of “SS/PBCH block index is known”. Skip the cases of unknown index.

*Recommendations for 2nd round:*

More discussion is needed on this issue. Especially considering the opportunities provided by BS style testing:
“For UE it is not possible to test PBCH since there is no feedback link for this channel. However, considering BS testing approach it might be possible to calculate PBCH miss detection rate using testing mode”

Contributor Comments:
(Dialog; please do not modify earlier comments; add follow-up always at the bottom of the discussion.)

[XXX]:

[YYY]:

[Nokia]: We prefer Option 2, because IAB can potentially operate without detecting PBCH and we do not see a need to introduce a new mandatory test that was not present before.

[Huawei]: We prefer Option 2.

### (2nd) Sub-topic 3-6: SDR

No open topics or issues after 1st round.

Contributor Comments:
(Dialog; please do not modify earlier comments; add follow-up always at the bottom of the discussion.)

[XXX]:

[YYY]:

### (2nd) Sub-topic 3-7: CSI Reporting

Issue 3-7-1: Test parameter specification simplification:

*Round 1 agreements:*

Follow tentative agreement from Issue 3-2-3:

No need to specify SSB, TRS, CSI-RS in the test parameters and FRCs.
FFS: Configurations for SSB, TRS, CSI-RS can be defined.

*Candidate options:*

None

*Recommendations for 2nd round:*

Please continue to discuss the remaining FFS in Issue 3-2-3.
I.e., no need to continue discussion here.

Contributor Comments:
(Dialog; please do not modify earlier comments; add follow-up always at the bottom of the discussion.)

[XXX]:

[YYY]:

Issue 3-7-3: CQI CSI-RS Resource type and report config:

*Candidate options:*

* + Option 1:
		- For FR1, use periodic reporting for both AWGN and fading conditions.
		- For FR2, use periodic reporting for AWGN and aperiodic reporting for fading conditions.
	+ Option 2: Limit requirements to only include periodic NZP CSI-RS and reporting.
	+ Option 3: Requirements building on aperiodic reporting can be re-used for periodic reporting.

*Recommendations for 2nd round:*

Continue discussion in 2nd round.
Candidate for GtW.

Contributor Comments:
(Dialog; please do not modify earlier comments; add follow-up always at the bottom of the discussion.)

[Intel]: Periodic or Aperiodic resource type and report config do not affect exact requirement. Prefer to continue discussion on CSI down-scoping under this assumption as mentioned in Option 3.

[YYY]:

[Nokia]: We propose to use a combination of Options 2 and 3.

[Huawei]: We are OK with Option 2.

Issue 3-7-5: CQI propagation condition:

*Round 1 agreements:*

Skip two tap channel.

*Candidate options:*

* + Option 2: Limit the propagation conditions in CQI reporting to re-use AWGN and TDLA, skip two tap channel.
	+ Option 3: Only keep CQI AWGN requirements.

*Recommendations for 2nd round:*

Continue discussion on candidate options in second round.

Contributor Comments:
(Dialog; please do not modify earlier comments; add follow-up always at the bottom of the discussion.)

[XXX]:

[YYY]:

[Nokia]: Takin into account LoS IAB propagation we do not see much usefulness of TDLA propagation conditions. Hence, we prefer Option 3.

[Huawei]: As per current specification TS 38.101-4, PUCCH or PUSCH is used for CSI reporting. However, considering BS-like testing, the related feedback should be left up to implementation.

For CQI fading cases, PMI/RI cases, test metric is defined as ratio of throughput with each reporting and that with fixed/random value, test complexity will be increased. At the same time, considering rather stable environment between different IABs, it is not necessary to report PMI and RI. Therefore, we propose to only keep CQI AWGN requirements for IAB MT.

Issue 3-7-6: PMI inclusion:

*Candidate options:*

* + Option 2: Reuse all PMI reporting test cases which were defined for TDD duplex mode for 4 Rx conducted and 2 Rx radiated requirements but change report configuration and CSI-RS resource type from aperiodic to periodic.
	+ Option 3: Not to include PMI requirements for IAB-MT.

*Recommendations for 2nd round:*

Continue discussion in 2nd round.

Contributor Comments:
(Dialog; please do not modify earlier comments; add follow-up always at the bottom of the discussion.)

[XXX]:

[YYY]:

[Nokia]: Practical IAB systems can support PMI reporting but can also have hardcoded PMI value and just rely on SSB beams, especially in LoS propagation conditions. Therefore, our preference is Option 3.

[Huawei]: Option 3. Considering rather stable environment for between different IABs, it is not so necessary to report PMI and RI in the real NW.

Issue 3-7-7: PMI CSI-RS Resource type and report config:

*Candidate options:*

* + Option 1: Change report configuration and CSI-RS resource type from aperiodic to periodic
	+ Option 2: Limit requirements to only include periodic NZP CSI-RS and reporting.

*Recommendations for 2nd round:*

Continue discussion in 2nd round.

Contributor Comments:
(Dialog; please do not modify earlier comments; add follow-up always at the bottom of the discussion.)

[XXX]:

[YYY]:

Issue 3-7-8: RI inclusion:

*Candidate options:*

* + Option 2: Reuse all RI reporting test cases which were defined for TDD duplex mode for 4 Rx conducted and 2 Rx radiated requirements but change report configuration and CSI-RS resource type from aperiodic to periodic.
	+ Option 3: Not to include RI requirements for IAB-MT.

*Recommendations for 2nd round:*

Continue discussion in 2nd round.

Contributor Comments:
(Dialog; please do not modify earlier comments; add follow-up always at the bottom of the discussion.)

[XXX]:

[YYY]:

[Nokia]: Functional IAB systems can also operate by using only link-adaptation based RI selection. The minimum test coverage does not need to include this. Hence, we prefer Option 3.

[Huawei]: Option 3. Considering rather stable environment for between different IABs, it is not so necessary to report PMI and RI in the real NW.

Issue 3-7-9: RI CSI-RS Resource type and report config:

*Candidate options:*

* + Option 1: Change report configuration and CSI-RS resource type from aperiodic to periodic
	+ Option 2: Limit requirements to only include periodic NZP CSI-RS and reporting.

*Recommendations for 2nd round:*

Continue discussion in 2nd round.

Contributor Comments:
(Dialog; please do not modify earlier comments; add follow-up always at the bottom of the discussion.)

[XXX]:

[YYY]:

### (2nd) Sub-topic 3-8: Interworking

No open topics or issues after 1st round.

Contributor Comments:
(Dialog; please do not modify earlier comments; add follow-up always at the bottom of the discussion.)

[XXX]:

[YYY]:

### (2nd) Sub-topic 3-9: Summary of requirement re-use (informative)

*Sub-topic description*

Using tables to track previously agreed and proposed main adaptations. Not all details are captured.
The agreements captured in the text of this summary document, as well as WFs, supersede the informative tables below.

*Open issues and candidate options before 2nd round:*

Table: UE requirement re-use table - FR1 (Informative)
Previous state: End of round 1.

|  |  |  |
| --- | --- | --- |
| **Feature** | **Previous State** | **Adaptations** |
| Rel-15 |
| PDSCH | MCS: ~~4,~~ 13, 19, 24(Table2)Mapping Type A, ~~Type B~~Channel: ~~TDLB100-400 Low, TDLC300-100 Low~~, TDLA30-10 Low, ~~HST-750, HST-1000,~~ TDLA30-10 **Med** (enhRX)Incl. ~~HARQ soft combining,~~~~Enhanced Receiver Type 1~~, ~~CSI-RS overlapped with PDSCH,LTE-NR coexistence~~ |   |
| PDCCH | Channel: TDLA30-10 Low, ~~TDLC300-100 Low~~, TDLA30-10 **Med**AL 2, 4, 8, 16Not include 15kHz SCS requirements for all cases |   |
| PBCH | Channel: ~~TDLC300-100 Low~~, TDLA30-10 Low |   |
| ~~SDR~~ | ~~Incl. CA~~ |   |
| CQI | Channel: AWGN, TDLA30-5 **high**, ~~Two tap~~Reporting: wideband, ~~sub-band~~CSI-RS type: periodicReport type: periodic, aperiodic |   |
| PMI | Channel: TDLA30-5 **high**Reporting: widebandCSI-RS type: periodic, aperiodicReport type: aperiodic |   |
| RI | Channel: TDLA30-5 Low**/high**CSI-RS type: periodicReport type: periodic |   |
| ~~Interworking~~ | ~~Subset of "verification in FR1" only~~ |   |
| Rel-16 |
| ~~URLLC ultra-low BLER~~ |   |   |
| ~~URLLC high reliability~~ |   |   |
| ~~URLLC low latency~~ |   |   |

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

Table: UE requirement re-use table - FR2 (Informative)
Previous state: End of round 1.

|  |  |  |
| --- | --- | --- |
| **Feature** | **Previous State** | **Adaptations** |
| Rel-15 |
| PDSCH | MCS: ~~4,~~ 13, 17, 18Mapping Type AChannel: ~~TDLC60-300 Low~~, ~~TDLA30-300 Low~~**/Med**, TDLA30-75 LowIncl. ~~HARQ soft combining,~~~~Enhanced Receiver Type 1~~ |   |
| PDCCH | Channel: TDLA30-75 Low, ~~TDLA30-300 Low~~AL 2, 4, 8, 16 |   |
| PBCH | Channel: TDLA30-75 Low, ~~TDLA30-300 Low~~ |   |
| ~~SDR~~ | ~~Incl. CA~~ |   |
| CQI | Channel: AWGN, TDLA30-35 **high**Reporting: widebandCSI-RS type: periodic, aperiodicReport type: periodic, aperiodic |   |
| PMI | Channel: TDLA30-35 LowReporting: widebandCSI-RS type: periodic, aperiodicReport type: aperiodic |   |
| RI | Channel: TDLA30-35 Low**/high**CSI-RS type: periodic, aperiodicReport type: aperiodic |   |
| ~~Interworking~~ | ~~Subset of "verification in FR2" only~~ |   |
| Rel-16 |
| ~~256 QAM~~ |   |   |
| ~~URLLC high reliability~~ |   |   |
| ~~URLLC low latency~~ |   |   |

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

### (2nd) Sub-topic 3-10: Other

No further topics or issues were alerted in 1st round.

Contributor Comments:
(Dialog; please do not modify earlier comments; add follow-up always at the bottom of the discussion.)

[XXX]:

[YYY]:

## 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”* |