**3GPP TSG-RAN WG4 Meeting # 97-e draftR4-2017618**

**Electronic Meeting, 2 – 13 Nov., 2020**

**Agenda item:** 7.4.8

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

**Title:** Email discussion summary for [97e][319] 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 NR IAB demodulation requirements (AI 7.4.8), with the email thread identifier “[97e][319] NR\_IAB\_Demod”.

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

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

7.4.8.1 General [NR\_IAB-Perf]

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

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

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

We remark that RAN4#97e has 1 TU allocated to RRM NR\_IAB-Perf [[RP-201755](https://www.3gpp.org/ftp/TSG_RAN/TSG_RAN/TSGR_89e/Docs/RP-201755.zip)].

## 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 [97e][319] NR\_IAB\_Demod.

Please also check the “RAN4#96-e E-meeting Arrangements and Guidelines”, 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 [319] NR\_IAB\_Demod.

* Draft folder:   
   [[97e][319] NR\_IAB\_Demod](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Inbox/Drafts/%5B97e%5D%5B319%5D%20NR_IAB_Demod)  
  https://www.3gpp.org/ftp/TSG\_RAN/WG4\_Radio/TSGR4\_97\_e/Inbox/Drafts/%5B97e%5D%5B319%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\_319\_1st round V**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.
* The moderator is trying to provide a new “cleaned” revision of the base document once a day.   
  Example: “Summary\_319\_1st round V**3**.docx”
  + Comments only received by email will 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** |
| R4-2015868 | Ericsson | Tdoc Title: On IAB testing approach  **Proposal 1: Both IAB-DU and IAB-MT requirements are passed explicitly.**  **Proposal 2: Specify both conducted and OTA tests for both IAB-DU and IAB-MT** (Moderator: Captured in options within topics #2 and #3.)  **Proposal 3: Strive to ensure that the same test environment can be used to test both IAB-DU and IAB-MT**  **Proposal 4: Define IAB-MT and IAB-DU demodulation tests in the same manner as BS demodulation tests in RAN4. Strive to not preclude (but also not necessitate) UE style testing.**  (Moderator: Captured in options within topics #2 and #3.)  **Proposal 5: Co-ordinate the decisions on IAB demod and IAB RF testing to the extent necessary to ensure that the approach to testing is consistent.** |
| R4-2016039 | Qualcomm Incorporated | Tdoc Title: IAB Demodulation Testing  IAB-MT Demodulation Testing  Observation: the IAB-MT demodulation test setup needs to be a mix of the BS setup and the UE setup.  (Moderator: Captured in options within topics #1 and #3.) |
| R4-2016443 | Nokia, Nokia Shanghai Bell | Tdoc Title: On NR IAB general demodulation requirements  Work plan for IAB demod  **Proposal 1: RAN4 to discuss and approve the above work plan.**  BigCR work split  **Proposal 2: RAN4 to suggest to the NR\_IAB rapporteur to allocate bigCRs split for the IAB requirement and IAB conformance test specs each as follows: 1x bigCR RF, 1x bigCR RRM, 1x bigCR Demod, 1x bigCR Appendices.** |

## 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: Workplan for IAB demod

*Sub-topic description*

The latest TU request for NR\_IAB can be found in [RP-201755, “Status report for WI Integrated access and backhaul for NR; rapporteur: Qualcomm”, WI status report, RAN#89-e].  
It is not currently not clear to the moderator, if the IAB Demod workplan is to be provided by the rapporteur or the IAB Demod group itself. Nonetheless a proposal can be discussed and agreed as a suggestion during this meeting.

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

**Issue 1-1-1: Suggested workplan**

* Proposals
  + Option 1 (Nokia): Suggested workplan
    - ~~RAN4#96-e:~~
      * ~~Discussion and agreement on work plan.~~
      * ~~Discussion on overall performance impact~~
    - RAN4#97-e:
      * Finish discussions on work plan and performance impact.
      * Start discussions for requirements per physical channel.
      * Start Simulation configuration alignments and FRCs.
    - RAN4#98:
      * Finish discussions per physical backhaul channel.
      * Simulation results collection and alignment.
      * Present draftCRs to decide skeletons for IAB demodulation requirements/conformance tests.
    - RAN4#98-bis:
      * Present draftCRs to introducing IAB demodulation requirements/conformance tests; some numbers can be in [] or TBD.
      * Final round of simulation results collection and alignment.
    - RAN4#99:
      * Final draftCRs for TS 38.174 NR; Integrated Access and Backhaul (IAB) radio transmission and reception
      * Final draftCRs for TS 38.xxx NR; Integrated Access and Backhaul (IAB) conformance testing
  + Option 2: Other options not precluded.
* Recommended WF
  + Collect views in 1st round.

|  |  |
| --- | --- |
| **Company** | **Comments** |
| XXX |  |
| YYY |  |
| XXX |  |
| Huawei | We are OK with the work plan. |
| Qualcomm | We are fine with the proposal, it might require fine tuning as we go. |

### Sub-topic 1-2: Connections between IAB-DU and IAB-MT testing

*Sub-topic description:*

Several contributions have highlighted interdependencies between IAB-DU and IAB-MT testing. Whenever possible those questions have been included in topic #2 and topic#3 at the same time.  
The occurrences where this was not a workable solution, are captured in this sub-topic.

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

**Issue 1-2-1: Explicit test passing**

* Proposals
  + Option 1 (Ericsson): Both IAB-DU and IAB-MT requirements are passed explicitly
  + Option 2: Other options are not precluded.
* Recommended WF
  + Collect views in 1st round.

|  |  |
| --- | --- |
| **Company** | **Comments** |
| XXX |  |
| Huawei | We are OK with Option 1. |
| Nokia, Nokia Shanghai Bell | We agree with Option 1. |

**Issue 1-2-2: Test environment**

* Proposals
  + Option 1 (Ericsson, QC): Strive to ensure that the same test environment can be used to test both IAB-DU and IAB-MT
  + Option 2: Other options are not precluded.
* Recommended WF
  + Collect views in 1st round.

|  |  |
| --- | --- |
| **Company** | **Comments** |
| XXX |  |
| Huawei | We are OK with Option 1. |
| Nokia, Nokia Shanghai Bell | Option 1 is fine for us. |
| Qualcomm | This is fine for us |

### Sub-topic 1-3: Connection to IAB RF

*Sub-topic description*

Many of the topics and issues treated in IAB Demod are also being discussed in IAB RF, at least in a related capacity.

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

**Issue 1-3-1: Connection to IAB RF**

* Proposals
  + Option 1 (Ericsson): Co-ordinate the decisions on IAB demod and IAB RF testing to the extent necessary to ensure that the approach to testing is consistent
  + Option 2: Other options are not precluded.
* Recommended WF
  + ~~Collect views in 1~~~~st~~ ~~round.~~
* Agreements from Nov03 GtW (informative, check meeting report for original)
  + Agreement: Co-ordinate the decisions on IAB demod and IAB RF testing to the extent necessary to ensure that the approach to testing is consistent

|  |  |
| --- | --- |
| **Company** | **Comments** |
| XXX |  |
| Huawei | We are OK with Option 1. |
| Nokia, Nokia Shanghai Bell | Yes, we agree that IAB demod discussion should proceed in coordination with IAB RF testing, Options 1. |

### Sub-topic 1-4: BigCR work split

*Sub-topic description*

The document “RAN4 meeting improvements v1.6 - Final.pptx” shared by the RAN4 leadership in RAN4#96e, indicates that the bigCR approach should be adopted for the performance part of NR\_IAB.

The bigCR approach is defined as follows:

|  |
| --- |
| * Big CR approach is adopted.   + “Big” means for each affected specification, either for core requirements or for perf requirements, maximum 4 such CRs are allowed. The detailed Big CR split is up to rapporteur and interested companies.     - Companies submit Draft CRs (or TPs in the case that a TS is not yet under change control), maximum one Draft CR (or TP) per specification per AI per company/organization       * Draft CR shall be based on the latest version of big Draft CR.     - After each meeting, the sourcing company of big Draft CR (based on the big CR work split agreement) combines all endorsed Draft CRs into Big Draft CR(s) which are further endorsed in the post-meeting email approval process.       * After each RAN plenary meeting, the big Draft CR, if needed, shall be updated based on the latest specification.     - Towards the end of the WI, formal CRs will be provided by the sourcing company of big Draft CR |

While “detailed Big CR split is up to rapporteur”, a suggestion can be agreed by the IAB demod group.

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

**Issue 1-4-1: Suggested bigCR work split**

* Proposals
  + Option 1 (Nokia): suggest to the NR\_IAB rapporteur to allocate bigCRs split for the IAB requirement and IAB conformance test specs each as follows:   
    1x bigCR RF,   
    1x bigCR RRM,   
    1x bigCR Demod,   
    1x bigCR Appendices.
  + Option 2: Other options are not precluded.
* Recommended WF
  + Following chair guidance, do not further discuss for now and wait for bigCR split to be decided by specification rapporteur.

|  |  |
| --- | --- |
| **Company** | **Comments** |
| XXX |  |
| Huawei | We are OK with Option 1 and prefer to take bigCR Demod. |
| Ericsson | We volunteer for either demod or Appendices. Shouldn’t RRM and RF be discussed in the appropriate sessions ? Maybe Demod should be split into DU and MT ? (in which case, we volunteer for one of them) |
| Nokia, Nokia Shanghai Bell | According to the latest meeting rules, it can be maximum 4 bigCRs per specification. It also could be that IAB requirements specification have 2 parts: conducted and radiated. |
| Moderator | In the Nov03GTW, guidance was requested from the co-chair on how to treat/proceed with the bigCR approach.  It is the moderator’s understanding of the guidance, that the bigCR split will be decided and communicated to the IAB demod group at a later point by the specification rapporteur of 38.174 and the specification rapporteur(s) of the future IAB conformance testing specification(s). |

### Sub-topic 1-5: 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 |
|  |
| None |  |
|  |
|  |
|  |

## 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: Workplan for IAB demod**  Issue 1-1-1: Suggested workplan  *Tentative agreements:*  The suggested workplan is agreeable with future necessary adjustments not precluded.   * + - RAN4#97-e:       * Finish discussions on work plan and performance impact.       * Start discussions for requirements per physical channel.       * Start Simulation configuration alignments and FRCs.     - RAN4#98:       * Finish discussions per physical backhaul channel.       * Simulation results collection and alignment.       * Present draftCRs to decide skeletons for IAB demodulation requirements/conformance tests.     - RAN4#98-bis:       * Present draftCRs to introducing IAB demodulation requirements/conformance tests; some numbers can be in [] or TBD.       * Final round of simulation results collection and alignment.     - RAN4#99:       * Final draftCRs for TS 38.174 NR; Integrated Access and Backhaul (IAB) radio transmission and reception       * Final draftCRs for TS 38.xxx NR; Integrated Access and Backhaul (IAB) conformance testing   *Recommendations for 2nd round:*  Tentative agreement is agreeable. |
| **Sub-topic 1-2** | **Sub-topic 1-2 Connections between IAB-DU and IAB-MT testing**  Issue 1-2-1: Explicit test passing  *Tentative agreements:*  Both IAB-DU and IAB-MT requirements are passed explicitly  *Recommendations for 2nd round:*  No opposing views received; tentative agreements are agreeable.  Issue 1-2-2: Test environment  *Tentative agreements:*  Strive to ensure that the same test environment can be used to test both IAB-DU and IAB-MT  *Recommendations for 2nd round:*  No opposing views received; tentative agreements are agreeable. |
| **Sub-topic 1-3** | **Sub-topic 1-3: Connection to IAB RF**  Issue 1-3-1: Connection to IAB RF  *GtW agreements:*  Co-ordinate the decisions on IAB demod and IAB RF testing to the extent necessary to ensure that the approach to testing is consistent  *Recommendations for 2nd round:*  Added for information. Check meeting report for agreement. |
| **Sub-topic 1-4** | **Sub-topic 1-4 BigCR work split**  Issue 1-4-1: Suggested bigCR work split  *Tentative agreements:*  Following chair guidance, do not further discuss for now and wait for bigCR split to be decided by specification rapporteur.  *Recommendations for 2nd round:*  Tentative agreement is agreeable but does not need to be captured. |

*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

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.  
For example,

**Issue x-x-x: TBA**

• Option 1 (CpyA, CpyC): TBA

• Option 2 (CpyB): TBA

Recommended WF

• TBA

Companies’ comments:

[CpyC]: View of cpyC.

[CpyB]: View of cpyB.

[CpyC]: Updated view of cpyC.

[Moderator]: Updated recommended WF or options, due to compromise between cpyC and cpyB.

[CpyA]:

etc.

### Sub-topic 1-1: Workplan for IAB demod

All open issues agreed in first round.  
Thank you very much for the cooperative work!

### Sub-topic 1-2 Connections between IAB-DU and IAB-MT testing

All open issues agreed in first round.  
Thank you very much for the cooperative work!

### Sub-topic 1-3: Connection to IAB RF

All open issues agreed in first round.  
Thank you very much for the cooperative work!

### Sub-topic 1-4 BigCR work split

All open issues agreed in first round.  
Thank you very much for the cooperative work!

## 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** |
| R4-2015592 | Huawei, HiSilicon | Tdoc Title: Discussion on NR IAB DU demodulation performance requirements  **Proposal 1: Based on Rel-15 gNB performance requirements to discuss IAB-DU performance requirements definition.**  Observation 1: There is negligible performance difference between different mapping type, bandwidth and SCS.  Observation 2: There is negligible difference between different DM-RS configuration for PUCCH format 3 and 4.  **Proposal 2: Follow the principle stated above, further down select the cases:  - Skip PUSCH cases with QPSK and 16QAM -** **Define performance requirements with mapping type, bandwidth and SCS agnostic - Define performance requirements with DMRS configuration agnostic for PUCCH format 3 and 4 - Skip cases with TDLB100-400 Low and TDLC300-100 Low for FR1 and TDLA30-300 Low for FR2. If there is no cases with other propagation conditions, replace the propagation conditions to TDLA30-10 Low for FR1 and TDLA30-75 Low for FR2. - Skip cases for HST and multi-slot PUCCH. - Only keep format 0 with 1.25kHz SCS and C2 with 30kHz and 120kHz SCS for PRACH performance requirements - Skip performance requirements for CA - Only keep 8Rx related performance requirements for FR1** [Moderator: Bullet point not captured in tdoc section 3: Proposals]  **Proposal 3: Reuse applicability rule for IAB-DU defined for BS in TS 38.141-1 and TS 38.141-2 if possible.**  **Proposal 4: Define NR IAB DU performance requirements as per overview in Table 2-4 and 2.-5 for FR1 and FR2 respectively.** [Moderator: Tables omitted here.] |
| R4-2015870 | Ericsson | Tdoc Title: IAB-DU demodulation requirements  Observation 1: There is no technical reason why the IAB access link could not be designed to support the same scenarios as a gNB, hence from a technical point of view all gNB demodulation requirements could be applicable (apart from possibly URLLC low latency).  Observation 2: The IAB DU backhaul link requirements are a sub-set of the IAB-DU access link requirements. |
| R4-2016444 | Nokia, Nokia Shanghai Bell | Tdoc Title: On NR IAB-DU demodulation requirements  General considerations  Observation 1: All new IAB-related features have a minor impact on the BS demodulation performance.  **Proposal 1: There is no need to introduce any new performance requirements for IAB-DU in addition to already existing BS requirements.**  Observation 2: IAB-node deployment conditions are different from the traditional RAN scenarios. In general, they are much more predictable, e.g., without IAB-node mobility, with principally LoS propagation conditions for BH links, very little beam management. Moreover, existing scenarios do not necessitate the use of IAB-nodes together with such features as HST, URLLC, etc.  **Proposal 2: Consider reduced and/or simplified scope of IAB-BS performance requirements, i.e., selectively copy paste from BS demod requirements to the extent possible to avoid additional work.**  **Proposal 3: RAN4 to base IAB-DU performance requirements on the 3GPP Release 15 features (e.g., excluding HST, URLLC, etc.) and consider additional features only by request.**  Detailed scope of IAB-DU requirements  **Proposal 4: RAN4 to re-use BS performance requirements for IAB-DU by following the criteria:  a. Re-use only propagation conditions adapted to the stationary LOS use case in a requirement, i.e., skip channels with large delay and/or Doppler spread such as TDLB100-400 Low, TDLA30-300 Low, etc., when there are alternatives.  b. Re-use only 1T2R requirements.  c. Re-use only requirements for PUSCH with transform precoding disabled.  d. Limit the PUCCH demodulation requirements to two cases chosen by the manufacturer.  e. Skip UL TA and HST tests.** |

## 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 requirement scope

*Sub-topic description:*

Please note that for IAB-DU, the test setup was already agreed in RAN4#96e [R4-2012644]:

|  |
| --- |
| IAB-DU - Test setup   * New test setup   + Re-use the BS test setup for both OTA and conducted requirements, with IAB-MT functionality disabled during the test. |

Hence the discussion on the scope of requirements for IAB-MT can be directly started from the first week on.

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

**Issue 2-1-1: IAB DU backhaul and access link differences**

* Background
  + Agreement from [R4-2012644]
    - Backhaul and access links  
      Limit the scope of IAB demod to UL (access and backhaul) and DL (backhaul) links.
* Proposals
  + Option 1 (Ericsson): Discuss whether there is any difference in RX scenario between backhaul and access for the IAB-DU
  + Option 2: Other options not precluded.
* Recommended WF
  + Companies are invited to discuss and present options, along with stating the impact of the proposals on the BS demod requirement re-use.
* Agreements from Nov03 GtW (informative, check meeting report for original)
  + RAN4 will introduce IAB-DU demodulation requirements covering UL access and backhaul links.
  + No need to discriminate the test cases for these two links in the specification.

|  |  |
| --- | --- |
| **Company** | **Comments** |
| XXX |  |
| Huawei | We prefer to only define one set of requirements applicable for both IAB-DU access link and IAB-DU backhaul link. |
| Ericsson | In our understanding, there is a difference between backhaul and access. Backhaul should be designed to be quite stable (most likely LoS) and high SNR. Access will be serving UEs and we do not see differences between serving a UE from a gNB and serving a UE from an IAB for access. We expect that a full range of SNR and probably channels are to be expected. |
| Nokia, Nokia Shanghai Bell | We do not see it necessary to introduce an explicit split in IAB-DU demod testing to reflect the difference between access and backhaul links. We need to use configurations covering both access and backhaul links. |

**Issue 2-1-2: Additional requirement configurations on top of BS ones**

* Proposals
  + Option 1 (Ericsson): The IAB DU backhaul link requirements are a sub-set of the IAB-DU access link requirements.
  + Option 2 (Nokia, Huawei): There is no need to introduce any new performance requirements for IAB-DU in addition to already existing BS requirements.
  + Option 3: Other options not precluded.
* Recommended WF
  + ~~No contributor wants to introduce requirements that go beyond previous BS requirements; one contributor explicitly proposes to not have additional requirements, while another one seems to also propose this indirectly.  
    Is it agreeable to say “The IAB DU backhaul link requirements are a sub-set of the IAB-DU access link requirements; no new requirements beyond BS requirements shall be introduced.”?~~
* Agreements from Nov03 GtW (informative, check meeting report for original)
  + There is no need to introduce any new performance requirements for IAB-DU in addition to already existing BS requirements.

|  |  |
| --- | --- |
| **Company** | **Comments** |
| XXX |  |
| Huawei | We prefer not to explicitly distinguish IAB-DU access link and IAB-DU backhaul link since there is no difference between them from RAN4’s perspective. |
| Ericsson | Recommended WF is OK |
| Nokia, Nokia Shanghai Bell | Recommended WF is fine for us. |
| Huawei | Ok with the recommended WF |

**Issue 2-1-3: Basis for requirement re-use**

* Proposals
  + Option 1 (Huawei, Nokia): Based on Rel-15 gNB performance requirements to discuss IAB-DU performance requirements definition.
  + Option 2 (Nokia, Huawei): Base IAB-DU performance requirements on the 3GPP Release 15 features (e.g., excluding HST, URLLC, etc.) and consider additional features only by request.
  + Option 3 (Ericsson): Discuss which Rel-16/15 requirements to exclude.
  + Option 4: Other options not precluded.
* Recommended WF
  + ~~Collect views in 1~~~~st~~ ~~round.~~
* Agreements from Nov03 GtW (informative, check meeting report for original)
  + Based on Rel-15 gNB performance requirements to discuss IAB-DU performance requirements definition.

|  |  |
| --- | --- |
| **Company** | **Comments** |
| XXX |  |
| Huawei | We prefer Option 1.  IAB WI is a Release 16 work item, considering the parallel discussions in other Release 16 WIs, it is reasonable to base on the existing Rel-15 BS performance requirements for IAB-DU performance requirements definition. |
| Ericsson | As discussed above, our understanding is that the access link (IAB-UE) is basically the same as the gNB-UE scenario, thus in principle all of the gNB requirements should apply. We can discuss more whether scnearios such as HST, URLLC, 2SR etc. are applicable (for the access link), although we note that support is declared and there is zero standardization effort whether they are included or not (possibly there may be issues with clashing rel-16 WIs though). |
| Nokia, Nokia Shanghai Bell | It may be challenging to keep up with all possible new requirements coming in Release 16 and future releases in IAB specifications. Thus, new features and related new requirements can be added later on if their support is needed. At the moment, it looks to be sufficient to make IAB requirements only based on Release 15 features. |

**Issue 2-1-4: Applicability rule re-use**

* Proposals
  + Option 1 (Huawei): Re-use applicability rule for IAB-DU defined for BS in TS 38.141-1 and TS 38.141-2, if possible.
  + Option 2: Other options not precluded.
* Recommended WF
  + Collect views in 1st round.

|  |  |
| --- | --- |
| **Company** | **Comments** |
| XXX |  |
| Huawei | Option 1. |
| Ericsson | It may be good to check the applicability rule to reduce the number of tests (considering that IAB-MT tests are needed as well). For example, test only the highest number of supported antennas. |
| Nokia, Nokia Shanghai Bell | Existing BS applicability rules shall be re-usable for IAB-DU. However, some additional rules can be introduced as well. Indeed, IAB-MT applicability rules should be better aligned with the IAB-DU ones. It makes sense to discuss that further in IAB-MT related section. |

### Sub-topic 2-2: Detailed scope of BS requirement re-use - tables/matrices

*Sub-topic description*

Last meeting’s way forward recommended for participants to provide an overview of a detailed requirement re-use scope

|  |
| --- |
| * Detailed scope of BS demod requirement re-use   + Option 1: Requirement matrix. A matrix is made of all current requirements is to be created and then a decision made on which are applicable for IAB-DU and which are not.   + Option 2: Not is scope for this meeting.   + Recommended WF: All participants are invited to provide a first overview of requirements to re-use/adapt/follow the principle of, for the next meeting. |

Following this recommendation, much input was received for this meeting.  
Most contributors have provided input in duplicated form: Classical proposals and a table/matrix detailing the exact impact of the proposals on the TS 38.104 BS demod requirements.  
In this sub-topic and the following ones, an attempt is made to capture both approaches; arguably the most progress could be made, by working directly on the shared table/matrix below.

Please check the moderator’s attempt of creating a shared table/matrix and comment on the preferred format going forward.

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

**Issue 2-2-1: Common BS requirement re-use table/matrix - FR1**

* Proposals

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Demodulation performance requirements | BS demod requirement configurations | | Declaration | Proposed adaptation for DU demod |
| PUSCH with transform precoding disabled | Antenna configuration | 1x2, 1x4, 1x8; 2x2, 2x4, 2x8 | SCS/CBW | Backhaul link  Antenna configuration:  Huawei: 1x8, 2x8 Nokia: 1x2, 2x2  Ericsson, Nokia: Can keep all requirements for antenna, but consider applicability rule such that only one is tested  Channel model: Huawei: TDLA30-10 Low only  Ericsson: Agreed considering backhaul link, but aren’t other channel models applicable for the access link ?  MCS:  Huawei: 19  Ericsson: Agree for backhaul link, but for the access link the full range of SNR could be encountered and thus alo lower modulation orders are applicable  CBW&SCS:  Huawei: agnostic  Resource mapping:  Huawei: agnostic |
| Channel model | TDLB100-400 Low, TDLC300-100 Low, TDLA30-10 Low |
| MCS | 2, 16, 19 |
| CBW&SCS | 5, 10, 20MHz for 15kHz SCS; 10, 20, 40, 100MHz for 30kHz SCS |
| Resource mapping | Type A, Type B |
| Additional DM-RS position | pos1 | Access link  Option: same as BH.  Option 2: Include all MCS and channel models. Include requirements for all antenna configurations, but consider tighter applicability rule. |
| Test metric | 70% of maximum TP |
| PUSCH with transform precoding disabled (30% TPUT) |  | 30% of maximum TP 1x2, TDLC300-100, MCS 16, Type A, pos1 30kHz/10MHz, 15kHz/5MHz | SCS/CBW | Backhaul link  Include these requirements: Huawei, Nokia: No |
| Access link  Option: same as BH. |
| PUSCH with transform precoding enabled | Antenna configuration | 1x2, 1x4, 1x8 | transform precoding support | Backhaul link  Include these requirements: Huawei, Nokia: No |
| Channel model | TDLB100-400 Low |
| MCS | 2 |
| CBW&SCS | 5MHz for 15kHz SCS; 10MHz for 30kHz SCS |
| Resource mapping | Type A, Type B | Access link  Option: same as BH.  Ericsson: For the access link, there may be power limited UEs and so we think that DFT-s-OFRM could be applicable- |
| Additional DM-RS position | pos1 |
| Test metric | 70% of maximum TP |
| UCI multiplexed on PUSCH | Antenna configuration | 1x2 | SCS/CBW | Backhaul link  Antenna configuration: Huawei, Nokia: 1x2  Channel model:  Huawei: TDLA30-10 Low  MCS:  Huawei: 19  CBW&SCS:  Huawei: agnostic  Resource mapping:  Huawei: agnostic |
| Channel model | TDLC300-100 Low |
| MCS | 16 |
| CBW&SCS | 10MHz for 30kHz SCS |
| Resource mapping | Type A, Type B | Access link  Option: same as BH.  Ericsson: Same comments; for the access link the full range of MCS, channel and antenna configuration are applicable. But consider tighter applicability rule for the antenna configuration. |
| Additional DM-RS position | pos1 |
| Test metric | 0.1%, 1% of BLER for CSI part 1, 2 respectively |
| PUSCH for high speed train |  |  | HST support | Backhaul link  Include these requirements: Huawei, Nokia: No  Low priority: Ericsson: No (For backhaul) |
| Access link  Option: same as BH.  Ericsson: Probably not a likely scenario, however there zero cost to include them and support is declared. |
| UL timing adjustment |  |  | HST support for scenario Y/Z, but not X | Backhaul link  Include these requirements: Huawei, Nokia: No  Low priority: Ericsson: No (For backhaul) |
| Access link  Option: same as BH.  Ericsson: If HST included, the timing adjustment should be included. |
| PUCCH format 0 | Antenna configuration | 1x2, 1x4, 1x8 | Format support | Backhaul link  Antenna configuration:  Huawei: 1x8 Nokia: 1x2  Channel model: Huawei: TDLA30-10 Low  CBW&SCS:  Huawei: agnostic  Resource mapping:  Huawei: agnostic  Limit number of PUCCH demodulation test: Nokia: 2 |
| Channel model | TDLC300-100 Low |
| CBW&SCS | 5, 10, 20MHz for 15kHz SCS; 10, 20, 40, 100MHz for 30kHz SCS | Access link  Option: same as BH.  Ericsson: Other channel models and more antenna configurations (with tighter applicability rule) probably applicable. |
| Test metric | 1% of ACK missed detection probability, 1% of DTX to ACK probability |
| PUCCH format 1 | Antenna configuration | 1x2, 1x4, 1x8 | Format support | Backhaul link  Antenna configuration:  Huawei: 1x8 Nokia: 1x2  Channel model: Huawei: TDLA30-10 Low  CBW&SCS:  Huawei: agnostic  Limit number of PUCCH demodulation requirements Nokia: 2 |
| Channel model | TDLC300-100 Low |
| CBW&SCS | 5, 10, 20MHz for 15kHz SCS; 10, 20, 40, 100MHz for 30kHz SCS | Access link  Option: same as BH.  Ericsson: Other channel models and more antenna configurations (with tighter applicability rule) probably applicable.  Regarding limiting number of requirements, we need to take care that the access link is properly covered. |
| Test metric | 0.1% of NACK to ACK probability, 1% of ACK missed detection probability, 1% of DTX to ACK probability |
| PUCCH format 2 | Antenna configuration | 1x2, 1x4, 1x8 | Format support | Backhaul link  Antenna configuration:  Huawei: 1x8 Nokia: 1x2  Channel model: Huawei: TDLA30-10 Low  CBW&SCS:  Huawei: agnostic  Limit number of PUCCH demodulation requirements: Nokia: 2 |
| Channel model | TDLC300-100 Low |
| CBW&SCS | 5, 10, 20MHz for 15kHz SCS; 10, 20, 40, 100MHz for 30kHz SCS | Access link  Option: same as BH.  Ericsson: Other channel models and more antenna configurations (with tighter applicability rule) probably applicable.  Regarding limiting number of requirements, we need to take care that the access link is properly covered. |
| Test metric | 1% of ACK missed detection probability, 1% of BLER, 1% of DTX to ACK probability |
| PUCCH format 3 | Antenna configuration | 1x2, 1x4, 1x8 | Format support | Backhaul link  Antenna configuration:  Huawei: 1x8 Nokia: 1x2  Channel model: Huawei: TDLA30-10 Low  CBW&SCS:  Huawei: agnostic  Limit number of PUCCH demodulation requirements: Nokia: 2 |
| Channel model | TDLC300-100 Low |
| CBW&SCS | 5, 10, 20MHz for 15kHz SCS; 10, 20, 40, 100MHz for 30kHz SCS | Access link  Option: same as BH.  Ericsson: Other channel models and more antenna configurations (with tighter applicability rule) probably applicable.  Regarding limiting number of requirements, we need to take care that the access link is properly covered. |
| Test metric | 1% of BLER, 1% of DTX to ACK probability |
| PUCCH format 4 | Antenna configuration | 1x2, 1x4, 1x8 | Format support | Backhaul link  Antenna configuration:  Huawei: 1x8 Nokia: 1x2  Channel model: Huawei: TDLA30-10 Low  CBW&SCS:  Huawei: agnostic  Limit number of PUCCH demodulation test: Nokia: 2 |
| Channel model | TDLC300-100 Low |
| CBW&SCS | 5, 10, 20MHz for 15kHz SCS; 10, 20, 40, 100MHz for 30kHz SCS | Access link  Option: same as BH.  Ericsson: Other channel models and more antenna configurations (with tighter applicability rule) probably applicable.  Regarding limiting number of requirements, we need to take care that the access link is properly covered. |
| Test metric | 1% of BLER, 1% of DTX to ACK probability |
| Multi-slot PUCCH format 1 | Antenna configuration | 1x2 | SCS/CBW | Backhaul link  Include these requirements: Huawei: No |
| Channel model | TDLC300-100 Low |
| CBW&SCS | 40MHz for 30kHz SCS | Access link  Option: same as BH.  Ericsson: These may be applicable for the access link. |
| Test metric | 0.1% of NACK to ACK probability, 1% of ACK missed detection probability, 1% of DTX to ACK probability |
| PRACH | Antenna configuration | 1x2, 1x4, 1x8 | Format support | Backhaul link  Antenna configuration:  Huawei: 1x8 Nokia: 1x2  Channel model: Huawei: TDLA30-10 Low FO=400Hz  Burst format &SCS: Huawei: Format 0 for 1.25kHz SCS, C2 for 30kHz SCS |
| Channel model | AWGN, TDLC300-100 Low FO=400Hz |
| Burst format &SCS | 0 for 1.25kHz SCS; A1, A2, A3, B4, C0, C2 for 15kHz SCS and 30kHz SCS | Access link  Option: same as BH.  Ericsson: Other channel models and more antenna configurations (with tighter applicability rule) probably applicable.  Regarding limiting number of requirements, we need to take care that the access link is properly covered. |
| Test metric | 99% of detection probability, 0.1% of false alarm probability |
| PRACH HST |  |  | HST support | Backhaul link  Include these requirements: Huawei, Nokia: No  Low priority: Ericsson: No |
| Access link  Option: same as BH.  If HST included, HST PRACH should be included |
| 2-step RACH |  |  | Unknown | Backhaul link  Include these requirements: Huawei, Nokia: No (not Rel-15) |
| Access link  Option: same as BH.  Ericsson: As with HST, it is on the other hand zero effort to include and support is declared. (But clashing WIs may be a problem) |
| NR-U |  |  | Unknown | Backhaul link  Include these requirements: Huawei, Nokia: No (not Rel-15)  Low priority: Ericsson: No (No unlicensed IAB band) |
| Access link  Option: same as BH. |
| URLLC 0.001% BLER |  |  | Unknown | Backhaul link  Include these requirements: Huawei, Nokia: No (not Rel-15)  Low priority: Ericsson: Yes |
| Access link  Option: same as BH.  Also as (very) low priority (same comments as HST; actually zero effort to includebut maybe clashing WIs) |
| URLLC high reliability |  |  | Unknown | Backhaul link  Include these requirements: Huawei, Nokia: No (not Rel-15)  Low priority: Ericsson: Yes |
| Access link  Option: same as BH.  Also as (very) low priority (same comments as HST; actually zero effort to includebut maybe clashing WIs) |
| URLLC low latency |  |  | Unknown | Backhaul link  Include these requirements: Huawei, Nokia: No (not Rel-15)  Low priority: Ericsson: Yes |
| Access link  Option: same as BH. Also as (very) low priority (same comments as HST; actually zero effort to includebut maybe clashing WIs) |

* Recommended WF
  + Please comment on the acceptability of this format or voice wishes to transform this table into “informative” material only, within the first few days of the meeting.

|  |  |
| --- | --- |
| **Company** | **Comments** |
| XXX |  |
| Huawei | Our comments are added for each requirements |
| Ericsson | To solve this table, we need to solve two issues:   * For the access link (i.e. IAB-DU receiving from UE) aren’t all of the scenarios for gNB-UE applicable ? If not, why ? * For the rel-16 features, several are not very likely for IAB, but on the other hand there is zero standardization effort to include them and support is declared. We would like to understand reasons to not include (possibly clashing WIs). (Note; HST not applicable for backhaul link, only access link). |
| Nokia, Nokia Shanghai Bell | The table format suits well. Following our comment on the Issie 2-1-1 (IAB-DU backhaul and access link differences), the IAB-DU shall support both UEs and MTs. Therefore, we do not see a need to introduce different sets of requirements for access and backhaul links. The split for access/backhaul link in the last column can be removed, and access configurations can be used as a basis. |
| Qualcomm | First of all we should discuss whether any deployment scenario assumed for “normal” gNBs(Rel.15) is also applicable for IAB-DU or not. Considering the difference between IAB and gNB is just the backhaul we believe this should be the case. As such, all the tests should apply. |
| Intel | Since it was agreed that RAN4 will not differentiate between access and backhaul links in terms of defined requirements, we should ensure that selected test cases will cover performance of both access and backhaul links. Access link is same as up-link to BS. During the Rel-15/16 comprehensive studies were conducted to ensure reasonable and sufficient coverage for up-link performance. In this case we suggest considering reusing of all at least Rel-15 test cases (for different MCS, channel models, both waveform, different antenna models, PRACH preamble formats, PUCCH formats, etc.). Same time we are fine to reduce the test efforts by defining new applicability rules for IAB nodes. |
| Nokia, Nokia Shanghai Bell | If Rel-16 HST requirements are excluded, then there are no other channel models in BS requirements that can be considered as high-speed. All of them are relevant for access UEs and can be kept for IAB-DU tests. There is no need to introduce new channel models either. Could, Huawei, clarify, please, what high speed scenarios you were referring to during the discussion of Issues 2-1-2 at GtW session? We would still prefer to keep only 2Rx requirements but can agree with the proposal by Ericsson to have the applicability rule and test only maximum number of Rx antennas supported by the IAB-DU. |

**Issue 2-2-2: Common BS requirement re-use table/matrix - FR2**

* Proposals

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Demodulation performance requirements | BS demod requirement configurations | | Declaration | Proposed adaptation for DU demod |
| PUSCH with transform precoding disabled | Antenna configuration | 1x2, 2x2 | SCS/CBW | Backhaul link  Antenna configuration:  Huawei, Nokia: 1x2, 2x2  Channel model: Huawei: TDLA30-75 Low only  MCS:  Huawei: 19  CBW&SCS:  Huawei: agnostic  Resource mapping:  Huawei: agnostic |
| Channel model | TDLA30-300 Low, TDLA30-75 Low |
| MCS | 2, 16, 19 |
| CBW&SCS | 50, 100MHz for 60kHz SCS; 50, 100, 200MHz for 120kHz SCS |
| Resource mapping | Type B | Access link  Option: same as BH.  Ericsson: Agree for backhaul link, but for the access link the full range of SNR could be encountered and thus alo lower modulation orders, more channels are applicable |
| Additional DM-RS position | pos0, pos1 |
| Test metric | 70% of maximum TP |
| PUSCH with transform precoding disabled (30%TPUT) |  | 30% of maximum TP 1x2, TDLA30-300, MCS 16, Type B, pos0&1, PT-RS on/off 120kHz/50MHz, 60kHz/50MHz | SCS/CBW | Backhaul link  Include these requirements: Huawei, Nokia: No (not Rel-15) |
| Access link  Option: same as BH. |
| PUSCH with transform precoding enabled | Antenna configuration | 1x2 | transform precoding support | Backhaul link  Include these requirements: Huawei, Nokia: No |
| Channel model | TDLA30-300 Low |
| MCS | 2 |
| CBW&SCS | 50MHz for 60kHz SCS; 50MHz for 120kHz SCS |
| Resource mapping | Type B | Access link  Option: same as BH.  Ericsson: Agree for backhaul link, but for the access link the full range of SNR could be encountered and thus also DFT-s could be applicable (power limited UEs) |
| Additional DM-RS position | pos0, pos1 |
| Test metric | 70% of maximum TP |
| UCI multiplexed on PUSCH | Antenna configuration | 1x2 | SCS/CBW | Backhaul link  Antenna configuration: Huawei, Nokia: 1x2  Channel model: Huawei: Change to TDLA30-75 Low  Ericsson: If the channel model and MCS are changed, then new simulations are needed. Isn’t in practice the existing requirement sufficient ?  MCS:  Huawei: 19  CBW&SCS:  Huawei: agnostic  Resource mapping:  Huawei: agnostic |
| Channel model | TDLA30-300 Low |
| MCS | 16 |
| CBW&SCS | 50MHz for 120kHz SCS |
| Resource mapping | Type B | Access link  Option: same as BH. |
| Additional DM-RS position | pos0, pos1 |
| Test metric | 0.1%, 1% of BLER for CSI part 1, 2 respectively |
| PUCCH format 0 | Antenna configuration | 1x2 | Format support | Backhaul link  Antenna configuration:  Huawei, Nokia: 1x2  Channel model: Huawei: Change to TDLA30-75 Low  Ericsson: Understand the principle, but is it really worth to spend additional simulations ?  Also a requirement is needed for the access link; preferably only 1 channel model.  CBW&SCS:  Huawei: agnostic |
| Channel model | TDLA30-300 Low |
| CBW&SCS | 50, 100MHz for 60kHz SCS; 50, 100, 200MHz for 120kHz SCS | Access link  Option: same as BH. |
| Test metric | 1% of ACK missed detection probability, 1% of DTX to ACK probability |
| PUCCH format 1 | Antenna configuration | 1x2 | Format support | Backhaul link  Antenna configuration:  Huawei, Nokia: 1x2  Channel model: Huawei: Change to TDLA30-75 Low  CBW&SCS:  Huawei: agnostic |
| Channel model | TDLA30-300 Low |
| CBW&SCS | 50, 100MHz for 60kHz SCS; 50, 100, 200MHz for 120kHz SCS | Access link  Option: same as BH. |
| Test metric | 0.1% of NACK to ACK probability, 1% of ACK missed detection probability, 1% of DTX to ACK probability |
| PUCCH format 2 | Antenna configuration | 1x2 | Format support | Backhaul link  Antenna configuration:  Huawei, Nokia: 1x2  Channel model: Huawei: Change to TDLA30-75 Low  Ericsson: Understand the principle, but is it really worth to spend additional simulations ?  CBW&SCS:  Huawei: agnostic |
| Channel model | TDLA30-300 Low |
| CBW&SCS | 50, 100MHz for 60kHz SCS; 50, 100, 200MHz for 120kHz SCS | Access link  Option: same as BH. |
| Test metric | 1% of ACK missed detection probability, 1% of BLER, 1% of DTX to ACK probability |
| PUCCH format 3 | Antenna configuration | 1x2 | Format support | Backhaul link  Antenna configuration:  Huawei, Nokia: 1x2  Channel model: Huawei: Change to TDLA30-75 Low  Ericsson: Understand the principle, but is it really worth to spend additional simulations ?  CBW&SCS:  Huawei: agnostic |
| Channel model | TDLA30-300 Low |
| CBW&SCS | 50, 100MHz for 60kHz SCS; 50, 100, 200MHz for 120kHz SCS | Access link  Option: same as BH. |
| Test metric | 1% of BLER, 1% of DTX to ACK probability |
| PUCCH format 4 | Antenna configuration | 1x2 | Format support | Backhaul link  Antenna configuration:  Huawei, Nokia: 1x2  Channel model: Huawei: Change to TDLA30-75 Low  Ericsson: Understand the principle, but is it really worth to spend additional simulations ?  CBW&SCS:  Huawei: agnostic |
| Channel model | TDLA30-300 Low |
| CBW&SCS | 50, 100MHz for 60kHz SCS; 50, 100, 200MHz for 120kHz SCS | Access link  Option: same as BH. |
| Test metric | 1% of BLER, 1% of DTX to ACK probability |
| PRACH | Antenna configuration | 1x2 | Format support | Backhaul link  Antenna configuration:  Huawei, Nokia: 1x2  Channel model: Huawei: Change to TDLA30-75 Low FO=4000Hz  Ericsson: Understand the principle, but is it really worth to spend additional simulations ?  Burst format &SCS:  Huawei: C2 for 120kHz SCS  CBW&SCS:  Huawei: agnostic |
| Channel model | AWGN, TDLA30-300 Low FO=4000Hz |
| Burst format &SCS | A1, A2, A3, B4, C0, C2 for 60kHz SCS; A1, A2, A3, B4, C0, C2 for 120kHz SCS | Access link  Option: same as BH.  Ericsson: We should import all of the gNB requirements for the access link. (As copy/paste; no new simulations) as circumstances may differ from the backhaul link. |
| Test metric | 99% of detection probability, 0.1% of false alarm probability |
| 2-step RACH |  |  | Unknown | Backhaul link  Include these requirements: Huawei, Nokia: No (not Rel-15) |
| Access link  Option: same as BH.  Ericsson: Same comment as FR1 |
| URLLC high reliability |  |  | Unknown | Backhaul link  Include these requirements: Huawei, Nokia: No (not Rel-15)  Low priority: Ericsson: Yes |
| Access link  Option: same as BH.  Ericsson: Same comment as FR1 |
| URLLC low latency |  |  | Unknown | Backhaul link  Include these requirements: Huawei, Nokia: No (not Rel-15)  Low priority: Ericsson: Yes |
| Access link  Option: same as BH.  Ericsson: Same comment as FR1 |

* Recommended WF
  + Please comment on the acceptability of this format or voice wishes to transform this table into “informative” material only, within the first few days of the meeting

|  |  |
| --- | --- |
| **Company** | **Comments** |
| XXX |  |
| Huawei | Our comments are added in the above table |
| Ericsson | Similarly to FR1, we should resolve the difference between access and backhaul and also the reasons not to copy/paste Rel-16 requirements. |
| Nokia, Nokia Shanghai Bell | The table format suits well. Following our comment on the Issie 2-1-1 (IAB-DU backhaul and access link differences), the IAB-DU shall support both UEs and MTs. Therefore, we do not see a need to introduce different sets of requirements for access and backhaul links. The split for access/backhaul link in the last column can be removed, and only access configurations can be used as a basis. We also prefer to keep existing channel models to avoid additional simulations. |
| Qualcomm | Same comment as for the previous topic. |
| Intel | Same as for FR1 we prefer to reuse all at least Rel-15 BS test cases without changing test parameters like proposed new channel model. |

### Sub-topic 2-3: Channel agnostic - Details of BS requirement re-use

*Sub-topic description*

In case a contributor is not comfortable with the table/matrix format of the previous sub-topic, in the following all channel agnostic proposals are listed in the classical format.  
The difference between subtopic 2-1 (“General requirement scope”) and subtopic 2-3 is that agreements from 2-1 would not be captured in specific cells of detailed summary table/matrix; but agreements can extend the list of “sections” in the table.

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

**Issue 2-3-1: General SCS/CBW combinations**

* Proposals
  + Option 1 (Huawei): Define performance requirements to be agnostic w.r.t. bandwidth and SCS.
  + Option 2: Other options are not precluded.
* Recommended WF
  + Collect views in 1st round.
* Agreements from Nov03 GtW (informative, check meeting report for original)
  + In principle, reuse the existing BS requirements as generic approach meanwhile the exceptions for the specific test cases not excluded pending on further discussion.
  + Using existing applicable rules for CHBW, SCS and number of RX antenna configuration as starting point, further refinement not precluded.

|  |  |
| --- | --- |
| **Company** | **Comments** |
| XXX |  |
| Huawei | Option 1 |
| Ericsson | For the IAB-DU, we don’t follow the need to do this, since we have the full set of requirements already. |
| Nokia, Nokia Shanghai Bell | In 38.141 TSs the applicability rules are define for SCS and CBW. What is the benefit in removing already existing requirements in this case? Moreover, if the requirements are formulated in SCS, CBS agnostic way, still some of those should be taken as a reference. Not obvious which one to use as a reference for simulations. |
| Huawei | It is fine for us to follow the existing full set of requirements with possible test applicability rule updates if needed, such as, only test the supported highest number of antenna configuration, only test the lowest supported SCS for each supported frequency range and etc., |

**Issue 2-3-2: General channel models**

* Proposals
  + Option 1 (Huawei): Skip cases with TDLB100-400 Low and TDLC300-100 Low for FR1 and TDLA30-300 Low for FR2. If there are no cases with other propagation conditions, replace the propagation conditions with TDLA30-10 Low for FR1 and TDLA30-75 Low for FR2.
  + Option 2: Skip cases with TDLB100-400 Low and TDLC300-100 Low for FR1 and TDLA30-300 Low for FR2, if there are alternatives.
  + Option 3: Other options are not precluded.
* Recommended WF
  + Collect views in 1st round.

|  |  |
| --- | --- |
| **Company** | **Comments** |
| XXX |  |
| Huawei | We prefer Option 1. |
| Ericsson | The proposals are understandable for the backhaul link, but for the access link why would different channels be experience for an IAB-UE compared to gNB-UE ? We think changing of channel models needs to be strongly justified as it would imply the need for new simulations. |
| Nokia, Nokia Shanghai Bell | Following our comment for the Issue 2-1-1 (IAB-DU backhaul and access link differences), the IAB-DU shall support both UEs and MTs. We prefer to use access configurations as a basis. Therefore, all channel models used in BS testing should be re-used for IAB-DU. We do not see a need to introduce any new channel models. |
| Huawei | We can further discuss whether cases with new channel models are needed, this is related to the discussion whether to remove the high mobility related test cases or not. |
| Intel | There is not needed to change channel model for IAB-DU performance test cases since access link is same as conventional up-link. If the intention to replace existing Rel-16 HST requirements we suggest simply reusing HST Rel-16 since the WI is nearly complete. |

**Issue 2-3-3: General HST**

* Proposals
  + Option 1 (Huawei, Nokia): Skip cases for HST, including UL TA.
  + Option 2: Other options are not precluded.
* Recommended WF
  + Collect views in 1st round.

|  |  |
| --- | --- |
| **Company** | **Comments** |
| XXX |  |
| Huawei | We prefer Option 1. |
| Ericsson | HST may not be so likely, but on the other hand there is zero cost to include it and support is declared. We would like to understand the reason to not include. |
| Nokia, Nokia Shanghai Bell | Based on our comment to the Issue 2-1-3 (Basis for requirement re-use), HST requirements can be skipped. |

**Issue 2-3-4: General CA**

* Proposals
  + Option 1 (Huawei): Skip performance requirements for CA.
  + Option 2: Other options are not precluded.
* Recommended WF
  + Collect views in 1st round.

|  |  |
| --- | --- |
| **Company** | **Comments** |
| XXX |  |
| Huawei | Option 1. |
| Ericsson | We do not think that CA should be precluded, especially for the access link. |
| Nokia, Nokia Shanghai Bell | We agree with Option 1 because in BS demod the usual approach is to measure each BW one after the other. |
| Ericsson | To clarify: There are no CA requirements, but section 8.1.2.1.4 clarifies that CA can be operated but is tested per carrier. Declaration D.107 is related. We think also for IAB it should be possible to operate CA with per carrier requirement/test. |
| Intel | Agree with comments from Ericsson. We should use the same approach as in BS CA testing. |

**Issue 2-3-5: General RX demodulation branches**

* Proposals
  + Option 1 (Huawei): Only keep 8Rx related performance requirements for FR1.
  + Option 2 (Nokia): Re-use only 1T2R requirements.
  + Option 3: Other options are not precluded.
* Recommended WF
  + Collect views in 1st round.
* Agreements from Nov03 GtW (informative, check meeting report for original)
  + Using existing applicable rules for CHBW, SCS and number of RX antenna configuration as starting point, further refinement not precluded.

|  |  |
| --- | --- |
| **Company** | **Comments** |
| XXX |  |
| Huawei | We prefer Option 1. However, considering radiated testing, 2Rx requirements is needed. Therefore, We are also fine with Option 2. |
| Ericsson | We think that the existing requirements for 1, 2, 4 RX can be taken into IAB. To reduce testing overhead, a stricter applicability rule could be defined; e.g. highest number of supported RX only. Note that 2RX is needed for OTA testing. |
| Nokia, Nokia Shanghai Bell | In our opinion, it would be sufficient to have only minimal requirements with 1T2R. Otherwise, all existing antenna configurations can be kept, and the applicability rule should be defined to test only maximum number of supported antennas. Maximum 8Rx antenna configuration in conducted and 2Rx - in OTA case to be tested. |

**Issue 2-3-6: Conducted and OTA requirements**

* Proposals
  + Option 1 (Ericsson): Specify both conducted and OTA tests for IAB-DU.
  + Option 2: Other options not precluded.
* Recommended WF
  + Collect views in 1st round.

|  |  |
| --- | --- |
| **Company** | **Comments** |
| XXX |  |
| Huawei | Option 1 is fine for us. |
| Nokia, Nokia Shanghai Bell | We agree with Option 1. |
| Intel | Agree with option 1. |

### Sub-topic 2-4: PUSCH - Details of BS requirement re-use

*Sub-topic description*

In case a contributor is not comfortable with the table/matrix format of the previous sub-topic, in the following all PUSCH proposals are listed in the classical format.

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

**Issue 2-4-1: PUSCH MCS**

* Proposals
  + Option 1 (Huawei): Skip QPSK and 16QAM.
  + Option 2: Other options not precluded.
* Recommended WF
  + Collect views in 1st round.

|  |  |
| --- | --- |
| **Company** | **Comments** |
| XXX |  |
| Huawei | Option 1 |
| Ericsson | We understand the motivation considering the backhaul link, but our understanding is that communication from UEs on the access link could experience the full range of SINR, so the requirements should be included considering the access link. |
| Nokia, Nokia Shanghai Bell | Following our comment on the Issue 2-1-1 (IAB-DU backhaul and access link differences), there is no reason to skip low MCSs in the tests because normal UEs can be served by the IAB-DU. |

**Issue 2-4-2: PUSCH mapping type**

* Proposals
  + Option 1 (Huawei): Define performance requirements with mapping type agnostic.
  + Option 2: Other options not precluded.
* Recommended WF
  + Collect views in 1st round.

|  |  |
| --- | --- |
| **Company** | **Comments** |
| XXX |  |
| Huawei | Option 1 |
| Ericsson | Our preference would be to copy in the existing requirements; then there is no need to be agnostic. |
| Nokia, Nokia Shanghai Bell | We would prefer just to follow already existing BS applicability rule. |
| Ericsson | To further clarify our comments: Copy in existing requirements and apply applicability rule for testing. |
| Intel | It is more straightforward to reuse existing BS approach. |

**Issue 2-4-3: PUSCH transform precoding**

* Proposals
  + Option 1 (Nokia, Huawei): Re-use only requirements for PUSCH with transform precoding disabled.
  + Option 2: Other options not precluded.
* Recommended WF
  + Collect views in 1st round.

|  |  |
| --- | --- |
| **Company** | **Comments** |
| XXX |  |
| Huawei | Option 1 |
| Ericsson | We understand the motivation considering the backhaul link. For the access link, though there may be scenarios with power limited UEs that would use DFT-s-OFDM. |

### Sub-topic 2-5: PUCCH – Details of BS requirement re-use

*Sub-topic description*

In case a contributor is not comfortable with the table/matrix format of the previous sub-topic, in the following all PUCCH proposals are listed in the classical format.

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

**Issue 2-5-1: PUCCH DM-RS configuration**

* Proposals
  + Option 1 (Huawei): Define performance requirements with DMRS configuration agnostic for PUCCH format 3 and 4.
  + Option 2: Other options not precluded.
* Recommended WF
  + Collect views in 1st round.

|  |  |
| --- | --- |
| **Company** | **Comments** |
| XXX |  |
| Huawei | Option 1 |
| Ericsson | We would prefer to copy existing requirements. |
| Nokia, Nokia Shanghai Bell | We think that it would be better to keep existing DMRS requirements following access-based DU configurations. |
| Intel | It is more straightforward to reuse existing BS approach. |

**Issue 2-5-2: PUCCH multi-slot**

* Proposals
  + Option 1 (Huawei): Skip cases for multi-slot PUCCH
  + Option 2: Other options not precluded.
* Recommended WF
  + Collect views in 1st round.

|  |  |
| --- | --- |
| **Company** | **Comments** |
| XXX |  |
| Huawei | Option 1 |
| Ericsson | These may be needed considering the access link |
| Nokia, Nokia Shanghai Bell | There is existing BS applicability rule for these cases that can be reused. |
| Ericsson | To clarify the comment: Bring in the gNB requirements and apply the test applicability rule |
| Intel | It is more straightforward to reuse existing BS approach. |

**Issue 2-5-3: PUCCH number of test cases**

* Proposals
  + Option 1 (Nokia): Limit the PUCCH demodulation requirements to two cases chosen by the manufacturer.
  + Option 2: Other options not precluded.
* Recommended WF
  + Collect views in 1st round.

|  |  |
| --- | --- |
| **Company** | **Comments** |
| XXX |  |
| Huawei | Option 1 is fine for us. |
| Ericsson | More requirements may be needed considering the access link. It is anyhow zero effort to copy in existing requirements. Testing could be limited if needed. |
| Nokia, Nokia Shanghai Bell | We believe that our proposal does not contradict the fact that the existing requirements are present in the specification. |
| Ericsson | Question to Nokia: The heading is “number of test cases” but then the option states limit the requirements. Do you mean limit the test cases ? If so, we are fine. |
| Intel | We are fine to define new applicability rule to reduce the test efforts. |
| Nokia, Nokia Shanghai Bell | Clarification: Yes, we propose to keep all the requirements and limit the number of tests to any two cases chosen by the manufacturer. |

### Sub-topic 2-6: PRACH - Details of BS requirement re-use

*Sub-topic description*

In case a contributor is not comfortable with the table/matrix format of the previous sub-topic, in the following all PRACH proposals are listed in the classical format.

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

**Issue 2-6-1: PRACH formats**

* Proposals
  + Option 1 (Huawei): Only keep format 0 with 1.25kHz SCS and C2 with 30kHz and 120kHz SCS for PRACH performance requirements.
  + Option 2: Other options not precluded.
* Recommended WF
  + Collect views in 1st round.

|  |  |
| --- | --- |
| **Company** | **Comments** |
| XXX |  |
| Huawei | Option 1 |
| Ericsson | It may be that for the access link, other formats are more appropriate, so prefer to copy more. |
| Nokia, Nokia Shanghai Bell | Following our comment on the Issue 2-1-1 (IAB-DU backhaul and access link differences), we propose to keep other PRACH requirements needed for the testing of access links. |
| Huawei | The existing PRACH requirements can be down scope. |
| Ericsson | We would prefer to keep the requirements, but can discuss the applicability rule |

### Sub-topic 2-7: 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 |
|  |
| None |  |
|  |
|  |
|  |

## 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 2-1** | **Sub-topic 2-1: General requirement scope**  Issue 2-1-1: IAB DU backhaul and access link differences  *GtW agreements:*  o RAN4 will introduce IAB-DU demodulation requirements covering UL access and backhaul links.  o No need to discriminate the test cases for these two links in the specification.  *Recommendations for 2nd round:*  Added for information. Check meeting report for agreements.  Issue 2-1-2: Additional requirement configurations on top of BS ones  *GtW agreements:*  There is no need to introduce any new performance requirements for IAB-DU in addition to already existing BS requirements.  *Recommendations for 2nd round:*  Added for information. Check meeting report for agreement.  Issue 2-1-3: Basis for requirement re-use  *GtW agreements:*  Based on Rel-15 gNB performance requirements to discuss IAB-DU performance requirements definition.  *Recommendations for 2nd round:*  Added for information. Check meeting report for agreement.  Issue 2-1-4: Applicability rule re-use  *Tentative agreements:*  None  *Candidate options:*   * Option 1: Re-use applicability rule for IAB-DU defined for BS in TS 38.141-1 and TS 38.141-2, if possible. * Option 2: Check and adapt the BS applicability rules to reduce the number of tests.  For example, test only the highest number of supported antennas.   *Recommendations for 2nd round:*  Continue discussion in 2nd round. |
| **Sub-topic 2-2** | **Sub-topic 2-2: Detailed scope of BS requirement re-use - tables/matrices**  Issue 2-2-1: Common BS requirement re-use table/matrix - FR1  *Tentative agreements:*  None  *Recommendations for 2nd round:*   * Keep table but make it informative. * Keep using table to track agreed and proposed adaptations. * Remove the Backhaul/Access link distinction, as per GtW agreement.   Issue 2-2-2: Common BS requirement re-use table/matrix - FR2  *Tentative agreements:*  None  *Recommendations for 2nd round:*   * Keep table but make it informative. * Keep using table to track agreed and proposed adaptations. * Remove the Backhaul/Access link distinction, as per GtW agreement. |
| **Sub-topic 2-3** | **Sub-topic 2-3: Channel agnostic - Details of BS requirement re-use**  Issue 2-3-1: General SCS/CBW combinations  *GtW agreements:*  o In principle, reuse the existing BS requirements as generic approach meanwhile the exceptions for the specific test cases not excluded pending on further discussion.  o Using existing applicable rules for CHBW, SCS and number of RX antenna configuration as starting point, further refinement not precluded.  *Tentative agreements:*  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.  *Recommendations for 2nd round:*  GtW agreement added for information. Check meeting report for agreements.  Tentative agreement following Huawei’s alignment with previous comments. Tentative agreement is agreeable.  Issue 2-3-2: General channel models  *Tentative agreements:*  None  *Candidate options:*   * Option 1: Skip cases with TDLB100-400 Low and TDLC300-100 Low for FR1 and TDLA30-300 Low for FR2. If there are no cases with other propagation conditions, replace the propagation conditions with TDLA30-10 Low for FR1 and TDLA30-75 Low for FR2. * Option 2: No new channel models shall be introduced.  Skip cases with TDLB100-400 Low and TDLC300-100 Low for FR1 and TDLA30-300 Low for FR2, if there are alternatives. * Option 3: No new channel models shall be introduced.  All channel models used in Rel-15 BS testing should be re-used for IAB-DU and applicability rules can be introduced/modified to allow reduction of testing load.   *Recommendations for 2nd round:*  Continue discussion.  Following the GtW agreement to use Rel-15 requirements as a basis and to not introduce any new performance requirements for IAB-DU in addition to already existing BS requirements, only option 2 and 3 seem feasible.  There seems to be some confusion, on what are “high mobility related test cases”. Can contributors clarify, which channel models they are referring to and also comment on the next issue?  Issue 2-3-3: Inclusion of Rel-16 HST requirements (was: General HST)  *Tentative agreements:*  None  *Candidate options:*   * Option 1: Do not include existing Rel-16 HST requirements (including UL TA). * Option 2: Include existing Rel-16 HST requirements (including UL TA).   *Recommendations for 2nd round:*  The GtW agreement to use Rel-15 requirements as a basis and to not introduce any new performance requirements for IAB-DU in addition to already existing BS requirements, does not directly preclude addition of existing Rel-16 HST requirements.  There seems to be a majority to not include after the GtW, but please confirm (or challenge) this understanding in the second round.  Issue 2-3-3b (new): Other Rel-16 BS demod requirements  *Tentative agreements:*  None  *Candidate options:*   * Option 1: 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 * Option 2: Do include a defined set of Rel-16 BS demod requirements. Please specify which ones.   *Recommendations for 2nd round:*  The moderator had previously neglected to create an issue for these rows of the table, which contain several contributors’ comments. 30%TPUT requirements were included in Rel-16 and are not present in Rel-15 specifications. Rel-16 HST requirement inclusion is treated in Issue 2-3-3.  Please discuss in the second round, if those requirements should be included for IAB.  Issue 2-3-4: Inclusion of CA notes (was: General CA)  *Tentative agreements:*  None  *Candidate options:*   * Option 1: Do not include performance requirements or text related to CA. * Option 2: Follow Rel-15 approach and clarify that CA can be operated but is tested per carrier.   *Recommendations for 2nd round:*  Continue discussion.  Issue 2-3-5: General RX demodulation branches  *GtW agreements:*  Using existing applicable rules for CHBW, SCS and number of RX antenna configuration as starting point, further refinement not precluded.  *Candidate options:*  Option 1: 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 supported antennas for the respective BS type, i.e., maximum 8Rx in conducted/hybrid testing and maximum 2Rx in OTA testing.  *Recommendations for 2nd round:*  GtW agreement added for information. Check meeting report for agreements.  Following the comments received on this issue, the candidate option should be agreeable, but confirmation is requested in second round.  Issue 2-3-6: Conducted and OTA requirements  *Tentative agreements:*  Specify both conducted and OTA tests for IAB-DU.  *Recommendations for 2nd round:*  No opposing views received; tentative agreements are agreeable. |
| **Sub-topic 2-4** | **Sub-topic 2-4: PUSCH - Details of BS requirement re-use**  Issue 2-4-1: PUSCH MCS  *Tentative agreements:*  None  *Candidate options:*   * Option 1: Do not use QPSK and 16QAM MCS. * Option 2: Keep all MCS from BS demodulation requirements.   *Recommendations for 2nd round:*  Continue discussion in second round.  Issue 2-4-2: PUSCH mapping type  *Tentative agreements:*  None  *Candidate options:*   * Option 1: Define performance requirements with mapping type agnostic. * Option 2: Copy existing requirements and apply BS demod like applicability rule for testing.   *Recommendations for 2nd round:*  Continue discussion. Option 2 is supported by the majority.  Issue 2-4-3: PUSCH transform precoding  *Tentative agreements:*  None  *Candidate options:*   * Option 1: Re-use only requirements for PUSCH with transform precoding disabled. * Option 2: Include requirements for PUSCH with transform precoding enabled.   *Recommendations for 2nd round:*  Continue discussion.  Issue 2-4-4 (new): Copying of all Rel-15 PUSCH BS demod requirements  *Tentative agreements:*  None  *Candidate options:*   * Option 1: Copy all Rel-15 PUSCH BS demod requirements and discuss applicability rule inclusion or adaptation to reduce the number of tests. * Option 2: Discuss each Rel-15 PUSCH BS demod requirement configurations separately.   *Recommendations for 2nd round:*  It has become clear that this issue is arising for each requirement and their configurations. In most cases contributors are converging to the homologue of option 1. Contributors are requested to express their opinion on a general rule for all Rel-15 PUSCH BS demod requirements.  The applicability rules themselves can then be discussed either still in this meeting or the next. |
| **Sub-topic 2-5** | **Sub-topic 2-5: PUCCH - Details of BS requirement re-use**  Issue 2-5-1: PUCCH DM-RS configuration  *Tentative agreements:*  None  *Candidate options:*   * Option 1: Define performance requirements with DMRS configuration agnostic for PUCCH format 3 and 4. * Option 2: Keep existing BS demodulation based DM-RS configurations.   *Recommendations for 2nd round:*  Discuss in second round.  Majority for option 2.  Issue 2-5-2: PUCCH multi-slot  *Tentative agreements:*  None  *Candidate options:*   * Option 1: Skip cases for multi-slot PUCCH. * Option 2: Include multi-slot PUCCH cases and keep or modify existing BS demodulation-based test applicability rule.   *Recommendations for 2nd round:*  Discuss in second round. Majority for option 2.  Issue 2-5-3: PUCCH number of test cases  *Tentative agreements:*  None  *Candidate options:*   * Option 1: Limit the PUCCH demodulation requirements to two cases chosen by the manufacturer. * Option 2: Keep all the PUCCH requirements and limit the number of tests to [any two] cases chosen by the manufacturer using applicability rule.   *Recommendations for 2nd round:*  Discuss in second round. Majority for option 2.  Issue 2-5-4 (new): Copying of all Rel-15 PUCCH BS demod requirements  *Tentative agreements:*  None  *Candidate options:*   * Option 1: Copy all Rel-15 PUCCH BS demod requirements and discuss applicability rule inclusion or adaptation to reduce the number of tests. * Option 2: Discuss each Rel-15 PUCCH BS demod requirement configurations separately.   *Recommendations for 2nd round:*  It has become clear that this issue is arising for each requirement and their configurations. In most cases contributors are converging to the homologue of option 1. Contributors are requested to express their opinion on a general rule for all Rel-15 PUCCH BS demod requirements.  The applicability rules themselves can then be discussed either still in this meeting or the next. |
| **Sub-topic 2-6** | **Sub-topic 2-6: PRACH - Details of BS requirement re-use**  Issue 2-6-1: PRACH formats  *Tentative agreements:*  None  *Candidate options:*   * Option 1: Only keep format 0 with 1.25kHz SCS and C2 with 30kHz and 120kHz SCS for PRACH performance requirements * Option 2: Keep all PRACH formats and discuss applicability rule.   *Recommendations for 2nd round:*  Discuss in second round.  Issue 2-5-4 (new): Copying of all Rel-15 PRACH BS demod requirements  *Tentative agreements:*  None  *Candidate options:*   * Option 1: Copy all Rel-15 PRACH BS demod requirements and discuss applicability rule inclusion or adaptation to reduce the number of tests. * Option 2: Discuss each Rel-15 PRACH BS demod requirement configurations separately.   *Recommendations for 2nd round:*  It has become clear that this issue might be arising for each requirement and their configurations. Contributors are requested to express their opinion on a general rule for all Rel-15 PRACH BS demod requirements.  The applicability rules themselves can then be discussed either still in this meeting or the next. |

*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

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.

### Sub-topic 2-1: General requirement scope

Issue 2-1-4: Applicability rule re-use

*Candidate options:*

* Option 1: Re-use applicability rule for IAB-DU defined for BS in TS 38.141-1 and TS 38.141-2, if possible.
* Option 2: Check and adapt the BS applicability rules to reduce the number of tests.   
  For example, test only the highest number of supported antennas.

*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]:

[Huawei]: Support Option 2.

For supported antennas, we prefer that test only the highest number of supported antennas, i.e.

* Unless otherwise stated, for a BS supporting different numbers of antenna connectors (for *BS type 1-C*) or *TAB connectors* (for *BS type 1-H*) (see D.x in table xxx), the tests with low MIMO correlation level shall apply only for the ~~lowest and~~ highest numbers of supported connectors, and the specific connectors used for testing are based on manufacturer declaration.

Applicability rule for PDSCH, PUSCH, PRACH should be discussed in corresponding Issues.

[Ericsson]

We also think only the highest number of supported antennas can be tested. Further test reductions can be sought and discussed next meeting.

[Nokia]: We support Option 2 because some new applicability rules need to be defined in IAB-DU context. They are discussed in the following issues.

### Sub-topic 2-2: Detailed scope of BS requirement re-use - tables/matrices

Issue 2-2-1: Common BS requirement re-use table/matrix - FR1

*Recommendations for 2nd round:*

* Keep table but make it informative.
* Keep using table to track agreed and proposed adaptations.
* Remove the Backhaul/Access link distinction, as per GtW agreement.

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

[XXX]:

[YYY]:

[Huawei] As per the agreement reached during GTW discussion: Based on Rel-15 gNB performance requirements to discuss IAB-DU performance requirements definition. All Release 16 related should not be discussed further, we prefer to remove Table: Common BS requirement re-use table/matrix - FR1 Rel-16 (Informative)

[Ericsson] What does “make it informative” mean ? Would it otherwise be in a specification ?

[Nokia]: Proposed approach is fine. We also agree with Huawei that FR1 Rel-16 (Informative) table can be excluded from the future discussions.

Table: Common BS requirement re-use table/matrix - FR1 Rel-15 (Informative)

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Demodulation performance requirements | BS demod requirement configurations | | Declaration | Proposed adaptation for DU demod |
| Rel-15 based | | | | |
| PUSCH with transform precoding disabled | Antenna configuration | 1x2, 1x4, 1x8; 2x2, 2x4, 2x8 | SCS/CBW | Antenna configuration:  Huawei: 1x8, 2x8 Nokia: 1x2, 2x2  Ericsson, Nokia: Can keep all requirements for antenna, but consider applicability rule such that only one is tested  Channel model: Huawei: TDLA30-10 Low only  Ericsson: Agreed considering backhaul link, but aren’t other channel models applicable for the access link ?  MCS:  Huawei: 19  Ericsson: Agree for backhaul link, but for the access link the full range of SNR could be encountered and thus alo lower modulation orders are applicable  CBW&SCS:  Huawei: agnostic  Resource mapping:  Huawei: agnostic |
| Channel model | TDLB100-400 Low, TDLC300-100 Low, TDLA30-10 Low |
| MCS | 2, 16, 19 |
| CBW&SCS | 5, 10, 20MHz for 15kHz SCS; 10, 20, 40, 100MHz for 30kHz SCS |
| Resource mapping | Type A, Type B |
| Additional DM-RS position | pos1 |
| Test metric | 70% of maximum TP |
| PUSCH with transform precoding enabled | Antenna configuration | 1x2, 1x4, 1x8 | transform precoding support | Include these requirements: Huawei, Nokia: No |
| Channel model | TDLB100-400 Low |
| MCS | 2 |
| CBW&SCS | 5MHz for 15kHz SCS; 10MHz for 30kHz SCS |
| Resource mapping | Type A, Type B |
| Additional DM-RS position | pos1 |
| Test metric | 70% of maximum TP |
| UCI multiplexed on PUSCH | Antenna configuration | 1x2 | SCS/CBW | Antenna configuration: Huawei, Nokia: 1x2  Channel model:  Huawei: TDLA30-10 Low  MCS:  Huawei: 19  CBW&SCS:  Huawei: agnostic  Resource mapping:  Huawei: agnostic |
| Channel model | TDLC300-100 Low |
| MCS | 16 |
| CBW&SCS | 10MHz for 30kHz SCS |
| Resource mapping | Type A, Type B |
| Additional DM-RS position | pos1 |
| Test metric | 0.1%, 1% of BLER for CSI part 1, 2 respectively |
| PUCCH format 0 | Antenna configuration | 1x2, 1x4, 1x8 | Format support | Antenna configuration:  Huawei: 1x8 Nokia: 1x2  Channel model: Huawei: TDLA30-10 Low  CBW&SCS:  Huawei: agnostic  Resource mapping:  Huawei: agnostic  Limit number of PUCCH demodulation test: Nokia: 2 |
| Channel model | TDLC300-100 Low |
| CBW&SCS | 5, 10, 20MHz for 15kHz SCS; 10, 20, 40, 100MHz for 30kHz SCS |
| Test metric | 1% of ACK missed detection probability, 1% of DTX to ACK probability |
| PUCCH format 1 | Antenna configuration | 1x2, 1x4, 1x8 | Format support | Antenna configuration:  Huawei: 1x8 Nokia: 1x2  Channel model: Huawei: TDLA30-10 Low  CBW&SCS:  Huawei: agnostic  Limit number of PUCCH demodulation requirements Nokia: 2 |
| Channel model | TDLC300-100 Low |
| CBW&SCS | 5, 10, 20MHz for 15kHz SCS; 10, 20, 40, 100MHz for 30kHz SCS |
| Test metric | 0.1% of NACK to ACK probability, 1% of ACK missed detection probability, 1% of DTX to ACK probability |
| PUCCH format 2 | Antenna configuration | 1x2, 1x4, 1x8 | Format support | Antenna configuration:  Huawei: 1x8 Nokia: 1x2  Channel model: Huawei: TDLA30-10 Low  CBW&SCS:  Huawei: agnostic  Limit number of PUCCH demodulation requirements: Nokia: 2 |
| Channel model | TDLC300-100 Low |
| CBW&SCS | 5, 10, 20MHz for 15kHz SCS; 10, 20, 40, 100MHz for 30kHz SCS |
| Test metric | 1% of ACK missed detection probability, 1% of BLER, 1% of DTX to ACK probability |
| PUCCH format 3 | Antenna configuration | 1x2, 1x4, 1x8 | Format support | Antenna configuration:  Huawei: 1x8 Nokia: 1x2  Channel model: Huawei: TDLA30-10 Low  CBW&SCS:  Huawei: agnostic  Limit number of PUCCH demodulation requirements: Nokia: 2 |
| Channel model | TDLC300-100 Low |
| CBW&SCS | 5, 10, 20MHz for 15kHz SCS; 10, 20, 40, 100MHz for 30kHz SCS |
| Test metric | 1% of BLER, 1% of DTX to ACK probability |
| PUCCH format 4 | Antenna configuration | 1x2, 1x4, 1x8 | Format support | Antenna configuration:  Huawei: 1x8 Nokia: 1x2  Channel model: Huawei: TDLA30-10 Low  CBW&SCS:  Huawei: agnostic  Limit number of PUCCH demodulation test: Nokia: 2 |
| Channel model | TDLC300-100 Low |
| CBW&SCS | 5, 10, 20MHz for 15kHz SCS; 10, 20, 40, 100MHz for 30kHz SCS |
| Test metric | 1% of BLER, 1% of DTX to ACK probability |
| Multi-slot PUCCH format 1 | Antenna configuration | 1x2 | SCS/CBW | Include these requirements: Huawei: No |
| Channel model | TDLC300-100 Low |
| CBW&SCS | 40MHz for 30kHz SCS |
| Test metric | 0.1% of NACK to ACK probability, 1% of ACK missed detection probability, 1% of DTX to ACK probability |
| PRACH | Antenna configuration | 1x2, 1x4, 1x8 | Format support | Antenna configuration:  Huawei: 1x8 Nokia: 1x2  Channel model: Huawei: TDLA30-10 Low FO=400Hz  Burst format &SCS: Huawei: Format 0 for 1.25kHz SCS, C2 for 30kHz SCS |
| Channel model | AWGN, TDLC300-100 Low FO=400Hz |
| Burst format &SCS | 0 for 1.25kHz SCS; A1, A2, A3, B4, C0, C2 for 15kHz SCS and 30kHz SCS |
| Test metric | 99% of detection probability, 0.1% of false alarm probability |

Table: Common BS requirement re-use table/matrix - FR1 Rel-16 (Informative)

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Demodulation performance requirements | BS demod requirement configurations | | Declaration | Proposed adaptation for DU demod |
| Rel-16 based | | | | |
| PUSCH with transform precoding disabled (30% TPUT) | [Empty] | 30% of maximum TP 1x2, TDLC300-100, MCS 16, Type A, pos1 30kHz/10MHz, 15kHz/5MHz | SCS/CBW | Include these requirements: Huawei, Nokia: No |
| PUSCH for high speed train |  |  | HST support | Include these requirements: 1st round: No. |
| UL timing adjustment |  |  | HST support for scenario Y/Z, but not X | Include these requirements: 1st round: No. |
| PRACH HST |  |  | HST support | Include these requirements: 1st round: No. |
| 2-step RACH |  |  | Unknown | Include these requirements: Huawei, Nokia: No (not Rel-15) |
| NR-U |  |  | Unknown | Include these requirements: Huawei, Nokia: No (not Rel-15)  Low priority: Ericsson: No (No unlicensed IAB band) |
| URLLC 0.001% BLER |  |  | Unknown | Include these requirements: Huawei, Nokia: No (not Rel-15)  Low priority: Ericsson: Yes |
| URLLC high reliability |  |  | Unknown | Include these requirements: Huawei, Nokia: No (not Rel-15)  Low priority: Ericsson: Yes |
| URLLC low latency |  |  | Unknown | Include these requirements: Huawei, Nokia: No (not Rel-15)  Low priority: Ericsson: Yes |

Issue 2-2-2: Common BS requirement re-use table/matrix - FR2

*Recommendations for 2nd round:*

* Keep table but make it informative.
* Keep using table to track agreed and proposed adaptations.
* Remove the Backhaul/Access link distinction, as per GtW agreement.

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

[XXX]:

[YYY]:

[Huawei] Same comments as for FR1, we prefer to remove Table: Common BS requirement re-use table/matrix - FR2 Rel-16 (Informative).

[Nokia]: Proposed approach is fine. We also agree with Huawei that FR2 Rel-16 (Informative) table can be excluded from the future discussions.

Table: Common BS requirement re-use table/matrix - FR2 Rel-15 (Informative)

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Demodulation performance requirements | BS demod requirement configurations | | Declaration | Proposed adaptation for DU demod |
| Rel-15 Based | | | | |
| PUSCH with transform precoding disabled | Antenna configuration | 1x2, 2x2 | SCS/CBW | Antenna configuration:  Huawei, Nokia: 1x2, 2x2  Channel model: Huawei: TDLA30-75 Low only  MCS:  Huawei: 19  CBW&SCS:  Huawei: agnostic  Resource mapping:  Huawei: agnostic |
| Channel model | TDLA30-300 Low, TDLA30-75 Low |
| MCS | 2, 16, 19 |
| CBW&SCS | 50, 100MHz for 60kHz SCS; 50, 100, 200MHz for 120kHz SCS |
| Resource mapping | Type B |
| Additional DM-RS position | pos0, pos1 |
| Test metric | 70% of maximum TP |
| PUSCH with transform precoding enabled | Antenna configuration | 1x2 | transform precoding support | Include these requirements: Huawei, Nokia: No |
| Channel model | TDLA30-300 Low |
| MCS | 2 |
| CBW&SCS | 50MHz for 60kHz SCS; 50MHz for 120kHz SCS |
| Resource mapping | Type B |
| Additional DM-RS position | pos0, pos1 |
| Test metric | 70% of maximum TP |
| UCI multiplexed on PUSCH | Antenna configuration | 1x2 | SCS/CBW | Antenna configuration: Huawei, Nokia: 1x2  Channel model: Huawei: Change to TDLA30-75 Low  Ericsson: If the channel model and MCS are changed, then new simulations are needed. Isn’t in practice the existing requirement sufficient ?  MCS:  Huawei: 19  CBW&SCS:  Huawei: agnostic  Resource mapping:  Huawei: agnostic |
| Channel model | TDLA30-300 Low |
| MCS | 16 |
| CBW&SCS | 50MHz for 120kHz SCS |
| Resource mapping | Type B |
| Additional DM-RS position | pos0, pos1 |
| Test metric | 0.1%, 1% of BLER for CSI part 1, 2 respectively |
| PUCCH format 0 | Antenna configuration | 1x2 | Format support | Antenna configuration:  Huawei, Nokia: 1x2  Channel model: Huawei: Change to TDLA30-75 Low  Ericsson: Understand the principle, but is it really worth to spend additional simulations ?  Also a requirement is needed for the access link; preferably only 1 channel model.  CBW&SCS:  Huawei: agnostic |
| Channel model | TDLA30-300 Low |
| CBW&SCS | 50, 100MHz for 60kHz SCS; 50, 100, 200MHz for 120kHz SCS |
| Test metric | 1% of ACK missed detection probability, 1% of DTX to ACK probability |
| PUCCH format 1 | Antenna configuration | 1x2 | Format support | Antenna configuration:  Huawei, Nokia: 1x2  Channel model: Huawei: Change to TDLA30-75 Low  CBW&SCS:  Huawei: agnostic |
| Channel model | TDLA30-300 Low |
| CBW&SCS | 50, 100MHz for 60kHz SCS; 50, 100, 200MHz for 120kHz SCS |
| Test metric | 0.1% of NACK to ACK probability, 1% of ACK missed detection probability, 1% of DTX to ACK probability |
| PUCCH format 2 | Antenna configuration | 1x2 | Format support | Antenna configuration:  Huawei, Nokia: 1x2  Channel model: Huawei: Change to TDLA30-75 Low  Ericsson: Understand the principle, but is it really worth to spend additional simulations ?  CBW&SCS:  Huawei: agnostic |
| Channel model | TDLA30-300 Low |
| CBW&SCS | 50, 100MHz for 60kHz SCS; 50, 100, 200MHz for 120kHz SCS |
| Test metric | 1% of ACK missed detection probability, 1% of BLER, 1% of DTX to ACK probability |
| PUCCH format 3 | Antenna configuration | 1x2 | Format support | Antenna configuration:  Huawei, Nokia: 1x2  Channel model: Huawei: Change to TDLA30-75 Low  Ericsson: Understand the principle, but is it really worth to spend additional simulations ?  CBW&SCS:  Huawei: agnostic |
| Channel model | TDLA30-300 Low |
| CBW&SCS | 50, 100MHz for 60kHz SCS; 50, 100, 200MHz for 120kHz SCS |
| Test metric | 1% of BLER, 1% of DTX to ACK probability |
| PUCCH format 4 | Antenna configuration | 1x2 | Format support | Antenna configuration:  Huawei, Nokia: 1x2  Channel model: Huawei: Change to TDLA30-75 Low  Ericsson: Understand the principle, but is it really worth to spend additional simulations ?  CBW&SCS:  Huawei: agnostic |
| Channel model | TDLA30-300 Low |
| CBW&SCS | 50, 100MHz for 60kHz SCS; 50, 100, 200MHz for 120kHz SCS |
| Test metric | 1% of BLER, 1% of DTX to ACK probability |
| PRACH | Antenna configuration | 1x2 | Format support | Antenna configuration:  Huawei, Nokia: 1x2  Channel model: Huawei: Change to TDLA30-75 Low FO=4000Hz  Ericsson: Understand the principle, but is it really worth to spend additional simulations ?  Burst format &SCS:  Huawei: C2 for 120kHz SCS  CBW&SCS:  Huawei: agnostic |
| Channel model | AWGN, TDLA30-300 Low FO=4000Hz |
| Burst format &SCS | A1, A2, A3, B4, C0, C2 for 60kHz SCS; A1, A2, A3, B4, C0, C2 for 120kHz SCS |
| Test metric | 99% of detection probability, 0.1% of false alarm probability |

Table: Common BS requirement re-use table/matrix - FR2 Rel-16 (Informative)

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Demodulation performance requirements | BS demod requirement configurations | | Declaration | Proposed adaptation for DU demod |
| Rel-16 Based | | | | |
| PUSCH with transform precoding disabled (30%TPUT) | [Empty] | 30% of maximum TP 1x2, TDLA30-300, MCS 16, Type B, pos0&1, PT-RS on/off 120kHz/50MHz, 60kHz/50MHz | SCS/CBW | Include these requirements: Huawei, Nokia: No (not Rel-15) |
| 2-step RACH |  |  | Unknown | Include these requirements: Huawei, Nokia: No (not Rel-15) |
| URLLC high reliability |  |  | Unknown | Include these requirements: Huawei, Nokia: No (not Rel-15)  Low priority: Ericsson: Yes |
| URLLC low latency |  |  | Unknown | Include these requirements: Huawei, Nokia: No (not Rel-15)  Low priority: Ericsson: Yes |

### Sub-topic 2-3: Channel agnostic - Details of BS requirement re-use

Issue 2-3-2: General channel models

*Candidate options:*

* Option 1: Skip cases with TDLB100-400 Low and TDLC300-100 Low for FR1 and TDLA30-300 Low for FR2. If there are no cases with other propagation conditions, replace the propagation conditions with TDLA30-10 Low for FR1 and TDLA30-75 Low for FR2.
* Option 2: No new channel models shall be introduced.   
  Skip cases with TDLB100-400 Low and TDLC300-100 Low for FR1 and TDLA30-300 Low for FR2, if there are alternatives.
* Option 3: No new channel models shall be introduced.   
  All channel models used in Rel-15 BS testing should be re-used for IAB-DU and applicability rules can be introduced/modified to allow reduction of testing load.

*Recommendations for 2nd round:*

Continue discussion.

Following the GtW agreement to use Rel-15 requirements as a basis and to not introduce any new performance requirements for IAB-DU in addition to already existing BS requirements, only option 2 and 3 seem practicable.

There is some confusion on what “high mobility related test cases” are. Can contributors clarify, which channel models exactly they are referring to, when talking about high mobility related test cases?   
The high-speed use case, is also topic of issue 2-3-3

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

[XXX]:

[YYY]:

[Huawei]: To clarify, considering both access and backhaul link, high mobility related test cases means that the cases with propagation condition of TDLB100-400 and TDLA30-300 which have larger Doppler shift. Even for access link, from our understanding, larger Doppler shift is not expected for IAB-DU in deployment scenarios for outdoor small cell deployments and indoors as studied in TR 38.874 of SI stage.

[Ericsson] All BS classes/types need to pass the requirements defined for all of the Rel-15 channels, so in our understanding it is difficult to justify removing some conditions for IAB.

[Nokia]: We cannot agree with Huawei that the propagation conditions of TDLB100-400 and TDLA30-300 can be described as high mobility. For the typical FR2 carrier of 3.5 GHz, 400 Hz Doller shift corresponds only to 12.3 kmph. The same is true for the 4000 Hz frequency offset in FR2. Moreover, simulation assumptions in IAB SI TR 38.874 assume that 20% of outdoor UEs have the speed of 30 kmph.  
We understand the intention to reduce the amount of tests for IAB-DU but cannot find a strong reason to skip these channel models.  
We propose to proceed with Option 3.

Issue 2-3-3: Inclusion of Rel-16 HST requirements (was: General HST)

*Candidate options:*

* Option 1: Do not include existing Rel-16 HST requirements (including UL TA).
* Option 2: Include existing Rel-16 HST requirements (including UL TA).

*Recommendations for 2nd round:*

The GtW agreement to use Rel-15 requirements as a basis and to not introduce any new performance requirements for IAB-DU in addition to already existing BS requirements, does not directly preclude addition of existing Rel-16 HST requirements.

There seems to be a majority to not include after the GtW, but please confirm (or challenge) this understanding 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]:

[Huawei]: Option 1. We confirm the understanding of GTW agreement not introduce **any** Rel-16 performance requirements for IAB-DU (including Rel-16 UL TA).

[Ericsson] Our understanding is also that the GTW conclusion means that HST requirements will not be included.

[Nokia]: We support Option 1 following our understanding of the outcomes of GtW discussion.

Issue 2-3-3b (new): Other Rel-16 BS demod requirements

*Candidate options:*

* Option 1: 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
* Option 2: Do include a defined set of Rel-16 BS demod requirements. Please specify which ones.

*Recommendations for 2nd round:*

The moderator had previously neglected to create an issue for these rows of the table, which contain several contributors’ comments.  
30%TPUT requirements were included in Rel-16 and are not present in Rel-15 specifications.  
Rel-16 HST requirement inclusion is treated in Issue 2-3-3.

Please discuss in the second round, if those requirements should be included for IAB.

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

[XXX]:

[YYY]:

[Huawei]: Option 1. We would like to further confirm the understanding of GTW agreement: not introduce **any** Rel-16 performance requirements for IAB-DU.

[Ericsson] Our understanding is that these requirements are agreed not to be included.

[Nokia]: We support Option 1 following our understanding of the outcomes of GtW discussion.

Issue 2-3-4: Inclusion of CA notes (was: General CA)

*Candidate options:*

* Option 1: Do not include performance requirements or text related to CA.
* Option 2: Follow Rel-15 approach and clarify that CA can be operated but is tested per carrier.

*Recommendations for 2nd round:*

Continue discussion.

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

[XXX]:

[YYY]:

[Huawei]: Prefer Option 1 to simplify the test.

[Ericsson]: In our view we should not prevent IAB from supporting CA. So either option 2 is needed or there needs to be some statement that CA is supported by the IAB-DU.

[Nokia]: We prefer Option 2 slightly more to have more clarity with CA.

Issue 2-3-5: General RX demodulation branches

*GtW agreements (for reference):*

Using existing applicable rules for CHBW, SCS and number of RX antenna configuration as starting point, further refinement not precluded.

*Candidate options:*

Option 1: 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 supported antennas for the respective BS type, i.e., maximum 8Rx in conducted/hybrid testing and maximum 2Rx in OTA testing.

*Recommendations for 2nd round:*

GtW agreement added for information. Check meeting report for agreements.

Following the comments received on this issue, the candidate option should be agreeable, but confirmation is requested in second round.

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

[XXX]:

[YYY]:

[Huawei]: We are OK with option 1 for the applicability for number of Rx antenna configuration.

[Ericsson] As discussed above, we support changing the applicability rule on number of RX antennas to be highest number of RX antennas only.

[Nokia]: Option 1 is OK.

### Sub-topic 2-4: PUSCH - Details of BS requirement re-use

Issue 2-4-1: PUSCH MCS

*Candidate options:*

* Option 1: Do not use QPSK and 16QAM MCS.
* Option 2: Keep all MCS from BS demodulation requirements.
* Option 3: 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.

*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]:

[Huawei]: We prefer Option 1 to only consider higher modulation order to reduce number of test cases. If companies have strong view to keep all MCS, we prefer to define test applicability rule as listed in Option 3.

[Ericsson] Since all BS classes and types need to support the QPSK and 16QAM demodulation requirements, and for an IAB it is expected that a range of SNR will be experienced, we do not see a justification to skip the requirements for IAB-DU.

[Nokia]: Following generally accepted assumption that IAB-DU can serve both MTs and access UEs, we do not see a clear criterion to define the applicability rule proposed by Huawei. Could Huawei, clarify this, please? Otherwise, we cannot find a strong reason to skip any MCSs (Option 2).

Issue 2-4-2: PUSCH mapping type

*Candidate options:*

* Option 1: Define performance requirements with mapping type agnostic.
* Option 2: Copy existing requirements and apply BS demod like applicability rule for testing.

*Recommendations for 2nd round:*

Continue discussion.  
Option 2 is supported by the majority.

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

[XXX]:

[YYY]:

[Huawei]: We are OK with both Options.

[Ericsson] Since we already have requirements available from the BS spec, we support option 2.

[Nokia]: Option 2 with applicability rule is fine.

Issue 2-4-3: PUSCH transform precoding

*Candidate options:*

* Option 1: Re-use only requirements for PUSCH with transform precoding disabled.
* Option 2: Include requirements for PUSCH with transform precoding enabled.
* Option 3: Include requirement for PUSCH with transform precoding enabled and define applicability rule for it.

*Recommendations for 2nd round:*

Continue discussion.

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

[XXX]:

[YYY]:

[Huawei]: Prefer Option 1. IAB-DU is used for improving the performance of scenario with cell edge or even no coverage, IAB-DU has no coverage problem at all.

[Ericsson] It is not obvious why an IAB-DU will not have a cell edge and UEs that experience a full range of SNR, and so we think that these requirements should be included. It is worth to remember that if DFT-s-OFDM is not implemented in the IAB, then there is no need to do the testing. It is not obvious why implementation of DFT-s-OFDM would be precluded.

[Nokia]: We propose to have an applicability rule for PUSCH with transform precoding requirement, i.e. if the manufacture declares that it is supported than it should be tested (new Option 3).

Issue 2-4-4 (new): Copying of all Rel-15 PUSCH BS demod requirements

*Candidate options:*

* Option 1: Copy all Rel-15 PUSCH BS demod requirements and discuss applicability rule inclusion or adaptation to reduce the number of tests.
* Option 2: Discuss each Rel-15 PUSCH BS demod requirement configurations separately.

*Recommendations for 2nd round:*

It has become clear that this issue is arising for each requirement and their configurations.  
In most cases contributors are converging to the homologue of option 1.  
Contributors are requested to express their opinion on a general rule for all Rel-15 PUSCH BS demod requirements.

The applicability rules themselves can then be discussed either still in this meeting or the next.

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

[XXX]:

[YYY]:

[Huawei]: We prefer Option 2. Based on the IAB-DU feature, we should discuss each Rel-15 PUSCH BS demodulation separately and analyse them case by case. Currently based on our understanding, PUSCH transform precoding, lower MCS and TDLB100-400 / TDLA30-300 related cases should not be included.

[Ericsson] We can discuss and check whether any requirements can be precluded, but in general we do not see a difference between IAB and the 3 BS classes (wide area, medium range, local area) in terms of UL access scenario. (Clearly the backhaul scenario differs).

[Nokia]: Based on our comments above we do not see any strong reasons to exclude any of Rel-15 PUSCH BS demodulation requirements (Option 1).

### Sub-topic 2-5: PUCCH - Details of BS requirement re-use

Issue 2-5-1: PUCCH DM-RS configuration

*Candidate options:*

* Option 1: Define performance requirements with DMRS configuration agnostic for PUCCH format 3 and 4.
* Option 2: Keep existing BS demodulation based DM-RS configurations.

*Recommendations for 2nd round:*

Discuss in second round.   
Majority for option 2.

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

[XXX]:

[YYY]:

[Huawei]: We are OK with both Options.

[Ericsson] Since we already have requirements available and there is no additional work, we prefer option 2.

[Nokia]: Option 2.

Issue 2-5-2: PUCCH multi-slot

*Candidate options:*

* Option 1: Skip cases for multi-slot PUCCH.
* Option 2: Include multi-slot PUCCH cases and keep or modify existing BS demodulation-based test applicability rule.

*Recommendations for 2nd round:*

Discuss in second round.  
Majority for option 2.

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

[XXX]:

[YYY]:

[Huawei]: Prefer Option 1. IAB-DU is used for improving the performance of scenario with cell edge or even no coverage, IAB-DU has no coverage problem at all.

[Ericsson] Again here our understanding is that there is not something special about IAB access compared to the existing 3 BS classes. If an IAB does not support this feature then of course there will be no need to meet the requirements, but it shouldnot be assumed that there will not be support.

[Nokia]: We do not think that coping the requirements is a big issue, if the applicability rule can be defined. Thus, we prefer Option 2.

Issue 2-5-3: PUCCH number of test cases

*Candidate options:*

* Option 1: Limit the PUCCH demodulation requirements to two cases chosen by the manufacturer.
* Option 2: Keep all the PUCCH requirements and limit the number of tests to [any two] cases chosen by the manufacturer using applicability rule.

*Recommendations for 2nd round:*

Discuss in second round.  
Majority for option 2.

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

[XXX]:

[YYY]:

[Huawei]: Considering BS may support only one or more than one PUCCH format, if we constraint it to two cases, it limits that BS must support at least 2 PUCCH formats, this is not true, so we prefer to reword Option 2 as following:

Option 2: 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 to any two cases chosen by the manufacturer using applicability rule.

[Ericsson] This applicability rule could be a sensible idea to reduce testing overhead.

[Nokia]: We prefer to follow Option 2 and agree with the comment by Huawei.

Issue 2-5-4 (new): Copying of all Rel-15 PUCCH BS demod requirements

*Candidate options:*

* Option 1: Copy all Rel-15 PUCCH BS demod requirements and discuss applicability rule inclusion or adaptation to reduce the number of tests.
* Option 2: Discuss each Rel-15 PUCCH BS demod requirement configurations separately.

*Recommendations for 2nd round:*

It has become clear that this issue is arising for each requirement and their configurations.  
In most cases contributors are converging to the homologue of option 1.  
Contributors are requested to express their opinion on a general rule for all Rel-15 PUCCH BS demod requirements.

The applicability rules themselves can then be discussed either still in this meeting or the next.

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

[XXX]:

[YYY]:

[Huawei]: We prefer Option 2. We should discuss each Rel-15 PUCCH BS demodulation separately and analyse them case by case. Currently based on our understanding, multi-slot PUCCH cases should not be included.

[Ericsson] We do not see a reason not to include all of the requirements; they are available and in our understanding the access links could be similar to the 3 BS classes. If the IAB supports many PUCCH configurations, an applicability rule for testing could be considered as discussed above.

[Nokia]: From our point of view, Option 1 is sufficient if proper applicability rules are defined.

### Sub-topic 2-6: PRACH - Details of BS requirement re-use

Issue 2-6-1: PRACH formats

*Candidate options:*

* Option 1: Only keep format 0 with 1.25kHz SCS and C2 with 30kHz and 120kHz SCS for PRACH performance requirements
* Option 2: Keep all PRACH formats and discuss applicability rule.

*Recommendations for 2nd round:*

Discuss in second round.

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

[XXX]:

[YYY]:

[Huawei]: We prefer Option 1. We are also OK with the following Option:

* Only copy-paste TDLC300-100/TDLA30-300 cases (currently TDLC300-100/TDLA30-300 and AWGN) for FR1 and FR2 respectively.
* For BS declares to support more than one PRACH formats, limit the number of tests to any two cases chosen by the manufacturer using applicability rule.

[Ericsson]

We think all requirements should be included, and all channels. We can consider a test applicability.

[Nokia]: We prefer to keep all PRACH formats in requirements and agree with the applicability rule proposed by Huawei.

Issue 2-5-4 (new): Copying of all Rel-15 PRACH BS demod requirements

*Candidate options:*

* Option 1: Copy all Rel-15 PRACH BS demod requirements and discuss applicability rule inclusion or adaptation to reduce the number of tests.
* Option 2: Discuss each Rel-15 PRACH BS demod requirement configurations separately.

*Recommendations for 2nd round:*

It has become clear that this issue might be arising for each requirement and their configurations.  
Contributors are requested to express their opinion on a general rule for all Rel-15 PRACH BS demod requirements.

The applicability rules themselves can then be discussed either still in this meeting or the next.

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

[XXX]:

[YYY]:

[Huawei]: Same comments as Issue 2-6-1:

* Only copy-paste TDLC300-100/TDLA30-300 cases (currently TDLC300-100/TDLA30-300 and AWGN) for FR1 and FR2 respectively.
* For BS declares to support more than one PRACH formats, limit the number of tests to any two cases chosen by the manufacturer using applicability rule.

[Ericsson] Same comment as previous issue.

[Nokia]: Option 1, as discussed in the previous issue.

### Sub-topic 2-7: Other

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

## 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** |
| R4-2015593 | Huawei, HiSilicon | Tdoc Title: Discussion on NR IAB MT demodulation performance requirements  Test setup  **Proposal 1: Define IAB MT performance requirements based on Rel-15 UE performance requirements.**  **Proposal 2: Test applicability rules need to be defined for different IAB-MT types and classes.**  **Proposal 3: There is no need to configure specific number of HARQ process and CBW/SCS, same performance requirements can be applied for different TDD UL-DL patterns and different CBW/SCS.**  **Proposal 4: Test configurations that are related to rate matching can be kept, others can be ignored, such as number of HARQ process, k0 and k1, TDD UL-DL pattern and etc.**  **Proposal 5: 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.**  **Proposal 6: Define test applicability rule for IAB-MT supporting different CBW&SCS.**  **Proposal 7: Only keep PDSCH cases with 64QAM.**  **Proposal 8: Only keep 4Rx requirements for FR1.**  **Proposal 9: Only keep requirements with PRB bundling size 2.**  **Proposal 10: Only keep PDSCH performance requirements for mapping Type-A**  **Proposal 11:** **Only keep PDCCH performance requirements with AL 8**  **Proposal 12: Only keep periodic NZP CSI-RS resource type for CQI/PMI/RI reporting cases**  **Proposal 13: Only keep wideband CQI reporting granularity for CQI/PMI/RI reporting cases**  **Proposal 14: Skip PDSCH cases that for HARQ soft combining, Enhanced Receiver Type 1, CSI-RS overlapped with PDSCH, LTE-NR coexistence and SDR.**  Detail test scope  **Proposal 15: Define NR IAB MT performance requirements as per overview in Table 2.2-1 and 2.2-2 for FR1 and FR2 respectively.** [Moderator: Tables omitted here.] |
| R4-2015869 | Ericsson | Tdoc Title: IAB-MT demodulation requirements  Scope of which UE requirements to follow  Observation 1: There is no need for FDD demodulation requirements for the IAB-MT  **Proposal 1: 2RX and 4RX requirements specified for FR1 IAB-MT.**  **Proposal 2: Do not develop QPSK requirements for PDSCH for IAB-MT (for both FR1 and FR2)**  Re-using parameters from UE demodulation requirements  **Proposal 3: RAN4 should discuss whether specifying 40MHz (FR1) and 100MHz (FR2) demodulation requirements is sufficient or other (in particular lower)/alternative bandwidths should be considered.**  **Proposal 4: RAN4 should investigate further how dependent the SNR for achieving relative throughput (e.g. 70%) is on the slot configuration (in particular for high SNR).** |
| R4-2016433 | Nokia, Nokia Shanghai Bell | Tdoc Title: On NR IAB-MT test setup and demodulation requirements  IAB deployment and architecture:  Observation 1: Both IAB-MT and IAB-DU are essentially the parts of the same infrastructure node, i.e., BS or IAB-node, deployed by a RAN vendor.  **Proposal 1: RAN4 to** **consider IAB-MT as a part of a network node with test setup and performance requirements based on the BS approach.**  Observation 2: For the BH data, the bearers are terminated at the PDCP layer of UEs. For SA mode, the establishment of DRBs is optional. Hence, the IAB-MT U-Plane protocol stack can be different from the traditional UE protocol stack. The test mode commands cannot be read at the IAB-MT.  Observation 3: The behavior of IAB-node BH links is much more predictable and less dynamic than in traditional RAN scenarios.  **Proposal 2: RAN4 to consider a simplification of the performance requirements for IAB-MT, when compared to UE requirements, to address IAB-node deployment scenarios.**  Observation 4: It is up to the implementation how IAB-node gets timing based on available synchronization sources, i.e., it can be done OTA, using the Uu interface, or based on GNSS source.  Conformance testing setup:  Observation 5: According to general performance requirements from TS 38.141-2, in the tests performed with signal generators, a synchronization signal may be provided from the BS to the signal generator to enable the correct timing of the wanted signal. The HARQ feedback could be done as an RF feedback or as a digital feedback. The HARQ feedback should be error-free [8]. In practice, time and frequency synchronization between the BS under test and the signal generator can be performed over the same connection together with HARQ/RV feedback used in PUSCH tests. HARQ feedback is needed only for correct retransmissions from the signal generator. The BS itself does throughput evaluation.  **Proposal 3: RAN4 to adopt the approach used in BS testing, where HARQ/RV feedback could be done via an error-free digital feedback (RF or cable link), and performance indicators are derived by the DUT, i.e., by the IAB-MT.**  Observation 6: For the OTA testing, coordinate reference point and orientation of the BS under test is for manufacturer declaration.  **Proposal 4: RAN4 to adopt for IAB-MT the approach used in BS testing where, coordinate reference point and orientation of the BS under test is for manufacturer declaration.**  Observation 7: In the UE tests, the system simulator performs the measurement of KPIs to be validated by the performance requirements, i.e., not by the device under test (DUT)/UE.  Observation 8: UE test loop mode A is mandatory to all 5GS UEs. It requires loopback of PDCP SDUs and the establishment of bi-directional radio bearers. Considering Observation 2 that DRBs and U-Plane PDCP are not mandatory for the IAB-MT, test loop mode A cannot always be established for IAB-MT. However, in UE demodulation performance testing, loopback is used only in sustained downlink data rate (SDR) tests.  **Proposal 5: Do not use the data loopback test function and consequently do not specify SDR tests for IAB-MT.**  Observation 9: Since the UE tests are performed in RRC connected state with test mode On, transmission of some of the PHY signals depends on the slot number and TDD UL-DL pattern. Thus, the UL demodulation performance tests are performed not over FRCs with simpler configuration like it is in BS testing, but for Reference Measurement Channels (RMC), which change between slots and have bi-directional transmission.  **Proposal 6: RAN4 to consider following the BS approach and specify the performance requirements for IAB-MT in a way that preserves freedom in the selection of TDD UL-DL patterns, e.g., using FRC approach, and does not require RRC connection state established.**  Observation 10: REFSENS needed for radiated UE tests has initial conditions that require UE test loop function to be implemented and turned on. Moreover, the test procedure itself includes RX beam peak direction search described in Annex K of TS 38.521-2.  **Proposal 7: RAN4 to adopt the approach used in BS testing where coordinate reference point and orientation of the IAB-MT under test is for manufacture declaration.**  **Proposal 8: RAN4 to agree on a test setup that offers the possibility for testing with a unidirectional Uu interface. The DUT being allowed to knowingly be in a L1/L2 test mode with hardcoded RRC and using TDD pattern independent FRC-like requirements to describe the KPI relevant channel structure. Time synchronization can be provided either via the digital feedback link from the tester or by a common (e.g., GNSS) source, or by Uu interface.**  IAB-MT performance requirements:  **Proposal 9: RAN4 to down select the UE demod requirements to be re-used for MT demod requirements.**  **Proposal 10: RAN4 to down select the UE demod requirements to be re-used for MT demod requirements, following the list above.** [Moderator: List copied here.  • Copy-paste from Rel-15 requirements only (Rel-16 requirements can be added according to operator request).  • Skip FDD requirements.  • Skip 2Rx requirements.  • Skip SDR requirements  (as argued in an earlier section).  • Heavily down scope CSI reporting requirements and requirements with overlapping CSI-RS  (assumed deployment scenario, i.e., stable LoS environment with one fixed directed beam between DU and MT, is not reliant on CSI).  • Low MCS requirements are not necessarily needed for IAB-nodes.  • Skip LTE-NR coexistence/DC/etc. requirements]  **Proposal 11: RAN4 to remove the following parameters from the UE demod PDSCH requirements and leave them up to implementation: PDCCH configuration, K1 value, CSI-RS for tracking, ZP CSI-RS.**  **Proposal 12: RAN4 to remove the following parameters from CSI reporting requirements and leave them up to implementation: PDCCH configuration, K1 value, CSI-RS for tracking, ZP CSI-RS.**  **Proposal 13: RAN4 to remove the CSI-RS for tracking parameters from the UE demod PDCCH requirements and leave them up to implementation.** |

## 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*

Most contributing parties have raised questions and made proposals concerning the IAB-MT testing setup. In particular pertaining to what infrastructure will be required for the testing.  
Since the detailed conclusions from this sub-topic likely have a large impact on the discussion on MT requirement details, it is recommended to threat this sub-topic with HIGHEST PRIORITY during this meeting.

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

**Issue 3-1-1: General approach**

* Proposals
  + Option 1 (Ericsson): Define IAB-MT demodulation tests in the same manner as BS demodulation tests in RAN4. Strive to not preclude (but also not necessitate) UE style testing
  + Option 2 (Nokia, Huawei): Consider IAB-MT as a part of a network node with test setup and performance requirements based on the BS approach.
  + Option 3 (QC): The IAB-MT demodulation test setup needs to be a mix of the BS setup and the UE setup.
  + Option 4: Other options not precluded
* Recommended WF
  + Evaluation of the proposed general approaches necessitates agreement on some of the details of the test setup in the following issues.

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| **Company** | **Comments** |
| XXX |  |
| Huawei | Option 2 is fine for us. |
| Nokia, Nokia Shanghai Bell | Both Option 1 and 2 are acceptable for us. |
| Moderator: | The IAB-MT test setup was discussed in the GtW pertaining to “[97e][309] NR\_IAB\_Conformance\_Part1”. Demodulation delegates were invited by the co-chair to contribute. The following agreements were achieved with involvement of demod delegates, but are only technically binding for BS RF.  For information, from Nov03GTW (see meeting report for original):  Common test issues from email thread [309] (1H15 minutes)  Issue 2-1-1: IAB-MT test setup  Using BS test structure to generate the test set-up including test configurations, test models, RF channels  - Test linkage between TE and DUT (IAB-MT) need to be further discussed including what’s the basis information needed, and which part can be left open to implementation.  - TS descriptions of environments shall not mandate specific equipment and therefore allow flexibility in connection setup  Please take part in the general IAB-MT test setup discussion in [309]. This agenda will focus on demodulation specific aspects of the IAB-MT test setup and forward any agreements to [309] for information. |

**Issue 3-1-2: DUT placement reference point and orientation**

* Proposals
  + Option 1 (Nokia): Coordinate reference point and orientation of the IAB-MT under test is for manufacture declaration.
  + Option 2: Other options are not precluded.
* Recommended WF
  + ~~Collect views in 1~~~~st~~ ~~round.~~
* Agreements from Nov03 GtW (informative, check meeting report for original)
  + Agreement: Coordinate reference point and orientation of the IAB-MT under test is for manufacture declaration.

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| **Company** | **Comments** |
| XXX |  |
| Huawei | Option 1 is fine for us. |
| Ericsson | Agree |

**Issue 3-1-3: DUT feedback**

* Proposals
  + Option 1 (Nokia): HARQ/RV feedback done via an error-free digital feedback (RF or cable link).
  + Option 2: Other options are not precluded.
* Recommended WF
  + ~~Collect views in 1~~~~st~~ ~~round.~~
* Agreements from Nov03 GtW (informative, check meeting report for original)
  + Agreement: HARQ/RV feedback done via an error-free digital feedback, the feedback linkage to TE still FFS

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| **Company** | **Comments** |
| XXX |  |
| Huawei | Option 1 is fine for us. |
| Ericsson | Agree |

**Issue 3-1-4: KPI deriving entity**

* Proposals
  + Option 1 (Nokia): Performance indicators are derived by the DUT, i.e., by the IAB-MT
  + Option 2: Other options are not precluded.
* Recommended WF
  + ~~Collect views in 1~~~~st~~ ~~round.~~
* Agreements from Nov03 GtW (informative, check meeting report for original)
  + No need to be specified in the specification for KPI deriving entity.

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| **Company** | **Comments** |
| XXX |  |
| Huawei | Option 1 is fine for us. |
| Ericsson | Agree, but may not need to be explicitly described in the spec. |
| Nokia, Nokia Shanghai Bell | We agree that it can be left implementation without explicit specification. |

**Issue 3-1-5: Detailed test setup**

* Proposals
  + Option 1 (Nokia): Use a test setup that offers the possibility for testing with a unidirectional Uu interface. The DUT being allowed to knowingly be in a L1/L2 test mode with hardcoded RRC and using TDD pattern independent FRC-like requirements to describe the KPI relevant channel structure. Time synchronization can be provided either via the digital feedback link from the tester or by a common (e.g., GNSS) source, or by Uu interface.
  + Option 2: Other options not precluded.
* Recommended WF
  + Companies are encouraged to discuss a test setup, including some details, that allows for re-use of previous UE demod requirements, while providing as much freedom for the test setup as is reasonable.

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| **Company** | **Comments** |
| XXX |  |
| Huawei | Option 1 is fine for us. |
| Ericsson | Agree |

### Sub-topic 3-2: General requirement scope

*Sub-topic description:*

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

**Issue 3-2-1: Basis for requirement re-use**

* Proposals
  + Option 1 (Huawei, Nokia): Define IAB MT performance requirements based on Rel-15 UE performance requirements.
  + Option 2 (Nokia): Copy-paste from Rel-15 requirements only; Rel-16 requirements can be added according to operator request.
  + Option 3 (Nokia): Strictly down select from UE demod requirements for re-use in MT demod requirements
  + Option 4: Other options not precluded.
* Recommended WF
  + Collect views in 1st round.

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| **Company** | **Comments** |
| XXX |  |
| Huawei | We are OK with Option 1.  Currently, there are many WIs still under discussion for Rel-16 performance requirements. Considering that Rel-15 is the first version of NR and provides baseline features, in our view, IAB MT performance requirements should be defined based on Rel-15 UE performance requirements defined in TS 38.101-4. |
| Ericsson | For Rel-16, HST is not applicable For the others (eMIMO, URLLC, etc) they may not be so likely but why to rule them out ? (Possibly clashing WI) ? |
| Nokia, Nokia Shanghai Bell | For IAB-MT only backhaul link is considered, in Rel. 16 IAB, nodes are static. If found to be needed, additional features can be considered, for example, in Release 17 enhanced IAB WI. |
| Ericsson | We can agree Rel-15 base for MT same as DU |
| Qualcomm | Option 3 looks reasonable as a starting point as only tests with slow channel should be used. If there is not enough coverage, some tests can be added with such channel models. |
| Intel | Agree to consider Rel-15 as baseline without PDSCH test cases for HST Single Tap. |

**Issue 3-2-2: Applicability rule for different SCS/CBW**

* Proposals
  + Option 1 (Huawei): Define test applicability rule for IAB-MT supporting different CBW&SCS.
  + Option 2: Other options not precluded.
* Recommended WF
  + Collect views in 1st round.

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| --- | --- |
| **Company** | **Comments** |
| XXX |  |
| Huawei | Option 1 |
| Ericsson | Yes we should define an applicability rule |
| Nokia, Nokia Shanghai Bell | Option 1 is fine for us. |
| Qualcomm | Option 1 is fine since IAB-MT will not support all the combinations mandated for a UE. When tests are taken based on UE requirements, these might have to be adapted for different parameters. |
| Intel | Support Option 1. |

**Issue 3-2-3: Applicability rule for MT types and classes**

* Proposals
  + Option 1 (Huawei): Test applicability rules need to be defined for different IAB-MT types and classes.
  + Option 2: Other options not precluded.
* Recommended WF
  + Collect views in 1st round.

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| --- | --- |
| **Company** | **Comments** |
| XXX |  |
| Huawei | Option 1 |
| Ericsson | An IAB can only be one type and class. For the type, the applicability is clear in the BS spec (i.e. only 2 radiated for 1-H, all radiated for 1-O, 2-O). For the class, if the requirements differ between the classes then the applicability should be clarified. |
| Nokia, Nokia Shanghai Bell | Could Huawei, clarify, please, what requirement may need class-dependent applicability rules? |
| Huawei | Typo, no class-dependent test applicability is needed. we mean that only IAB type *1-H, 1-O* and *2-O* are defined, from Rel-15 BS demodulation requirements, only conducted performance requirements are defined for BS *1-H* (no duplicated tests for both conducted and radiated test), radiated performance requirements for BS *1-O* and *2-O*. |
| Ericsson | We agree for 1-H the requirements should be only conducted, for 1-O, 2-O only radiated |
| Qualcomm | OTA and conducted have to be split. Same tests should apply for all classes since same channels are used on the MT-parent link |
| Nokia, Nokia Shanghai Bell | We thank Ericsson for clarification. We agree with the option to have only conducted requirements for type 1-H and radiated for classes 1-O and 2-O. |

### Sub-topic 3-3: Detailed scope of UE requirement re-use - tables/matrices

*Sub-topic description*

Last meeting’s way forward recommended for participants to provide an overview of a detailed requirement re-use scope

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| * Detailed scope of UE demod requirement re-use   + Option 1: Requirement matrix. A matrix is made of all current requirements is to be created and then a decision made on which are applicable for IAB-MT and which are not.   + Option 2: Not is scope for this meeting.   + Recommended WF: All participants are invited to provide a first overview of requirements to re-use/adapt/follow the principle of, for the next meeting. |

Following this recommendation, much input was received for this meeting.  
Most contributors have provided input in duplicated form: Classical proposals and a table/matrix detailing the exact impact of the proposals on the TS 38.101-4 UE demod requirements.  
In this sub-topic and the following ones, an attempt is made to capture both approaches; arguably the most progress could be made, by working directly on the shared table/matrix below.

Please check the moderator’s attempt of creating a shared table/matrix and comment on the preferred format going forward.

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

**Issue 3-3-1: Common UE requirement re-use table/matrix - FR1**

* Proposals

|  |  |  |  |
| --- | --- | --- | --- |
| Demodulation performance requirements | UE demod requirement configurations | | Proposed adaptation for MT demod |
| PDSCH | Antenna configuration | 1x2, 2x2 ULA Low, 2x2 ULA Medium, 4x2 ULA Low, 1x4, 2x4 ULA Low, 4x4 ULA Low, 4x4 ULA Medium A | Antenna configuration (TxR): Huawei: 2x4 ULA Low Ericsson,Nokia: 2RX and 4RX  Channel model:  Huawei, Nokia: TDLA30-10 Low  MCS:  Huawei: 19 Ericsson: 13, 19, 24  CBW&SCS:  Huawei: agnostic  Ericsson, Nokia: Alternatively 40MHz only  Resource mapping:  Huawei: Type A  Ericsson: Why not both with applicability rule ?  TDD/FDD: Ericsson, Nokia, Huawei: No FDD  HARQ soft combining and Enhanced Receiver Type 1: Huawei: Skip.  Ericsson: Could declare support  CSI-RS overlapped: Ericsson: Yes Nokia, Huawei: No  Co-existence with LTE CRS  Ericsson, Nokia, Huawei: No.  PRB bundling size:  Huawei: 2 |
| Channel model | TDLB100-400 Low, TDLC300-100 Low, TDLA30-10 Low, HST-750, HST-1000 |
| MCS | 4, 13, 19, 24(Table2) |
| CBW&SCS | 10MHz for 15kHz SCS; 20, 40MHz for 30kHz SCS |
| Resource mapping | Type A, Type B |
| Special purpose | HARQ soft combining, Enhanced Receiver Type 1, CSI-RS overlapped with PDSCH, LTE-NR coexistence |
| Test metric | 70%, 30% of maximum TP |
| PDCCH | Antenna configuration | 1x2 Low, 2x2 Low, 1x4 Low, 1x4 Medium A, 2x4 Low | Antenna configuration:  Huawei: 2x4 Low Ericsson, Nokia: 2RX, 4RX  Channel model:  Huawei, Nokia: TDLA30-10 Low  CBW&SCS:  Huawei: agnostic  Aggregation level:  Huawei, Nokia: 8  TDD/FDD: Ericsson, Nokia, Huawei: No FDD |
| Channel model | TDLA30-10 Low, TDLC300-100 Low |
| CBW&SCS | 10MHz for 15kHz SCS; 40MHz for 30kHz SCS |
| Aggregation level | 2, 4, 8, 16 |
| DCI Format | 1\_0, 1\_1 |
| Test metric | 1% of Pm-dsg |
| PBCH | Antenna configuration | 1 x 2 Low, 1x4 Low | Antenna configuration:  Huawei: 1x4 Low  Channel model:  Huawei: TDLA30-10 Low  CBW&SCS:  Huawei: agnostic  Ericsson: Alternatively 40MHz only ?  TDD/FDD: Ericsson, Nokia, Huawei: No FDD |
| Channel model | TDLC300-100 Low, TDLA30-10 Low |
| CBW&SCS | 10MHz for 15kHz SCS; 40MHz for 30kHz SCS |
| Test metric | 1% of Pm-bch |
| SDR | Test metric | 85% of TB success rate | Include these requirements: Huawei, Nokia, Ericsson: No |
| CQI | Antenna configuration | 2x2 Static, 2x2 ULA High, 2x4 Static, 2x4 XP High | Antenna configuration:  Huawei,: 2x4 Static, 2x4 XP High  Ericsson, Nokia: 2RX and 4RX  Channel model:  Huawei, Nokia: AWGN, TDLA30-5 Low  CBW&SCS:  Huawei: agnostic  Ericsson: Alternatively 40MHz only ?  CQI reporting:  Huawei, Nokia: wideband  CSI-RS resource Type:  Huawei, Nokia: periodic  ReportConfigType:  Huawei, Nokia: periodic  TDD/FDD: Ericsson, Nokia, Huawei: No FDD |
| Channel model | AWGN, TDLA30-5 Low , Two tap |
| CBW&SCS | 10MHz for 15kHz SCS; 40MHz for 30kHz SCS |
| CQI reporting | wideband, subband |
| CSI-RS resource Type | periodic |
| ReportConfigType | periodic, aperiodic |
| PMI | Antenna configuration | 4x2 XP High, 8x2 XP High, 4x4 XP High, 8x4 XP High | Antenna configuration:  Huawei, Ericsson: 4x4 XP High, 8x4 XP High  Ericsson: Also 2RX  Channel model:  Huawei, Nokia: TDLA30-5 Low  CBW&SCS:  Huawei: agnostic  Ericsson: Alternatively 40MHz only ?  PMI reporting:  Huawei: wideband  CSI-RS resource Type:  Huawei, Nokia: wideband periodic  ReportConfigType:  Huawei: wideband periodic  TDD/FDD: Ericsson, Nokia, Huawei: No FDD |
| Channel model | TDLA30-5 Low |
| CBW&SCS | 10MHz for 15kHz SCS; 40MHz for 30kHz SCS |
| PMI reporting | wideband |
| CSI-RS resource Type | periodic, aperiodic |
| ReportConfigType | aperiodic |
| RI | Antenna configuration | 2x2 ULA Low, 2x2 ULA High, 2x4 ULA Low, 2x4 ULA High, 4x4 ULA Low | Antenna configuration:  Huawei: 2x4 ULA Low, 4x4 ULA Low  Ericsson: 4Rx, 2RX  Channel model:  Huawei: TDLA30-5 Low  CBW&SCS:  Huawei: agnostic  Ericsson: Alternatively 40MHz only ?  CSI-RS resource Type:  Huawei: periodic  ReportConfigType:  Huawei: periodic  TDD/FDD: Ericsson, Nokia, Huawei: No FDD |
| Channel model | TDLA30-5 Low |
| CBW&SCS | 10MHz for 15kHz SCS; 40MHz for 30kHz SCS |
| CSI-RS resource Type | periodic |
| ReportConfigType | periodic |
| Interworking |  |  | Include these requirements: Nokia, Huawei: No |
| URLLC ultra-low BLER |  |  | Include these requirements: Huawei, Nokia, Ericsson: No |
| URLLC high reliability |  |  | Include these requirements: Huawei, Nokia, Ericsson: No |
| URLLC low latency |  |  | Include these requirements: Huawei, Nokia, Ericsson: No |

* Recommended WF
  + Please comment on the acceptability of this format or voice wishes to transform this table into “informative” material only, within the first few days of the meeting.

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| **Company** | **Comments** |
| XXX |  |
| Ericsson | 2RX is proposed to cover OTA testing. For the bandwidths, an alternative to agnostic could be just to define 40MHz. |
| Huawei | Only conducted performance requirements are defined for FR1 in the existing UE demodulation requirements in TS 38.101-4, it is not necessary to repeat to test the same performance requirements for both conducted and radiated testing.  If performance requirements are defined only for 40MHz, the applicability rule for testing of larger bandwidth than 40MHz used in existing BS demodulation requirements should be reused: the tests shall be done by using performance requirement for the closest channel bandwidth lower than this widest supported bandwidth; the tested PRBs shall then be centered in this widest supported channel bandwidth. |
| Nokia, Nokia Shanghai Bell | It is fine to have the requirements for 40 MHz CBW and then add an applicability rule for wider CBWs as proposed by Huawei. |

**Issue 3-3-2: Common UE requirement re-use table/matrix – FR2**

* Proposals

|  |  |  |  |
| --- | --- | --- | --- |
| Demodulation performance requirements | UE demod requirement configurations | | Proposed adaptation for MT demod |
| PDSCH | Antenna configuration | 2x2 ULA Low, 2x2 XPL Medium, 2x2 ULA Medium | Antenna configuration:  Huawei, Nokia: 2x2 ULA Low  Channel model:  Huawei, Nokia: TDLA30-75 Low  MCS:  Huawei, Nokia: 19  Ericsson: 13, 17, 18  CBW&SCS:  Huawei: agnostic  Ericsson: Alternatively 50/200MHz only ?  Resource mapping:  Huawei: agnostic  HARQ soft combining and Enhanced Receiver Type 1: Huawei, Nokia: Skip.  Remark: No FDD in FR2 |
| Channel model | TDLC60-300 Low, TDLA30-300 Low, TDLA30-75 Low |
| MCS | 4, 13, 17, 18 |
| CBW&SCS | 50MHz for 60kHz SCS; 50, 100, 200MHz for 120kHz SCS |
| Resource mapping | Type A |
| Special purpose | HARQ soft combining, Enhanced Receiver Type 1 |
| Test metric | 70%, 30% of maximum TP |
| PDCCH | Antenna configuration | 1x2 Low, 2x2 Low | Antenna configuration:  Huawei, Nokia: 2x2 Low  Channel model:  Huawei, Nokia: TDLA30-75 Low  CBW&SCS:  Huawei: agnostic  Ericsson: Alternatively 50/200MHz only ?  Aggregation level:  Huawei, Nokia: 8 |
| Channel model | TDLA30-75 Low, TDLA30-300 Low |
| CBW&SCS | 100MHz for 120kHz SCS |
| Aggregation level | 2, 4, 8, 16 |
| DCI Format | 1\_0, 1\_1 |
| Test metric | 1% of Pm-dsg |
| PBCH | Antenna configuration | 1 x 2 Low | Antenna configuration:  Huawei: 1x2 Low  Channel model:  Huawei, Nokia: TDLA30-75 Low  CBW&SCS:  Huawei: agnostic  Ericsson: Alternatively 50/200MHz only ? |
| Channel model | TDLA30-75 Low, TDLA30-300 Low |
| CBW&SCS | 100MHz for 120kHz SCS; 100MHz for 240kHz SCS |
| Test metric | 1% of Pm-bch |
| SDR | Test metric | 85% of TB success rate | Include these requirements: Huawei, Nokia, Ericsson: No |
| CQI | Antenna configuration | 2x2 Static, 2x2 ULA High | Antenna configuration:  Huawei: 2x2 Static, 2x2 ULA High  Channel model:  Huawei, Nokia: AWGN, TDLA30-35 Low  CBW&SCS:  Huawei: agnostic  Ericsson: Alternatively 50/200MHz only ?  CQI reporting:  Huawei, Nokia: wideband  CSI-RS resource Type:  Huawei, Nokia: periodic  ReportConfigType:  Huawei, Nokia: periodic |
| Channel model | AWGN, TDLA30-35 Low |
| CBW&SCS | 100MHz for 120kHz SCS |
| CQI reporting | wideband |
| CSI-RS resource Type | periodic, aperiodic |
| ReportConfigType | periodic, aperiodic |
| PMI | Antenna configuration | 2x2 ULA Low | Antenna configuration:  Huawei: 2x2 ULA Low  Channel model:  Huawei, Nokia: TDLA30-35 Low  CBW&SCS:  Huawei: agnostic  Ericsson: Alternatively 50/200MHz only ?  PMI reporting:  Huawei, Nokia: wideband  CSI-RS resource Type:  Huawei, Nokia: periodic  ReportConfigType:  Huawei: periodic |
| Channel model | TDLA30-35 Low |
| CBW&SCS | 100MHz for 120kHz SCS |
| PMI reporting | wideband |
| CSI-RS resource Type | periodic, aperiodic |
| ReportConfigType | aperiodic |
| RI | Antenna configuration | 2x2 ULA Low, 2x2 XP High | Antenna configuration:  Huawei, Nokia: 2x2 ULA Low  Channel model:  Huawei, Nokia: TDLA30-35 Low  CBW&SCS:  Huawei: agnostic  Ericsson: Alternatively 50/200MHz only ?  CSI-RS resource Type:  Huawei, Nokia: periodic  ReportConfigType:  Huawei: periodic |
| Channel model | TDLA30-35 Low |
| CBW&SCS | 100MHz for 120kHz SCS |
| CSI-RS resource Type | periodic, aperiodic |
| ReportConfigType | aperiodic |
| Interworking |  |  | Include these requirements: Nokia, Huawei: No |
| 256 QAM |  |  | Include these requirements: Ericsson: Yes  Huawei, Nokia: No (not Rel-15) |
| URLLC high reliability |  |  | Include these requirements: Huawei, Nokia, Ericsson: No |
| URLLC low latency |  |  | Include these requirements: Huawei, Nokia, Ericsson: No |

* Recommended WF
  + Please comment on the acceptability of this format or voice wishes to transform this table into “informative” material only, within the first few days of the meeting.

|  |  |
| --- | --- |
| **Company** | **Comments** |
| XXX |  |
| Huawei | For CBW, if only performance requirements for one bandwidth are defined, same comments as FR1 part should be considered. |
| Nokia, Nokia Shanghai Bell | It is fine to have the requirements as proposed by Ericsson: 50 kHz CBW - 60 kHz SCS; 100MHz CBW - 120kHz SCS and then define applicability rule for wider CBWs as proposed by Huawei. |

### Sub-topic 3-4: Requirement agnostic - Details of UE requirement re-use

*Sub-topic description*

In case a contributor is not comfortable with the table/matrix format of the previous sub-topic, in the following all requirement agnostic proposals are listed in the classical format.  
The difference between subtopic 3-2 (“General requirement scope”) and subtopic 3-4 is that agreements from 3-2 would not be captured in specific cells of detailed summary table/matrix; but agreements can extend the list of “sections” in the table.

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

**Issue 3-4-1: Conducted and OTA requirements**

* Proposals
  + Option 1 (Ericsson): Specify both conducted and OTA tests for IAB-MT.
  + Option 2: Other options not precluded.
* Recommended WF
  + Collect views in 1st round.

|  |  |
| --- | --- |
| **Company** | **Comments** |
| XXX |  |
| Huawei | Option 1 is fine for us. |
| Nokia, Nokia Shanghai Bell | We agree with Option 1. |

**Issue 3-4-2: CBW/SCS**

* Proposals
  + Option 1 (Huawei): No need to configure specific CBW/SCS, same performance requirements can be applied for different CBW/SCS.
  + Option 2 (Ericsson): Discuss whether specifying 40MHz (FR1) and 100MHz (FR2) demodulation requirements is sufficient or other (in particular lower)/alternative bandwidths should be considered
  + Option 3: Other options not precluded.
* Recommended WF
  + Moderator: Huawei has some results in their contribution and might be able to give some preliminary insights.

|  |  |
| --- | --- |
| **Company** | **Comments** |
| XXX |  |
| Huawei | We prefer Option 1 since there is negligible performance difference between different TDD UL-DL patterns different PDSCH mapping type and different CBW/SCS. |
| Ericsson | The FR2 proposal is wrong; it should be 40MHz (FR1) and 50MHz for 60k SCS, 100MHz for 120k SCS for FR2; i.e. the UE specs as of today |
| Nokia, Nokia Shanghai Bell | We prefer to use specific CBW/SCS combination. Corrected proposal by Ericsson looks reasonable. |
| Huawei | Corresponding test applicability rule needs to be defined for testing of larger bandwidth if performance requirements are defined for only one bandwidth. |
| Ericsson | Yes agree an applicability rule is needed |
| Intel | Specific CBW/SCS combination with applicability rule is fine for us. |
| Nokia, Nokia Shanghai Bell | Agree to define requirements: 40MHz (FR1) and 50MHz for 60k SCS, 100MHz for 120k SCS for FR2 with the applicability rule for wider CBWs proposed by Huawei. |

**Issue 3-4-3: TDD pattern**

* Proposals
  + Option 1 (Huawei): Same performance requirements can be applied for different TDD UL-DL patterns.
  + Option 2 (Nokia): Specify the performance requirements for IAB-MT in a way that preserves freedom in the selection of TDD UL-DL patterns
  + Option 3 (Ericsson): Investigate further how dependent the SNR for achieving relative throughput (e.g. 70%) is on the slot configuration (in particular for high SNR)
  + Option 4: Other options are not precluded.
* Recommended WF
  + Collect views in 1st round.

|  |  |
| --- | --- |
| **Company** | **Comments** |
| XXX |  |
| Huawei | From our understanding, Option 1 and Option 2 have the same meaning.  For Option 3, there is negligible performance difference between different TDD UL-DL patterns different PDSCH mapping type and different CBW/SCS as per our observation. |
| Ericsson | All proposals aim to end up with requirements that specify one test configuration but can be declared to be applicable for any configuration. The only question is whether to verify that the existing UE requirements that are relative could scale to single slot/other TDD patterns and what to do for the UE requirements that are not relative. |
| Intel | Support Option 1 and Option 2. |
| Nokia, Nokia Shanghai Bell | We tend agree with HW but further studies for the next meeting might be needed. |

**Issue 3-4-4: HARQ**

* Proposals
  + Option 1 (Huawei): Number of HARQ process and k1 configurations can be ignored.
  + Option 2: Other options not precluded
* Recommended WF
  + Can proponents in give more details in the first round regarding which requirement and which configurations are concerned by their proposals (presumably at least PDSCH TDRA, SDR, CQI)?

|  |  |
| --- | --- |
| **Company** | **Comments** |
| XXX |  |
| Huawei | Option 1 |
| Ericsson | Agree |
| Nokia, Nokia Shanghai Bell | Option 1 is fine. |
| Qualcomm | Number of HARQ processes has influence on the soft buffer size. Given that for this link we would not expect to have many re-transmissions, this proposal should be fine. |
| Intel | Option 1 is fine for us. |

**Issue 3-4-5: TDRA**

* Proposals
  + Option 1 (Huawei): K0 configurations can be ignored.
  + Option 2: Other options not precluded
* Recommended WF
  + Can proponents in give more details in the first round regarding which requirement and which configurations are concerned by their proposals (presumably at least PDSCH TDRA, SDR, CQI)?

|  |  |
| --- | --- |
| **Company** | **Comments** |
| XXX |  |
| Huawei | Option 1 |
| Ericsson | Agree |
| Nokia, Nokia Shanghai Bell | Option 1 is fine. |
| Intel | Option 1 is fine for us. |

**Issue 3-4-6: High speed scenarios**

* Proposals
  + Option 1 (Huawei): 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: Other options are not precluded.
* Recommended WF
  + Collect views in 1st round.

|  |  |
| --- | --- |
| **Company** | **Comments** |
| XXX |  |
| Huawei | Option 1 |
| Ericsson | Agree |
| Nokia, Nokia Shanghai Bell | Option 1 is fine. |
| Qualcomm | Option 1 is ok |
| Intel | Support Option 1. |

**Issue 3-4-7: General RX demodulation branches**

* Proposals
  + Option 1 (Huawei): Only keep 4Rx requirements for FR1.
  + Option 2 (Ericsson): 2RX and 4RX requirements specified for FR1 IAB-MT.
  + Option 3 (Nokia): Skip 2Rx requirements
  + Option 4: Other options are not precluded.
  + Option 5: 4Rx for conducted test only and 2Rx for radiated test only for FR1.
* Recommended WF
  + Collect views in 1st round.

|  |  |
| --- | --- |
| **Company** | **Comments** |
| XXX |  |
| Huawei | We prefer Option 1. Considering there is only 2Rx for radiated test, we are also OK with Option 5: 4Rx for conducted test only and 2Rx for radiated test only for FR1. |
| Ericsson | 2RX are needed for OTA testing |
| Ericsson | New option 5 is fine. Could add 2RX for FR2. |
| Qualcomm | Option 5 is ok. |
| Intel | Option 5 is fine for us. |
| Nokia, Nokia Shanghai Bell | Option “4Rx for conducted test only and 2Rx for radiated test only for FR1 and 2RX for FR2” would be our choice. |

**Issue 3-4-8: FDD and TDD requirements**

* Proposals
  + Option 1 (Nokia, Ericsson, Huawei): Skip FDD requirements.
  + Option 2: Other options not precluded.
* Recommended WF
  + Collect views in 1st round.

|  |  |
| --- | --- |
| **Company** | **Comments** |
| XXX |  |
| Huawei | We prefer Option 1. |
| Qualcomm | Option 1 is ok for now, these can be added if FDD bands will ever be added. |
| Intel | Ok with option 1. |

### Sub-topic 3-5: PDSCH - Details of UE requirement re-use

*Sub-topic description*

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

**Issue 3-5-1: MCS**

* Proposals
  + Option 1 (Huawei, Nokia): Only keep PDSCH cases with 64QAM.
  + Option 2: (Ericsson): Do not develop QPSK requirements for PDSCH for IAB-MT (for both FR1 and FR2).
  + Option 3 (Nokia): Low MCS requirements are not necessarily needed.
  + Option 4: Other options are not precluded.
* Recommended WF
  + Collect views in 1st round.

|  |  |
| --- | --- |
| **Company** | **Comments** |
| XXX |  |
| Huawei | We are OK with Option 1. It is sufficient to only define 64QAM cases. |
| Qualcomm | 16QAM should also be tested. |
| Intel | We slightly prefer Option 2 instead of Option 1 to have bigger test coverage. |
| Nokia, Nokia Shanghai Bell | We prefer Option 1. It is sufficient for stable LoS BH links. |

**Issue 3-5-2: PRB bundling size**

* Proposals
  + Option 1 (Huawei): Only keep requirements with PRB bundling size 2
  + Option 2: Other options are not precluded.
* Recommended WF
  + Collect views in 1st round.

|  |  |
| --- | --- |
| **Company** | **Comments** |
| XXX |  |
| Huawei | Option 1. |
| Ericsson | Option 1 is OK |
| Intel | Option 1 is fine for us. |
| Nokia, Nokia Shanghai Bell | Option 1 is fine. |

**Issue 3-5-3: Mapping type**

* Proposals
  + Option 1 (Huawei): Only keep PDSCH performance requirements for mapping Type-A
  + Option 2: Other options are not precluded.
* Recommended WF
  + Collect views in 1st round.

|  |  |
| --- | --- |
| **Company** | **Comments** |
| XXX |  |
| Huawei | Option 1. |
| Ericsson | As long as no additional simulation is needed, then requirements could be taken for both along with an applicability rule. |
| Nokia, Nokia Shanghai Bell | Agree with the proposal by Ericsson. |
| Huawei | It is different from BS side in NR release 15, supporting of mapping Type-B is mandatory with UE capability for NR UE, so only one requirements are defined for Type-B for different duplex mode and antenna configuration of 2Rx and 4Rx. |
| Nokia, Nokia Shanghai Bell | Could Huawei, clarify the argument above a bit further, please? |

**Issue 3-5-6: HARQ soft combining**

* Proposals
  + Option 1 (Huawei): Skip PDSCH cases for HARQ soft combining.
  + Option 2: Other options are not precluded.
* Recommended WF
  + Collect views in 1st round.

|  |  |
| --- | --- |
| **Company** | **Comments** |
| XXX |  |
| Huawei | Option 1. |
| Ericsson | Option 1 is OK |
| Intel | Option 1 is fine for us. |
| Nokia, Nokia Shanghai Bell | Option is fine. |

**Issue 3-5-7: Enhanced receiver**

* Proposals
  + Option 1 (Huawei): Skip PDSCH cases for enhance receiver Type 1.
  + Option 2: Other options are not precluded.
* Recommended WF
  + Collect views in 1st round.

|  |  |
| --- | --- |
| **Company** | **Comments** |
| XXX |  |
| Huawei | Option 1. |
| Ericsson | As long as no additional simulation is needed, these could be included but support declared. |
| Nokia, Nokia Shanghai Bell | We prefer Option 1. |
| Intel | Same view as Ericsson |
| Nokia, Nokia Shanghai Bell | We prefer Option 1. |

**Issue 3-5-8: CSI-RS overlapped with PDSCH**

* Proposals
  + Option 1 (Huawei, Nokia): Skip PDSCH cases for CSI-RS overlapped with PDSCH
  + Option 2 (Nokia): Heavily down scope requirements with overlapping CSI-RS.
  + Option 3: Other options are not precluded.
* Recommended WF
  + Collect views in 1st round.

|  |  |
| --- | --- |
| **Company** | **Comments** |
| XXX |  |
| Huawei | We prefer Option 1. |
| Ericsson | The requirements should be at least down-scoped |
| Nokia, Nokia Shanghai Bell | We agree with Option 1 as well. |

**Issue 3-5-9: Relative TPUT and slot configuration**

* Proposals
  + Option 1 (Ericsson): Investigate further how dependent the SNR for achieving relative throughput (e.g. 70%) is on the slot configuration (in particular for high SNR).
  + Option 2: Other options not precluded
* Recommended WF
  + Huawei has some results in their contribution and might be able to give some preliminary insights.  
    This issue is partially repeated from Issue 3-4-3, but here the scope is PDSCH only. Please discuss here, if no requirement agnostic agreement is reached.

|  |  |
| --- | --- |
| **Company** | **Comments** |
| XXX |  |
| Huawei | As per our observation, there is negligible performance difference between different TDD UL-DL patterns different PDSCH mapping type and different CBW/SCS. |
| Nokia, Nokia Shanghai Bell | We tend to agree with Huawei, but further study might be needed for the next meeting. |

**Issue 3-5-10: Test parameters specification simplification**

* Proposals
  + Option 1 (Nokia): Remove the following parameters from the UE demod PDSCH requirements and leave them up to implementation:
    - PDCCH configuration,
    - K1 value,
    - CSI-RS for tracking,
    - ZP CSI-RS.
  + Option 2 (Huawei): Remove the following parameters from UE demodulation PDSCH requirements:
    - Number of HARQ process,
    - K0 value
    - K1 value
    - TDD UL-DL pattern
  + Option 3: Other options are not precluded.
* Recommended WF
  + Collect views in 1st round.

|  |  |
| --- | --- |
| **Company** | **Comments** |
| XXX |  |
| Huawei | We are ok to both Option 1 and Option 2. |
| Ericsson | Generally agree for all; just for option 1 the PDCCH configuration can be removed for PDSCH but obviously not for PDCCH requirements. |
| Qualcomm | What is the rationale to remove all these? The donor-MT link is like a link to a normal UE. |

### Sub-topic 3-6: PDCCH - Details of UE requirement re-use

*Sub-topic description*

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

**Issue 3-6-1: Aggregation level**

* Proposals
  + Option 1 (Huawei): Only keep PDCCH performance requirements with AL 8.
  + Option 2: Other options are not precluded.
* Recommended WF
  + Collect views in 1st round.

|  |  |
| --- | --- |
| **Company** | **Comments** |
| XXX |  |
| Huawei | Option 1 |
| Ericsson | Again if no additional simulation needed then why not include all requirements but declare which is supported / applicability rule ? |
| Nokia, Nokia Shanghai Bell | We prefer Option 1. |

**Issue 3-6-2: Test parameters specification simplification**

* Proposals
  + Option 1 (Nokia): Remove the CSI-RS for tracking parameters from the UE demod PDCCH requirements and leave them up to implementation.
  + Option 2: Other options are not precluded.
* Recommended WF
  + Collect views in 1st round.

|  |  |
| --- | --- |
| **Company** | **Comments** |
| XXX |  |
| Huawei | We are OK with Option 1. |
| Ericsson | OK |
| Qualcomm | What is the rationale for this proposal? Since the link is configured by the parents, we do not think this can be left to implementation. The MT is supposed to work with different parents. |

### Sub-topic 3-7: PBCH - Details of UE requirement re-use

*Sub-topic description*

No classical proposals were submitted on the PBCH topic.  
However, some shared tables/matrices have contained references to PBCH. Hence, this sub-topic is created, but left empty, to allow easy inclusion, if more detailed discussions become necessary.

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

### Sub-topic 3-8: SDR - Details of UE requirement re-use

*Sub-topic description*

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

**Issue 3-8-1: Inclusion of SDR requirements**

* Proposals
  + Option 1 (Huawei, Ericsson): Do not include SDR requirements in IAB-MT demodulation.
  + Option 2 (Nokia): Do not use the data loopback test function and consequently do not specify SDR tests for IAB-MT.
  + Option 3: Other options are not precluded.
* Recommended WF
  + Collect views in 1st round.

|  |  |
| --- | --- |
| **Company** | **Comments** |
| XXX |  |
| Huawei | As per our understanding, Option 1 and Option 2 have the same meaning. |
| Qualcomm | This test is important to show that the device can process full data rate. For the MT, this would be especially important since it is expected to process large amounts of data. |
| Nokia, Nokia Shanghai Bell | To Qualcomm: as per our observation, this test cannot be carried out for IAB-MT because PDCP is not necessarily present int IAB-MT data plane, and thus loopback function cannot be established. |

### Sub-topic 3-9: CSI - Details of UE requirement re-use

*Sub-topic description*

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

**Issue 3-9-1: Inclusion of CSI requirements**

* Proposals
  + Option 1 (Nokia, Huawei): Heavily down scope CSI reporting requirements.
  + Option 2: Other options are not precluded.
* Recommended WF
  + Collect views in 1st round.

|  |  |
| --- | --- |
| **Company** | **Comments** |
| XXX |  |
| Huawei | Option 1 |
| Ericsson | Agree; downscope |
| Qualcomm | This needs more discussion, what are we downscoping and why? |
| Nokia, Nokia Shanghai Bell | Our preference would be to down-scope IAB-MT CSI reporting requirements further and keep only CQI reporting tests. |

**Issue 3-9-2: CSI-RS resource type**

* Proposals
  + Option 1 (Huawei): Only keep periodic NZP CSI-RS resource type for CQI/PMI/RI reporting cases
  + Option 2: Other options are not precluded.
* Recommended WF
  + Collect views in 1st round.

|  |  |
| --- | --- |
| **Company** | **Comments** |
| XXX |  |
| Huawei | Option 1. |
| Ericsson | Since IAB node is stationary in most case and the radio condition is stable, maybe IAB-MT does not need to report CSI periodically and it can reduce overhead. We could also consider aperiodic NZP-CSI-RS resource scenario also. |
| Qualcomm | Aperiodic might be used in practice so it should be tested. |
| Nokia, Nokia Shanghai Bell | If PMI/RI tests found to be needed, we prefer Option 1. |

**Issue 3-9-3: CQI reporting granularity**

* Proposals
  + Option 1 (Huawei): Only keep wideband CQI reporting granularity for CQI/PMI/RI reporting cases.
  + Option 2: Other options are not precluded.
* Recommended WF
  + Collect views in 1st round.

|  |  |
| --- | --- |
| **Company** | **Comments** |
| XXX |  |
| Huawei | Option 1. |
| Ericsson | Option 1 is OK |
| Qualcomm | Why not use subband? |
| Nokia, Nokia Shanghai Bell | We prefer Option 1. |

**Issue 3-9-4: CQI/PMI/RI reporting type**

* Proposals
  + Option 1 (Huawei): Only keep periodic CSI reporting type for CQI/PMI/RI reporting cases.
  + Option 2: Other options are not precluded.
* Recommended WF
  + Collect views in 1st round.

|  |  |
| --- | --- |
| **Company** | **Comments** |
| XXX |  |
| Huawei | Option 1. |
| Ericsson | Same comment as 3-9-2. Maybe we could consider aperiodic CSI reporting also. |
| Qualcomm | Aperiodic should be kept. |
| Nokia, Nokia Shanghai Bell | Aperiodic CSI reporting type is specified for PMI/RI in UE testing. If these tests are found to be needed, we would preferer not to introduce new CSI-RS reporting types and use aperiodic. |

**Issue 3-9-5: Test parameters specification simplification**

* Proposals
  + Option 1 (Nokia): Remove the following parameters from CSI reporting requirements and leave them up to implementation: PDCCH configuration, K1 value, CSI-RS for tracking, ZP CSI-RS.
  + Option 2: Other options are not precluded.
* Recommended WF
  + Collect views in 1st round.

|  |  |
| --- | --- |
| **Company** | **Comments** |
| XXX |  |
| Huawei | We are OK with Option 1. |
| Qualcomm | What is the rationale for this? Leaving this to implementation does not make sense because MT will not configure this link. |

### Sub-topic 3-10: Interworking - Details of UE requirement re-use

*Sub-topic description*

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

**Issue 3-10-1: Inclusion of interworking requirements**

* Proposals
  + Option 1 (Huawei): Skip LTE-NR coexistence.
  + Option 2 (Nokia): Skip LTE-NR coexistence/DC/etc. requirements.
  + Option 3: Other options are not precluded.
* Recommended WF
  + Collect views in 1st round.

|  |  |
| --- | --- |
| **Company** | **Comments** |
| XXX |  |
| Huawei | We are OK with Option 2. |
| Ericsson | Should be OK, but if there is no simulation needed what is the harm to keep them (with declared support) ? |

### Sub-topic 3-11: 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 |
|  |
| None |  |
|  |
|  |
|  |

## 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: General approach  *Tentative agreements:*  None  *Candidate options:*   * Option 1: Define IAB-MT demodulation tests in the same manner as BS demodulation tests in RAN4. Strive to not preclude (but also not necessitate) UE style testing * Option 2: Consider IAB-MT as a part of a network node with test setup and performance requirements based on the BS approach. * Option 3: The IAB-MT demodulation test setup needs to be a mix of the BS setup and the UE setup.   *Recommendations for 2nd round:*  In the GtW is was agreed to primarily the general IAB-MT test setup discussion in [309]. The more detailed test setup, especially for demod focused issues, can still be deliberated here, with all agreements being sent to the [309] discussion for information.  For information: The common RF/demod IAB GtW on Tuesday, resulted in the following agreements, which are captured for “Rel-16 NR IAB RF conformance general and common issues”:  Issue 2-1-1: IAB-MT test setup Using BS test structure to generate the test set-up including test configurations, test models, RF channels - Test linkage between TE and DUT (IAB-MT) need to be further discussed including what’s the basis information needed, and which part can be left open to implementation. - TS descriptions of environments shall not mandate specific equipment and therefore allow flexibility in connection setup  It is recommended to prioritise the discussion of issue 3-1-5.  Issue 3-1-2: DUT placement reference point and orientation  *GtW agreements:*  Coordinate reference point and orientation of the IAB-MT under test is for manufacture declaration.  *Recommendations for 2nd round:*  Added for information. Check meeting report for agreements.  Issue 3-1-3: DUT feedback  *GtW agreements:*  HARQ/RV feedback done via an error-free digital feedback, the feedback linkage to TE still FFS.  *Recommendations for 2nd round:*  Added for information. Check meeting report for agreements.  Issue 3-1-4: KPI deriving entity  *GtW agreements:*  No need to be specified in the specification for KPI deriving entity.  *Recommendations for 2nd round:*  Added for information. Check meeting report for agreements.  Issue 3-1-5: Detailed test setup  *Tentative agreements:*  None  *Candidate options:*   * Option 1: Use a test setup that offers the possibility for testing with a unidirectional Uu interface. The DUT being allowed to knowingly be in a L1/L2 test mode with hardcoded RRC and using TDD pattern independent FRC-like requirements to describe the KPI relevant channel structure. Time synchronization can be provided either via the digital feedback link from the tester or by a common (e.g., GNSS) source, or by Uu interface   *Recommendations for 2nd round:*  No explicit opposing views received in first round; however, it is related to the RF general  Please continue to provide feedback on the detailed test setup proposal and potential demod focused configuration sub-options. |
| **Sub-topic 3-2** | **Sub-topic 3-2: General requirement scope**  Issue 3-2-1: Basis for requirement re-use  *Tentative agreements:*  Use Rel-15 UE demodulation requirements as a basis for requirement development.  *Candidate options:*   * 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.   *Recommendations for 2nd round:*  Tentative agreement is agreeable.  Continue discussion on candidate options in the second round.  There seems to be a diverging opinion, if “performance requirement” refers to   a) the feature under test along with the test parameters table, or   b) the feature under test along with the parameters from the test parameters table and the parameters captured in the minimum performance tables. The options have been rephrased to be more precise. Please comment on your understanding.  Issue 3-2-2: Applicability rule for different SCS/CBW  *Tentative agreements:*  Define test applicability rule for IAB-MT supporting different CBW&SCS.  *Recommendations for 2nd round:*  Tentative agreement is agreeable.  Moderator remark: A possible version of such an applicability rule is discussed in Issue 3-4-2.  Issue 3-2-3: Requirements for MT types and classes (was: Applicability rule for MT types and classes)  *Tentative agreements:*  Only conducted performance requirements shall be defined for type 1-H (no duplication of conducted and radiated test).  Radiated performance requirements shall be defined for type 1-O and 2-O.  *Candidate options:*  Option 1: The same requirements apply for all classes (local and wide area).  Option 2: The requirements to test differ by class (local and wide area).  *Recommendations for 2nd round:*  Tentative agreement is expected to be agreeable, please check.  Feedback on the candidate options is requested for round 2. |
| **Sub-topic 3-3** | **Sub-topic 3-3: Detailed scope of UE requirement re-use - tables/matrices**  Issue 3-3-1: Common UE requirement re-use table/matrix - FR1  *Tentative agreements:*  None  *Recommendations for 2nd round:*   * Keep table but make it informative. * Keep using table to track agreed and proposed adaptations.   Issue 3-3-2: Common UE requirement re-use table/matrix -– FR2  *Tentative agreements:*  None  *Recommendations for 2nd round:*   * Keep table but make it informative. * Keep using table to track agreed and proposed adaptations. |
| **Sub-topic 3-4** | **Sub-topic 3-4: Requirement agnostic - Details of UE requirement re-use**  Issue 3-4-1: Conducted and OTA requirements  *Tentative agreements:*  Specify both conducted and OTA tests for IAB-MT.  *Recommendations for 2nd round:*  No opposing views received; tentative agreement is agreeable.  Issue 3-4-2: CBW/SCS  *Tentative agreements:*  *Candidate options:*   * Option 1: Do not specify CBW/SCS, same performance requirements can be applied for different CBW/SCS. * Option 2: Specify requirements for 40MHz for 15kHz/30kHz, 50MHz for 60kHz, and 100MHz for 120kHz. The applicability rule used in existing BS demodulation requirements for testing of larger bandwidths than the specified one should be reused. I.e., the tests shall be done by using performance requirement for the closest channel bandwidth lower than this widest supported bandwidth; the tested PRBs shall then be centered in this widest supported channel bandwidth. * Option 3: Specify requirements for 40MHz for 15kHz/30kHz, 50MHz for 60kHz, and 200MHz for 120kHz.   *Recommendations for 2nd round:*  Continue discussion in 2nd round. Option 2 can be a feasible compromise.  Issue 3-4-3: TDD pattern  *Tentative agreements:*  None.  *Candidate options:*  Option 1: FFS: Specify requirements with one TDD pattern configuration and declare the requirements to be applicable for any configuration.  *Recommendations for 2nd round:*  Contributors that requested further study are invited to present their results in the next meeting, to compare with the ones delivered in this meeting.  Issue 3-4-4: HARQ  *Tentative agreements:*  Number of HARQ process and k1 configurations can be ignored.  *Recommendations for 2nd round:*  Tentative agreement is agreeable.  Issue 3-4-5: TDRA  *Tentative agreements:*  K0 configurations can be ignored.  *Recommendations for 2nd round:*  No opposing views received; tentative agreement is agreeable.  Issue 3-4-6: High speed scenarios  *Tentative agreements:*  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.  *Recommendations for 2nd round:*  Tentative agreement is agreeable.  Issue 3-4-7: General RX demodulation branches  *Tentative agreements:*  None  *Candidate options:*   * Option 1: Only keep 4Rx requirements for FR1 * Option 2: 4Rx for conducted test only and 2Rx for radiated test only for FR1. * Option 3: 4Rx for conducted test only and 2Rx for radiated test only for FR1 and 2RX for FR2   *Recommendations for 2nd round:*  Continue discussion in 2nd round.  Issue 3-4-8: FDD and TDD requirements  *Tentative agreements:*  Do not specify FDD requirements.  *Recommendations for 2nd round:*  Tentative agreement is agreeable.  Issue 3-4-9 (new): Testing in both conducted and radiated testing  *Tentative agreements:*  None  *Candidate options:*   * Option 1: Only conducted performance requirements are defined for FR1 in the existing UE demodulation requirements in TS 38.101-4, it is not necessary to repeat to test the same performance requirements for both conducted and radiated testing. * Option 2: Other options not precluded.   *Recommendations for 2nd round:*  Start discussion in 2nd round. Could the original contributor clarify how this goal is achieved (e.g., via applicability rule or by removing testing from type 1-O nodes) and the expected impact on specification?  Issue 3-4-10 (new): Inclusion of Rel-16 requirements  *Tentative agreements:*  None  *Candidate options:*   * Option 1: Do not include Rel-16 UE demod requirements, i.e., the following (HST is excluded)   + FR2 256 QAM   + URLLC 0.001% BLER   + URLLC high reliability   + URLLC low latency * Option 2: Do include a defined set of Rel-16 UE demod requirements. Please specify which ones.   *Recommendations for 2nd round:*  HST for FR1 is excluded, since it is treated in Issue 3-4-6.  The moderator had previously neglected to create an issue for these rows of the table, which contain several contributors’ comments.  Please discuss in the second round, if those requirements should be included for IAB. |
| **Sub-topic 3-5** | **Sub-topic 3-5: PDSCH - Details of UE requirement re-use**  Issue 3-5-1: MCS  *Tentative agreements:*  QPSK shall not be tested.  64QAM shall be tested  *Candidate options:*   * Option 1: 16QAM shall be tested. * Option 2: 16QAM shall not be tested.   *Recommendations for 2nd round:*  Tentative agreement is agreeable.  Continue to discuss in 2nd round.  Issue 3-5-2: PRB bundling size  *Tentative agreements:*  Only keep requirements with PRB bundling size 2  *Recommendations for 2nd round:*  No opposing views received; tentative agreement is agreeable.  Issue 3-5-3: Mapping type  *Tentative agreements:*  None  *Candidate options:*   * Option 1: Only keep PDSCH performance requirements for mapping Type-A * Option 2: Include requirements for mapping type A and B. Use applicability rule to reduce testing load.   *Recommendations for 2nd round:*  Continue discussion in second round.  An enquiry regarding the argumentation for option 1 was made.  Issue 3-5-6: HARQ soft combining  *Tentative agreements:*  Skip PDSCH cases for HARQ soft combining  *Recommendations for 2nd round:*  No opposing views received; tentative agreement is agreeable.  Issue 3-5-7: Enhanced receiver  *Tentative agreements:*  None  *Candidate options:*   * Option 1: Skip PDSCH cases for enhanced receiver Type 1. * Option 2: Include requirements for enhanced receiver Type 1 but allow to declare support.   *Recommendations for 2nd round:*  Continue discussion.  Issue 3-5-8: CSI-RS overlapped with PDSCH  *Tentative agreements:*  None  *Candidate options:*   * Option 1: Skip PDSCH cases for CSI-RS overlapped with PDSCH. * Option 2: Keep a down scoped set of PDSCH cases for CSI-RS overlapped with PDSCH.   *Recommendations for 2nd round:*  Continue discussion.  Please details the down scoping for option 2.  Issue 3-5-9: Relative TPUT and slot configuration  *Tentative agreements:*  None  *Candidate options:*   * Option 1: FFS: Investigate further how dependent the SNR for achieving relative throughput (e.g. 70%) is on the slot configuration (in particular for high SNR).   *Recommendations for 2nd round:*  Contributors that requested further study are invited to present their results in the next meeting, to compare with the ones delivered in this meeting.  Issue 3-5-10: Test parameters specification simplification  *Tentative agreements:*  None  *Candidate options:*   * Option 1: 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.   *Recommendations for 2nd round:*  K0, K1, number of HARQ processes, and TDD UL-DL pattern were removed from previous options, as those are treated in other issues.  Continue discussion is second round. An enquiry regarding the rationale behind option 1 was made.  Issue 3-5-11 (new): PDSCH co-existence with LTE CRS  *Tentative agreements:*  None  *Candidate options:*   * Option 1: Skip PDSCH cases for co-existence with LTE CRS. * Option 2: Keep PDSCH cases for co-existence with LTE CRS.   *Recommendations for 2nd round:*  The moderator had previously neglected to create an issue for this comment made in the table. Continue discussion in 2nd round. |
| **Sub-topic 3-6** | **Sub-topic 3-6: PDCCH - Details of UE requirement re-use**  Issue 3-6-1: Aggregation level  *Tentative agreements:*  None  *Candidate options:*  Option 1: Only keep PDCCH performance requirements with AL 8.  Option 2: Include all requirements but declare which is supported and/or use applicability rule.  *Recommendations for 2nd round:*  Continue discussion.  Issue 3-6-2: Test parameters specification simplification  *Tentative agreements:*  None  *Candidate options:*   * Option 1: Remove the CSI-RS for tracking parameters from the UE demod PDCCH requirements and leave them up to implementation. * Option 2: Keep the CSI-RS for tracking parameters from the UE demod PDCCH requirements.  Since the link is configured by the parents this cannot be left to implementation. The MT is supposed to work with different parents.   *Recommendations for 2nd round:*  Continue discussion is second round. An enquiry regarding the rationale behind option 1 was made. |
| **Sub-topic 3-7** | **Sub-topic 3-7: PBCH - Details of UE requirement re-use**  No issues that only pertain to PBCH have come to light in the first round. |
| **Sub-topic 3-8** | **Sub-topic 3-8: SDR - Details of UE requirement re-use**  Issue 3-8-1: Inclusion of SDR requirements  *Tentative agreements:*  None  *Candidate options:*   * Option 1: Do not include SDR requirements in IAB-MT demodulation. * Option 2: Include SDR requirements in IAB-MT demodulation.   *Recommendations for 2nd round:*  Continue discussion in 2nd round.  Candidate for GtW. |
| **Sub-topic 3-9** | **Sub-topic 3-9: CSI - Details of UE requirement re-use**  Issue 3-9-1: Inclusion of CSI requirements  *Tentative agreements:*  None.  *Candidate options:*  Option 1: Heavily down scope CSI reporting requirements  *Recommendations for 2nd round:*  Continue discussion.  Please detail what is to be down scoped and why.  Issue 3-9-2: CSI-RS resource type  *Tentative agreements:*  None.  *Candidate options:*   * Option 1: Only keep periodic NZP CSI-RS resource type for CQI/PMI/RI reporting cases. * Option 2: Keep all UE demod configuration for NZP CSI-RS resource types for CQI/PMI/RI reporting cases.   *Recommendations for 2nd round:*  Continue discussion.  Issue 3-9-3: CQI reporting granularity  *Tentative agreements:*  None.  *Candidate options:*   * Option 1: Only keep wideband CQI reporting granularity for CQI/PMI/RI reporting cases. * Option 2: Keep wideband and subband CQI reporting granularity for CQI/PMI/RI reporting cases   *Recommendations for 2nd round:*  Continue discussion.  Issue 3-9-4: CQI/PMI/RI reporting type  *Tentative agreements:*  None.  *Candidate options:*   * Option 1: Only keep periodic CSI reporting type for CQI/PMI/RI reporting cases. * Option 2: Keep periodic and aperiodic CSI reporting type for CQI/PMI/RI reporting cases.   *Recommendations for 2nd round:*  Continue discussion.  Issue 3-9-5: Test parameters specification simplification  *Tentative agreements:*  None.  *Candidate options:*   * Option 1: 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: 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. It cannot be left to implementation, as the MT will not configure this link.   *Recommendations for 2nd round:*  K1 value has been removed from initial options, as it is treated in the requirement agnostic sub-topic.  Continue discussion is second round. An enquiry regarding the rationale behind option 1 was made.  Issue 3-9-6 (new): CQI two tap channel model  *Tentative agreements:*  None.  *Candidate options:*   * Option 1: Skip two tap channel model for CQI test cases. * Option 2: Keep two tap channel model for CQI test cases.   *Recommendations for 2nd round:*  The moderator had previously neglected to create an issue for this comment made in the table. Continue discussion in 2nd round. |
| **Sub-topic 3-10** | **Sub-topic 3-10: Interworking - Details of UE requirement re-use**  Issue 3-10-1: Inclusion of interworking requirements  *Tentative agreements:*  None.  *Candidate options:*   * Option 1: Skip LTE-NR coexistence/DC/etc. requirements. * Option 2: Keep LTE-NR coexistence/DC/etc. requirements and allow to declare support.   *Recommendations for 2nd round:*  Continue discussion is second round, without low priority. |

*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

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.

### Sub-topic 3-1: Conformance testing setup

Issue 3-1-1: General approach

*Candidate options:*

* Option 1: Define IAB-MT demodulation tests in the same manner as BS demodulation tests in RAN4. Strive to not preclude (but also not necessitate) UE style testing
* Option 2: Consider IAB-MT as a part of a network node with test setup and performance requirements based on the BS approach.
* Option 3: The IAB-MT demodulation test setup needs to be a mix of the BS setup and the UE setup.

*Recommendations for 2nd round:*

In the GtW is was agreed to primarily the general IAB-MT test setup discussion in [309].  
The more detailed test setup, especially for demod focused issues, can still be deliberated here, with all agreements being sent to the [309] discussion for information.

For information: The common RF/demod IAB GtW on Tuesday, resulted in the following agreements, which are captured for “Rel-16 NR IAB RF conformance general and common issues”:

Issue 2-1-1: IAB-MT test setup  
Using BS test structure to generate the test set-up including test configurations, test models, RF channels  
- Test linkage between TE and DUT (IAB-MT) need to be further discussed including what’s the basis information needed, and which part can be left open to implementation.  
- TS descriptions of environments shall not mandate specific equipment and therefore allow flexibility in connection setup

It is recommended to prioritise the discussion of issue 3-1-5 and issue 3-1-5.

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

[XXX]:

[YYY]:

[Huawei]: Prefer Option 2.

[Ericsson] We are OK with option 2 or option 1.

[Nokia]: In general, we would like to allow flexibility in the test set-up. Therefore, our primary choice is Option 1, but Option 2 is also acceptable.

Issue 3-1-5: Detailed test setup

*Candidate options:*

* Option 1: Use a test setup that offers the possibility for testing with a unidirectional Uu interface. The DUT being allowed to knowingly be in a L1/L2 test mode with hardcoded RRC and using TDD pattern independent FRC-like requirements to describe the KPI relevant channel structure. Time synchronization can be provided either via the digital feedback link from the tester or by a common (e.g., GNSS) source, or by Uu interface

*Recommendations for 2nd round:*

No explicit opposing views received in first round; however, it is related to the general discussion including RF.

Please continue to provide feedback on the detailed test setup proposal and potential demod focused configuration sub-options.

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

[XXX]:

[YYY]:

[Huawei] We prefer to reuse the existing test setup for BS approach.

[Ericsson] We think that testing using the BS setup should be possible. We can also agree that it should not be precluded that Uu is used as an alternative. So option 1 is OK.

[Nokia]: Option 1 is fine. In our understanding, allowing for flexibility in the test setup includes, for example, the exact way to get into RRC connected to run the test. This also concerns the exact configurations implemented for T-RS/SSB to maintain synchronization during the test (and operation in general). Thus, such configuration should not be dictated by the specification, and several alternative options to maintain synchronization during the test can be explicitly allowed.

Issue 3-1-6 (new): Questions on performance aspects

*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.

*Recommendations for 2nd round:*

In an effort to align with [309] NR\_IAB\_Conformance\_Part1, feedback is requested for the above questions.   
Given the early phase of the work, agreements will be proposed in corresponding WF only if very good alignment is reached in comments.

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

[XXX]:

[YYY]:

[Huawei] It is better to discuss this issue based on test parameters configured for UE minimum performance for the related physical channels as listed below.

[Ericsson]: Maybe this should be re-phrased as what is the minimum set of channels/parameters that need to be specified in the IAB spec ? (Other parameters or channels may be added but could be decided on by the test house)

[Nokia]:

In the remainder of IAB-MT topic, we regularly propose to remove test parameters and configuration from UE demod derived requirements for the following reasons.  
Our main concern is to keep the performance testing independent from the exact test setup and choice of feature configuration.   
This flexibility in test setup, and not mandating specific test equipment, was also agreed in the shared RF/Demod GtW.  
In our understanding, allowing for flexibility in the test setup includes, for example, the exact way to get into RRC\_connected to run the test.  
However (and perhaps less apparently), this also concerns the exact configurations implemented for T-RS/SSB to maintain synchronization during the test (and operation in general). Thus, such configuration should not be dictated by the specification, or better yet, the option to maintain synchronization in other ways during the test should be explicitly allowed.

For example, the PDSCH demodulation performance should not be much dependent on the exact T-RS/SSB/etc. configurations, as long as the synchronization is working.  
From an RF perspective, and also partially from a demodulation pov, detailed parameters and configurations are not what is tested; they are just a tool to confirm that the device achieves minimum performance metrics.   
Therefore, flexibility should be maintained to allow variety in test setups and test equipment.

Moreover, the IAB feature is part of the infrastructure.   
IAB devices do not roam and are operator deployed or authorized. Hence there are no concerns on “black-box” inter-operability.

Finally, cost effective testing is paramount for a low device volume feature, such as IAB, to not be dead on arrival.

### Sub-topic 3-2: General requirement scope

Issue 3-2-1: Basis for requirement re-use

*Agreements from round 1:*

Use Rel-15 UE demodulation requirements as a basis for requirement development.

*Candidate options:*

* 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.

*Recommendations for 2nd round:*

Continue discussion on candidate options in the second round.

There seems to be a diverging opinion, if “performance requirement” refers to   
 a) the feature under test along with the test parameters table, or   
 b) the feature under test along with the parameters from the test parameters table and the parameters captured in the minimum performance tables.  
The options have been rephrased to be more precise. Please comment on your understanding.

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

[XXX]:

[YYY]:

[Huawei] Based on our understanding, one performance requirement refer to one test case defined in minimum performance table, the related test parameters table and parameters captured in the minimum performance are test configurations for the test cases, to clarify our understanding, we add Option 4:

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.

[Ericsson] Generally agree with the Huawei note. We need to be careful with “configurations cannot be changed” though; for example the TDD configuration may need attention, in particular if we define requirements as FRC based.

[Nokia]: There is no appropriate option in the list of options. Our proposal would be:

Define IAB MT performance requirements solely based on Rel-15 UE performance requirements. No new requirement can be added, but the configurations of the existing requirements can be down scoped, i.e. to allow more flexibility in how the test set-up is arranged.

Issue 3-2-2: Applicability rule for different SCS/CBW

*Agreement from 1st round:*

Define test applicability rule for IAB-MT supporting different CBW&SCS.

*Recommendations for 2nd round:*

Moderator remark: A possible version of such an applicability rule is discussed in Issue 3-4-2.

Issue 3-2-3: Requirements for MT types and classes (was: Applicability rule for MT types and classes)

*Agreements from 1st round:*

Only conducted performance requirements shall be defined for type 1-H (no duplication of conducted and radiated test).   
Radiated performance requirements shall be defined for type 1-O and 2-O.

*Candidate options:*

Option 1: The same requirements apply for all classes (local and wide area).

Option 2: The requirements to test differ by class (local and wide area).

*Recommendations for 2nd round:*

Tentative agreement is expected to be agreeable, please check.

Feedback on the candidate options is requested for round 2.

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

[XXX]:

[YYY]:

[Huawei] We confirm the agreement reached in the 1st round. We prefer Option 1.

[Ericsson] Probably option 1 is OK, but we should remember that the local area IAB-MT backhaul link may be less predictable/stable than the wide area and rather than agree this now it may be good t consider if this difference could have any implications on which demodulation requirements should be supported.

[Nokia]: We confirm the former agreement. If distinguishing of requirements between local and wide area IAB-MT classes found to be needed, it would be better to arrange the discussion in a separate issue.

### Sub-topic 3-3: Detailed scope of UE requirement re-use - tables/matrices

Issue 3-3-1: Common UE requirement re-use table/matrix - FR1

*Recommendations for 2nd round:*

* Keep table but make it informative.
* Keep using table to track agreed and proposed adaptations.

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

[XXX]:

[YYY]:

[Huawei] We prefer all discussion is based on Rel-15 UE demodulation performance requirements.

[Ericsson] We are OK to base on rel-15. We don’t quite follow what “informative” means in this context.

[Nokia]: Release 16 requirements can be excluded from the table. Otherwise, we preferer to keep the table format to keep track of the agreements.

Table: Common UE requirement re-use table/matrix - FR1 (Informative)

|  |  |  |  |
| --- | --- | --- | --- |
| Demodulation performance requirements | UE demod requirement configurations | | Proposed adaptation for MT demod |
| PDSCH | Antenna configuration | 1x2, 2x2 ULA Low, 2x2 ULA Medium, 4x2 ULA Low, 1x4, 2x4 ULA Low, 4x4 ULA Low, 4x4 ULA Medium A | Antenna configuration (TxR): Huawei: 2x4 ULA Low Ericsson,Nokia: 2RX and 4RX  Channel model:  Huawei, Nokia: TDLA30-10 Low  MCS:  Huawei: 19 Ericsson: 13, 19, 24  CBW&SCS:  Huawei: agnostic  Ericsson, Nokia: Alternatively 40MHz only  Resource mapping:  Huawei: Type A  Ericsson: Why not both with applicability rule ?  First round: TDD only.  HARQ soft combining and Enhanced Receiver Type 1: Huawei: Skip.  Ericsson: Could declare support  CSI-RS overlapped: Ericsson: Yes Nokia, Huawei: No  Co-existence with LTE CRS  Ericsson, Nokia, Huawei: No.  PRB bundling size:  Huawei: 2 |
| Channel model | TDLB100-400 Low, TDLC300-100 Low, TDLA30-10 Low, HST-750, HST-1000 |
| MCS | 4, 13, 19, 24(Table2) |
| CBW&SCS | 10MHz for 15kHz SCS; 20, 40MHz for 30kHz SCS |
| Resource mapping | Type A, Type B |
| Special purpose | HARQ soft combining, Enhanced Receiver Type 1, CSI-RS overlapped with PDSCH, LTE-NR coexistence |
| Test metric | 70%, 30% of maximum TP |
| PDCCH | Antenna configuration | 1x2 Low, 2x2 Low, 1x4 Low, 1x4 Medium A, 2x4 Low | Antenna configuration:  Huawei: 2x4 Low Ericsson, Nokia: 2RX, 4RX  Channel model:  Huawei, Nokia: TDLA30-10 Low  CBW&SCS:  Huawei: agnostic  Aggregation level:  Huawei, Nokia: 8  First round: TDD only. |
| Channel model | TDLA30-10 Low, TDLC300-100 Low |
| CBW&SCS | 10MHz for 15kHz SCS; 40MHz for 30kHz SCS |
| Aggregation level | 2, 4, 8, 16 |
| DCI Format | 1\_0, 1\_1 |
| Test metric | 1% of Pm-dsg |
| PBCH | Antenna configuration | 1 x 2 Low, 1x4 Low | Antenna configuration:  Huawei: 1x4 Low  Channel model:  Huawei: TDLA30-10 Low  CBW&SCS:  Huawei: agnostic  Ericsson: Alternatively 40MHz only ?  First round: TDD only. |
| Channel model | TDLC300-100 Low, TDLA30-10 Low |
| CBW&SCS | 10MHz for 15kHz SCS; 40MHz for 30kHz SCS |
| Test metric | 1% of Pm-bch |
| SDR | Test metric | 85% of TB success rate | Include these requirements: Huawei, Nokia, Ericsson: No |
| CQI | Antenna configuration | 2x2 Static, 2x2 ULA High, 2x4 Static, 2x4 XP High | Antenna configuration:  Huawei,: 2x4 Static, 2x4 XP High  Ericsson, Nokia: 2RX and 4RX  Channel model:  Huawei, Nokia: AWGN, TDLA30-5 Low  CBW&SCS:  Huawei: agnostic  Ericsson: Alternatively 40MHz only ?  CQI reporting:  Huawei, Nokia: wideband  CSI-RS resource Type:  Huawei, Nokia: periodic  ReportConfigType:  Huawei, Nokia: periodic  First round: TDD only. |
| Channel model | AWGN, TDLA30-5 Low , Two tap |
| CBW&SCS | 10MHz for 15kHz SCS; 40MHz for 30kHz SCS |
| CQI reporting | wideband, subband |
| CSI-RS resource Type | periodic |
| ReportConfigType | periodic, aperiodic |
| PMI | Antenna configuration | 4x2 XP High, 8x2 XP High, 4x4 XP High, 8x4 XP High | Antenna configuration:  Huawei, Ericsson: 4x4 XP High, 8x4 XP High  Ericsson: Also 2RX  Channel model:  Huawei, Nokia: TDLA30-5 Low  CBW&SCS:  Huawei: agnostic  Ericsson: Alternatively 40MHz only ?  PMI reporting:  Huawei: wideband  CSI-RS resource Type:  Huawei, Nokia: wideband periodic  ReportConfigType:  Huawei: wideband periodic  First round: TDD only. |
| Channel model | TDLA30-5 Low |
| CBW&SCS | 10MHz for 15kHz SCS; 40MHz for 30kHz SCS |
| PMI reporting | wideband |
| CSI-RS resource Type | periodic, aperiodic |
| ReportConfigType | aperiodic |
| RI | Antenna configuration | 2x2 ULA Low, 2x2 ULA High, 2x4 ULA Low, 2x4 ULA High, 4x4 ULA Low | Antenna configuration:  Huawei: 2x4 ULA Low, 4x4 ULA Low  Ericsson: 4Rx, 2RX  Channel model:  Huawei: TDLA30-5 Low  CBW&SCS:  Huawei: agnostic  Ericsson: Alternatively 40MHz only ?  CSI-RS resource Type:  Huawei: periodic  ReportConfigType:  Huawei: periodic  First round: TDD only. |
| Channel model | TDLA30-5 Low |
| CBW&SCS | 10MHz for 15kHz SCS; 40MHz for 30kHz SCS |
| CSI-RS resource Type | periodic |
| ReportConfigType | periodic |
| Interworking |  |  | Include these requirements: Nokia, Huawei: No |
| Rel-16 based | | | |
| URLLC ultra-low BLER |  |  | Include these requirements: Huawei, Nokia, Ericsson: No |
| URLLC high reliability |  |  | Include these requirements: Huawei, Nokia, Ericsson: No |
| URLLC low latency |  |  | Include these requirements: Huawei, Nokia, Ericsson: No |

Issue 3-3-2: Common UE requirement re-use table/matrix -– FR2

*Recommendations for 2nd round:*

* Keep table but make it informative.
* Keep using table to track agreed and proposed adaptations.

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

[XXX]:

[YYY]:

[Huawei] We prefer all discussion is based on Rel-15 UE demodulation performance requirements.

Table: Common UE requirement re-use table/matrix - FR2 (Informative)

|  |  |  |  |
| --- | --- | --- | --- |
| Demodulation performance requirements | UE demod requirement configurations | | Proposed adaptation for MT demod |
| PDSCH | Antenna configuration | 2x2 ULA Low, 2x2 XPL Medium, 2x2 ULA Medium | Antenna configuration:  Huawei, Nokia: 2x2 ULA Low  Channel model:  Huawei, Nokia: TDLA30-75 Low  MCS:  Huawei, Nokia: 19  Ericsson: 13, 17, 18  CBW&SCS:  Huawei: agnostic  Ericsson: Alternatively 50/200MHz only ?  Resource mapping:  Huawei: agnostic  HARQ soft combining and Enhanced Receiver Type 1: Huawei, Nokia: Skip.  Remark: No FDD in FR2 |
| Channel model | TDLC60-300 Low, TDLA30-300 Low, TDLA30-75 Low |
| MCS | 4, 13, 17, 18 |
| CBW&SCS | 50MHz for 60kHz SCS; 50, 100, 200MHz for 120kHz SCS |
| Resource mapping | Type A |
| Special purpose | HARQ soft combining, Enhanced Receiver Type 1 |
| Test metric | 70%, 30% of maximum TP |
| PDCCH | Antenna configuration | 1x2 Low, 2x2 Low | Antenna configuration:  Huawei, Nokia: 2x2 Low  Channel model:  Huawei, Nokia: TDLA30-75 Low  CBW&SCS:  Huawei: agnostic  Ericsson: Alternatively 50/200MHz only ?  Aggregation level:  Huawei, Nokia: 8 |
| Channel model | TDLA30-75 Low, TDLA30-300 Low |
| CBW&SCS | 100MHz for 120kHz SCS |
| Aggregation level | 2, 4, 8, 16 |
| DCI Format | 1\_0, 1\_1 |
| Test metric | 1% of Pm-dsg |
| PBCH | Antenna configuration | 1 x 2 Low | Antenna configuration:  Huawei: 1x2 Low  Channel model:  Huawei, Nokia: TDLA30-75 Low  CBW&SCS:  Huawei: agnostic  Ericsson: Alternatively 50/200MHz only ? |
| Channel model | TDLA30-75 Low, TDLA30-300 Low |
| CBW&SCS | 100MHz for 120kHz SCS; 100MHz for 240kHz SCS |
| Test metric | 1% of Pm-bch |
| SDR | Test metric | 85% of TB success rate | Include these requirements: Huawei, Nokia, Ericsson: No |
| CQI | Antenna configuration | 2x2 Static, 2x2 ULA High | Antenna configuration:  Huawei: 2x2 Static, 2x2 ULA High  Channel model:  Huawei, Nokia: AWGN, TDLA30-35 Low  CBW&SCS:  Huawei: agnostic  Ericsson: Alternatively 50/200MHz only ?  CQI reporting:  Huawei, Nokia: wideband  CSI-RS resource Type:  Huawei, Nokia: periodic  ReportConfigType:  Huawei, Nokia: periodic |
| Channel model | AWGN, TDLA30-35 Low |
| CBW&SCS | 100MHz for 120kHz SCS |
| CQI reporting | wideband |
| CSI-RS resource Type | periodic, aperiodic |
| ReportConfigType | periodic, aperiodic |
| PMI | Antenna configuration | 2x2 ULA Low | Antenna configuration:  Huawei: 2x2 ULA Low  Channel model:  Huawei, Nokia: TDLA30-35 Low  CBW&SCS:  Huawei: agnostic  Ericsson: Alternatively 50/200MHz only ?  PMI reporting:  Huawei, Nokia: wideband  CSI-RS resource Type:  Huawei, Nokia: periodic  ReportConfigType:  Huawei: periodic |
| Channel model | TDLA30-35 Low |
| CBW&SCS | 100MHz for 120kHz SCS |
| PMI reporting | wideband |
| CSI-RS resource Type | periodic, aperiodic |
| ReportConfigType | aperiodic |
| RI | Antenna configuration | 2x2 ULA Low, 2x2 XP High | Antenna configuration:  Huawei, Nokia: 2x2 ULA Low  Channel model:  Huawei, Nokia: TDLA30-35 Low  CBW&SCS:  Huawei: agnostic  Ericsson: Alternatively 50/200MHz only ?  CSI-RS resource Type:  Huawei, Nokia: periodic  ReportConfigType:  Huawei: periodic |
| Channel model | TDLA30-35 Low |
| CBW&SCS | 100MHz for 120kHz SCS |
| CSI-RS resource Type | periodic, aperiodic |
| ReportConfigType | aperiodic |
| Interworking |  |  | Include these requirements: Nokia, Huawei: No |
| Rel-16 Based | | | |
| 256 QAM |  |  | Include these requirements: Ericsson: Yes  Huawei, Nokia: No (not Rel-15) |
| URLLC high reliability |  |  | Include these requirements: Huawei, Nokia, Ericsson: No |
| URLLC low latency |  |  | Include these requirements: Huawei, Nokia, Ericsson: No |

### Sub-topic 3-4: Requirement agnostic - Details of UE requirement re-use

Issue 3-4-2: CBW/SCS

*Candidate options:*

* Option 1: Do not specify CBW/SCS, same performance requirements can be applied for different CBW/SCS.
* Option 2: Specify requirements for 40MHz for 15kHz/30kHz, 50MHz for 60kHz, and 100MHz for 120kHz.  
  The applicability rule used in existing BS demodulation requirements for testing of larger bandwidths than the specified one should be reused. I.e., the tests shall be done by using performance requirement for the closest channel bandwidth lower than this widest supported bandwidth; the tested PRBs shall then be centered in this widest supported channel bandwidth.
* Option 3: Specify requirements for 40MHz for 15kHz/30kHz, 50MHz for 60kHz, and 200MHz for 120kHz.

*Recommendations for 2nd round:*

Continue discussion in 2nd round.  
Option 2 can be a feasible compromise.

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

[XXX]:

[YYY]:

[Huawei]: Option 2 is OK for us.

[Ericsson] Option 2 OK for us. The other options need more simulation/analysis to check.

[Nokia]: Option 2 is fine.

Issue 3-4-3: TDD pattern

*Candidate options:*

Option 1: FFS: Specify requirements with one TDD pattern configuration and declare the requirements to be applicable for any configuration.

*Recommendations for 2nd round:*

Contributors that requested further study are invited to present their results in the next meeting, to compare with the ones delivered in this meeting.

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

[XXX]:

[YYY]:

Ericsson: Option 1 is good, but some simulation/checking is needed to validate that it is actually true.

[Nokia]: We agree with the approach, but more analysis should be carried out for the next meeting.

Issue 3-4-7: General RX demodulation branches

*Candidate options:*

* Option 1: Only keep 4Rx requirements for FR1
* Option 2: 4Rx for conducted test only and 2Rx for radiated test only for FR1.
* Option 3: 4Rx for conducted test only and 2Rx for radiated test only for FR1 and 2RX for FR2

*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]:

[Huawei]: We prefer Option 3 that is more detailed.

[Ericsson] Option 3.

[Nokia] Option 3 is OK.

Issue 3-4-9 (new): Testing in both conducted and radiated testing

*Candidate options:*

* Option 1: Only conducted performance requirements are defined for FR1 in the existing UE demodulation requirements in TS 38.101-4, it is not necessary to repeat to test the same performance requirements for both conducted and radiated testing.
* Option 2: Other options not precluded.

*Recommendations for 2nd round:*

Start discussion in 2nd round.  
Could the original contributor clarify how this goal is achieved (e.g., via applicability rule or by removing testing from type 1-O nodes) and the expected impact on specification?

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

[XXX]:

[YYY]:

[Huawei]: For our understanding,

* If IAB declares type 1-H, then only 4Rx conducted cases can be tested for FR1.
* If IAB declares type 1-O, then only 2Rx radiated cases can be tested for FR1.
* If IAB declares type 2-O, then only 2Rx radiated cases can be tested for FR2.

[Ericsson] It is straightforward to apply demodulation tests that are defined as conducted as OTA; at least for the BS test setup. Effectively the cable from the test gear to the DUT is just replaced by 2 antenna and the link in the chamber. As with the BS and IAB-MT, the testing should be either all conducted or all radiated, and there is never any reason to do both for demodulation requirements. We agree with Huawei’s understanding.

[Nokia]: Option 1 is fine based on the clarifications above.

Issue 3-4-10 (new): Inclusion of Rel-16 requirements

*Candidate options:*

* Option 1: Do not include Rel-16 UE demod requirements, i.e., the following (HST is exluded)
  + FR2 256 QAM
  + URLLC 0.001% BLER
  + URLLC high reliability
  + URLLC low latency
* Option 2: Do include a defined set of Rel-16 UE demod requirements. Please specify which ones.

*Recommendations for 2nd round:*

HST for FR1 is excluded, since it is treated in Issue 3-4-6.

The moderator had previously neglected to create an issue for these rows of the table, which contain several contributors’ comments.

Please discuss in the second round, if those requirements should be included for IAB.

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

[XXX]:

[YYY]:

[Huawei]: We prefer Option 1. All discussion should be based on Rel-15 UE demodulation performance requirements.

[Ericsson] We are OK for option 1, as for the DU.

[Nokia]: Option 1 is fine as agreed at GtW.

### Sub-topic 3-5: PDSCH - Details of UE requirement re-use

Issue 3-5-1: MCS

*Agreements from round 1:*

QPSK shall not be tested.

64QAM shall be tested

*Candidate options:*

* Option 1: 16QAM shall be tested.
* Option 2: 16QAM shall not be tested.

*Recommendations for 2nd round:*

Continue to discuss in 2nd round.

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

[XXX]:

[YYY]:

[Huawei]: We prefer that 16QAM shall not be tested, same reason with QPSK. Considering good coverage and even LOS propagation condition, higher MCS is expected and 64QAM is enough.

[Ericsson] It is probably OK to not consider 16QAM for the wide area. For the local area, bearing in mind that the backhaul link may not be planned, it is not quite so obvious that 16QAM could never happen.

[Nokia]: We are expecting that testing with 64QAM is sufficient to verify the capabilities of IAB-MT. Thus, we preferer to skip 16QAM requirement.

Issue 3-5-3: Mapping type

*Candidate options:*

* Option 1: Only keep PDSCH performance requirements for mapping Type-A
* Option 2: Include requirements for mapping type A and B. Use applicability rule to reduce testing load.

*Recommendations for 2nd round:*

Continue discussion in second round.

An enquiry regarding the argumentation for option 1 was made.

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

[XXX]:

[YYY]:

[Huawei]: We prefer Option 1.

Supporting of PDSCH mapping Type-B is mandatory with UE capability for NR UE, PDSCH mapping Type A is mandatory to support, only one requirement is defined for PDSCH Type-B for different duplex mode and antenna configuration of 2Rx and 4Rx. To reduce the number of test cases, Option 1 is preferred.

[Ericsson] For the wide area IAB, it is not mandatory whether to do A or B and the operator will know the capability of the IAB and configure appropriately. So it is not obvious that we should mandate that the IAB implements type B to pass conformance. If the requirements exist we can include them, but clearly there should be an applicability rule so that only one is tested.

[Nokia]: We prefer Option 2.

Issue 3-5-7: Enhanced receiver

*Candidate options:*

* Option 1: Skip PDSCH cases for enhanced receiver Type 1.
* Option 2: Include requirements for enhanced receiver Type 1 but allow to declare support.

*Recommendations for 2nd round:*

Continue discussion.

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

[XXX]:

[YYY]:

[Huawei]: We prefer Option 1. In the first release for IAB-MT performance requirements definition, we prefer not to consider optional feature, this is should be the basis for the following discussion. Considering enhanced receiver Type 1 is optional feature for UE to support, we cannot mandate IAB-MT to support. To reduce the number of test case, Option 1 should be considered.

[Nokia]: We agree with Huawei and support Option 1.

Issue 3-5-8: CSI-RS overlapped with PDSCH

*Candidate options:*

* Option 1: Skip PDSCH cases for CSI-RS overlapped with PDSCH.
* Option 2: Keep a down scoped set of PDSCH cases for CSI-RS overlapped with PDSCH.

*Recommendations for 2nd round:*

Continue discussion.

Please detail the down scoping envisioned for option 2.

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

[XXX]:

[YYY]:

[Huawei]: We prefer Option 1. We do not think that it is typical configuration in the real network.

[Ericsson] Operating IAB in a DSS environment may not be common. We do not follow though; is there actually any effort in including optional requirements ?

[Nokia]: Since such a deployment should be exceedingly rare, we would prefer to not have requirements captured, which might require maintenance in the future.

Issue 3-5-9: Relative TPUT and slot configuration

*Candidate options:*

* Option 1: FFS: Investigate further how dependent the SNR for achieving relative throughput (e.g. 70%) is on the slot configuration (in particular for high SNR).

*Recommendations for 2nd round:*

Contributors that requested further study are invited to present their results in the next meeting, to compare with the ones delivered in this meeting.

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

[XXX]:

[YYY]:

[Huawei]: What is the difference with Issue 3-4-3?

[Ericsson] This is needed to answer the question whether the requirements can be TDD independent.

[Nokia]: We agree with Option 1.

Issue 3-5-10: Test parameters specification simplification

*Candidate options:*

* Option 1: 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.

*Recommendations for 2nd round:*

K0, K1, number of HARQ processes, and TDD UL-DL pattern were removed from previous options, as those are treated in other issues.

Continue discussion is second round.  
An enquiry regarding the rationale behind option 1 was made.

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

[XXX]:

[YYY]:

[Huawei]: We are OK with Option 1 to reduce test complexity.

[Ericsson] IT is OK not to explicitly specify these.

[Nokia]: In line with our previous comments, we suggest excluding these parameters from the explicit definition. Hence, we allow more flexibility in the test setup. Please also see our response in issue 3-1-6.

Issue 3-5-11 (new): PDSCH co-existence with LTE CRS

*Candidate options:*

* Option 1: Skip PDSCH cases for co-existence with LTE CRS.
* Option 2: Keep PDSCH cases for co-existence with LTE CRS.

*Recommendations for 2nd round:*

The moderator had previously neglected to create an issue for this comment made in the table.  
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]:

[Huawei]: We prefer Option 1 to reduce number of test cases considering it is optional feature.

[Ericsson] The scenario may not be extremely likely, but we would like to understand is there some kind of cost in terms of effort in including them that we avoid ?

[Nokia]: Since such a deployment should be exceedingly rare, we would prefer to not have requirements captured, which might require maintenance in the future.

### Sub-topic 3-6: PDCCH - Details of UE requirement re-use

Issue 3-6-1: Aggregation level

*Candidate options:*

Option 1: Only keep PDCCH performance requirements with AL 8.

Option 2: Include all requirements but declare which is supported and/or use applicability rule.

*Recommendations for 2nd round:*

Continue discussion.

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

[XXX]:

[YYY]:

[Huawei]: Prefer Option 1. We would like to know what is the test applicability rule can defined based on IAB declaration?

[Ericsson] It could be simple to keep all requirements and then just say that the IAB vendor declares which is supported and one AL for testing.

[Nokia]: Both options are acceptable for us.

Issue 3-6-2: Test parameters specification simplification

*Candidate options:*

* Option 1: Remove the CSI-RS for tracking parameters from the UE demod PDCCH requirements and leave them up to implementation.
* Option 2: Keep the CSI-RS for tracking parameters from the UE demod PDCCH requirements.   
  Since the link is configured by the parents this cannot be left to implementation. The MT is supposed to work with different parents.

*Recommendations for 2nd round:*

Continue discussion is second round.  
An enquiry regarding the rationale behind option 1 was made.

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

[XXX]:

[YYY]:

[Huawei]: We are OK with Option 1 to reduce test complexity.

[Ericsson]: The IAB should work with different parents, but the operator always knows the capability of the IAB. So the operator can configure as he sees fit. This is different to a UE; anybody can roam into the network with a UE and the operator cannot control it’s capabilities, so mandatory support for some minimum set of features is needed. Our understanding is not specifying these parameters is OK.

[Nokia]: In line with our previous comments, we suggest excluding these parameters from the explicit definition. Hence, we allow more flexibility in the test setup.

### Sub-topic 3-7: PBCH - Details of UE requirement re-use

No issues that only pertain to PBCH have come to light in the first round.

### Sub-topic 3-8: SDR - Details of UE requirement re-use

Issue 3-8-1: Inclusion of SDR requirements

*Candidate options:*

* Option 1: Do not include SDR requirements in IAB-MT demodulation.
* Option 2: Include SDR requirements in IAB-MT demodulation.

*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]:

[Huawei]: We prefer Option 1 to reduce number of test cases.

[Ericsson]: We do not see a need to include SDR requirements. The IAB will need a baseband platform supporting both DU and MT, and it may support multi-carrier (which is different to CA) for DU. It is not contrained in it’s BB processing like a UE. Also, the testing should not necessitate operating the protocol stack.

[Nokia]: As we commented in the 1st round, loopback function cannot be necessitated for IAB-MT. Thus, only Option 1 makes sense.

### Sub-topic 3-9: CSI - Details of UE requirement re-use

Issue 3-9-1: Inclusion of CSI requirements

*Candidate options:*

Option 1: Heavily down scope CSI reporting requirements

*Recommendations for 2nd round:*

Continue discussion.

Please detail what is to be down scoped and why.

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

[XXX]:

[YYY]:

[Huawei]: we agree the general rule in Option 1. Further discussion on test complexity reduction in the following issues.

[Ericsson] Agree that CSI can be downscoped as the range of different channel conditions will be limited, especially for wide area.

[Nokia]: More detailed proposals are required before we can make an agreement here.

Issue 3-9-2: CSI-RS resource type

*Candidate options:*

* Option 1: Only keep periodic NZP CSI-RS resource type for CQI/PMI/RI reporting cases.
* Option 2: Keep all UE demod configuration for NZP CSI-RS resource types for CQI/PMI/RI reporting cases.

*Recommendations for 2nd round:*

Continue discussion.

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

[XXX]:

[YYY]:

[Huawei]: As per 38.101-4, no matter periodic/aperiodic CSI-RS resource type and periodic/aperiodic CSI reporting, the CSI-RS resource position and CSI reporting position are same for periodic and aperiodic configuration and reporting. To reduce test complexity and avoid unnecessary duplicated testing, we prefer Option1.

[Ericsson] Aperiodic could be used in practice, but we should examine which of these options leads to a good test configuration.

[Nokia] In the backhaul we only expect to deploy periodic configurations. We currently see not much interest in saving some CSI-RS REs and power considerations are also not important for MTs. But we can leave this issue open for now.

Issue 3-9-3: CQI reporting granularity

*Candidate options:*

* Option 1: Only keep wideband CQI reporting granularity for CQI/PMI/RI reporting cases.
* Option 2: Keep wideband and subband CQI reporting granularity for CQI/PMI/RI reporting cases

*Recommendations for 2nd round:*

Continue discussion.

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

[XXX]:

[YYY]:

[Huawei]: As per 38.101-4,

* AWGN (wideband) and fading (wideband and subband) for FR1
* AWGN (wideband) and fading (wideband) for FR2

Only test for subband is defined for FR1, to keep the test balance between FR1 and FR2, we prefer to keep wideband CQI reporting tests; also sub-band tested is defined with frequency-selective channel, we don’t think that it is suitable for the IAB scenario.

[Ericsson] Tend to agree with Huawei for the backhaul link; sub-band is not really useful.

[Nokia]: For now, we expect wideband CQI to be sufficient in non-mobile backhaul. But we are open to keep discussing.

Issue 3-9-4: CQI/PMI/RI reporting type

*Candidate options:*

* Option 1: Only keep periodic CSI reporting type for CQI/PMI/RI reporting cases.
* Option 2: Keep periodic and aperiodic CSI reporting type for CQI/PMI/RI reporting cases.

*Recommendations for 2nd round:*

Continue discussion.

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

[XXX]:

[YYY]:

[Huawei]: As per 38.101-4, no matter periodic/aperiodic CSI-RS resource type and periodic/aperiodic CSI reporting, the CSI-RS resource position and CSI reporting position are same for periodic and aperiodic configuration and reporting. To reduce test complexity and avoid unnecessary duplicated testing, we prefer Option1.

[Nokia] In the backhaul we only expect to deploy periodic configurations. We currently see not much interest in saving some reporting resources and power considerations are also not important for MTs. But we can leave this issue open for now.

Issue 3-9-5: Test parameters specification simplification

*Candidate options:*

* Option 1: 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: 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.  
  It cannot be left to implementation, as the MT will not configure this link.

*Recommendations for 2nd round:*

K1 value has been removed from initial options, as it is treated in the requirement agnostic sub-topic.

Continue discussion is second round.  
An enquiry regarding the rationale behind option 1 was made.

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

[XXX]:

[YYY]:

[Huawei]: We are OK with Option 1 to reduce test complexity.

[Ericsson] The IAB is not like a UE since it is known by the operator, so we do not see a need to specify these parameters.

[Nokia] Please see our response in issue 3-1-6 for our rationale behind test parameter specification simplification.

Issue 3-9-6 (new): CQI two tap channel model

*Candidate options:*

* Option 1: Skip two tap channel model for CQI test cases.
* Option 2: Keep two tap channel model for CQI test cases.

*Recommendations for 2nd round:*

The moderator had previously neglected to create an issue for this comment made in the table.  
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]:

[Huawei]: We prefer Option 1. We don’t think that two tap channel model is typical for IAB scenario.

[Ericsson] At least for widea area IAB-MT two tap is probably not relevant.

### Sub-topic 3-10: Interworking - Details of UE requirement re-use

Issue 3-10-1: Inclusion of interworking requirements

*Tentative agreements:*

None.

*Candidate options:*

* Option 1: Skip LTE-NR coexistence/DC/etc. requirements.
* Option 2: Keep LTE-NR coexistence/DC/etc. requirements and allow to declare support.

*Recommendations for 2nd round:*

Continue discussion is second round, without low priority.

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

[XXX]:

[YYY]:

[Huawei]: We prefer Option 1.

[Ericsson] The scenario is probably not so likely, but what is the cost to include the requirements and declare if supported ?

[Nokia]: Since such a deployment should be exceedingly rare, we would prefer to not have requirements captured, which might require maintenance in the future.

### Sub-topic 3-11: Other

Not further topics or issues were alerted in 1st round.

## 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”* |