**3GPP TSG-RAN WG4 Meeting # 97-e draftR4-2017417**

**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. |

### 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. |

**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. |

### 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 1st round.

|  |  |
| --- | --- |
| **Company** | **Comments** |
| XXX |  |
| Huawei | We are OK with Option 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
  + Collect views in 1st round.

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

### 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:* |

*Recommendations on WF/LS assignment*

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

### CRs/TPs

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

|  |  |
| --- | --- |
| **CR/TP number** | **CRs/TPs Status update recommendation** |
| XXX | *Based on 1st round of comments collection, moderator can recommend the next steps such as “agreeable”, “to be revised”* |

## Discussion on 2nd round (if applicable)

## Summary on 2nd round (if applicable)

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

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

# 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 ~~and test setup~~

*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 prosals on the BS demod requirement re-use.

|  |  |
| --- | --- |
| **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. |

**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.”?

|  |  |
| --- | --- |
| **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 |

**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 1st round.

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

**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. |

### 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: Can keep all requirements for antenna, but consider applicability rule such that only one is tested  Channel model: Huawei, Nokia: 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 |
| 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 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. |
| 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 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 |
| 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: 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: 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: 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). |

**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, Nokia: 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: 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: 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: 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. |

### 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.

|  |  |
| --- | --- |
| **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. |

**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 (Nokia): 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. |

**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. |

**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. |

**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.

|  |  |
| --- | --- |
| **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. |

**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. |

### 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. |

**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. |

**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. |

**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 |

**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. |

### 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. |

### 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:* |

*Recommendations on WF/LS assignment*

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

### CRs/TPs

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

|  |  |
| --- | --- |
| **CR/TP number** | **CRs/TPs Status update recommendation** |
| XXX | *Based on 1st round of comments collection, moderator can recommend the next steps such as “agreeable”, “to be revised”* |

## Discussion on 2nd round (if applicable)

## Summary on 2nd round (if applicable)

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

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

# 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. |

**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 1st round.

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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 1st round.

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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 1st round.

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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. |

**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) ? |

**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 |

**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. |

### 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: 2RX and 4RX  Channel model:  Huawei: TDLA30-10 Low  MCS:  Huawei: 19 Ericsson: 13, 19, 24  CBW&SCS:  Huawei: agnostic  Ericsson: 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: 2RX, 4RX  Channel model:  Huawei: TDLA30-10 Low  CBW&SCS:  Huawei: agnostic  Aggregation level:  Huawei: 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: 2RX and 4RX  Channel model:  Huawei: AWGN, TDLA30-5 Low  CBW&SCS:  Huawei: agnostic  Ericsson: Alternatively 40MHz only ?  CQI reporting:  Huawei: wideband  CSI-RS resource Type:  Huawei: periodic  ReportConfigType:  Huawei: 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: TDLA30-5 Low  CBW&SCS:  Huawei: agnostic  Ericsson: Alternatively 40MHz only ?  PMI reporting:  Huawei: wideband  CSI-RS resource Type:  Huawei: 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. |

**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: 2x2 ULA Low  Channel model:  Huawei: TDLA30-75 Low  MCS:  Huawei: 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: 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: 2x2 Low  Channel model:  Huawei: TDLA30-75 Low  CBW&SCS:  Huawei: agnostic  Ericsson: Alternatively 50/200MHz only ?  Aggregation level:  Huawei: 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: 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: AWGN, TDLA30-35 Low  CBW&SCS:  Huawei: agnostic  Ericsson: Alternatively 50/200MHz only ?  CQI reporting:  Huawei: wideband  CSI-RS resource Type:  Huawei: periodic  ReportConfigType:  Huawei: 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: TDLA30-35 Low  CBW&SCS:  Huawei: agnostic  Ericsson: Alternatively 50/200MHz only ?  PMI reporting:  Huawei: wideband  CSI-RS resource Type:  Huawei: 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: 2x2 ULA Low  Channel model:  Huawei: TDLA30-35 Low  CBW&SCS:  Huawei: agnostic  Ericsson: Alternatively 50/200MHz only ?  CSI-RS resource Type:  Huawei: 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: 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.

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

### 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. |

**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.

|  |  |
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| **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 |

**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. |

**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 |

**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 |

**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 |

**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 |

**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. |

### 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): 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. |

**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. |

**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. |

**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. |

**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. |

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

* Proposals
  + Option 1 (Huawei): 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 |

**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. |

**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. |

### 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 ? |

**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 |

### 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. |

### 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 |

**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. |

**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. |

**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. |

**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. |

### 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:* |

*Recommendations on WF/LS assignment*

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

### CRs/TPs

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

|  |  |
| --- | --- |
| **CR/TP number** | **CRs/TPs Status update recommendation** |
| XXX | *Based on 1st round of comments collection, moderator can recommend the next steps such as “agreeable”, “to be revised”* |

## Discussion on 2nd round (if applicable)

## Summary on 2nd round (if applicable)

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

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