**3GPP TSG-RAN WG4 Meeting # 98-bis-e draftR4-2105990**

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

**Agenda item:** 5.3.5

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

**Title:** Email discussion summary for [98-bis-e][319] NR\_IAB\_Demod

**Document for:** Information

# Introduction

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

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

* 1st round: TBA
* 2nd round: TBA

## Scope

This tdoc will be used to guide and summarize the email discussion for the topic of Rel-16 IAB demodulation and CSI requirements (AI 5.3.5), with the email thread identifier “[98-bis-e][319] NR\_IAB\_Demod”.

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

5.3 Integrated Access and Backhaul for NR

5.3.5 Demodulation and CSI requirements

5.3.5.1 General

5.3.5.2 IAB-DU performance requirements

5.3.5.3 IAB-MT performance requirements

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

## Notes on email discussions

From the meeting arrangement:

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

# Topic #1: General (5.3.5.1)

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

## Companies’ contributions summary

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| **T-doc number** | **Company** | **Proposals / Observations** |
| R4-20xxxxx | Company A | Proposal 1:  Observation 1: |
| R4-2104660 | Ericsson | pCR to 38.176-1: Introduction of annexes on test tolerance, test setup and propagation conditions for performance requirements  Text proposal |
| R4-2104661 | Ericsson | Draft CR to 38.174: FRCs and PRACH preambles  Text proposal |
| R4-2106438 | Intel Corporation | draftCR to 38.174: IAB-MT and IAB-DU performance requirements  Text proposal |
| R4-2106439 | Intel Corporation | TP to TS 38.176-1: FRC and PRACH test preambles  Text proposal |
| R4-2106440 | Intel Corporation | TP to TS 38.176-2: Demodulation manufacturer declarations  Text proposal |
| R4-2106441 | Intel Corporation | Big TP to TS 38.176-1: IAB demodulation performance requirements  Text proposal |
| R4-2106778 | Nokia, Nokia Shanghai Bell | draftTP to TS 38.176-2 IAB-DU performance requirements and parts of DU and MT appendix  Text proposal |
| R4-2106817 | Huawei, HiSilicon | Big CR on IAB-MT demodulation in TS 38.174  Text proposal |
| R4-2106819 | Huawei, HiSilicon | pCR on IAB conducted conformance testing (Manufacturer declarations) to TS 38.176-1  Text proposal |
| R4-2106822 | Huawei, HiSilicon | pCR on IAB radiated conformance testing (FRCs and PRACH test preambles) to TS 38.176-2  Text proposal |
| R4-2107094 | Nokia, Nokia Shanghai Bell | bigTP draft to TS 38.176-2 Demodulation performance  Text proposal |

## Open issues summary

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

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

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

### Sub-topic 1-1: IAB general specification editorial questions

*Sub-topic description*

This section and all issues inside have initially been created by the moderator. Hence, topics in this section are for informative discussion, unless specifically agreed by the contributors to be captured in the WF.  
From the initial text proposals submitted to this meeting, some editorial questions and issues have been observed that are highlighted in this sub-topic.

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

**Issue 1-1-1: Void clauses and number alignment**

* Proposals
  + Option 1 (Moderator): Most companies have elected to build text proposals based on 38.101-4/104/141-1/141-2 specifications. Those specification contain many voided clauses, figures, and tables.  
    Should those void items be deleted in the new specifications (with impact on numbering), or are they to be kept for number alignment with the UE/BS demod specifications?

In a more general version of this issue, should we include PBCH/SDR/etc sections as “void” to keep number alignment?

* + Option 2: Other options not precluded.
* Recommended WF
  + Please discuss.

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| **Company** | **Comments** |
| Ericsson | Creating void clauses in a new specification seems rather messy. Even though it would change the numbering, we prefer not to create void clauses. |
| Nokia, Nokia Shanghai Bell | Our preference it to have a new specification that will not include unnecessary sections (PBCH, SDR, etc.), figures, tables, etc. from the BS/UE specifications. The direct numbering correspondence will be lost in any case due to the different arrangement of IAB specification. However, the benefit will be in much neater and clearer IAB specification. |
| Intel | Even IAB specifications will be based on 38.101-4/104/141-1/141-2 specifications, they are separate specs and we do not need to align them with BS/UE specs. Definition of void clauses as well as clauses for requirements that are not applicable for IAB (SDR, PBCH) can have wrong impression. Support not to create void clauses and define IAB specification with only relevant requirements. |

**Issue 1-1-2: IAB types**

* Proposals
  + Option 1 (Moderator): In TS 38.174 draft\_V16.2.0 only "IAB type 1-H/1-O/2-O" are currently described.  
    How do we translate, e.g., BS type 1-H? Will it become “IAB type 1-H”, or “IAB-DU type 1-H”?
  + Option 2: Other options not precluded.
* Recommended WF
  + Please discuss.

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| **Company** | **Comments** |
| Ericsson | We should follow the same terminology as the RF parts of the specification, i.e. IAB type 1-H etc. |
| Nokia, Nokia Shanghai Bell | We are OK to follow existing practice from 38.174 and use IAB type 1-H. |
| Intel | Support IAB type 1-H instead of IAB-DU type 1-H to align with RF spec. |

**Issue 1-1-3: Appendix numbering and merging**

* Proposals
  + Option 1 (Moderator): A large diversity in text proposals concerning numbering of appendices, and in particular merging of DU/MT appendix sections, was observed.  
    Can we agree on a common numbering/merging guideline? Or should this be handled between the responsible for the same sections over several specifications?

Please note that we will also need to align with RF appendices being merged and/or placed, but this will only be resolvable once we go to bigCRs/TPs and align with spec editors.

* + Option 2: Other options not precluded.
* Recommended WF
  + Please discuss.

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| **Company** | **Comments** |
| Ericsson | It would be good to agree on a common numbering in a WF, then the drafts can be updated to align for the May meeting. It is probably best if one person (the moderator ?) makes a proposal . We can volunteer to do so if the moderator is busy. |
| Nokia, Nokia Shanghai Bell | Based on our reply to the Issue 1-1-1, it should be new numbering in the IAB specifications. Additionally, we see it beneficial to join whenever possible the IAB-MT (UE) and IAB-DU (BS) annexes, e.g., propagation conditions, test setups, etc. Further alignment can be discussed between the editors of corresponding sections. Commonly reached understanding could additionally be captured in a noted editorial WF. |
| Intel | It is better to have agreement of draft skeleton of IAB specifications this meeting. Responsible companies for each bigCR/TP can provide their view at the begging of second round discussion based on received comments in the first round. In this case companies will have enough time to align structures between different IAB specs in second round discussion. |

**Issue 1-1-4: bigCR/TP approach after this meeting**

* Proposals
  + Option 1 (Moderator): A large diversity in text proposal styles was observed to be submitted to this meeting. Should we go ahead with creating bigCR/TPs after this meeting, or should we discuss a common style this meeting and build bigCR/TPs only based on next meeting’s submissions?
  + Option 2: Other options not precluded.
* Recommended WF
  + Please discuss.

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| **Company** | **Comments** |
| Ericsson | Our proposal is to collect comments and feedback on the draft CRs this meeting and the note them. Also produce a WF containing details on how to approach common issues e.g. section numbering, FRC naming etc.  Do not create big CRs this meeting. But then prior to the May meeting, the CR editors should edit their CRs and align them to the comments and agreed numbering, naming etc. This should make the job of creating big CRs more straightforward for the next meeting. |
| Nokia, Nokia Shanghai Bell | It is fine to build bigCR/TP after this meeting, but we don’t expect it to be “endorsable”. We also think that additional coordination between the editors of the IAB specifications will be needed after the first versions of bigCR/TP is assembled. In any case, bigCR/TPs should be submitted, but only decided to be noted. It will be beneficial to identify potential compliance issues between different sections before the next meeting. |
| Intel | We support creating of bigCR/TPs after this meeting and make them noted. They should contain at least agreed specifications skeleton and some already agreed clauses. Exact context can be further revised and discussed next meeting. |

### Sub-topic 1-2: Other

*Sub-topic description:*

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

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

### CRs/TPs comments collection

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

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| **CR/TP number** | **Comments collection** |
| XXX | Title, Source |
| Company A |
| Company B |
|  |
| R4-2104660 | pCR to 38.176-1: Introduction of annexes on test tolerance, test setup and propagation conditions for performance requirements, Ericsson. |
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| R4-2104661 | Draft CR to 38.174: FRCs and PRACH preambles, Ericsson. |
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| R4-2106438 | draftCR to 38.174: IAB-MT and IAB-DU performance requirements, Intel. |
| Ericsson: Initial comments:   * 8.2.3.1 heading mis-spelt. * Depending on agreements, can remove ZP-CSI-RS from parameter table. * Also physical channel, delay etc. can be removed from parameter tables * In the radiated intro text there is mention of FDD; depending on agreements this could be removed. * The PDSCH table has too many parameters; many not needed. * Coreset table not needed. * No need for number of HARQ processes etc. Same for PDCCH. |
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| R4-2106439 | TP to TS 38.176-1: FRC and PRACH test preambles, Intel. |
| Ericsson: Initial comments: FRC naming convention and section ordering would benefit from being aligned between specifications. Suggest we discuss a general principle and then implement prior to the May meeting |
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| R4-2106440 | TP to TS 38.176-2: Demodulation manufacturer declarations, Intel. |
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| R4-2106441 | Big TP to TS 38.176-1: IAB demodulation performance requirements, Intel. |
| [Moderator]: Reserved. Big CRs/TPs will be uploaded and passed through email approval after the online meeting |
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| R4-2106778 | draftTP to TS 38.176-2 IAB-DU performance requirements and parts of DU and MT appendix, Nokia. |
| Ericsson: Initial comments:   * Remvoe reference to FDD. * Some merging/simplification is needed for the propagation conditions section. Check the E/// CR on Annexes where we have attempted such a merging between UE and BS chapters. * The contents of the second Annex C on DL physical channels is almost entirely redundant; most likely the whole Annex is not needed. * Change references to BS/UE to IAB etc. |
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| R4-2106817 | Big CR on IAB-MT demodulation in TS 38.174, Huawei. |
| [Moderator]: Reserved. Big CRs/TPs will be uploaded and passed through email approval after the online meeting |
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| R4-2106819 | pCR on IAB conducted conformance testing (Manufacturer declarations) to TS 38.176-1, Huawei. |
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| R4-2106822 | pCR on IAB radiated conformance testing (FRCs and PRACH test preambles) to TS 38.176-2, Huawei. |
| Ericsson: Initial comments:   * No need for sections on PBCH, SDR. * Description of test procedure needed |
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| R4-2107094 | bigTP draft to TS 38.176-2 Demodulation performance, Nokia. |
| [Moderator]: Reserved. Big CRs/TPs will be uploaded and passed through email approval after the online meeting |
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## Summary for 1st round

### Open issues

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

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

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

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

*Note: The tdoc decisions shall be provided in Section 3 and this table is optional in case moderators would like to provide additional information.*

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

## Discussion on 2nd round (if applicable)

## Summary on 2nd round (if applicable)

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

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| **CR/TP/LS/WF number** | **T-doc Status update recommendation** |
| XXX | *Based on 2nd round of comments collection, moderator can recommend the next steps such as “agreeable”, “to be revised”* |
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# Topic #2: IAB-DU remaining issues (5.3.5.2)

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

## Companies’ contributions summary

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| **T-doc number** | **Company** | **Proposals / Observations** |
| R4-20xxxxx | Company A | Proposal 1:  Observation 1: |
| R4-2104659 | Ericsson | Title: Draft CR to 38.174: Introduction of IAB-DU performance requirements  Text proposal |
| R4-2104664 | Ericsson | Title: IAB-DU remaining issues  PRACH format support  **Proposal 1: Include all PRACH formats.**  PRACH test applicability  **Proposal 2:** **Test PRACH formats that are declared to be supported.**  PUCCH multi-slot  None. |
| R4-2106433 | Intel Corporation | Title: Views on IAB-DU demodulation performance requirements  PUSCH  **Proposal 1: Clarify PUSCH MCS/SCS applicability rule: If IAB-DU supports more than 1 SCS then highest modulation order is tested only with lowest supported SCS and other modulation orders only with highest supported SCS. Otherwise all modulation orders are tested on supported SCS.**  Multi-slot PUCCH  **Proposal #2: Include multi-slot PUCCH cases and keep existing BS demodulation-based test applicability rule (“multi-slot PUCCH requirement tests shall apply only if the BS supports it”).**  PRACH  **Proposal #3: Copy all requirements for all PRACH formats. Vendor can declare which ones are supported/tested. If PRACH formats prioritization will be agreed based on Option2, then also include PRACH format A1.** |
| R4-2106777 | Nokia, Nokia Shanghai Bell | Title: On IAB-DU demodulation requirements  PUCCH - Multi-slot  Observation 1: The implementation and function of multi-slot PUCCH is not impacted by the different deployment and usage scenarios in IAB.  **Proposal 1: Include multi-slot PUCCH cases and keep existing BS demodulation-based test applicability rule (“multi-slot PUCCH requirement tests shall apply only if the BS supports it”).**  PUCCH - App rules  Observation 2: In the last meeting it was agreed to keep all PUCCH formats’ requirements in the specification.  **Proposal 2: Keep all (Rel-15) PUCCH formats’ requirements in the specification.**  **Proposal 3: For each supported PUCCH format, only choose one SCS to be tested if multiple SCSs supported.**  PRACH - Formats  **Proposal 4: Include all Rel-15 PRACH formats in the specification (minus high speed configurations).**  PRACH - App rules  **Proposal 5: All existing requirements and applicability rules for PRACH should be re-used for IAB-DU and corresponding declaration on supporting of this feature should be defined. The following new one applicability rule should be added:  “For IAB-DU declares to support more than one PRACH formats, limit the number of tests to any two cases chosen by the manufacturer. If IAB-DU declares to support more than one PRACH formats where formats for both long and short PRACH sequences are presented, require choosing formats with different sequences.”** |
| R4-2106812 | Huawei, HiSilicon | Title: Discussion on NR IAB-DU demodulation performance requirements  PUCCH - multi-slot  **Proposal 1: Skip cases for multi-slot PUCCH.**  PUCCH - Applicability rule on number of test cases and formats  **Proposal 2: Both options are OK for us:  − Keep all PUCCH formats in the requirements from BS, and formulate an applicability rule as  • If one PUCCH format and more than one SCS are supported, test the PUCCH format with all SCS.  • If more than one PUCCH format and one SCS are supported, test any two formats chosen by the manufacturer.  • If more than one PUCCH format and more than one SCS are supported, each declared SCS is tested with one different PUCCH format chosen by the manufacturer.  − For each supported PUCCH format, only choose one SCS to be tested if multiple SCSs supported**  PRACH - formats  **Proposal 3: Only keep requirements for PRACH formats that infrastructure manufacturers plan to implement/configure in IAB-nodes, but at least formats 0, A2, C0 and C2.**  PRACH - Applicability rule for formats  **Proposal 4: For IAB-DU declares to support more than one PRACH formats, limit the number of tests to any two cases chosen by the manufacturer. If IAB-DU declares to support more than one PRACH formats where formats for both long and short PRACH sequences are presented, require to choose formats with different sequences.** |
| R4-2107251 | Nokia, Nokia Shanghai Bell | Title: draftTP to TS 38.176-1 IAB-DU performance requirements  Text proposal |

## Open issues summary

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

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

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

### Sub-topic 2-1: PUSCH

*Sub-topic description:*

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

**Issue 2-1-1: MCS/SCS applicability rule clarification**

* Prior agreements (R4-2103994)
  + MCS
    - Include requirements for QPSK, 16QAM (and declaration of support).  
      Add applicability rule that highest modulation order is tested only with lowest supported SCS and other modulation orders only with highest supported SCS.
  + Applicability rule on SCS
    - Combine existing applicability rule for tested SCS with newly proposed one for MCS.
* Proposals
  + Option 1: Clarify PUSCH MCS/SCS applicability rule:   
    If IAB-DU supports more than 1 SCS then highest modulation order is tested only with lowest supported SCS and other modulation orders only with highest supported SCS. Otherwise all modulation orders are tested on supported SCS.
  + Option 2: Other options not precluded.
* Recommended WF
  + Discuss in 1st round.

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| **Company** | **Comments** |
| Ericsson | Option 1 is OK for us. |
| YYY |  |
| XXX |  |

### Sub-topic 2-2: PUCCH

*Sub-topic description*

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

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

* Proposals
  + Option 1: Include multi-slot PUCCH cases and keep existing BS demodulation-based test applicability rule (“multi-slot PUCCH requirement tests shall apply only if the BS supports it”).
  + Option 2: Skip cases for multi-slot PUCCH.
* Recommended WF
  + Please try to find a compromise in the first days.  
    This is a long-standing issue and will be brought to GtW otherwise.

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| **Company** | **Comments** |
| Ericsson | Prefer option 1. |
| Nokia, Nokia Shanghai Bell | In our understanding, multi-slot PUCCH is beneficial in the situations with low connection quality, i.e. when coverage enhancement is needed. If there are challenges in the reception of PUCCH, then the throughput of data channel, i.e., backhaul link, will be limited as well. In our opinion, it is not a typical scenario for IAB. However, we can compromise to include multi-slot PUCCH cases with existing BS applicability rule, if that leads to a closure of this topic. |
| Intel | Support Option 1 to have wider range of covered scenarios. Minimization of restrictions on IAB deployment is an important aspect to increase real amount of NR IAB deployments. |

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

* Prior discussion and agreements (R4-2103994)
  + Applicability rule on number of test cases and formats
    - Option 6d: Keep all PUCCH formats in the requirements from BS, and formulate an applicability rule as
      * If one PUCCH format and more than one SCS are supported, test the PUCCH format with all SCS.
      * If more than one PUCCH format and one SCS are supported, test any two formats chosen by the manufacturer.
      * If more than one PUCCH format and more than one SCS are supported, ensure that each declared SCS is tested with one different PUCCH format chosen by the manufacturer.
    - Option 7: For each supported PUCCH format, only choose one SCS to be tested if multiple SCSs supported
* Proposals
  + Option 1a: Keep all (Rel-15) PUCCH formats’ requirements in the specification. For each supported PUCCH format, only choose one SCS to be tested if multiple SCSs supported
  + Option 1b: For each supported PUCCH format, only choose one SCS to be tested if multiple SCSs supported.
  + Option 2: Keep all PUCCH formats in the requirements from BS, and formulate an applicability rule as
    - If one PUCCH format and more than one SCS are supported, test the PUCCH format with all SCS.
    - If more than one PUCCH format and one SCS are supported, test any two formats chosen by the manufacturer.
    - If more than one PUCCH format and more than one SCS are supported, ensure that each declared SCS is tested with one different PUCCH format chosen by the manufacturer.
* Recommended WF
  + All contributing entities are fine with the following, hence WF is to agree the following:
    - For each supported PUCCH format, only choose one SCS to be tested if multiple SCSs supported.
  + Please comment on the clarification present in Option 1a:
    - Keep all (Rel-15) PUCCH formats’ requirements in the specification.

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| **Company** | **Comments** |
| Ericsson | Recommended WF is Ok for us |
| Nokia, Nokia Shanghai Bell | We agree with the proposed WF. It is already agreed that only Rel-15 features must be used as a basis for IAB specifications. Hence, it is straightforward that only Rel-15 PUCCH formats should be re-used. All of Rel-15 PUCCH formats should be kept in the specification because IAB-DU acts like a regular BS and should be capable of serving access UEs. We are eager to reduce the IAB-DU test burden, and Option 2 looks more attractive for us. However, we are also fine with the proposed WF. |
| Intel | We support the recommended WF. |

### Sub-topic 2-3: PRACH

*Sub-topic description*

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

**Issue 2-3-1: Formats to be included in IAB-DU specification**

* Proposals
  + Option 1: Include all PRACH formats  
    Copy all requirements for all PRACH formats (excluding high speed configurations).
  + Option 2: Only keep requirements for PRACH formats that infrastructure manufacturers plan to implement/configure in IAB-nodes, but at least formats 0, A2, C0 and C2.
  + Option 3: Only keep requirements for PRACH formats that infrastructure manufacturers plan to implement/configure in IAB-nodes, but at least formats 0, **A1**, A2, C0 and C2.
* Recommended WF
  + There is a majority of proposals to copy paste all requirements (excluding high speed) PRACH formats into the IAB-DU specification, and then leaving the limitation of test cases to test applicability rules.  
    Unless counter-opinions are met in the first round, option 1 will be the recommended WF.

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| **Company** | **Comments** |
| Ericsson | We prefer option 1, since the spec should provide a toolbox for IAB-DU deployment scenarios. |
| Nokia, Nokia Shanghai Bell | The IAB-DU shall serve both regular access UEs and IAB-MTs, Therefore, it is hard to limit the number of formats already defined for regular BSs. In our opinion, it is more straightforward to copy all relevant requirements and implement applicability rules. Thus, the proposed WF is fine for us. |
| Intel | We support the recommended WF. |

**Issue 2-3-2: Test applicability**

* Proposals
  + Option 1: Test PRACH formats that are declared to be supported.
  + Option 2: All existing requirements and applicability rules for PRACH should be re-used for IAB-DU and corresponding declaration on supporting of this feature should be defined. The following new one applicability rule should be added:   
    “For IAB-DU declares to support more than one PRACH formats, limit the number of tests to any two cases chosen by the manufacturer. If IAB-DU declares to support more than one PRACH formats where formats for both long and short PRACH sequences are presented, require choosing formats with different sequences.
* Recommended WF
  + Please try to find a compromise within the first few days. This is a longstanding issue with little progress in the last meeting.

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| **Company** | **Comments** |
| Ericsson | We prefer option 1. For option 2, we are concerned that we would be creating two levels of declaration:   * Firstly declare whether or not a format is supported * Then if a format is declared to be supported declare/choose whether it should be tested.   This does not seem a good principle to adopt in the specifications.  Additionally, these tests are not time consuming. Once the test equipment has been set up and the test harness initialized, testing each preamble is a matter of minutes. |
| Nokia, Nokia Shanghai Bell | We would like to reduce the IAB-DU test burden. Hence, Option 2 is preferred. However, we can compromise to Option 1. |
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### Sub-topic 2-4: IAB-DU specification editorial questions

*Sub-topic description*

This section and all issues inside have initially been created by the moderator. Hence, topics in this section are for informative discussion, unless specifically agreed by the contributors to be captured in the WF.  
From the initial text proposals submitted to this meeting, some editorial questions and issues have been observed that are highlighted in this sub-topic.

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

**Issue 2-4-1: IAB DU and FDD**

* Proposals
  + Option 1 (Moderator): In the IAB-MT subtopic it was decided to not have FDD requirements. The IAB-DU configurations contain notes, stating that all requirements are applicable to FDD “TDD patterns”. Should these references need to be removed?
  + Option 2: Other options not precluded.
* Recommended WF
  + Please discuss.

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| **Company** | **Comments** |
| Ericsson | Since FDD is not supported, references to FDD should be removed. |
| Nokia, Nokia Shanghai Bell | We think that all references to FDD should be removed, because IAB is not planned for any of FDD frequency bands. |
| Intel | References for FDD should be removed. |

### Sub-topic 2-5: 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.*

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

### CRs/TPs comments collection

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

|  |  |
| --- | --- |
| **CR/TP number** | **Comments collection** |
| XXX | Title, Source |
| Company A |
| Company B |
|  |
| R4-2104659 | Draft CR to 38.174: Introduction of IAB-DU performance requirements, Ericsson. |
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| R4-2107251 | draftTP to TS 38.176-1 IAB-DU performance requirements, Nokia. |
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## Summary for 1st round

### Open issues

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

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| --- | --- |
|  | **Status summary** |
| **Sub-topic#1** | *Tentative agreements:*  *Candidate options:*  *Recommendations for 2nd round:* |
|  |  |

*Recommendations on WF/LS assignment*

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

### CRs/TPs

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

*Note: The tdoc decisions shall be provided in Section 3 and this table is optional in case moderators would like to provide additional information.*

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

## Discussion on 2nd round (if applicable)

## Summary on 2nd round (if applicable)

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

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| **CR/TP/LS/WF number** | **T-doc Status update recommendation** |
| XXX | *Based on 2nd round of comments collection, moderator can recommend the next steps such as “agreeable”, “to be revised”* |
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# Topic #3: IAB-MT remaining issues (5.3.5.3)

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

## Companies’ contributions summary

|  |  |  |
| --- | --- | --- |
| **T-doc number** | **Company** | **Proposals / Observations** |
| R4-20xxxxx | Company A | Proposal 1:  Observation 1: |
| R4-2104662 | Ericsson | Title: pCR to 38.176-2: Introduction of CSI-RS performance tests and requirements  Text proposal |
| R4-2104663 | Ericsson | Title: pCR to 38.176-1: IAB-MT performance tests  Text proposal |
| R4-2104665 | Ericsson | Title: IAB-MT remaining issues  Conformance testing setup - Synchronization configuration  No proposal or observation.  General - Reference signals in test parameters and reference channels  **Proposal 1:** **Add the following notes:  Note 1: PDSCH is transmitted only in D slots that do not contain CSI-RS, SSB and TRS.   Note 2: SSB, TRS and/or CSI-RS are not specified as part of the FRC, but if needed may be transmitted.  Note 3: If SSB, TRS and/or CSI/RS are transmitted then slots may be reserved for these signals. Such slots are not used for PDSCH transmission**  General - Additional simulations to replace TDLC300-100 and TDLA30-300  No proposal or observation.  [Moderator]: The tdoc text indicates a preference, but no proposal is given. Please add your support in the 1st round.  PDSCH - FR1 256QAM testability  No proposal or observation.  CSI Reporting - PMI reporting  **Proposal 2: Include PMI requirements, and a declaration of PMI support**  **Proposal 3: Adopt PMI reporting requirements as they exist in 38.101-4**  **Proposal 4: Include RI requirements, and a declaration of RI support.**  **Proposal 5: Adopt RI reporting requirements as they exist in 38.101-4**  General - OCNS model for unused REs  **Proposal 6: Define single slot PDSCH FRC so that symbols containing PDSCH contain only PDSCH and DM-RS and with all REs allocated.**  **Proposal 7: No need for OCNS for PDSCH**  **Proposal 8: Include OCNS for PDCCH**  General - Test tolerances  **Proposal 9: TT=0.3dB for static channel, TT=0.6dB for fading channel for both conducted and radiated testing.** |
| R4-2104666 | Ericsson | Title: IAB-MT simulation results  Simulation results only. |
| R4-2106434 | Intel Corporation | Title: Views on IAB-MT demodulation performance requirements  Conformance testing setup - Synchronization configuration  **Proposal #1: If specification provides enough flexibility to use different approaches on fine synchronization during the test – explicit agreement on baseline/optional assumptions on fine synchronization is not needed.**  General - Reference signals in test parameters and reference channels  **Proposal #2: Configurations for SSB, TRS, CSI-RS should be defined as a reference example and marked “up to implementation”. Additional note should be added that transmission of SSB, TRS, CSI-RS is not mandated, and they can be transmitted if deemed needed during the test by the IAB manufacturer.**  General - Updated Propagation conditions  **Proposal #3: Try to replace propagation conditions and provide simulation results for alignment, but final decision on propagation conditions replacement should take into account number of submitted results and obtained span among companies.**  PDSCH - Updated PRB bundling size in Rank 3 test case  **Proposal #4: Reuse 16QAM Rank 3 TDLA30-10 test case for IAB-MT. Configuration either with 2 or wideband PRB bundling size granularity can be considered.**  CSI reporting requirements - RI and PMI inclusion  **Proposal #5: Define PMI and RI reporting requirements for IAB-MT node.** |
| R4-2106571 | Nokia, Nokia Shanghai Bell | Title: On IAB-MT demodulation requirements  [Moderator]: Zip file additionally contains excel file with simulation results.  On IAB-MT conformance testing setup:  **Observation 1**: Fine synchronization for IAB-MT can be provided based on the DM-RS that are explicitly defined in FRCs. Transmission of TRS is neither necessitated nor prohibited by the in the testing setup.  **Proposal 1: RAN4 not to pursue agreement on fine synchronization.**  On reference signals in test parameters and reference channels:  **Observation 2**: The use of SSB, TRS, CSI-RS is not necessitated by the BS-style testing approach for demodulation performance. If these signals are still decided to be used in the tests, their configuration is not restricted and can be left up to the implementation.  **Proposal 2: Add a note in the test parameters and FRC that transmission of SSB, TRS, CSI-RS is not precluded.**  **Proposal 3: Do not define SSB, TRS, CSI-RS configurations as a part of demodulation performance test parameters or FRC.**  **Proposal 4: If found to be needed, list a typical conducted and radiated configuration of SSB, TRS, CSI-RS in an informative Appendix to the specification.**  On definition of PDSCH test parameters:  PDCCH resources  **Observation 3**: The configuration of PDCCH resources to schedule (for example) PDSCH resources during PDSCH and CSI reporting performance requirement testing often seems incompatible with the FRC for DL testing approach.  **Proposal 5: RAN4 to discuss if PDCCH resources need to be included in the PDSCH test parameters.**  **Observation 4**: The number of consecutive PDSCH symbols is defined explicitly in the FRCs. The allocation length is less than full frame (i.e., less than 14 symbols). These symbols can be used for PDCCH if it found to be needed by implementation. However, the transmission of PDCCH is not necessitated.  **Proposal 6: RAN4 not to define PDCCH configuration in PDSCH test parameters.**  256QAM  **Observation 5**: We do not have reason to believe that the high SNR figures given in 256QAM requirements cause a significant link-budget related testing problem in FR1. Furthermore, copy-pasting of one 256 QAM test does not add a significant specification drafting load and testing load is limited by declaration of support.  **Proposal 7: Re-use (i.e., copy-past from UE specification) FR1 256QAM with 2Rx requirement, and test if support of 256 QAM is declared to be supported for type 1-O IAB-MT.**  PRB  **Observation 6**: Wideband PRB bundling can be chosen for IAB backhaul links with low channel frequency selectivity. Thus, testing of such configuration makes sense.  **Proposal 8: RAN 4 to change prior agreement and re-use FR1 Rank 3 4Rx UE requirement for IAB-MT with wideband PRB bundling.**  On down-scoping of requirements and new propagation channels:  **Observation 7**: A significant difference in the results may cause inconsistencies for a low number of contributing companies.  **Proposal 9: If inconsistencies in the provided calibration results are found (e.g., less than three companies within a span of 1.5 dB), the TDLC300-100 in FR1 and TDLA30-300 (Low and medium) in FR2 propagation conditions and corresponding requirements shall be kept, and the requirements shall be copy-pasted from UE specification.**  Simulation results:  **Observation 8**: The introduction of new IAB-MT requirements can bring unnecessary overhead in the future.  **Observation 9**: Minimal PDSCH requirements and Throughput vs. SINR curves with updated propagation models are close enough to the results of the other two companies reported so far.  **Observation 10**: Minimal PDSCH requirements and Throughput vs. SINR curves reported so far by two other companies have considerable differences (e.g., over 2 dB for Test3).  **Proposal 10: RAN4 to discuss if reported PDCCH results can be agreed to be consistent.**  On CSI reporting requirements:  **Observation 11**: CSI-RS need to be transmitted to let IAB-MT perform CSI measurements. The former IAB-MT agreement not to specify CSI-RS is not applicable to CSI reporting performance tests.  **Proposal 11: Define CSI-RS configurations for IAB-MT CSI reporting tests. Follow configurations from UE testing.**  **Proposal 12: RAN4 to discuss if PDCCH resources need to be included in the CSI reporting test parameters.**  **Proposal 13: Do not define PDCCH configuration for CSI reporting tests.**  **Proposal 14: Do not define the K1 value (PDSCH-to-HARQ-timing-indicator) and leave it up to implementation.**  **Proposal 15: Do not define the physical channel for the CSI report and leave it up to the implementation.**  **Proposal 16: Do not include CSI reporting requirements for PMI and RI.** |
| R4-2106779 | Nokia, Nokia Shanghai Bell | Title: draftCR to TS 38.174 CSI reporting radiated performance requirements  Text proposal |
| R4-2106813 | Huawei, HiSilicon | Title: Discussion on NR IAB-MT demodulation performance requirements  General - Synchronization configuration  **Proposal 1: Keep the agreement that “No need to specify SSB, TRS, CSI-RS in the test parameters and FRCs”.**  General - Reference signals in test parameters and reference channels  **Proposal 2: For all requirements, configurations for SSB, TRS, CSI-RS should not be defined, they are left open to implementation, remove the corresponding rows in specification tables without any explicit notes.**  General - Down scoping and changing of propagation conditions  **Proposal 3: Replace the channel model of the test cases corresponding to TDLC300-100 in FR1 and TDLA30-300 (Low and medium) in FR2 with following candidate channel model: TDLA30-10 (Low) for FR1 and TDLA30-75 (Low) for FR2.**  PDSCH - PRB bundling size  **Proposal 4: For PRB bundling size, keep prior agreements that only keep requirements with PRB bundling size 2.**  **Proposal 5: If companies have strong concern about the rank 3 case, change PRB bundling size from wideband to 2 and re-simulate that case.**  CSI - PMI & RI inclusion  **Proposal 6: Do not introduce PMI and RI reporting requirements.** |
| R4-2106814 | Huawei, HiSilicon | Title: Simulation results for NR IAB-MT demodulation performance requirements  Simulation results only. |
| R4-2106815 | Huawei, HiSilicon | Title: Updated simulation assumptions for NR IAB-MT demodulation requirements  Neither observations nor proposals. |
| R4-2106816 | Huawei, HiSilicon | Title: Summary of simulation results for NR IAB-MT demodulation requirements  [Moderator]: Reserved. To capture updated simulation results during the meeting. |
| R4-2106818 | Huawei, HiSilicon | Title: Draft CR on IAB-MT conducted performance requirements (General and Demodulation) in TS 38.174  Text proposal |
| R4-2106820 | Huawei, HiSilicon | Title: pCR on IAB-MT conducted conformance testing (CSI reporting and Interworking) to TS 38.176-1  Text proposal |
| R4-2106821 | Huawei, HiSilicon | Title: pCR on IAB-MT radiated conformance testing (General and Demodulation) to TS 38.176-2  Text proposal |

## Open issues summary

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

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

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

### Sub-topic 3-1: General

*Sub-topic description:*

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

**Issue 3-1-1: Synchronization configuration in test setup**

* Prior discussion (R4-2103994)
  + Synchronization configuration
    - Option 1: Provide DM-RS for fine synchronization. Optionally, TRS can also be transmitted during the test for fine synchronization.
    - Option 2: Agreement on this matter is not required.
* Proposals
  + Option 1: Keep the agreement that “No need to specify SSB, TRS, CSI-RS in the test parameters and FRCs”.
  + Option 2: If specification provides enough flexibility to use different approaches on fine synchronization during the test – explicit agreement on baseline/optional assumptions on fine synchronization is not needed.
  + Option 3: RAN4 not to pursue agreement on fine synchronization.
* Recommended WF
  + It is the moderators understanding that all contributing entities do not see it necessary to reach agreement on this matter.  
    Unless other opinions are voiced, the recommended WF will be “agreement on this matter is not required.”

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| **Company** | **Comments** |
| Ericsson | Agree with the recommended WF |
| Nokia, Nokia Shanghai Bell | We agree with the proposed WF. |
| Intel | We support the recommended WF. |

**Issue 3-1-2: Reference signals in test parameters and reference channels**

* Prior discussion (R4-2103994)
  + Reference signals in test parameters and reference channels
    - No need to specify SSB, TRS, CSI-RS in the test parameters and FRCs.  
      FFS: Configurations for SSB, TRS, CSI-RS can be defined.
      * Option 3: Configurations for SSB, TRS, CSI-RS can be defined, and they can be transmitted if deemed needed during the test by the IAB manufacturer.
      * Option 4: Configurations for SSB, TRS, CSI-RS do not need to be defined, they are left open to implementation.
      * Option 5:
        + Add note in specification that transmission of SSB, TRS, CSI-RS is not precluded.
        + Remove FFS.
* Proposals
  + Option 1: Add the following notes:
    - Note 1: PDSCH is transmitted only in D slots that do not contain CSI-RS, SSB and TRS.
    - Note 2: SSB, TRS and/or CSI-RS are not specified as part of the FRC, but if needed may be transmitted.
    - Note 3: If SSB, TRS and/or CSI/RS are transmitted then slots may be reserved for these signals. Such slots are not used for PDSCH transmission
  + Option 2: For all requirements, configurations for SSB, TRS, CSI-RS should not be defined, they are left open to implementation, remove the corresponding rows in specification tables without any explicit notes.
  + Option 3: Configurations for SSB, TRS, CSI-RS should be defined as a reference example and marked “up to implementation”. Additional note should be added that transmission of SSB, TRS, CSI-RS is not mandated, and they can be transmitted if deemed needed during the test by the IAB manufacturer.
  + Option 4:
    - Add a note in the test parameters and FRC that transmission of SSB, TRS, CSI-RS is not precluded.
    - Do not define SSB, TRS, CSI-RS configurations as a part of demodulation performance test parameters or FRC.
    - If found to be needed, list a typical conducted and radiated configuration of SSB, TRS, CSI-RS in an informative Appendix to the specification.
  + Option 5 (Moderator):
    - Do not define SSB, TRS, CSI-RS configurations as a part of demodulation performance test parameters or FRC. CSI reporting is exempt from the CSI-RS configuration omission.
    - Add the following notes to the FRCs:
      * Note 1: PDSCH/PDCCH is transmitted only in D slots that do not contain CSI-RS, SSB and TRS.
      * Note 2: SSB, TRS and/or CSI-RS are not specified as part of the FRC, but if needed may be transmitted. It is left up to implementation.
      * Note 3: If SSB, TRS and/or CSI/RS are transmitted then slots may be reserved for these signals. Such slots are not used for PDSCH transmission
    - Remove SSB, TRS, CSI-RS configurations rows from demodulation performance test parameters and the following note, plus corresponding appendix:
      * Note x: Transmission of SSB, TRS, CSI-RS is not mandated. A typical configuration of SSB, TRS, CSI-RS can be found in Appendix X.
* Recommended WF
  + The moderator has tried to create a potential compromise from the submissions (Option 5).   
    Please comment in first round with the understanding that this is a longstanding open issue.

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| **Company** | **Comments** |
| Ericsson | The proposed WF by the moderator (option 5) is OK for us. |
| Nokia, Nokia Shanghai Bell | We agree with the moderator’s proposal. As it was already agreed, there is no use in defining these signals and channel in a normative way, as BS style testing is followed. The Notes 1-3 are needed for clarity, and additional information can be listed in the informative Appendix. |
| Intel | We support the recommended by moderator Option 5. |

**Issue 3-1-3: Down scoping and changing of propagation conditions**

* Proposals
  + Option 1a: Try to replace propagation conditions and provide simulation results for alignment, but final decision on propagation conditions replacement should take into account number of submitted results and obtained span among companies.
  + Option 1b: If inconsistencies in the provided calibration results are found (e.g., less than three companies within a span of 1.5 dB), the TDLC300-100 in FR1 and TDLA30-300 (Low and medium) in FR2 propagation conditions and corresponding requirements shall be kept, and the requirements shall be copy-pasted from UE specification
  + Option 2: Replace the channel model of the test cases corresponding to TDLC300-100 in FR1 and TDLA30-300 (Low and medium) in FR2 with following candidate channel model: TDLA30-10 (Low) for FR1 and TDLA30-75 (Low) for FR2.
  + Option 3 (Moderator): Replace propagation conditions (FR1: TDLC300-100 -> TDLA30-**10**; FR2: TDLA30-300 -> TDLA30-75) and provide simulation results for alignment.
  + Option 4 (Moderator): If less than [3] companies provide results within a span of [1.5] dB, propagation conditions and corresponding requirements shall be kept, and the requirements shall be copy-pasted from UE specification.
* Recommended WF
  + It seems that all contributors agree to change the channel model and re-simulate in FR1. One company does not want to change the model for FR2.  
    Proposed agreement is option 3:
    - Replace propagation conditions (FR1: TDLC300-100 -> TDLA30-**10**; FR2: TDLA30-300 -> TDLA30-75) and provide simulation results for alignment.
  + Differences are observed in the handling of possible misalignment.  
    Proposed WF is to discuss suitability of option 4.

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| **Company** | **Comments** |
| Ericsson | It is probably OK to take the new channel; we should check the alignment of the final results |
| Nokia, Nokia Shanghai Bell | Based on the submitted simulation results, we observe pretty good accordance of those, especially for PDSCH. On PDCCH side, the difference in the result is higher. However, the tests with new channel models have span of less than 2.5 dB, what can be considered as reasonable. Thus, we agree to use new propagation conditions. |
| Intel | There is a good alignment between companies except some of the PDCCH test cases. We agree to change propagation conditions, but further simulation results alignment is needed next meeting that companies may double check their results. |

**Issue 3-1-4: OCNS model for unused REs - FRC**

* Prior discussion (R4-2103994)
  + IAB-MT - General - Reference channels
    - Demodulation requirements are defined based on single-slot FRCs.
    - PDSCH is scheduled only on ‘D’ slots without CSI-RS resource and TRS allocated.
* Proposals
  + Option 1: Define single slot PDSCH FRC so that symbols containing PDSCH contain only PDSCH and DM-RS and with all REs allocated.
  + Option 2: Other options not precluded.
* Recommended WF
  + Please comment in first round, if the proposed clarification on FRC definition is required.

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| **Company** | **Comments** |
| Ericsson | We agree with option 1, which means that no OCNS is needed. |
| Nokia, Nokia Shanghai Bell | In our understanding, Option 1 is aligned with previous agreements and with the principles of BS style testing. We agree with Option 1. |
| Intel | Support Option 1 which is aligned with previous agreements. |

**Issue 3-1-5: OCNS model for unused REs - PDSCH**

* Proposals
  + Option 1: No need for OCNS for PDSCH.
  + Option 2: Other options not precluded.
* Recommended WF
  + Collect comments in first round.

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| **Company** | **Comments** |
| Ericsson | Agree option 1 if option 1 from 3-1-4 is agreed. |
| Nokia, Nokia Shanghai Bell | Indeed, there is not need in OCNS model for PDSCH because we are expecting that all REs are allocated. Option 1 is OK. |
| Intel | Support Option 1. |

**Issue 3-1-6: OCNS model for unused REs - PDCCH**

* Proposals
  + Option 1: Include OCNS for PDCCH.
  + Option 2: Other options not precluded.
* Recommended WF
  + Collect comments in first round.

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| **Company** | **Comments** |
| Ericsson | Option 1 would align to the UE spec, but it is probably not very important either way. |
| Nokia, Nokia Shanghai Bell | The content of unused REs is not defined in BS demodulation testing. While it should not be forbidden to load empty PDCCH REs with OCNS, it should also not be mandated. |
| Intel | We support option 1 to have unified testing assumptios. OCNS should be renamed to OCNG to align with other specifications. |

**Issue 3-1-7: Test tolerances**

* Proposals
  + Option 1: TT=0.3dB for static channel, TT=0.6dB for fading channel for both conducted and radiated testing.
  + Option 2: Other options not precluded.
* Recommended WF
  + Collect comments in first round.

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| **Company** | **Comments** |
| Ericsson | Option 1 |
| Nokia, Nokia Shanghai Bell | The proposed Option 1 is fine. The listed tolerance values match the values from the BS conformance testing specifications 38.141-1/2. |
| Intel | Based on TS 38.521-4 up 1 dB TT for conducted and 1.8 dB TT for radiated UE performance requirements are considered. It is higher than BS TT. Since IAB specification allows different testing approaches it is better to consider the worst case and reuse UE TT for IAB-MT conformance testing. Suggest Option 2: Reuse UE TT values from TS 38.521-4. |

### Sub-topic 3-2: PDSCH

*Sub-topic description*

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

**Issue 3-2-1: PRB bundling size**

* Prior discussion (R4-2103994)
  + PRB bundling size
    - Option 1: Change prior agreement: Only keep requirements with wideband PRB bundling size and PRB bundling size 2.
    - Option 2: Keep prior agreements that only keep requirements with PRB bundling size 2.
* Proposals
  + Option 1: Keep prior agreements that only keep requirements with PRB bundling size 2. Do not re-simulate the rank 3 case.
  + Option 2: Keep prior agreements that only keep requirements with PRB bundling size 2. For rank 3 case, change PRB bundling size from wideband to 2 and re-simulate that case.
  + Option 3: Change prior agreement and re-use FR1 Rank 3 4Rx UE requirement (16QAM, TDLA30-10) for IAB-MT with wideband PRB bundling.
* Recommended WF
  + Discuss in first round.

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| **Company** | **Comments** |
| XXX |  |
| Nokia, Nokia Shanghai Bell | Looking at the PDCCH simulations results, we can observe that PDCCH Test case 3 has the largest span, over 2.5 dB. Therefore, our choice is to use the results of exiting UE test, and our preference is Option 3. |
| Intel | Option 2 and Option 3 are fine for us. For our results we assume PRB bundling size 2 for this test case. |

**Issue 3-2-2: PDCCH resources**

* Proposals
  + Option 1: Do not to define PDCCH configuration in PDSCH test parameters.
  + Option 2: Other options not precluded.
* Recommended WF
  + Discuss in first round.

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| **Company** | **Comments** |
| Ericsson | Agree with option 1; the configuration is not needed. |
| Nokia, Nokia Shanghai Bell | As FRC based testing with (at least) coarse synchronization is used, there is no need to use dynamic allocation of PDSCH, thus PDCCH demodulation (and hence its configuration) is not impacting PDSCH demodulation performance.  Additionally, PDCCH transmission opportunities are not described by FRC that follow the strict definition of FRCs, and BS style testing will ignore PDCCH configurations.  As such, the configuration should be removed from any normative sections. I.e., option 1. |
| Intel | Agree with Option 1. |

**Issue 3-2-3: 256QAM**

* Prior discussion (R4-2103994)
  + MCS (from GtW)
    - 16QAM and 256QAM (FR1 only) need to be covered.
      * The supporting of 256QAM requirements should be declaration basis.
      * The supporting of 256QAM requirements based on the assumption of 256QAM supporting for 1-O is testable
      * Further checking 256QAM supporting for 1-O considering test link-budget issue.
* Proposals
  + Option 1: Re-use (i.e., copy-paste from UE specification) FR1 256QAM with 2Rx requirement, and test if support of 256 QAM is declared to be supported for type 1-O IAB-MT.
  + Option 2: Other options not precluded.
* Recommended WF
  + No contributor has challenged the assumption that 256QAM is testable in FR1 OTA.
  + It is recommended to close this topic without further agreements.

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| **Company** | **Comments** |
| Ericsson | Agree option 1. |
| Nokia, Nokia Shanghai Bell | Option 1 is OK for us. |
| Intel | Recommended WF is fine for us. |

### Sub-topic 3-3: PDCCH

*Sub-topic description*

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

**Issue 3-3-1: Simulation alignment**

* Proposals
  + Option 1: Discuss if reported PDCCH results can be agreed to be consistent.
  + Option 2: Other options not precluded.
* Recommended WF
  + Please comment on the question raised in the proposal.

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| **Company** | **Comments** |
| XXX |  |
| Nokia, Nokia Shanghai Bell | We do not observe any problems with PDSCH results. PDCCH results are less consistent between the companies. Referring to the issue 3-2-1, we are proposing to use all updated test except for Test 3 that could be kept from UE requirements. |
| Intel | It is preferable to change propagation conditions for all considered scenarios. We can make second round of results alignment next meeting for PDCCH test cases in which span is higher than 2.5 dB. |

### Sub-topic 3-4: CSI reporting

*Sub-topic description*

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

**Issue 3-4-1: PMI inclusion**

* Proposals
  + Option 1: Include PMI requirements, and a declaration of PMI support.
  + Option 2: Do not introduce PMI requirements.
* Recommended WF
  + Please try to find a compromise in the first round.

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| **Company** | **Comments** |
| Ericsson | Prefer option 1; test PMI if it is supported but allow for declaration |
| Nokia, Nokia Shanghai Bell | As we clarify in our contribution, it is possible that IAB-MT can be implemented without or based on very rare PMI reporting. On the other hand, we understand the intention to test the functionality if it is implemented in the device. Hence, we can compromise to a bit rephrased Option 1a:  Include PMI requirements, and test them if PMI usage is declared. |
| Intel | Some IAB nodes might implement PMI reporting and another might not. We need to ensure that all possible implementations are covered by test specification. As a compromise we agree with Option 1 to consider PMI reporting requirements as up to declaration support. Otherwise we cannot guarantee proper processing of PMI reporting and ensure that IAB nodes from different vendors can operate with each other. |

**Issue 3-4-2: PMI CSI-RS Resource type and report config**

* Proposals
  + Option 1: Adopt PMI reporting requirements as they exist in 38.101-4.
  + Option 2: Other options not precluded.
* Recommended WF
  + Discuss in parallel with inclusion issue.

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| **Company** | **Comments** |
| Ericsson | Prefer option 1; no need to create new requirements |
| Nokia, Nokia Shanghai Bell | In this issue we would preferer to clarify, what “adopt” means. In our understanding, it is OK to copy-paste minimum requirements from 38.101-4, i.e,, gamma values. However, the test parameters should be still updated to be compliant with the BS testing approach. |
| Intel | We agree with Option 1 to adopt same gamma values, CSI-RS resource type and report config modes for IAB as in UE spec. We do not see any issues to consider aperiodic type. |

**Issue 3-4-3: RI inclusion**

* Proposals
  + Option 1: Include RI requirements, and a declaration of RI support.
  + Option 2: Do not introduce RI requirements.
* Recommended WF
  + Please try to find a compromise in the first round.

|  |  |
| --- | --- |
| **Company** | **Comments** |
| Ericsson | Prefer option 1; RI support can be declared but should be tested if supported. |
| Nokia, Nokia Shanghai Bell | Similarly to PMI requirements (Issue 3-4-1), we would reformulate Option 1 as  Include RI requirements, and test them if RI usage is declared. |
| Intel | Same comment as on PMI reporting requirements: Support Option 1. |

**Issue 3-4-4: RI CSI-RS Resource type and report config**

* Proposals
  + Option 1: Adopt RI reporting requirements as they exist in 38.101-4.
  + Option 2: Other options not precluded.
* Recommended WF
  + Discuss in parallel with inclusion issue.

|  |  |
| --- | --- |
| **Company** | **Comments** |
| Ericsson | Prefer option 1; no need for creating new requirements compared to the UE. |
| Nokia, Nokia Shanghai Bell | Similarly to PMI requirements (Issues 3-4-2), we agree that the minimal requirements can be copy-pasted directly, but test parameters should be check and updated to be complaint with BS style testing approach. |
| Intel | Same comment as for PMI CSI-RS resource type and report config: Support Option 1. Some test parameters can be further removed but not updated comparing to TS 38.101-4. |

**Issue 3-4-5: CSI configurations**

* Proposals
  + Option 1: Define CSI-RS configurations for IAB-MT CSI reporting tests. Follow configurations from UE testing.
  + Option 2: Other options not precluded.
* Recommended WF
  + Please discuss in first round.

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| --- | --- |
| **Company** | **Comments** |
| Ericsson | The CSI-RS used for determining CSI needs to be included |
| Nokia, Nokia Shanghai Bell | We have an agreement not to define CIS-RS configuration. It is true for the demodulation performance tests. However, reference symbols are needed for CSI reporting in order to perform necessary CSI measurements. Hence, we support Option 1. |
| Intel | Support Option 1. |

**Issue 3-4-6: PDCCH configuration**

* Proposals
  + Option 1: Not define PDCCH configuration for CSI reporting tests.
  + Option 2: Other options not precluded.
* Recommended WF
  + Please discuss in first round.

|  |  |
| --- | --- |
| **Company** | **Comments** |
| Ericsson | Agree with option 1; no need to define PDCCh in the specifications |
| Nokia, Nokia Shanghai Bell | Same as for Issue 3-2-2:  As FRC based testing with (at least) coarse synchronization is used, there is no need to use dynamic allocation of PDSCH, thus PDCCH demodulation (and hence its configuration) is not impacting PDSCH demodulation performance.  Additionally, PDCCH transmission opportunities are not described by FRC that follow the strict definition of FRCs, and BS style testing will ignore PDCCH configurations.  As such, the configuration should be removed from any normative sections. I.e., option 1. |
| Intel | Support Option 1. |

**Issue 3-4-7: K1 value**

* Prior agreements (R4-2017673)
  + HARQ
    - Number of HARQ process and k1 configurations can be ignored.
* Proposals
  + Option 1: Do not define the K1 value (PDSCH-to-HARQ-timing-indicator) and leave it up to implementation
  + Option 2: Other options not precluded.
* Recommended WF
  + The moderator thinks that this question has already been agreed upon.  
    Recommendation to not discuss this issue further.

|  |  |
| --- | --- |
| **Company** | **Comments** |
| Ericsson | Keep to previous agreement |

**Issue 3-4-8: Reporting channel**

* Proposals
  + Option 1: Do not define the physical channel for the CSI report and leave it up to the implementation.
  + Option 2: Other options not precluded.
* Recommended WF
  + Please comment in first round.

|  |  |
| --- | --- |
| **Company** | **Comments** |
| Ericsson | Agree with option 1; for the test set-up feedback mechanism is not specified |
| Nokia, Nokia Shanghai Bell | Following the BS testing approach, only uni-directional uU interface is used by default. Therefore, one option to report CSI values is to use a feedback link, similarly to HARQ feedback. We do not consider this as the only possible way to report CSI. Hence, the final decision about the way of reporting can be left to implementation. |
| Intel | Support option 1 which is aligned with previous agreements on IAB-MT testing approach. |

### Sub-topic 3-5: IAB-MT specification editorial questions

*Sub-topic description*

This section and all issues inside have initially been created by the moderator. Hence, topics in this section are for informative discussion, unless specifically agreed by the contributors to be captured in the WF.  
From the initial text proposals submitted to this meeting, some editorial questions and issues have been observed that are highlighted in this sub-topic.

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

**Issue 3-5-1: UE capability**

* Proposals
  + Option 1 (Moderator): The UE demodulation specification uses the terms UE capabilities/features.  
    Is this terminology retained in IAB-MT specifications?
  + Option 2: Other options not precluded.
* Recommended WF
  + Please discuss.

|  |  |
| --- | --- |
| **Company** | **Comments** |
| Ericsson | This terminology should be removed. The IAB-MT is like a network node. Support for some features is by declaration. There are no capabilities of feature lists, |
| Nokia, Nokia Shanghai Bell | We consider IAB-MT as a part of the network node. Thus, capability/feature terminology should not be applied to the IAB-MT.  Furthermore, the IAB-MT does not have the same freedom as a UE to impose any support/capabilities on the NW. Hence all parts about UE capabilities should be removed and the IAB-MT needs to test all requirements that are captured in the IAB specification. |
| Intel | IAB capability/feature is proper term and TS 38.306 captures mandatory IAB-MT features/capabilities. Other features are optional for IAB-MT. To establish connection with parent node IAB-MT should provide list of the supported features.  Even we do not define requirements with optional IAB features we need to have similar table as in UE spec “Applicability of requirements for mandatory UE features with capability signalling” to capture that some requirements depends on IAB-MT capabilities like: Supported maximum number of PDSCH MIMO layers (*maxNumberMIMOLayersPDSCH*) and also Supported maximum number of PDSCH MIMO layers (maxNumberMIMOLayersPDSCH) that determine application of rank 3 and rank 4 test cases. |

**Issue 3-5-2: FRC naming**

* Proposals
  + Option 1 (Moderator): For IAB-DU the FRC naming conventions are straightforward; IAB-MT FRCs are new.  
    What would be an acceptable naming convention for IAB-MT FRCs?
  + Option 2: Other options not precluded.
* Recommended WF
  + Please discuss.

|  |  |
| --- | --- |
| **Company** | **Comments** |
| Ericsson | We proposed a similar naming convention to IAB-DU FRCs. Open to other suggestions. It would be good to agree a naming convention for FRCs and also how to number them in a WF. |
| Nokia, Nokia Shanghai Bell | In BS specification 38.104, FRCs have the following numbering format: G-(frequency range)-(appendix index)-(FRC index). It would be logical to inherit the same naming convention. To distinguish between IAB-DU and IAB-MT specific FRCs, a first letter in the FRC name for MT, can be changed, .e.g., M-FR2-A7-1. |
| Intel | Support Nokia proposal on IAB-MT FRC naming convention. Same time can we change ‘G’ from -IAB-DU FRCs to ‘D’? |

**Issue 3-5-3: FRC removal**

* Proposals
  + Option 1 (Moderator): Compared to UE demodulation specs, not all available FRCs are needed.  
    Do we only keep FRCs that are currently being used, or do we include all available in the new specifications.
  + Option 2: Other options not precluded.
* Recommended WF
  + Please discuss.

|  |  |
| --- | --- |
| **Company** | **Comments** |
| Ericsson | Only include the ones that are used. |
| Nokia, Nokia Shanghai Bell | In our opinion, only used RFCs shall be kept in the new specifications. |
| Intel | There is no need to capture not used FRCs. |

**Issue 3-5-4: Heading re-numbering**

* Proposals
  + Option 1 (Moderator): Since FDD is not covered by IAB-MT requirements, it would be possible to remove the FDD/TDD distinction in the headings.  
    Since OTA testing only has 2RX test as “non-void” sections, it would possible remove the RX distinction headings.  
    Remove FDD/TDD headings? Remove 2Rx/1Rx headings?
  + Option 2: Other options not precluded.
* Recommended WF
  + Please discuss.

|  |  |
| --- | --- |
| **Company** | **Comments** |
| Ericsson | We prefer to remove the “FDD/TDD” headings to collapse the heading structure 1 level. |
| Nokia, Nokia Shanghai Bell | Following our comment for the Issues 1-1-1, all unused and non-valid part shall be removed from the new specifications as much as possible. Hence, we agree to remove FDD/TDD heading as well as 2Tx/1Rx headings. The latter distinction can be directly made in the requirements tables, following BS demod spec style. |
| Intel | Agree with suggestion on removing headings regarding duplex mode and number of Rx antennas. More aligned structure among IAB-DU and IAB-MT parts will be reached in this case. |

**Issue 3-5-5: Heading depth**

* Proposals
  + Option 1 (Moderator): Heading re-numbering, as in issue 3-5-4, can resolve this issue.

38.101-4 already uses headings down to H6. The maximum heading depth supported by 3GPP template is H7. Following the heading numbering approach in the TP/CR split will require usage of H9, e.g., in the case of OTA CSI reporting, where both FR1 and FR2 sub-headings are required according to previous agreements.  
More economical approaches can reduce the need to H8, which is still more than H7. DU specifications are landing on H7 exactly.   
How to deal with the sub-heading depth of IAB-MT specification sections?

* + Option 2: Other options not precluded.
* Recommended WF
  + Please discuss.

|  |  |
| --- | --- |
| **Company** | **Comments** |
| XXX |  |
| Nokia, Nokia Shanghai Bell | We support heading renumbering. It is still necessary to verify that H8 is supported and cannot cause any further issues in the specifications. |
| Intel | We can discuss this issue later on after resolving issue 3-5-4. |

### Sub-topic 3-6: Other

*Sub-topic description:*

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

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

### CRs/TPs comments collection

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

|  |  |
| --- | --- |
| **CR/TP number** | **Comments collection** |
| XXX | Title, Source |
| Company A |
| Company B |
|  |
| R4-2104662 | pCR to 38.176-2: Introduction of CSI-RS performance tests and requirements, Ericsson. |
|  |
|  |
|  |
| R4-2104663 | pCR to 38.176-1: IAB-MT performance tests, Ericsson. |
|  |
|  |
|  |
| R4-2106779 | draftCR to TS 38.174 CSI reporting radiated performance requirements, Nokia. |
| Ericsson: Initial comments:   * Remove section 8.1.1.3 and references to “UE capabilities / capability signalling”. Support of requirements is by declaration. (Depending on agreement) * Potentially remove Void sections (Depending on agreement) * No need for PDCCH configuration * The common and test parameters tables can be merged in the CQI section * Remove “UE” and replace with “IAB-MT” |
|  |
|  |
| R4-2106818 | Draft CR on IAB-MT conducted performance requirements (General and Demodulation) in TS 38.174, Huawei. |
| Ericsson: Initial comments: Remove PBCH, SDR sections |
|  |
|  |
| R4-2106820 | pCR on IAB-MT conducted conformance testing (CSI reporting and Interworking) to TS 38.176-1, Huawei. |
|  |
|  |
|  |
| R4-2106821 | pCR on IAB-MT radiated conformance testing (General and Demodulation) to TS 38.176-2, Huawei. |
| Ericsson: General comment: We need to agree on a naming and numbering convention for sections and FRCs in a WF to align the specs. |
|  |
|  |

## Summary for 1st round

### Open issues

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

|  |  |
| --- | --- |
|  | **Status summary** |
| **Sub-topic#1** | *Tentative agreements:*  *Candidate options:*  *Recommendations for 2nd round:* |
|  |  |

*Recommendations on WF/LS assignment*

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

### CRs/TPs

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

*Note: The tdoc decisions shall be provided in Section 3 and this table is optional in case moderators would like to provide additional information.*

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

## Discussion on 2nd round (if applicable)

## Summary on 2nd round (if applicable)

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

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

# Recommendations for Tdocs

## 1st round

**New tdocs**

|  |  |  |
| --- | --- | --- |
| **Title** | **Source** | **Comments** |
| WF on … | YYY |  |
| LS on … | ZZZ | To: RAN\_X; Cc: RAN\_Y |
|  |  |  |

**Existing tdocs**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Tdoc number** | **Title** | **Source** | **Recommendation** | **Comments** |
| R4-210xxxx | CR on … | XXX | Agreeable, Revised, Merged, Postponed, Not Pursued |  |
|  |  |  |  |  |
|  |  |  |  |  |
|  |  |  |  |  |

Notes:

1. Please include the summary of recommendations for all tdocs across all sub-topics incl. existing and new tdocs.
2. For the Recommendation column please include one of the following:
   1. CRs/TPs: Agreeable, Revised, Merged, Postponed, Not Pursued
   2. Other documents: Agreeable, Revised, Noted
3. For new LS documents, please include information on To/Cc WGs in the comments column
4. Do not include hyper-links in the documents

## 2nd round

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Tdoc number** | **Title** | **Source** | **Recommendation** | **Comments** |
| R4-210xxxx | CR on … | XXX | Agreeable, Revised, Merged, Postponed, Not Pursued |  |
| R4-210xxxx | WF on … | YYY | Agreeable, Revised, Noted |  |
| R4-210xxxx | LS on … | ZZZ | Agreeable, Revised, Noted |  |
|  |  |  |  |  |

Notes:

1. Please include the summary of recommendations for all tdocs across all sub-topics.
2. For the Recommendation column please include one of the following:
   1. CRs/TPs: Agreeable, Revised, Merged, Postponed, Not Pursued
   2. Other documents: Agreeable, Revised, Noted
3. Do not include hyper-links in the documents