**3GPP TSG-RAN WG4 Meeting # 96-e R4-2012548**

**Electronic Meeting, 17 – 28 Aug., 2020**

**Agenda item:** 7.4.2.2

**Source:** Moderator (Samsung)

**Title:** Email discussion summary for [96e][310] NR\_IAB\_RF\_Part\_3

**Document for:** Information

# Introduction

This is summary for email discussion on IAB Receiver RF requirements. For RAN4#96e meeting, contributions with proposals on remaining technical issues to be handled in this thread are on below topics. It is suggested to share the view on each topic in the 1st round discussion and converge in the 2nd round.

* Reference sensitivity and Receiver FRC
* Remaining issues on ACS , IBB and OBB
* FR1 RX IMD
* FR1 spurious emission

Considering this meeting is expected to be the last meeting for Rel-16 IAB RF core, the completion on open sub-clauses in IAB TS should be prioritized. Hence if there is any comment on TP to TS38.174 other than the main remaining technical issue it would be recommended to share beforehand, i.e., in 1st round to leave more time for revision.

# Topic #1: Reference sensitivity and FRC

## Companies’ contributions summary

|  |  |  |
| --- | --- | --- |
| **T-doc number** | **Company** | **Proposals / Observations** |
| [R4-2009794](http://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_96_e/Docs/R4-2009794.zip) | CATT | Observation 1: The UE common reference channel parameters for DL can be reused by IAB-MT.  Observation 2: If 20MHz FRC is selected for IAB-MT, several test cases may be needed for the 100MHz FRC test. |
| [R4-2010149](http://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_96_e/Docs/R4-2010149.zip) | Samsung | Based on above SCS and PRB allocation, the corresponding FRC suits for configurations are abstracted from in TS38.101-1 and TS38.101-2 for FR1 and FR2 as Table A.x.x.x-1 and Table A.x.x.x-2  In addition, the general parameters captured in Table A.3.1-1 of TS38.101-1 for FR1 and Table A.3.1-1 of TS38.101-2 for FR2 should also be taken into account for reference channel of IAB-MT. |
| [R4-2010954](http://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_96_e/Docs/R4-2010954.zip) | ZTE Corporation | Proposal : adopt the FRC in this contribution for IAB-MT.  Additional test parameters for TDD. e.g.DL-UL pattern configuration and HARQ number for FR1 IAB-MT could be reused from Table A.3.3.1-1 in TS 38.101-2 and test parameters of CORESET configuration, PDSCH, DMRS, PT-TS configuration for FR1 IAB-MT could also be reused from Table A.3.1-1 in TS 38.101-2 |
| [R4-2011034](http://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_96_e/Docs/R4-2011034.zip) | Ericsson | Observation 1: There are potentially a large number of IAB-MT RX slot configurations.  Proposal 1: Specify IAB-MT FRCs using the BS spec approach (i.e. single slot FRCs that are applicable for any TDD pattern).  Proposal 2: Consider only the BS REFSENS’ SCS/BW combinations for IAB-MT.  Proposal 3: No need for FDD requirements; potentially no need for 15kHz SCS requirements for FR1.  Proposal 4: Not necessary to differentiate REFSENS SNR requirements between the wide area class and local area class.  Proposal 5: Optional TRS and SSB transmissions.  Proposal 6: FRC configuration for IAB-MT as Table 2 and Table 3. |
| [R4-2011294](http://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_96_e/Docs/R4-2011294.zip) | Huawei | SNR value specified for the UE is different, as this is dependent on the modulated signal the UE value is used which changes the final reference sensitivity values slightly from the BS values.  The sensitivity values for FR1 are given in tables 2.3-1 and 2.3-2 in this document, the equivalent FRC;s for the IAB-MT are given in table 2.3-3  For FR2 the as the value is in a range which is rounded to 1dB and the difference in the SNR is small the range is the same for both IAB-MT and the BS. The equivalent FRC’s re given in table 2.5-3 |
| [R4-2011295](http://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_96_e/Docs/R4-2011295.zip) | Huawei | TP to TS 38.174 -IAB RX sensitivity and dynamic range |
| [R4-2011296](http://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_96_e/Docs/R4-2011296.zip) | Huawei | TP to TR 38.809 -IAB RX sensitivity |

## Open issues summary

### Sub-topic 1-1: SNR for REFSENS

SNR in REFSENS formula is still open needs clarification.

**Issue 1-1:**

* Proposals
  + Option 1: [R4-2011034] Use SNR=-1 dB for both FR1 and FR2.
  + Option 2: [R4-2011294] Update the REFSENS value based on UE SNR for FR1 for IAB-MT and no need to consider the difference on SNR due to OTA declaration in FR2
* Recommended WF
  + TBA

### Sub-topic 1-2: RFC

It’s agreed in R4-2008785 that “Selected UE FRC can be for IAB-MT based the same criteria as BS”. In this meeting companies bring in detail proposal on this aspect.

For most of the detail companies’ input aligned quite well. Hence for FRC we will focus on the discussion for the points with diverse views as below.

**Issue 1-2-1: FRC-necessity on 15 kHz SCS in FR1**

* Proposals
  + Option 1: Not needed
  + Option 2: Include 15 kHz for full package specification
* Recommended WF
  + TBA

**Issue 1-2-2: FRC-general parameters with different views**

* Proposals
  + Option 1: Reuse the TDD configuration and other parameters in UE spec
  + Option 2: FRC should be agonistic to general parameters as BS

Optional TRS and SSB transmissions, TDD configuration, # of HARQ process

* Recommended WF
  + TBA

### Sub-topic 1-3: FR1 IAB-MT RX dynamic range

It is captured in Rel-16 IAB exception list as:

|  |
| --- |
| IAB-MT Receiver Dynamic Range  FR1 IAB-MT Rx dynamic range (whether to define or not is still FFS) |

To complete the WI decision on this requirement is needed during this meeting

**Issue 1-3: TBA**

* Proposals
  + Option 1: requirement is not defined for IAB-MT
  + Option 2: other proposal is not precluded
* Recommended WF
  + TBA

## Companies views’ collection for 1st round

### Open issues

|  |  |
| --- | --- |
| **Company** | **Comments** |
| XXX | Sub topic 1-1:  Sub topic 1-2:  ….  Others: |
| Ericsson | Issue 1-1. Maybe option 1 and 2 are complementary to each other. Need confirm SNR=-1 dB is used for UE SNR FR1 and FR2.  Issue 1-2-1: Option 1. N41, n77, n78 and n79 has no 5 MHz channel, suggestion is that 30kHz for higher bandwidth channel is good enough to specify for IAB-MT. For Demod performance, only 30kHz SCS specified for TDD band.  Issue1-2-2: Option 2. It is upon RAN5 request that general parameter is specified. We could think such detailed parameter can be discussed in conformance testing phase.  Issue 1-3: option 1. Long time ago we agree no minimum input power reuqirment will be needed. |
| Huawei | Sub topic 1-1: I think we used SNR = -1dB in R4-2011294 so I think both options are the same.  Sub topic 1-2-1: If none of the current bands support 15kHz then not needed but it does no harm to specify. No strong preference.  Sub topic 1-2-1: option 2 if possible |
| CATT | **Sub-topic 1-1: SNR for REFSENS**  UE uses SNR=-1 dB. If we conisider the difference of DL and UL signal, it seems UE SNR is reasonable, but actually the SNR in UE discussion was rounded up but it seems BS didn’t..  **Issue 1-2-1: FRC-necessity on 15 kHz SCS in FR1**  In TS 38.101-1, 15kHz SCS can support up to 50 MHz for n41, n77, n78 and n79. Operator’s opinion may be needed.  **Issue 1-2-2: FRC-general parameters with different views**  Option 1 maybe the easier way because definitely it’s needed and that was already verified by UE.  **Sub-topic 1-3: FR1 IAB-MT RX dynamic range**  There was agreement that no maximum input power was defined although I don’t know if there will be some problem for the mobile IAB. |
| Samsung | Sub topic 1-1: we also aware that it seems the two options are identical. Even though our preference is to align with the BS requirement for both frequency ranges considering the deviation is quite small, such as +/-0.2dB. But we can be fine with majority view to reach consensus.  Sub topic 1-2-1: tend to agree with HW no harm to keep 15 kHz since we also have them for DU side.  Sub topic 1-2-2: our original suggestion is to reuse corresponding UE configuration. In BS conformance testing spec the TDD configuration is also defined as a fixed one. Regarding the TRS, SSB and HARQ we would like to understand what’s the issue to configure them? Any burdern  Sub topic 1-3: option 1. In last year the agreement on “no maximum input level defined” is for FR2 only as captured in R4-1916161. Since no input on this topic on FR1 for this meeting, it’s assumed that no interesting/motivation to define such requirement. |
| Nokia, Nokia Shanghai Bell | **Issue 1-1: SNR for sensitivity in BS is a bandwidth specific value, in UE it is tentative agreed to be -1dB, As agreed in previous meeting, the selected UE FRC can be IAB-MT, therefore, we prefer to use SNR=-1 dB**  **Issue 1-2-1: 15 kHz SCS is supported per TS 38.104 (Table 5.3.5-1)**  **Issue 1-2-2: Option 2. We thought that the FRC form should generally use or be closer to the BS specifications.**  **Issue 1-3: Option 1** |

### CRs/TPs comments collection

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| **CR/TP number** | **Comments collection** |
| [R4-2011295](http://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_96_e/Docs/R4-2011295.zip) | Nokia, Nokia Shanghai Bell: In section 10.1 general part should cover IAB-DU also. FRC parameters need more discussion. The test setup and FRC form should be closer to BS specification, i.e., single slot FRCs. The FRC parameters for DU can be directly re-used from the BS specification. It would be useful to add CP-OFDM Symbols per slot so that it does not be calculated from the bitrates. For the frame allocation PBCH is taken into account but it could be optional. We also think the real HARQ-ACL with changing K1 is not necessary, instead the BS approach could be used here. |
| Company B |
| Ercisson: we need discuss the parameters used in FRC (PTRS, TDD pattern configuration, etc), even whether the common reference channel parameter shoudl be specified, this depend on the issue 1.2.2. |
| Samsung: for FR1 10MHz and 15MHz BW with 60 kHz SCS the update sensitivity should be -99.0 dB rather than -98.0dB. Furthermore, the FRC table can be merged for the same frequency range. |
| [R4-2011296](http://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_96_e/Docs/R4-2011296.zip) | Company A |
| Company B |
| Ericsson: we need discuss the parameters used in FRC (PTRS, TDD pattern configuration, etc), even whether the common reference channel parameter shoudl be specified, this depend on the issue 1.2.2. |
| Samsung: for FR1 10MHz and 15MHz BW with 60 kHz SCS the update sensitivity should be -99.0 dB rather than -98.0dB |

## 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:** SNR for REFSENS | *Tentative agreements: Majority view is to use SNR=-1dB for IAB-MT sensitivity. And as the FR2 declaration range has already been approved, this will impact FR2 declaration range.*  *Recommendations for 2nd round:*  *Confirm and capture the agreement in 2nd round in WF or revised TP to TR.* |
| Sub-topic 1-2: RFC | *Tentative agreements:*  *Issue 1-2-1: FRC-necessity on 15 kHz SCS in FR1*  *It seems no strong view from both option. Hence it’s tentatively suggested to consider option 2.*  *Issue 1-2-2: FRC-general parameters with different views*  *According to feedback on this topic, both options obtain equal supporting. Hence it is tentatively suggested that this meeting we agree on all necessary configurations can be reused from UE on FRC and leave remaining ones open to be determined further in performance phase.*  *Recommendations for 2nd round:*  *Confirm and capture the agreement in 2nd round in WF or revised TP to TR. And update TP to TS accordingly* |
| Sub-topic 1-3: FR1 IAB-MT RX dynamic range | *Tentative agreements:*  *Option 1 can be agreed as no RX dynamic range to be defined for IAB-MT of FR1.*  *Recommendations for 2nd round:*  *Confirm and capture the agreement in 2nd round in revised TP to TR. And update TP to TS accordingly* |

*Recommendations on WF/LS assignment*

|  |  |  |
| --- | --- | --- |
|  | **WF/LS t-doc Title** | **Assigned Company,**  **WF or LS lead** |
| #1 | WF on remaining issue on Reference sensitivity and FRC for IAB-MT | Huawei |

### 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** |
| [R4-2011295](http://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_96_e/Docs/R4-2011295.zip) | *To be revised to update according to comment in 1st round and further agreement to be confirmed in 2nd round* |
| 6R4-2011296 | *To be revised to update according to comment in 1st round and further agreement to be confirmed in 2nd round* |

## 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: ACS , IBB and OBB

## Companies’ contributions summary

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| --- | --- | --- |
| **T-doc number** | **Company** | **Proposals / Observations** |
| [R4-2009795](http://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_96_e/Docs/R4-2009795.zip) | CATT | For ACS,  Observation 1: For 100MHz CBW, UE REFSENS and the ACS interference signal uses 100MHz CBW.  Observation 2: 20MHz interference signal is more stringent than 100MHz interference signal for commercial UE implementation.  Proposal 1: IAB-MT ACS requirement follow UE requirement but the interference signal RB number needs to be aligned with REFSENS FRC RB number.  For IBB,  Observation 3: For 100MHz CBW, UE IBB interference signal and wanted signal use 100MHz CBW.  Proposal 2: LA IAB-MT IBB requirement follows UE requirement but the interference signal RB number needs to be aligned with REFSENS FRC RB number. |
| [R4-2010723](http://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_96_e/Docs/R4-2010723.zip) | Nokia, Nokia Shanghai Bell | Proposal 1: Apply 45 dB ACS for local area IAB-MT in FR1  Proposal 2: Apply Refsens +6 wanted signal level for local area IAB-MT in FR1  Proposal 3: Apply same interfering signal levels as specified for local area IAB-DU in FR1 to local area IAB-MT in FR1.  Proposal 4: Re-use interferer signal BW and frequency offset from TS 38.104 |
| [R4-2010955](http://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_96_e/Docs/R4-2010955.zip) | ZTE Corporation | Proposal 1: For WA IAB-MT type 1-H, the same interfering signal bandwidth and interfering signal offset of FR1 NR BS could be reused.  Proposal 2: For WA IAB-MT type 1-O, the same interfering signal bandwidth and interfering signal offset of FR1 NR BS could be reused.  Observation :For LA IAB-MT type 1-H and 1-O, option 2 with BS approach is preferred, otherwise lots of requirement has to be be redefined due to FRC alignment between IAB-MT and NR BS. |
| [R4-2011298](http://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_96_e/Docs/R4-2011298.zip) | Huawei | Proposal 1: For FR1 LA IAB-MT IBB blocking levels should be based on option 1, wanted signal = REFSENS+6dB, interfere = -35dBm  Proposal 2: For FR1 LA IAB-MT use 45dBc for IAM-MT ACS  Proposal 3: Use REFSENS + 6dB for the FR2 LA IAB-MT ACS wanted signal level. |
| [R4-2011035](http://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_96_e/Docs/R4-2011035.zip) | Ericsson | Observation#1: The ACS selectivity is tested under the condition that subcarriers of wanted and interference signal is non-orthogonal.  Observation#2: subcarriers of wanted and interference signal for IAB-MT are orthogonal if the wanted and interference signal were configured with same subcarrier spacing.  Proposal-1: keep the subcarrier non-orthogonality property between wanted and interference signal for the case of different SCS configured for wanted and interference signal.  TP to TS38.174 on IAB-MT ACS, IBB and OBB. |
| [R4-2011036](http://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_96_e/Docs/R4-2011036.zip) | Ericsson | TP to TR38.809 on IAB-MT in-band blocking |

## Open issues summary

As agreed in WF R4-2009066, there are still 2 options on LA IAB-MT for ACS and in-band blocking reuqiremnt. Furthermore, it is indicated in WF that the interference signal detail may need study.

### Sub-topic 2-1 ACS and IBB for FR1 LA IAB-MT

**Issue 2-1-1: ACS**

* Proposals
  + Option 1: 33 dB
    - The interference signal RB number needs to be aligned with REFSENS FRC RB number
  + Option 2: 45 dB
    - Apply Refsens +6 wanted signal level for local area IAB-MT in FR1
    - Apply same interfering signal levels as specified for local area IAB-DU in FR1 to local area IAB-MT in FR1.
    - Re-use interferer signal BW and frequency offset from TS 38.104
* Recommended WF
  + TBA

**Issue 2-1-2: IBB**

* Proposals
  + Option 1: LA IAB-MT IBB requirement follows UE requirement
    - The interference signal RB number needs to be aligned with REFSENS FRC RB number
  + Option 2: wanted signal = REFSENS+6dB, interfere = -35dBm
    - Apply same interfering signal levels as specified for local area IAB-DU in FR1 to local area IAB-MT in FR1.
    - Re-use interferer signal BW and frequency offset from TS 38.104
* Recommended WF
  + TBA

**Issue 2-1-3: Narrow band blocking**

* Proposals
  + Option 1:Introduce narrow band blocking for FR1 IAB-MT as BS
  + Option 2: other proposal is not precluded
* Recommended WF
  + TBA

### Sub-topic 2-2 Out-of-band blocking

**Issue 2-2:**

* Proposals
  + Option 1: Introduce out-of-band blocking for FR1 IAB-MT as BS
  + Option 2: other proposal is not precluded
* Recommended WF
  + TBA

## Companies views’ collection for 1st round

### Open issues

|  |  |
| --- | --- |
| **Company** | **Comments** |
| XXX | Sub topic 2-1:  Sub topic 2-2:  ….  Others: |
| Ericsson | Issue 2-1-1: option 2. LA IAB-MT as unplanned case may need better ACS. Simulation (R4-2004170) shows the 5th percentile of user thoughput will be degraded if the 33 dB ACS is chosen.  Issue 2-1-2: option 2. This issue is connected to issue 2-1-1.  Issue 2-1-3: option 1.  Issue 2-2: option 1. |
| Huawei | Sub topic 2-1-1: Option 2 as per out paper  Sub topic 2-1-2: option 2 as per our paper  Sub topic 2-1-3: I assumed this was part of the blocking requirement, why would we not include it? Anyway option 1  Sub topic 2-2: Deployment is like BS so will be subjected to same out of band interferers, if link is to be protected then it is necessary to have an oob blocking req. option 1. |
| CATT | No strong opinion. Generally as commented in ACLR part, it depends on what form factor is assumed. If it’s like a LA BS, then the requirement is ok. But if it’s like a WIFI router or CPE, it’ll be difficult. |
| Samsung | **Issue 2-1-3: Narrow band blocking:** for BS this requirement is design to model a scenario with interfering NR signal transmission on single RB. However, not sure whether this scenario is valid for IAB-MT with interference from DL transmission.  **Issue 2-2:** here it should be clarified that co-located case never has been discussed extensively before. In TP it’s included in WA and LA IAB node agnostic to IAB-DU and IAB-MT. The applicability to IAB classification should be clarified. |
| Nokia, Nokia Bell Labs | Issue 2-1-1: Option 2, 45 dB  Issue 2-1-2: Option 2  Issue 2-1-3: Option 1  Issue 2-2: Option 1 |

### CRs/TPs comments collection

|  |  |
| --- | --- |
| **CR/TP number** | **Comments collection** |
| [R4-2011035](http://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_96_e/Docs/R4-2011035.zip) | Huawei: Need to wait for conclusion of discussion but uses BS specs so we are ok with this. |
| Samsung: many text is just copied directly form BS spec needs to be revised/updated to IAB. |
|  |
| [R4-2011036](http://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_96_e/Docs/R4-2011036.zip) | Huawei: The conclusion under the table seems to contradict the agreement (i.e. to use the BS requirements). The statement about traditionally using 99.99% is less correct than it was, for AAS and hence NR we have been using lower probabilities. |
| Company B |
|  |

## Summary for 1st round

### Open issues

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

|  |  |
| --- | --- |
|  | **Status summary** |
| **Sub-topic2-1:** ACS and IBB for FR1 LA IAB-MT | *Tentative agreements:*  **Issue 2-1-1: ACS**  **Option 2 is preferred by most companies**  **Issue 2-1-2: IBB**  **Option 2 is preferred by most companies**  **Issue 2-1-3: Narrow band blocking**  *It seems the question on the applicability of narrow band blocking with interference of1PRB allocation on adjacent channel for IAB-MT needs clarification.*  *Recommendations for 2nd round:*  *Confirm the option 2 for issue 2-1-1 and 2-1-2.*  *Discuss further on issue 2-1-3 and capture the conclusion in WF if needed* |
| Sub-topic 2-2 Out-of-band blocking | *Tentative agreements:*  *It seems the question on the co-location OBB for FR1 case and applicability on class of IAB-DU and IAB-MT still need clarification*  *Recommendations for 2nd round:*  *Confirm the option 2 for issue 2-1-1 and 2-1-2.*  *Discuss further on sub-topic 2-2 and capture the conclusion in WF if needed* |

*Suggestion on WF/LS assignment*

|  |  |  |
| --- | --- | --- |
|  | **WF/LS t-doc Title** | **Assigned Company,**  **WF or LS lead** |
| #1 | WF on FR1 narrowband blocking and OBB for IAB-MT | Ericsson |

### CRs/TPs

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

|  |  |
| --- | --- |
| **CR/TP number** | **CRs/TPs Status update recommendation** |
| R4-2011035 | *To be revised* |
| [R4-2011036](http://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_96_e/Docs/R4-2011036.zip) | *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: RX IMD and RX spurious emission

## Companies’ contributions summary

|  |  |  |
| --- | --- | --- |
| **T-doc number** | **Company** | **Proposals / Observations** |
| [R4-2010956](http://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_96_e/Docs/R4-2010956.zip) | ZTE | Proposal 1: to reuse the Wide area BS requirements for FR1 Wide-area IAB-MT.  Proposal 2: to reuse the Local area BS requirements for FR1 Local-area IAB-MT  TP for FR1 RX IMD to TR38.809 |
| [R4-2010957](http://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_96_e/Docs/R4-2010957.zip) | ZTE | TP for FR1 RX IMD to TR38.174 |
| [R4-2011037](http://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_96_e/Docs/R4-2011037.zip) | Ericsson | TP to TR38.809 for FR1 and RF2 IAB-MT RX spurious emission with update according comment received in last meeting. |
| [R4-2011038](http://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_96_e/Docs/R4-2011038.zip) | Ericsson | TP to TS38.174 for FR1 IAB-MT on Rx spurious emission based on assumption of same scaling factor with Tx spurious. |

## Open issues summary

### Sub-topic 3-1: FR1 IAB-MT RX IMD

As summarized in exception list below item is open before RAN4#96e:

|  |
| --- |
| Receiver intermodulation   * Definition of Rx IM for FR1 IAB-MT(whether to define this or not is FFS) |

**Issue 3-1:**

* Proposals
  + Option 1: Reuse NR gNB RX IMD requirement for IAB-MT with the same class:
    - To reuse the Wide area BS requirements for FR1 Wide-area IAB-MT.
    - To reuse the Local area BS requirements for FR1 Local-area IAB-MT
    - The FRC agreed in sub-topic #1-2 for FR1 will be applied to this requirement
  + Option 2: other proposal if any is not precluded
* Recommended WF
  + Confirm to accept option 1

### Sub-topic 3-2: FR1 IAB-MT RX spurious emission

It’s agreed in RAN4#94e to “Reuse BS RX spurious emission requirement for IAB-MT “ in WF R4-2002483. The remaining issue is the emission scaling factor. As the emission factor would reply on the decision in other thread, in the 1st round discussion in [310] it’s suggested to confirm below two issues first.

**Issue 3-2:**

* Proposal 1: The IAB-MT type 1-O and type 1-H will reuse the same scaling factor for RX spurious emission as TX spurious emission
* Proposal 2: Agree with the basic limit suggested in R4-2011038 for IAB type 1-H and 1-O respectively.
* Recommended WF
  + Confirm above two proposals

Agreement: Using same approach as Tx spurious emission for scaling factor.

Huawei: we have separate NTxu and NRxu. We should follow current BS approach.

Nokia: Agree with Huawei. We will have 4 terms TxU, RXU and DU/MT.

Huawei: Not sure whether separate definitions combined with DU/MT.

ZTE: Agree with Huawei. As well as DUT provide enough information is fine for us.

Nokia: we can clarify values in DU and MT can be separate.

## Companies views’ collection for 1st round

### Open issues

|  |  |
| --- | --- |
| **Company** | **Comments** |
| XXX | Sub topic 3-1:  Sub topic 3-2:  ….  Others: |
| Ericsson | Issue 3-1: ok with the recommended WF.  Issue 3-2: agree with two proposals. |
| Huawei | Sub topic 3-1: Option 1 is ok, also do we need to check the definition of the interferer not just the wanted signal.  Sub topic 3-2: Proposal are ok, there are updates to NR Rx emissions based on EU regulation check these are incorporated (they might be I haven’t checked yet) |
| Samsung | Fine with WF on both sub-topics |
| Nokia, Nokia Shanghai Bell | Issue 3-1: Options 1 is preferred  Issue 3-2: WF is ok |

### CRs/TPs comments collection

For companies hold no objection on the technical proposal in the TPs, please share the comments on other aspects for each TP in table below.

|  |  |
| --- | --- |
| **TP number** | **Comments collection** |
| [R4-2010956](http://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_96_e/Docs/R4-2010956.zip) | Company A |
| Company B |
| Ericsson :ok |
| Huawei: The conclusions are ok but I am not sure I agree with the reasoning. In general for Rx IMD it follows IBB, so if the IBB levels are deemed to be same as BS and there are multiple BS available to act as interferers then it follows the BS RX IMD is also used. |
| [R4-2010957](http://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_96_e/Docs/R4-2010957.zip) | Company A |
| Company B |
| Ericsson:ok |
| Huawei: IAB-MT is referenced from BS but do we need to update the interferer modulation definitions? |
| Nokia: 7.7.1 General, remove bracket [] of “[*and IAB-MT type 1-H*]” |
| [R4-2011037](http://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_96_e/Docs/R4-2011037.zip) | Huawei: I don’t like the term relaxed, there are no requirements so we are selecting tem base on what’s needed and using the BS and UE values as guides, if its higher than UE that doesn’t mean its relaxed. |
| Nokia, Nokia Shanghai Bell: re-wording the term “relaxed” |
|  |
| [R4-2011038](http://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_96_e/Docs/R4-2011038.zip) | Huawei: looks ok |
| Samsung: terminology on Nrxu and Ntxu should be aligned. And in title of Table 10.7.3.1-1 “BS” should be removed. |
|  |

## 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 3-1: FR1 IAB-MT RX IMD | *Tentative agreements:*  *Option 1 as below can be approved*   * + Option 1: Reuse NR gNB RX IMD requirement for IAB-MT with the same class:     - To reuse the Wide area BS requirements for FR1 Wide-area IAB-MT.     - To reuse the Local area BS requirements for FR1 Local-area IAB-MT     - The FRC agreed in sub-topic #1-2 for FR1 will be applied to this requirement   *Recommendations for 2nd round:*  *Based on this agreement work on TP further in 2nd round.* |
| Sub-topic 3-2: FR1 IAB-MT RX spurious emission | *Tentative agreements:*  *Based on feedback in 1st round below proposals can be approved*   * Proposal 1: The IAB-MT type 1-O and type 1-H will reuse the same scaling factor for RX spurious emission as TX spurious emission * Proposal 2: Agree with the basic limit suggested in R4-2011038 for IAB type 1-H and 1-O respectively.   *Recommendations for 2nd round:*  *Based on this agreement work on TP further in 2nd round.* |

*Suggestion on WF/LS assignment*

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

### CRs/TPs

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

|  |  |
| --- | --- |
| **CR/TP number** | **CRs/TPs Status update recommendation** |
| [R4-2010956](http://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_96_e/Docs/R4-2010956.zip) | *There is a question waiting for clarification from proponent of TP. Hence it is recommended to check this TP further during 2nd round. .* |
| [R4-2010957](http://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_96_e/Docs/R4-2010957.zip) | *To be revised* |
| [R4-2011037](http://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_96_e/Docs/R4-2011037.zip) | *To be revised* |
| R4-2011038 | *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”* |