**3GPP TSG-RAN WG4 Meeting #96-e R4-2012042**

**Electronic Meeting, 17 August – 28 August, 2020**

**Agenda item:** 7.4.3

**Source:** Moderator (ZTE Corporation)

**Title:** Email discussion summary for [96e][211] NR\_IAB\_RRM

**Document for:** Information

# Introduction

The scope of this email discussion summary covers following agenda items.

7.4.3 RRM core requirements (38.133)

7.4.3.1 RLM requirements

7.4.3.2 Other requirements maintenance

# Topic #1: RLM requirements

## Companies’ contributions summary

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| --- | --- | --- |
| **T-doc number** | **Company** | **Proposals / Observations** |
| R4-2009670 | Samsung | Observation 1: The link between MT and DU cannot easily experience radio link failure so that evaluation period can be relaxed.  Observation 2: As the IAB radio link failure is mainly caused by unexpected link blockage, IAB channel between MT and DU on FR2 is comparatively susceptible to blockage than FR1.  **Proposal 1: Since the situations for FR1 and FR2 are different, smaller scaling factor should be applied to relaxing the RLM evaluation period for FR2.**  Observation 3: Too large K2 leads to unreasonable long evaluation period (e.g. 24s) for RLM on FR2.  **Proposal 2: Compared to UE, the evaluation period for IAB RLM requirement could be relaxed by 2 times for FR2, i.e. K2 = 2.** |
| R4-2009679 | ZTE Corporation | Proposal 1: K2 = K1 = 5. |
| R4-2009990 | Qualcomm Incorporated | Observation 1: In an IAB network, if one backhaul node’s link quality becomes very poor, all UEs that are in the downstream of the backhaul node suffer.  Observation 2: Assuming sharing factor to be 1 and SSB periodicity to be 20 ms, a relaxation factor of 5 will make FR2 RLM evaluation period for IAB-MTs to be 4 second.   * This will impact the communication of downstream UEs during radio link failure.   **Proposal 1: For FR2, the relaxation factor for both SSB and CSI-RS based RLM evaluation period of IAB-MTs should be 2.** |
| R4-2011071 | Huawei, HiSilicon | Observation 1: For the temperate blockage, it is more likely to be recovered by the link recovery procedure for FR2 where the corresponding performance is guaranteed by the requirements defined for BFD and CBD.  Observation 2: For other severer cases with new constructed buildings, there is no big different for FR1 and FR2 cases which could rarely happen.  **Proposal 1: Relax the evaluation period for SSB-based and CSI-RS based RLM for FR2 by k2 = 5.** |

## Open issues summary

### Sub-topic 1-1

**Issue 1-1: Relaxation factor K2**

* Proposals
  + Option 1: K2 = 5 (ZTE, Huawei)
  + Option 2: K2 = 2 (Samsung, Qualcomm)
* Recommended WF
  + Discussion is needed to reach consensus

## Companies views’ collection for 1st round

### Open issues

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| **Company** | **Comments** |
| Qualcomm | Sub topic 1-1: We support option 2.  Assuming sharing factor to be 1 and SSB periodicity to be 20 ms, a relaxation factor of 5 will make FR2 RLM evaluation period for IAB-MTs to be 4 second.   * This will impact the communication of downstream UEs during radio link failure.   Hence, option 2 should be accepted to speed up RLM evaluation process. |
| Huawei | We support option 1.  We agree with the observation from ZTE’s paper that the long evaluation time in FR2 is mainly resulted from beam sweeping. If we define two different relaxation factors for FR1 and FR2 respectively, IAB nodes may need different implementation and requirements. Also as mentioned in our paper, we have a quite tight BFD requirements so the RLM evaluation process shall be relaxed in same degree. |
| ZTE | Support Option 1.  As reasoned in our paper, the longer evaluation in FR2 is caused by beam sweeping factor. For FR1 we have K1 = 5 and companies all agreed on that value. We think K2 should equal to K1 because it’s fair to assume that the channel condition for FR2 is as good as in FR1. for companies suggesting K2 ≠ K1 then it’s equivalent to suggest that the channel condition in FR1 is different than in FR2, which is not supported by any facts / simulations. |
| Nokia | We would support option 2, the RLM period will be too long for FR2 with option 1. |
| Samsung | Sub topic 1-1: We support option 2.  As we discussed in our paper, there are two major differences between FR1 and FR2: one is the probability that link failure occurs, and another is the FR2 beam sweeping factor N=8. This results in more frequent link failure occurrence and unreasonable long evaluation period for FR2. From this perspective, channel conditions of FR1 and FR2 are different.  Even though CBD can help recover the link, still some cases it does not work. At this moment, the RLM period has reached **10 or 20 seconds** long which induces high link outage risk in IAB backhaul. If the same thing happened to FR1, only a few second period at most before radio link failure recovery. Thus, K1 = 5 is acceptable to IAB whereas K2 =5 leads to severe performance deterioration. Considering the typical case and worst case of evaluation period, K2 =2 is an appropriate choice. |

### 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** |
| R4-2009679 | qualcomm: The CR should be evaluated after finalizing the open issue regarding relaxation factor K2. |
| Nokia: The CR should be treated after we have conclusion on the K2 value. |
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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#1-1** | *Candidate options:*  K2 = 2 (Qualcomm, Nokia, Samsung)  K2 = 5 (Huawei, ZTE)  *Recommendations for 2nd round:*  This topic has been discussed since last meeting and decision needs to be made to complete Core Part. Suggest companies to study a compromised value, eg. K2 = 3. |

*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*

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| --- | --- |
| **CR/TP number** | **CRs/TPs Status update recommendation** |
| R4-2009679 | To be revised |

## Discussion on 2nd round (if applicable)

**Issue 1-1: Relaxation factor K2**

* Proposals
  + Option 1: K2 = 5
  + Option 2: K2 = 2
  + Option 3: K2 = 3 (added by the moderator as a possible compromise)

## Companies views’ collection for 1st round

### Issue 2-1

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| **Company** | **Comments** |
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### 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** |
| (revised R4-2009679) |  |
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## 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”* |

# Topic #2: Transmit timing of IAB-MTs in CA scenarios

## Companies’ contributions summary

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| **T-doc number** | **Company** | **Proposals / Observations** |
| R4-2009680 | ZTE Corporation | Proposal 1: Do not define transmit timing requirements for wide area IAB-MTs. |
| R4-2011431 | Nokia, Nokia Shanghai Bell | **Observation 1:** CA scenarios is supported for wide area IAB-MT class.   1. Specify CA scenarios requirements for transmit timing for wide area IAB-MT class. |

## Open issues summary

### Sub-topic 2-1

**Issue 2-1: Whether define transmit timing requirements for wide area IAB-MTs in CA scenarios**

* Proposals
  + Option 1: No (ZTE)
  + Option 2: Yes (Nokia)
* Recommended WF
  + Discussion is needed to reach consensus

## Companies views’ collection for 1st round

### Open issues

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| --- | --- |
| **Company** | **Comments** |
| Ericsson | Sub topic 2-1: We support option 1. We discussed this in the last meeting and conclusion was no such requirements are needed for WA-IAB. In the RF session there is no change wrt previous agreement i.e. IAB-MT will be follow BS approach for multi-carrier operation.  Also according to the exception sheet in RP-201322, timing is not an open issue and therefore we should not add any new timing requirement. Only RLM evaluation period is an open issue:  *RAN4 RRM core requirement:*   1. *Remaining issue on RLM evaluation period for IAB-MTs:*   *FFS the relaxation factor of SSB and CSI-RS based RLM evaluation period in FR2* |
| Qualcomm | Sub-topic 2-1: We support option 2.  If wide area IAB-MTs don’t support transmit timing requirements, performance cannot be guaranteed at parent Dus in CA scenarios. |
| Huawei | Sub-topic 2-1: Support option 1.  We share similar views as Ericsson. It had been discussed in the last RAN4 meeting and we should follow the agreement for multi-carrier operation in RF session. |
| ZTE | Issue 2-1:  Support Option 1. Regarding the IAB-MT CA feature, the following agreement is not good reason for wide-area IAB-MT to support CA band combinations, as this is just high level of agreement which approach should be used for wide-area IAB-MT RF requirements if CA is supported. So we don’t agree to Option 2.   |  | | --- | | For the multi-band, multi-carrier and CA requirements, IAB-MT requirements follow BS approach for all wide area  IAB-MT class only, other IAB-MT class FFS. | |
| Nokia | We support Option 2. According to the RF session agreement “*For the multi-band, multi-carrier and CA requirements, IAB-MT requirements follow BS approach for all wide area  IAB-MT class only, other IAB-MT class FFS.*”, if we do not add this requirement and no other clarification in RRM requirements, This CA support for wide-area will be missed. |
| Samsung | Sub topic 2-1: We support option 2. We think the requirement here is reasonable to derive transmit timing in CA scenarios, or otherwise performance at parent DUs may degrade so that it cannot be guaranteed. |

### 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** |
| R4-2011431 | Ericsson: please see our comments on sub-topic 2.1. We suggest to note the TP. |
| Qualcomm: We are OK with the TP. |
| ZTE: we also think that we should first conclude on Issue 2-1. |

## 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#2-1** | *Candidate options:*  Don’t define transmit timing requirements for wide area IAB-MTs in CA scenarios (Ericsson, Huawei, ZTE)  Define transmit timing requirements for wide area IAB-MTs in CA scenarios (Qualcomm, Nokia, Samsung)  *Recommendations for 2nd round:*  This topic needs to be further discussed. Suggest to check on the RF session for updates if any. |

*Suggestion on WF/LS assignment*

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| --- | --- | --- |
|  | **WF/LS t-doc Title** | **Assigned Company,**  **WF or LS lead** |
| #1 | WF on transmit timing requirements for wide area IAB-MTs in CA scenarios | ZTE Corporation |

### CRs/TPs

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

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| **CR/TP number** | **CRs/TPs Status update recommendation** |
| R4-2011431 | To be revised |

## Discussion on 2nd round (if applicable)

**Issue 2-1: Whether define transmit timing requirements for wide area IAB-MTs in CA scenarios**

* Proposals
  + Option 1: No
  + Option 2: Yes

## Companies views’ collection for 1st round

### Issue 2-1

|  |  |
| --- | --- |
| **Company** | **Comments** |
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### 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** |
| (revised R4-2011431) |  |
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## 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”* |

# Topic #3: Maintenance for R16 Core

## Companies’ contributions summary

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| **T-doc number** | **Company** | **Proposals / Observations** |
| R4-2009991 | Qualcomm Incorporated | Observation 1: No CR has yet been proposed for the following issues:   1. To align the accuracy requirement for absolute power applied to the first preamble and the relative power applied to the additional preamble with RF’s conclusion; and 2. To revise the terminology of “downlink” and “uplink” and align with RF conclusion.   **Observation 2: RAN4 has not yet agreed to define IAB MT timer accuracy requirements.** |
| R4-2010150 | Samsung | TP for TR38.809: IAB RRM general |
| R4-2011072 | Huawei, HiSilicon | TP to TS 38.174 on RRC release with redirection for IAB-MT |

## Open issues summary

### Sub-topic 3-1

Companies are encouraged to provide feedback for each TP directly in 3.3.2.

## Companies views’ collection for 1st round

### Open issues

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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** |
| R4-2009991 | Ericsson. OK. If this TP is revised for any reason then we suggest to merge R4-2011072 into revision of R4-2009991, because R4-2011072 is mainly editorial type and it is sufficient to have one editorial TP covering all changes. |
| Nokia: The TP update should be fine as to remove all editor's note. |
| Samsung: We are OK with this TP. |
| R4-2010150 | Ericsson: It is strange to list all requirements and stating that it is not needed/NA. This may cause some confusion. Therefore in Table 11-1, it is sufficient to list only those RRM requirements which are specified for IAB. |
| Huawei: We agree with Ericsson, and we also think it is ambiguous and a bit subjective to say some feature is important or not. |
| Nokia: We agree with Ericsson and Huawei. Since we have the TS 38.174, what we should focus in TR38.809? RLM and link recovery requirements is applied to all IAB-MTs, not limited to local area IAB-MT. |
| Samsung: This big table is derived from meeting agreements and our intention is to summarize the reason why we introduce a part of RRM requirements for IAB while not the rest. The TR will serve as not only an explanation but also an important reference when IAB requirements need to be revised in future release. We think it’s better to maintain a good explanatory document as it is original purpose of TR.  To Ericsson and Huawei: If companies worry about it may cause confusion, we may add the intention in the TR, or revise some wording to be objective. If any further problem still exists, please let us know and we are glad to revise the TR accordingly. We think capturing meeting agreements is good for future standardization.  To Nokia: We assume it is agreement in plenary. All we captured in the TR are meeting agreements or consensus we reached. We think we should focus on complementary information in the TR and companies are encouraged to provide more interpretations in the TR. |
| R4-2011072 | Qualcomm: This TP provides a minor editorial change. We have the same comment as the one that Ericsson made regarding R4-2009991. If R4-2009991 needs to be revised for any reason, R4-2011072 can be incorporated there.  If R4-2009991 does not need to be revised, R4-2011072 can perhaps be noted and the proponent can mention this change in the reflector during 38.174 update related email discussion after the meeting. |
| Huawei: We are fine to merge this TP to R4-2009991. We had made the comments in last meeting, but it was not captured somehow, so we prefer to handle this issue during the meeting rather than in the email discussion. |
| ZTE: suggest to merge into Qualcomm’s TP. No editorial CR / TP should be allowed. |
| Nokia: The change is not correct as it mixed the condition. The condition is : “If the IAB-MT is not provided with SMTC configuration or measurement object for the frequency which is also configured for the RRC connection release with redirection then …..” |
| Huawei Further comments:  To ZTE: We could accept to merge the change but we don’t believe it is an editorial TP though it changes the format only. The previous agreement is not correctly captured then the conditions is completely different as commented by Nokia.  To Nokia:  We had agreements in RAN4#94-e as follows:   |  | | --- | | **Topic #3: Details of RRC mobility control requirements**  Issue 3-2: Necessity of defining RRC re-establishment requirement when the SSB transmission periodicity is larger than 160 ms.  Agreement: There is no requirement for RRC re-establishment for IAB-MTs if the SSB transmission periodicity is larger than 160 ms.  Issue 3-3: Necessity of defining RRC release with re-direction requirement when the periodicity of SSB is greater than 160 ms  Agreement: There is no requirement for RRC release with re-direction when the periodicity of SSB is greater than 160 ms. |   It is regardless of whether the SMTC is configured or not.  Also it was correctly captured in the approved TP R4-2008598 in RAN4#95\_e but is was not captured in the spec and this is why we propose the TP to fix it. |

## 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:* |

*Suggestion 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 provided recommendation on CRs/TPs Status update suggestion*

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| --- | --- |
| **CR/TP number** | **CRs/TPs Status update recommendation** |
| R4-2009991 | To be revised. |
| R4-2010150 | To be revised. |
| R4-2011072 | To be merged into R4-2009991. |

## Discussion on 2nd round (if applicable)

### 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** |
| (revised R4-2009991) |  |
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| (revised R4-2010150) |  |
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| (revised R4-2011072) |  |
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## 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”* |