**3GPP TSG-RAN WG4 Meeting #94-e R4-200xxxx**

**Electronic Meeting, Feb.24th – Mar.6th 2020**

**Agenda item:** 8.5.5, 8.5.5.1, 8.5.5.2, 8.5.5.3, 8.5.5.4, 8.5.5.5

**Source:** Qualcomm Incorporated

**Title:** Way forward for RAN4#94e\_#53\_NR\_IAB\_RRM

**Document for:** Information

# Introduction

3GPP has almost finalized selecting the list of NR IAB RRM features for which RAN4 requirements will be defined. Now, RAN4 needs to define the detailed RRM requirements for these features. This contribution provides the recommended way forwards.

# Agreements from the first round

**Issue 1: Introduction of HO related core requirements for IAB-MTs**

* Agreements*:* RAN4 does not introduce HO related requirements for IAB-MTs in Rel-16.

**Issue 2: Introduction of MT timer related core requirements for IAB-MTs**

* Conclusion:There is no consensus during this meeting to define timer accuracy requirements for IAB-MTs

**Issue 3: Definition of macro and micro IAB nodes, as mentioned in R4-2000051**

* Conclusion: RAN4 RF session will define the types of IAB-MTs.

**Issue 4: Necessity of defining RRC re-establishment delay requirement when the periodicity of SMTC window is larger than 160 ms and the serving cell is in low SNR.**

* Agreement: IAB MT is not required to successfully identify a cell when the SMTC window is larger than 160ms and the serving cell is in low SNR

**Issue 5: 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 6: 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.

**Issue 7: TA adjustment accuracy requirement**

* Agreement: The MT timing related requirements in terms of TA adjustment accuracy (Te) reuse the current requirements defined in TS 38.133.

**Issue 8: Transmit timing requirement**

* Agreement: The MT timing related requirements in terms of transmit timing (Tp and Tq) reuse the current requirements defined in TS 38.133.

**Issue 9: Applicability of UL transmission in the presence of SSB**

* Agreement: IAB MT shall only transmit in uplink if it can meet Te requirement.

**Issue 10: RLM requirements for DRX mode**

* Agreement: RLM requirements for IAB-MTs are defined for no-DRX mode only.

**Issue 11: Relaxed RLM requirement.**

* Proposals: Apply relaxed RLM requirement of NR UE to the requirement of IAB-MT during no-DRX case.
	+ Increase the number of samples and the lower boundary of the SSB and CSI-RS based RLM evaluation period.
* Conclusion:
	+ No consensus on extending RLM measurement period.
	+ One company wants to wait till RF session finalizes the definition of IAB-MT classes.
	+ This issue can be decided in the next meeting after RF session finalizes different IAB-MT classes.

**Issue 12: Sharing factor P in RLM requirements**

* Conclusion:
	+ No consensus on keeping or removing the sharing factor for IAB RLM evaluation period.
	+ Discuss this issue further in future meetings.

**Issue 13: Density of CSI-RS to define CSI-RS based RLM requirements.**

* Conclusion:
	+ No consensus regarding the density of CSI-RS for RLM.
	+ Discuss this issue further in future meetings

**Issues 14: Reuse of Rel-15 requirements.**

* Conclusion:
	+ This topic can only be finalized after finalizing issue 11 and 12.

**Issue 15: BFD/CBD requirements for IAB-MTs are defined for no-DRX mode only**

* Agreement:
	+ BFD/CBD requirements for IAB-MTs are defined for no-DRX mode only.

**Issue 16: Beam sweeping factor**

* Conclusion:
	+ No consensus on the value of beam sweeping factor (N) for the CBD evaluation period of IAB-MTs.
	+ Candidate options:
		- Value of N is down selected from the following:
			* N = 2
			* N = 4
			* N = 8
	+ Moderator’s note:
		- This issue needs to be discussed further in the future meetings.
		- Note that the value of N is 8 for UE power class 1 (fixed UEs) which may share similar beam sweeping characteristics as IAB-MTs.

**Issue 17: Sharing factor P for BFD/CBD requirements**

* Conclusion:
	+ No consensus on keeping or removing the sharing factor for IAB BFD/CBD evaluation period.
	+ Discuss this issue further in future meetings.

**Issue 18: Reuse of Rel-15 requirements.**

* Conclusion: This topic can only be finalized after finalizing issue 16 and 17.

# Agreements from the second round

**Issue 18: Modification of RLM OOS and IS BLER rates.**

* **Agreement:** Rel-15 RLM OOS and IS BLER levels are reused for IAB-MTs.

**Issue 19: Modification of BFD OOS and IS BLER rates.**

* **Agreement:** Rel-15 BFD OOS and IS BLER levels are reused for IAB-MTs.

**Issue 20: Applicability of signaling characteristics related requirements**

* **Agreement:** The TP of R4-2001852 is approved by adding an editor’s note:

--------------------------------------------------Start of TP------------------------------------------------------

* 4.7 Applicability of RRM requirements in this specification
* 4.7.1 Applicability of signalling characteristics related RRM requirements
* The RRM requirements on the signalling characteristics for IAB MTs specified in section 12.3 shall apply only for the local area IAB class defined in section 4.4.
* [Editor’s Note: The exact wording, especially the term ‘local area IAB class’, can be revised after RAN4 concludes the relevant discussion]

--------------------------------------------------End of TP---------------------------------------------

**Issue 21: Applicability of signaling characteristics related requirements**

* **Agreement:** The TP of R4-2001858 is approved.
* --------------------------------------------------Start of TP------------------------------------------------------
* **12.2.4 Cell phase synchronization accuracy**
* 12.2.4.1 Introduction
* Cell phase synchronization accuracy is defined as the maximum absolute deviation in frame start timing between any pair of cells on the same frequency that have overlapping coverage areas.
* 12.2.4.2 Requirements
* The cell phase synchronization accuracy measured at IAB DU antenna connectors shall be better than 3 µs.
* --------------------------------------------------End of TP---------------------------------------------

**Issue 22: How to capture RAN1 agreement which mentions that IAB-MT can be configured up to four SMTC windows per frequency layer?**

* Tentative conclusion:
	+ Discuss this issue further in the next meeting
	+ Moderator’s note: Interested companies are encouraged to follow the relevant discussion that’s shown in 2nd round summary (R4-2002307)

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| **CR/TP/LS/WF number** | **T-doc Status update recommendation**  |
| **Issue 23:**R4-2002128 | The TP can be discussed again during the next meeting. The author is requested to consider other companies’ feedbacks that have been listed in the 2nd round summary (R4-2002307) |
| **Issue 24:** R4-2001853 | The TP can be discussed again during the next meeting. The author is requested to consider other companies’ feedbacks that have been listed in the 2nd round summary (R4-2002307) |
| **Issue 25:**R4-2001854 | The TP can be discussed again during the next meeting. The author is requested to consider other companies’ feedbacks that have been listed in the 2nd round summary (R4-2002307) |
| **Issue 26:**R4-2001855 | The TP can be discussed again during the next meeting. The author is requested to consider other companies’ feedbacks that have been listed in the 2nd round summary (R4-2002307) |
| **Issue 27:**R4-2001856 | The TP can be discussed again during the next meeting. The author is requested to consider other companies’ feedbacks that have been listed in the 2nd round summary (R4-2002307) |
| **Issue 28:**R4-2001857 | The TP can be discussed again during the next meeting. The author is requested to consider other companies’ feedbacks that have been listed in the 2nd round summary (R4-2002307) |
| **Issue 29:**R4-2001955 | The TP can be discussed again during the next meeting. The author is requested to consider other companies’ feedbacks that have been listed in the 2nd round summary (R4-2002307) |
| **Issue 30:**R4-2002125 | The TP cannot be agreed during this meeting. Since R4-2001858 is approved, this TP doesn’t need to re-submitted to the next meeting. |

**Issue 31: How to split TP/CR workload among different companies?**

**Conclusion:**

**Grouping of IAB RRM topics to prepare TPs/CRs for the next meetings (company input requested regarding #3 and #4):**

1. RRC re-establishment delay and RRC release with re-direction (Ericsson)

2. Random access and MT timing (Huawei)

3. RLM requirements (Qualcomm/?)

4. BFD requirements (Qualcomm/?)

5. CBD requirements (Samsung)