**3GPP TSG-RAN WG4 Meeting # 107 R4-23XXXXX**

**Incheon, KR, May 22nd – May 26th , 2023**

**Agenda item:** 8.34.4

**Source:** Moderator (Qualcomm)

**Title:** Topic summary for [107][233] NR\_mobile\_IAB

**Document for:** Information

# Introduction

*This email discussion contains the summary of the proposals on the RRM requirements to be defined for mobile IAB. The discussion is a continuation from RAN4#106-bis-e based on the WF agreed in RP-2306368.*

# Topic #1: Title

*Definition of RRM requirements for mobile IAB is discussed in this section.*

## Companies’ contributions summary

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| **T-doc number** | **Company** | **Proposals / Observations** |
| [**R4-2308039**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_107/Docs/R4-2308039.zip) | Nokia, Nokia Shanghai Bell | **Proposal 1. Requirements for transitions to be excluded from the mobile IAB RLM requirements.****Proposal 2. Only non-DRX requirements for link recover procedures apply for mobile IAB.****Proposal 3. Requirement for beam failure recovery in SCell to be excluded from the mobile IAB requirements.****Proposal 4. RAN4 does not need to introduce HST requirements for mobile IAB.****Proposal 5. No RAN4 requirements for connection release with re-direction are needed.** **Proposal 6. Limited set of UE RRM requirements relevant for IAB-MT can be the baseline where basic requirements for the mobility need to be supported, others are FFS.** |
| [**R4-2308325**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_107/Docs/R4-2308325.zip) | Huawei, HiSilicon | **Observation 1: There is no explicit description about HST scenario or speed assumption in the WID for mIAB.****Observation 2: The discussion about HSDN in RAN2 is about reusing HSDN framework to let UE prioritize the mIAB cell when UE determines itself onboard a mIAB Cell, which is for UE instead of mIAB. And it is irrelevant to HST scenario.****Proposal 1: Do not define HST specific requirements for mobile IAB MT.****Proposal 2: Requirements for RRC Connection Release with Redirection in TS 38.174 clause 12.1.1.3 can be reused for mobile IAB.****Proposal 3: Do not define CA related requirements for Rel-18 mobile IAB, which could be further studied in future release.****Proposal 4: The requirements already defined in TS 38.174 in Rel-16/17 can be reused directly.****Observation 3: Some requirements introduced Rel-16/17 features are not needed for mobile IAB.****Proposal 5: For requirements absent in TS 38.174, take Rel-15 requirements in TS38.133 as baseline.**

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| --- | --- | --- |
| **Requirement** | **Baseline** | **Whether can be reused directly or modification is needed?** |
| Intra-frequency handover | TS 38.133 6.1.1.2 and 6.1.1.4 | Only intra-frequency HO |
| RRC Re-establishment | TS 38.174 12.1.1.1 | Reused |
| RACH | TS 38.174 12.1.1.2 | Reused |
| Connection with redirection | TS 38.174 12.1.1.3 | Reused |
| Transmit timing | TS 38.174 12.2.1 | Reused |
| Timing advance | TS 38.174 12.2.3 | Reused |
| RLM | TS 38.174 12.3.1 | Reused |
| Link recovery | TS 38.174 12.3.2 | Reused |
| TCI switching | TS 38.133 8.10 | Reused |
| Intra-frequency measurement | TS 38.133 9.2 | Without measurement gapWithout DRX Without deactivated SCell requirements CSSF needs updating |
| L1-RSRP | TS 38.133 9.5 | Without measurement gapWithout DRX  |

**Proposal 6: Define RRM requirements for Rel-18 mobile IAB-MT based on above Table I, and other requirements are precluded in Rel-18.** |
| [**R4-2309644**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_107/Docs/R4-2309644.zip) | Ericsson | **General aspects of RRM requirements:*** **Observation #1**: Several scenarios/features for which RRM requirements are defined in TS 38.133 are not applicable for the mIAB.
* **Proposal #1**: A list of RRM requirements explicitly identified for mIAB-MT are defined for the mIAB-MT.

**RRC Connection Mobility Control:*** **Observation #2**: The RRC connection release with redirection to target NR carrier is analoguous to an inter-frequency handover.
* **Observation #3**: It has been agreed to define only intra-frequency handover requirements since intra-frequency mobility is the most important and basic scenario for the mIAB.
* **Proposal #2**: Do not define RRC connection release with redirection requirements for mIAB-MT.

**RLM:*** **Observation #4**: It was agreed that in general RRM requirements for the mIAB-MT will be defined in non-DRX and without considering any measurement relaxations for power savings.
* **Observation #5**: The measurement gaps will not be used by the mIAB-MT for the RRM measurements.
* **Proposal #3**: The RLM requirements except the following in clause 8.1 of TS 38.133 are defined for the mIAB-MT:
	+ Proposal 3A:
		- When *highSpeedMeasFlagFR2-r17* is configured
	+ Proposal 3B:
		- Aspects related to measurement gaps
	+ Proposal 3C:
		- Requirements for RLM on PSCell
	+ Proposal 3D:
		- Requirements for RLM when the PSCell is deactivated
	+ Proposal 3E:
		- UE transitions between DRX and no DRX or when DRX cycle periodicity changes

**Link recovery procedure (LRP):*** **Proposal #4**: The LRP requirements except the following in clause 8.5 of TS 38.133 are defined for the mIAB-MT:
	+ Proposal 4A:
		- When *highSpeedMeasFlagFR2-r17* is configured
	+ Proposal 4B:
		- Aspects related to measurement gaps
	+ Proposal 4C:
		- Requirements for LRP on PSCell and SCell
	+ Proposal 4D:
		- Requirements for LRP when the PSCell is deactivated
	+ Proposal 4E:
		- UE transitions between DRX and no DRX or when DRX cycle periodicity changes

**CA related requirements:*** **Observation #6**: Only intra-frequency handover/mobility requirements will be defined and does not impact any other serving cell as it involves changing of the PCell of the IAB-MT.
* **Proposal #5**: No CA related requirement to support mobility of the mIAB-MT is required.

**HST scenario:*** **Observation #7**: The mIAB WID does not explicitly state that the HST scenario is within the scope of the WI.
* **Observation #8**: According to the WID the main scenario comprises of the mIAB nodes mounted on vehicles.
* **Observation #9**: mIAB applicability under HST scenario will require upscoping of the WID and therefore plenary level agreements.
* **Observation #10**: Deployment scenario for the IAB in HST scenario may not be the same as used for the UEs and would require considerable discussion mIAB to the HST.
* **Proposal #6**: HST scenario is NOT within the scope of mIAB WI.
* **Proposal #7**: Do not specify requirements for mIAB under HST scenario.
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| [**R4-2308788**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_107/Docs/R4-2308788.zip) | Qualcomm Incorporated | **Proposal 1:** **Reuse the UE intra-frequency HO requirements from TS 38.133 clauses 6.1.1.2 and 6.1.1.4.****Proposal 2: Re-use the UE RRC re-establishment requirements in TS 38.133 clause 6.2.1 for the mobile IAB.** **Proposal 3: Also introduce inter-frequency re-establishment requirement (re-use existing UE requirements) as fallback case for inter-frequency mobility.****Proposal 4: The** **UE requirements for the active TCI state switching delay from TS 38.133 Clause 8.10 should be reused.****Proposal 5:** **UE RLM requirements from TS 38.133 Clause 8.1 shall be adapted and reused as follows:*** **Discard requirements related to DRX: requirements depending on DRX cycle length, requirement at transitions**
* **Discard requirements related to measurement gaps and collisions between RLM-RS and measurement gaps**
* **Discard scheduling availability requirements related to FR1-FR2 inter-band CA and NR-DC (clause 8.1.7.4)**

**Proposal 6: UE link recovery procedures requirements from TS 38.133 Clause 8.5 shall be reused and adapted as follows:*** **Discard requirements related to DRX**
* **Discard requirements related to measurement gaps**

**Discard requirements related to deactivated PSCells/SCells, inter-band CA, FR2-2, etc****Proposal 7: U****E L1-RSR measurement requirements shall be based on the UE requirements defined in TS 38.133 Clause 9.5 and adapted as follows:*** **Keep the beam sweeping factors**
* **Discard requirements related to DRX**
* **Discard requirements related to measurement gaps(gap sharing) and interf-frequency/inter-RAT measurements**

**Proposal 8:** **UE intra-frequency measurement requirements defined in TS 38.133 Clause 9.2 should be reused the L3 measurement requirements with the following amendments:*** **Discard the DRX requirements**
* **Discard the requirements for SFTD and measurements with gaps.**

For all the requirements in which the requirements with gaps are discarded, a simple sentence stating that delays will longer if measurement gaps are configured can be included in the specs for consistency.**Proposal 9: UE requirements for 4 step rand access procedure defined in TS 38.133 Clause 6.2.2.2 should be reused for the mobile IAB.****Proposal 10: Do not introduce requirements for the RRC release with redirection.****Proposal 11: I****ntroduce requirements for the direct SCell activation at SCell addition and direct SCell activation at handover based on the UE requirements defined in TS 38.133 Clause 8.3.4 and 8.3.5.****Proposal 12: Introduce HST requirements as optional such that this use case is also enabled.**If this proposal cannot be agreed, optional support for HST should be kept FFS pending plenary discussion on this use case. This can be discussed in RAN#100 and it would not have any impact on the WI schedule. |

## Open issues summary

The open issues are mainly about how to define requirements that were agreed to be introduced in the previous meetings.

### Sub-topic 1-0

**Issue 0-1: General**

* Proposals

Option 1:

* The requirements already defined in TS 38.174 in Rel-16/17 can be reused directly.
* For requirements absent in TS 38.174, take Rel-15 requirements in TS38.133 as baseline.
* Define RRM requirements for Rel-18 mobile IAB-MT based on above Table I, and other requirements are precluded in Rel-18.

|  |  |  |
| --- | --- | --- |
| **Requirement** | **Baseline** | **Whether can be reused directly or modification is needed?** |
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| Transmit timing | TS 38.174 12.2.1 | Reused |
| Timing advance | TS 38.174 12.2.3 | Reused |
| RLM | TS 38.174 12.3.1 | Reused |
| Link recovery | TS 38.174 12.3.2 | Reused |
| TCI switching | TS 38.133 8.10 | Reused |
| Intra-frequency measurement | TS 38.133 9.2 | Without measurement gapWithout DRX Without deactivated SCell requirements CSSF needs updating |
| L1-RSRP | TS 38.133 9.5 | Without measurement gapWithout DRX  |

* Recommended WF
	+ To be discussed

### Sub-topic 1-1

*HO requirements*

It was already agreed that only intra-frequency HO will be defined

**Issue 1-1: Intra-frequency HO requirements**

* Proposals
	+ Option 1: Reuse the UE intra-frequency HO requirements from TS 38.133 clauses 6.1.1.2 and 6.1.1.4.
	+ Option 2: others
* Recommended WF
	+ Option 1

### Sub-topic 1-2

*RRC Re-establishment requirements*

**Issue 1-2: RRC Re-establishment**

* Proposals
	+ Option 1: Re-use the UE RRC re-establishment requirements in TS 38.133 clause 6.2.1 for the mobile IAB
	+ Option 2: others
* Recommended WF
	+ Option 1

### Sub-topic 1-3

*Inter-frequency RRC re-establishment*

RRC release with re-direction is very similar to a inter-frequency HO to a unknown cell

**Issue 1-3: Inter-frequency RRC re-establishment**

* Proposals
	+ Option 1: Introduce inter-frequency RRC re-establishment requirements, do not introduce RRC release with re-direction requirements
	+ Option 2: Introduce RRC release with re-direction requirements
	+ Option 3: Do not introduce either requirement
* Recommended WF
	+ To be discussed

### Sub-topic 1-4

*Active TCI state switching*

**Issue 1-4: Active TCI state switching**

* Proposals
	+ Option 1: reuse UE requirements for the active TCI state switching delay from TS 38.133 Clause 8.10
	+ Option 2: others
* Recommended WF
	+ Option 1

### Sub-topic 1-5

*RLM Requirements*

**Issue 1-5: RLM Requirements**

* Proposals
	+ Option 1: UE RLM requirements from TS 38.133 Clause 8.1 shall be adapted and reused as follows:
		- Discard requirements related to DRX: requirements depending on DRX cycle length, requirement at transitions
		- Discard requirements related to measurement gaps and collisions between RLM-RS and measurement gaps
		- Discard scheduling availability requirements related to FR1-FR2 inter-band CA and NR-DC (clause 8.1.7.4)
		- Discard Requirements when *highSpeedMeasFlagFR2-r17* is configured
	+ Option 2: TBA
* Recommended WF
	+ Option 1

### Sub-topic 1-6

*Link recovery procedure*

**Issue 1-6: Link recovery procedure**

* Proposals
	+ Option 1: UE link recovery procedures requirements from TS 38.133 Clause 8.5 shall be reused and adapted as follows:
		- Discard requirements related to DRX
		- Discard requirements related to measurement gaps
		- Discard requirements related to deactivated PSCells/SCells, inter-band CA, FR2-2, etc
		- Discard requirements when *highSpeedMeasFlagFR2-r17* is configured
	+ Option 2: TBA
* Recommended WF
	+ Option 1

### Sub-topic 1-7

*L1-RSRP Measurements*

**Issue 1-7: L1-RSRP measurement requirements**

* Proposals
	+ Option 1: UE L1-RSR measurement requirements shall be based on the UE requirements defined in TS 38.133 Clause 9.5 and adapted as follows:
		- Keep the beam sweeping factors for FR2
		- Discard requirements related to DRX
		- Discard requirements related to measurement gaps(gap sharing) and interf-frequency/inter-RAT measurements
	+ Option 2: TBA
* Recommended WF
	+ Option 1

### Sub-topic 1-8

*Intra-frequency measurements*

**Issue 1-8: Intra-frequency measurement requirements**

* Proposals
	+ Option 1: UE intra-frequency measurement requirements defined in TS 38.133 Clause 9.2 should be reused the L3 measurement requirements with the following amendments:
		- Keep the beam sweeping factors
		- Discard the DRX requirements
		- Discard the requirements for SFTD and measurements with gaps.
	+ Option 2: TBA
* Recommended WF
	+ Option 1

### Sub-topic 1-9

*Handling of measurement gaps*

**Issue 1-9: Handling of measurement gaps**

* Proposals
	+ Option 1: Include a sentence stating that delays will longer if measurement gaps are configured for the requirements where measurement gaps were discarded because measurement gaps can be configured in practice
	+ Option 2: Do not mention anything about measurement gaps
* Recommended WF
	+ To be discussed

### Sub-topic 1-10

*HST requirements*

**Issue 1-10: Handling of HST**

* Proposals
	+ Option 1: Do not introduce any HST requirements
	+ Option 2: Introduce HST requirements as optional
	+ Option 3: clarify the handling of HST in RAN#100
* Recommended WF
	+ Option 3

### Sub-topic 1-11

*CA Related Requirements*

**Issue 1-11: CA Related Requirements**

* Proposals
	+ Option 1: Introduce requirements for the direct SCell activation at SCell addition and direct SCell activation at handover based on the UE requirements defined in TS 38.133 Clause 8.3.4 and 8.3.5.
	+ Option 2: Do not introduce any CA requirements
* Recommended WF
	+ To be discussed

### Sub-topic 1-12

*Timing related requirements*

**Issue 1-12: Timing related**

* Proposals
	+ Option 1: Reuse the transmit timing and timing advance requirements from 38.174 (no need to do anything)
	+ Option 2: TBA
* Recommended WF
	+ Option 1

### Sub-topic 1-13

*RACH requirements*

**Issue 1-13: Random access requirements**

* Proposals
	+ Option 1: Re-use requirements from TS 38.174 (no need to do anything)
	+ Option 2: TBA
* Recommended WF
	+ Option 1