**3GPP T****SG-RAN WG3 Meeting #129-bis R3-257239**

**Prague, Czech Republic, 13 – 17 October 2025**

**Agenda Item: 12.2.2**

**Source: Qualcomm (moderator)**

**Title: Summary of Offline Discussion for CB: # 22\_AIMLintraCULTM**

**Document for: Discussion**

1 Introduction

**CB: # 22\_AIMLintraCULTM**

**- TP to capture the agreement in appropriate way**

**- discuss the above open issues**

(QC - Moderator)

Summary of the offline discussion in [R3-257239](file:///D%3A%5C3GPP%20Standardization%5CRAN3%5CRAN3%23129bis%5Cagenda%5CInbox%5CR3-257239.zip)

2 For the Chair Notes

**xxxxx To be agreed**

3 Discussion

3.1 L1 and L3 Measurements based LTM

In the online discussion there was a confusion on what it means by considering both L1 and L3 Measurements based Intra-CU LTM for AI/ML based optimization.

Considering L1 and L3 Measurements based Intra-CU LTM for AI/ML based optimization means -

* Considering L1 and L3 measurements as input for AI/ML use cases
* Considering L1 and L3 measurements as feedback

**Are companies ok with the above explanation and agree to consider both L1 and L3 measurements for AI/ML based Intra-CU LTM?**

3.2 Beam Prediction

Some companies in their paper have mentioned interest to study beam prediction for LTM -

**R3-256537** - Proposal 5: Introduce a finer granularity based on beam-level for UE trajectory prediction

**R3-256549** - Proposal 2 Finer granularity UE trajectory prediction and predicted L3 measurement results can be used as a kind of assistance information for candidate cell selection. Proposal 3 The gNB-CU can internally use the predicted information (e.g., cell/beam-level UE trajectory prediction or predicted L3 measurements) to assist with candidate cell selection.

**R3-256862** – Proposal 1: Based on R18 AI/ML-based Mobility Optimization, following objective for LTM may be achieved by AI/ML model:

- Efficient early TA acquisition;

- Beam level UE Location prediction;

- Optimization on candidate cells selection;

- Optimization on execution conditions;

**R3-256610** – Proposal 5: Along with Candidate cell and Target cell prediction, beam prediction should also be considered for the LTM Handover Preparation and LTM handover execution to reduce LTM HO failures due to incorrect beam. Proposal 6: UE Trajectory Prediction carried in the LTM Handover Request should include beam prediction to assist subsequent LTM handovers.

It was also captured in online meeting to discuss beam prediction as - **beam prediction should also be considered?**

**Are companies ok to study beam prediction along with Cell prediction for LTM handover preparation and execution?**

**Are companies ok to study addition of beam prediction in UE Trajectory prediction?**

3.3 TA Prediction

Many companies have shown interest in studying TA prediction for Intra-CU LTM.

1. **R3-256537** - Proposal 3: RAN3 to investigate AI/ML mechanisms to aid triggering of early synchronization (DL and UL) for both L3 based LTM and L1 based LTM.
2. **R3-256549** - Proposal 5 TA value calculation can be performed more accurate with AI/ML techniques. RAN3 is kindly to discuss the solutions above implement TA value prediction.
3. **R3-256695** - Proposal 3: The predicted TA value of candidate cell(s) and the corresponding validity time can be taken as the output of the AI/ML model training/inference.
4. **R3-256862** - Proposal 3: In intra-DU LTE, it is also suggested to use the historical TA value measured by UE for all the candidate cells as input to predicate the TA value in AI/ML model.
5. **R3-256913** - Proposal 2: RAN3 to discuss AI/ML for Early TA prediction, e.g., gNB-CU predicts the TA value for the candidate cell.
6. **R3-257077** - Proposal 1: To mitigate the F1 signalling burden issue caused by early synchronization, RAN3 should consider predicting the TA value for candidate gNB-DUs or cells using AI/ML functionality within the NG-RAN node.

**Are companies ok to study prediction of TA value for AI/ML based IntraCU LTM?**

**Are companies ok to study prediction of TA value validity for AI/ML based IntraCU LTM?**

3.4 Inference in DU

Many companies have proposed Inference in the DU for AI/ML based IntraCU LTM. This can be based on the AI/ML use cases studied for IntraCU LTM.

**Do companies agree to study Inference in DU based on AI/ML use cases for IntraCU LTM?**

Annex Draft TP

4 Use cases and Solutions

4.1 AI/ML based Network Slicing

4.1.1 Use case description

L1/L2 Triggered Mobility is defined in TS 38.300 [x].

LTM is a procedure in which a gNB receives L1 or L3 measurement report(s) from a UE, and on their basis the gNB may change UE serving cell by a cell switch command signalled via a MAC CE. The cell switch command indicates an LTM candidate configuration that the gNB previously prepared and provided to the UE through RRC signalling. Then the UE switches to the target configuration according to the cell switch command. The LTM procedure can be used to reduce the mobility latency.

IntraCU LTM is specified in TS38.401[x].

AI/ML can be used to optimise IntraCU LTM procedures to enhance Network and UE performance, optimize resource allocation and reduce mobility failures.

4.1.2 General Principles

Normal intra-CU LTM scenarios are considered as priority for study.

4.1.3 Solutions and standard impacts

4.1.3.1 Locations for AI/ML Model Training and AI/ML Model Inference

For CU-DU split architecture, the following solutions are possible:

- AI/ML Model Training is located in the OAM and AI/ML Model Inference is located in the gNB-CU.

- AI/ML Model Training and Model Inference are both located in the gNB-CU.

FFS whether the model inference can be located at gNB-DU to support AI/ML-based intra-CU LTM

4.1.3.2 Input data of AI/ML-assisted Intra-CU LTM

For AI/ML optimization of IntraCU LTM the following information can be considered as input data:

* Measured/Predicted Radio Resource Status
* Measured/Predicted cell-level UE trajectory
* UE History Information
* Measured/Predicted L3 measurement report
* Measured L1 measurement report

4.1.2.3 Input data of AI/ML-assisted intra-CU LTM

For AI/ML optimization of IntraCU LTM the following information can be considered as output data:

* Candidate cell set for LTM HO Preparation

4.1.2.4 Feedback of AI/ML-assisted intra-CU LTM

For optimized LTM operation, the following information can be considered as feedback for AI/ML-assisted intra-CU LTM:

* Legacy UE Performance
* Measured UE Trajectory
* Measured Resource Status
* SON reports for RLF, SHR, RA

4.1.2.5 Potential standard impacts

Following standard impacts are listed for subsequent Rel-20 normative work:

* F1 interface: