3GPP TSG-RAN WG2 Meeting #131 R2-25xxxxx

Bangalore, India Aug 25th – 29th , 2025

Agenda Item: 8.3.1

Source: OPPO

Title: Draft summary of [AT131][033][AI Mob] Conclusions for TR (OPPO)

Document for: Discussion, Decision

# Annex: Proposed text proposal

*START OF CHANGES*

# 7 Conclusion

The study focuses on evaluation of benefit of AI mobility use cases, namely RRM measurement prediction and measurement event prediction. Another use case i.e. RLF prediction is studied without evaluation. The potential specification impact is also studied to enable RRM measurement prediction, measurement event prediction and relevant mobility procedure in RRC\_CONNECTED state within NR system.

During the study, FR1 intra-frequency temporal domain case B and FR1 inter-frequency prediction are chosen as representative scenarios to verify study goal1, i.e. measurement reduction. For FR1 intra-frequency temporal domain case B ,the simulation results captured in section 5.5.2.2 show that there is no considerable handover performance degradation compared with existing L3 handover procedure when measurement is reduced e.g. 50% in temporal domain. For inter-frequency prediction, in addition to reducing UE’s measurement efforts, the UE throughput can also be increased if measurement gap configuration can be avoided or relaxed.

FR2 intra-frequency temporal domain case A is chosen as a representative scenario to verify study goal2, i.e. to improve handover performance (the reduction of handover failure (HOF) rate, etc). The simulation results captured in section 5.5.2.1 indicate reduction of the HOF rate in most cases when the handover is executed based on predicted measurement event in advance. For other companies, the HOF rate is not changed significantly.

The simulation results for RRM measurement prediction captured in section 5.2.2.1 show that the AI algorithm outperforms non-AI (e.g. sample and hold) in terms of prediction accuracy, i.e. average difference between actual and predicted L3 cell level RSRP values for both intra-frequency temporal cases A and B and for inter-frequency prediction, especially for long prediction windows.

Furthermore, simulation results for generalization captured in 5.2.2.2 show that the AI models can generalize well across UE speeds and different cell configurations, especially when the training is performed using mixed data sets or inter-frequency prediction direction is indicated.

Limited simulation results are submitted for intra-cell spatial domain prediction and L3 beam level prediction without any evaluation conclusion.

Both cluster approach (where measurement results from more than one cells are used as input to the model) and single cell approach (where measurement results from single cell are used as input to the model) were used by different companies. Both approaches are valid implementations.

Specification impact for both UE sided model and network sided model are studied. The study focused on potential enhancements of LCM procedures including data collection for model training. The outcome of the study is captured in section 6.1 and 6.2. For UE sided model the specification impact is mainly due to the introduction of RRM measurement prediction, with limited additional specification impact for measurement event prediction. The main specification impact for network sided model is for data collection.

For RRM measurement prediction, L3 beam-level prediction is feasible, however there are concerns on UE complexity and RAN4 workload for UE sided model. For network sided model, all scenarios and all RRM sub-cases are feasible based on existing specification. For intra-frequency temporal domain case A sub-case 2 enhancement is needed. For other cases there is no specification impact. However, it can be discussed in WI phase whether enhancement (i.e. multi-instances reporting of beam) is needed and justified.

Based on what is summarized above, the following scenarios and/or sub-cases are recommended for normative work:

* For UE sided model, intra-frequency temporal domain case A, intra-frequency temporal domain case B and inter-frequency domain prediction for co-located case,
* For network sided model, at least RRM sub-case 2 of intra-frequency temporal domain case A for inference input report and all scenarios and sub-cases for data collection.

*END OF CHANGE*