**3GPP TSG RAN WG2 Meeting #131 R2-2505xxx
Bengaluru, Indian, August 25 – 29, 2025**

**Agenda item: 8.1.2.2**

**Source: Apple**

**Title: Summary report of [AT131][003][AI PHY] Functionality activation (Apple)**

**WID/SID: NR\_AIML\_Air-Core– Release 19**

**Document for: Discussion and Decision**

# 1 Introduction

This is to trigger the following offline discussion:

* [AT131][003][AI PHY] Functionality activation (Apple)

 Intended outcome: Agreable proposal for functionality activation open issues (interpretation, RRC-15, 17, and 45, whether for offline whether configuration is provided to L1 before model applicability, response to RAN4]]

 Deadline: Thursday

# 2 Discussion

## 2.1 Agreements made in Tuesday

* RRC processing delay shouldn’t be impacted by the model loading delay
* If the UE is ready for inference by end of RRC processing delay, it reports model applicable. If not, it reports model inapplicable and doesn’t set the release flag. The network is not expected to release inference configuration (this will not be added to stage 3 specifcation).
* Once the model is applicable, UE reports applicability to network via UAI (applicable to all CSI reporting).
* Respond to RAN4

## 2.2 RAN4 LS and RRC-15

**RAN4 LS**

[R2-2505045](file:///C%3A%5CUsers%5Cwattsdy%5COneDrive%20-%20InterDigital%20Communications%2C%20Inc%5C3GPP%5CRAN2%5C131%20Bangalore%5CReview%5Ctdocs_131%5CR2-2505045.zip) LS on AI/ML functionality activation (R4-2508085; contact: CMCC) RAN4 LS in Rel-19 NR\_AIML\_air-Core To:RAN2 Cc:RAN1

*Interpretation 1 vs. 2*

[R2-2505510](file:///C%3A%5CUsers%5Cwattsdy%5COneDrive%20-%20InterDigital%20Communications%2C%20Inc%5C3GPP%5CRAN2%5C131%20Bangalore%5CReview%5Ctdocs_131%5CR2-2505510.zip) Discussion and draft reply LS on functionality activation CMCC,OPPO discussion Rel-19 NR\_AIML\_air-Core

Proposal 1: RAN2 confirm that Interpretation 1 is common understanding for AI/ML functionality activation for option A, and update the wording as follows:.

 Interpretation 1: the applicable functionalities are already considered activated (i.e., the applicable functionalities activation is completed) before upon reporting applicable functionalities via RRCReconfigurationComplete in step 4

[R2-2505192](file:///C%3A%5CUsers%5Cwattsdy%5COneDrive%20-%20InterDigital%20Communications%2C%20Inc%5C3GPP%5CRAN2%5C131%20Bangalore%5CReview%5Ctdocs_131%5CR2-2505192.zip) Discussion on LS on functionality activation and open issues on BM vivo discussion NR\_AIML\_air-Core

Proposal 1. Reply to RAN4 that interpretation 2 is aligned with RAN2 agreements. That is, UE starts to activate the applicable functionalities (i.e., the applicable functionalities activation is not completed) upon reporting applicable functionalities via RRCReconfigurationComplete.

*RRC-15: The time duration for an AI functionality to become available for inference after UE reports applicability*

[R2-2505470](file:///C%3A%5CUsers%5Cwattsdy%5COneDrive%20-%20InterDigital%20Communications%2C%20Inc%5C3GPP%5CRAN2%5C131%20Bangalore%5CReview%5Ctdocs_131%5CR2-2505470.zip) Further Discussion on the Remaining RRC Issues on LCM MediaTek Inc. discussion

Proposal 6 (RRC-17): It is clarified that loading/preparation time for the model corresponding to the applicable configuration is not considered as a component in the processing latency between the reception of RRCReconfiguration and the reporting of RRCReconfigurationComplete.

[R2-2505502](file:///C%3A%5CUsers%5Cwattsdy%5COneDrive%20-%20InterDigital%20Communications%2C%20Inc%5C3GPP%5CRAN2%5C131%20Bangalore%5CReview%5Ctdocs_131%5CR2-2505502.zip) Remaining issues on LCM procedure of UE-sided model for AI/ML based beam management Apple discussion Rel-19 NR\_AIML\_air-Core

Proposal 3 (Open issue RRC-15): On the time duration for an AI functionality to become available for inference, RAN2 conclude that it is up to UE implementation and no need of UE reporting. Whether to specify its requirement is left to RAN4.

**Rapporteur suggested way-forward:**

MediaTek P6 has been agreed on Tuesday. Thus, we can focus on P3 of Apple. It is aligned with Tuesday agreement. But it is better to further clarify that NW implicitly knows when model is ready via applicability reporting and no need of new UE reporting.

**Proposal 3 (Open issue RRC-15): On the time duration for an AI functionality to become available for inference, RAN2 conclude that it is up to UE implementation, and the network will be aware a model is ready implicitly via applicability reporting (i.e., no need** **for new UE reporting). Whether to specify its requirement is left to RAN4.**

## 2.3 RRC-17

RRC-17: Processing timing requirement of applicability/inapplicability report via RRCReconfigurationComplete

[R2-2505778](file:///C%3A%5CUsers%5Cwattsdy%5COneDrive%20-%20InterDigital%20Communications%2C%20Inc%5C3GPP%5CRAN2%5C131%20Bangalore%5CReview%5Ctdocs_131%5CR2-2505778.zip) RRC open issues for AIML for NR air interface Ericsson discussion (Moved from 8.1.1)

to determine the applicability.

Proposal 7: (RRC-17) RRCReconfigurationComplete containing applicability reports has a processing latency requirement of 16 ms with respect to the reception of RRCReconfiguration. FFS whether RAN4 input is needed. FFS whether this solves open issue RRC-15.

[R2-2505301](file:///C%3A%5CUsers%5Cwattsdy%5COneDrive%20-%20InterDigital%20Communications%2C%20Inc%5C3GPP%5CRAN2%5C131%20Bangalore%5CReview%5Ctdocs_131%5CR2-2505301.zip) Discussion on life cycle management open issues Xiaomi discussion Rel-19 NR\_AIML\_air-Core

Proposal 3: (RRC-17) Introduce multiple RRC processing delay requirements for applicability reporting based on UE capability. Values of RRC processing delay requirement is up to RAN4.

**Rapporteur suggested way-forward:**

According to Tuesday agreement “RRC processing delay shouldn’t be impacted by the model loading delay”, it precludes new RRC processing delay requirement. So, we can focus on P7 of Ericsson.

**Proposal 7: (RRC-17) RRCReconfigurationComplete containing applicability reports has a processing latency requirement of 16 ms with respect to the reception of RRCReconfiguration. FFS whether RAN4 input is needed. FFS whether this solves open issue RRC-15.**

## 2.4 RRC-45

*RRC-45: How/where to capture activation of periodic inference CSI-ReportConfig in specifications*

* What to write in RRC specifications:
	1. Upon including the applicable status in RRCReconfigurationComplete, indicate to lower layers to activate the configuration, or
	2. Submit/do not submit the configuration to lower layers, which would be the equivalent of activation/no activation.

[R2-2505502](file:///C%3A%5CUsers%5Cwattsdy%5COneDrive%20-%20InterDigital%20Communications%2C%20Inc%5C3GPP%5CRAN2%5C131%20Bangalore%5CReview%5Ctdocs_131%5CR2-2505502.zip) Remaining issues on LCM procedure of UE-sided model for AI/ML based beam management Apple discussion Rel-19 NR\_AIML\_air-Core

Proposal 7 (Open issue RRC-45): As no concept of “activation/deactivation of periodic CSI reporting” in RAN1, adopt the way of “submit/do not submit the configuration to lower layers” in RRC running CR.

**Rapporteur suggested way-forward:**

P7 of Apple seems to be consensus according to company contribution. The key point is that RAN2 do not introduce new concept of “activation/deactivation of periodic CSI reporting”.

**Proposal 7 (Open issue RRC-45): As no concept of “activation/deactivation of periodic CSI reporting” in RAN1, adopt the way of “submit/do not submit the configuration to lower layers” in RRC running CR.**

* Where exactly in RRC to capture the solution:
	1. In Section 5.3.5.3 when setting the content of RRCReconfigurationComplete, or
	2. In Section 5.3.5.3 when sending RRCReconfigurationComplete to the lower layers

[R2-2505345](file:///C%3A%5CUsers%5Cwattsdy%5COneDrive%20-%20InterDigital%20Communications%2C%20Inc%5C3GPP%5CRAN2%5C131%20Bangalore%5CReview%5Ctdocs_131%5CR2-2505345.zip) Remaining issues in LCM for BM and CSI prediction Samsung discussion Rel-19 NR\_AIML\_air-Core

Proposal 4: (RRC-45) Handling of periodic CSI-ReportConfig is described in Section 5.3.5.3 when setting the content of RRCReconfigurationComplete.

**Rapporteur suggested way-forward:**

P4 of Samsung seems to be majority view according to company contribution. In Rapporteur understanding, both a) and b) can work and their timing difference is quite minor (and it is UE’s internal processing time).

**Proposal 4: (RRC-45) Handling of periodic CSI-ReportConfig is described in Section 5.3.5.3 when setting the content of RRCReconfigurationComplete.**

## 2.5 (if time allows) whether configuration is provided to L1 before model applicability

If time allows:

[R2-2505838](file:///C%3A%5CUsers%5Cpanidx%5COneDrive%20-%20InterDigital%20Communications%2C%20Inc%5CDocuments%5C3GPP%20RAN%5CTSGR2_131%5CDocs%5CR2-2505838.zip) LCM for UE-side models for beam management Ericsson discussion

Proposal 6 (RRC-45): RAN2 to ask RAN1 to resolve the decoding ambiguity at the NW regarding whether/when the UE starts sending AIML-based periodic CSI reports. Compliance with the RRC processing delay requirements should be ensured.

[R2-2505762](file:///C%3A%5CUsers%5Cpanidx%5COneDrive%20-%20InterDigital%20Communications%2C%20Inc%5CDocuments%5C3GPP%20RAN%5CTSGR2_131%5CDocs%5CR2-2505762.zip) Remaining open issues: LCM for UE-sided model for BM use case InterDigital discussion Rel-19 NR\_AIML\_air-Core

**Proposal 2b: [RRC-45] UE does not multiplex UCI containing inference predictions until applicabile functionality is activated.**

[R2-2505502](file:///C%3A%5CUsers%5Cwattsdy%5COneDrive%20-%20InterDigital%20Communications%2C%20Inc%5C3GPP%5CRAN2%5C131%20Bangalore%5CReview%5Ctdocs_131%5CR2-2505502.zip) Remaining issues on LCM procedure of UE-sided model for AI/ML based beam management Apple discussion Rel-19 NR\_AIML\_air-Core

**Proposal 8 (Open issue RRC-45): When periodic CSI prediction is configured, it is up to NW implementation how to resolve the UCI multiplexing issue (if any).**

**Rapporteur suggested way-forward:**

If P4 of Samsung is agreeable, it means that the UE will not do periodic CSI inference until it reports RRCReconfigurationComplete. Thus, in Rapporteur understanding, NW knows when the UE will start to report CSI prediction, which may address Ericsson’s concern. We can add RAN1 action to make necessary spec changes (if any)

**Proposal X: RAN2 conclude that the UE submits the inference configuration of periodic CSI to lower layers only after the applicabilityStatus is set to applicable. Thus, NW knows that the UE will not report periodic CSI prediction until reception of RRCReconfigurationComplete. In reply LS to RAN4, add action to RAN1: “RAN1 take the RAN2 conclusion into accout and make necessary specification change (if any).”**

## 2.6 (if time allows) LS to RAN4

According to RAN2 agreement, we can reply RAN4 (cc RAN1).

# 4 References

[1] RP-243244, Revised WID: Artificial Intelligence (AI)/Machine Learning (ML) for NR Air Interface, Qualcomm.

[2] RAN2#130, Chair Notes.

[3] R2-2505778, Remaining RRC open issues in feature AIML PHY, Ericsson.

# Appendix

The UE performance requirements for RRC procedures are specified in the following tables. The performance requirement is expressed as the time in [ms] from the end of reception of the network -> UE message on the UE physical layer up to when the UE shall be ready for the reception of uplink grant for the UE -> network response message with no access delay other than the TTI-alignment (e.g. excluding delays caused by scheduling, the random access procedure or physical layer synchronisation). In case the RRC procedure triggers BWP switching, the RRC procedure delay is the value defined in the following table plus the BWP switching delay defined in TS 38.133 [14], clause 8.6.3.



Figure 12.1-1: Illustration of RRC procedure delay