**3GPP TSG RAN WG2 Meeting #130 R2-250xxxx**

Bengaluru, India, Aug 25th – 29th, 2025

Agenda Item: 8.1.x

Source: Xiaomi

Title: Report of [POST130][038][AI PHY] UE capabilities (Xiaomi)

Document for: Discussion and Decision

# Introduction

* [POST130][038][AI PHY] UE capabilities (Xiaomi)

 Intended outcome: Discuss RAN2 specific AI/ML capabilities and submit agreable proposals and RAN2 UE capability CRs

 Deadline:  Long

Rapporteurs will provide proposals for RAN2#131 and a UE capability running CR based on the outcome of this post email discussion after the deadline.

Companies providing input to this email discussion are requested to leave contact information below.

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| **Company** | **Name** | **Email Address** |
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# Discussion

It is observed by rapporteur that BM/CSI prediction inference-related capabilities and UE-side data collection related capabilities are being discussed in RAN1. In this email discussion, for RAN2 specific capabilities, we will mainly focus on RAN2 specific features, including NW-side data collection, LCM, and candidate UE-side data collection.

***UE logging AS layer memory size***

It was agreed in RAN2 #126 meeting with following agreement,

1. For gNB centric and OAM centric (for RRC signaling between UE and gNB), reporting multiple instances of logged L1 measurement result from UE to gNB via a RRC message as configured by gNB is an optional feature. FFS how to handle case when single RRC message is not sufficient. FFS if there will be any further enhancement needed pending RAN1 agreement.

Following agreements were made during RAN2 #127 meeting, a minimum AS layer memory size is needed if UE supports UE logging and reporting for NW-side data collection. However, the memory size of AS layer memory is not decided.

1. UE stores the logged training data at AS layer with a minimum AS layer memory size supported by the UE. FFS on the memory size. This is across all use cases
2. When UE reaches its buffer limitation the UE stops measurement for data collection purposes and logging.

In logged MDT feature, a minimum AS layer memory size of 64kB is introduced. Furthermore, QoE also has additional 64kB for QoE pause and another 64kB for QoE measurement report in RRC\_IDLE/INACTIVE state.

Similar as logged MDT and QoE, UE logging for AI/ML air NW-side data collection can also introduce additional 64kB as baseline minimum AS layer memory.

##### Q1. Do you agree additional minimum AS layer memory size is 64kB (compared to logged MDT and QoE), which is shared by all AI/ML use cases?

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| **Company** | **Yes/No** | **Comment** |
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##### Q2. Do you think UE can support other memory sizes and indicate to network via optional capability signaling?

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| **Company** | **Yes/No** | **Comment** |
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***UE periodic and event-based logging***

In addition, RAN2 also introduced periodic and event-based data collection/logging with following agreements, where radio-condition based event data logging is supported, including L3 measurement triggered, beam-based event triggered and L1 beam measurement triggered.

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| * Periodic logging is supported for training data collection procedure in R19 * Event-triggered data logging will be supported. At least radio condition based event triggered logging will be supported. FFS the details of radio condition based event. FFS if other events are supported. * Support the use of L3 measurement event triggered (i.e. L3 serving cell measurements becoming worse/better than a threshold for TTT) to determine whether the UE performs logging or not. L1 measurement event triggered will not be supported. FFS what to log |

##### Q3. Which option do you prefer as optional UE capability for UE logging?

Option 1) Single optional UE capability with signaling for both periodic logging and L3 measurement event triggered logging (all events).

Option 2) One optional UE capability with signaling for periodic logging, another optional UE capability with signaling for L3 measurement event triggered logging.

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| **Company** | **Option 1/2** | **Comment** |
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***Availability Indication Reporting***

As agreed in RAN2 #129bis meeting, UE can send a UAI to provide assistance information for NW-side data collection.

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| **Agreements on availability indication**   * Availability indication can be triggered due to:   + Full buffer being reached (if configured)   + Buffer threshold being reached (if configured).   + Low power (if configured) * The UE send a UAI that indicates:   + Data is available   + Reason for trigger (full buffer, threshold)   + Low power indication * The encoding of the data is available/UAI and the cause value is FFS   NOTE: it is up to UE Implementation how buffer threshold reached and low power is determined |

Similar as other assistance information (e.g., *overheatingInd, referenceTimeProvision-r16, releasePreference-r16, flightPathAvailabilityIndicationUAI-r18, ul-TrafficInfo-r18*) reported via UAI, an optional UE capability with signaling can be introduced for NW-side data collection assistance information.

Q4. Do you agree to introduce an optional UE capability with signaling to indicate UE can provide assistance information (e.g., data is available, reason for trigger, low power indication) for NW-side data collection?

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| **Company** | **Yes/No** | **Comment** |
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***Applicability Reporting***

RAN2 agreed to report applicability reporting via *RRCReconfigurationComplete* message as initial reporting, while reporting the update of applicability reporting via UAI if there’s a change. Similar as NW-side data collection assistance information reporting via UAI, UE can also indicate the support of reporting update of applicability reporting via UAI as optional capability.

Q5. Do you agree to introduce an optional UE capability with signaling to indicate UE can provide update of applicability reporting via UAI?

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| **Company** | **Yes/No** | **Comment** |
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For companies’ information, following RAN1 inference FGs of AI/ML-based BM are copied below (note that similar inference capabilities are also introduced by RAN1 for AI/ML-based CSI prediction):





Furthermore, as agreed in RAN2 #130 meeting, both Option A and Option B are supported for applicability reporting. It was also proposed in R2-2503714 to introduce a separate UE capability is introduced for option B to allow more flexibility.

1. (RRC8) RAN2 confirm that option A and option B can be configured in the same RRCReconfiguration message with the unified applicability report procedure.

##### Q6. What is your view on UE capability for Option A and Option B applicability reporting procedure?

Option 1) Implicitly indicated UE supports both options if UE supports one or more of RAN1 defined inference related capabilities (e.g., FG58-0-1 and/or FG58-1-2/3/4/5, the details of those feature group depend on RAN1 progress). RAN2 will add applicability reporting procedure related UE capability description in RAN1 introduced related capabilities. (details will be implemented after RAN1 feature groups are implemented in RAN2 UE capability mega CR)

Option 2) Two conditional mandatory capabilities (with signaling) for Option A and Option B, respectively, if UE supports FG58-0-1 and/or FG58-1-2/3/4/5 (the details of those feature group depend on RAN1 progress).

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| **Company** | **Option 1 or Option 2** | **Comment** |
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***UE preferred data collection configuration***

During Rel-19, RAN2 has agreed UE can indicate preferred configurations for UE-side data collection, and following agreements were made:

Agreements on data collection configuration

* The UE can request measurement configuration for data collection of AI/ML based beam management. The request can contain one or more of the following:

• An indication on start/stop of data collection

• Preferred configuration from a list of candidate configurations provided by NW. Details of signaling are FFS. It is up to network what it configures at the end.

* Introduce UAI message for UE request of data collection measurement configuration. And it is up to UE implementation when to send the request.

##### Q7. Do you agree to introduce an optional UE capability signaling for UE preferred configuration for UE-side data collection? If yes, do you think 1) it can be added as part of RAN1 FG58-1-7 or 2) a separate capability is introduced?

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***Use cases***

##### Q8. Do you think the above capabilities need be defined 1) for all use cases (e.g., BM Case 1, BM Case 2, CSI-prediction) or 2) per use case, except minimum AS layer memory size?

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| **Company** | **Option 1/Option 2** | **Comment** |
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***AI/ML co-exist with other features***

It is observed that there are many features not supported by (e)RedCap UE, IAB-MT, and NCR-MT, for example, CA, MR-DC, DAPS, etc. It is mainly to reduce complexity for such UEs, especially for (e)RedCap UE(s), where they are expected to be reduced capability.

##### Q9. Do you think all AI/ML features can be supported by (e)RedCap UE, IAB-MT, NCR-MT?

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| **Company** | **Yes/No** | **Reason/Any other features** |
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If AI/ML is supported by (e)RedCap, similar as logged MDT, minimum AS layer memory size can be 16kB.

##### Q10. If AI/ML is supported by (e)RedCap, do you agree the minimum AS layer memory size of UE logging measurement results for NW-data collection is 16kB?

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| **Company** | **Yes/No** | **Comment** |
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##### Q11. If there’s other UE capability for AI/ML based beam management and/or CSI prediction that is not covered by above questions, please list in below table.

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# Conclusion