3GPP TSG-RAN WG1 Meeting #117 R1-2405578

**Fukuoka City, Fukuoka, Japan, May 20th – 24th, 2024**

**Title: Reply LS on data collection to enable ML model training and inference in 5GC for Direct AI/ML based positioning**

**Response to: R1-2403835 (S2-2405833)**

**Release: Rel-19**

**Work Item: FS\_AIML\_CN**

**Source: RAN1**

**To: SA2**

**Cc: RAN2, RAN3**

**Contact person:**

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**Attachments:** None

# 1 Overall description

RAN1 thanks SA2 for the LS on data collection to enable ML model training and inference in 5GC for direct AI/ML based positioning. RAN1 would like to provide the responses to the following questions in SA2 LS (S2-2405833) based on RAN1 progress up to RAN1#117 meeting.

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| SA2 would seek clarification from RAN1 and RAN2 on the following questions: 1. What data to be collected for ML model training for Direct AI/ML based positioning corresponding to cases 2b, 3b has been identified by RAN WG? 2. What data to be collected for location inference using ML models for Direct AI/ML based positioning corresponding to cases 2b, 3b has been identified by RAN WG? |

For the first question, RAN1 has reached the following agreements and working assumptions up to RAN1#117 meeting.

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| **Agreement**For training data collection of AI/ML based positioning, the collected data sample can include the following components:Part A:* channel measurement
* quality indicator of channel measurement
* time stamp of channel measurement

Part B:* ground truth label (or its approximation)
* quality indicator of label
* time stamp of label

Note: “Part A” and “Part B” terminologies are only for RAN1 discussion purpose, and may not be used in specification. Note: contents in Part A and Part B may or may not be generated by different entities.Note: Part A and/or Part B, and their contents may or may not apply for each caseFFS: detailed definition of channel measurement**Agreement**For training data generation of AI/ML based positioning Case 3a and 3b, the measurement and its related data (e.g., timestamp) are generated by TRP/gNB.Working AssumptionFor training data generation of AI/ML based positioning Case 3b, the label and its related data (e.g., time stamp) can be generated by:* PRU
* Non-PRU UE with estimated location
* LMF

Note: transfer of label and its related data is out of RAN1 scope.Note: It is assumed that user data privacy of non-PRU UE is preserved.Working AssumptionFor training data generation of AI/ML based positioning Case 2a and 2b, the channel measurement and its related data (e.g., time stamp) are generated by PRU and/or non-PRU UE.Working AssumptionFor training data generation of AI/ML based positioning Case 2b, the label and its related data (e.g., time stamp) can be generated by: * PRU
* Non-PRU UE with estimated location
* LMF

Note: transfer of label and its related data is out of RAN1 scope.**Agreement**For training data collection of AI/ML based positioning, if a training data sample contains both Part A and Part B, RAN1 assumes that Part A and Part B in one training data sample are: * for a same UE (PRU or Non-PRU UE), and
* for a same location associated with Part B.

Note: the association can be discussed |

For the second question, RAN1 has reached the following agreements up to RAN1#117 meeting.

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| **Agreement*** For AI/ML based positioning case 3b, at least the following types of time domain channel measurements are supported for reporting:
1. timing information;
2. paired timing information and power information.

**Agreement*** For AI/ML based positioning case 2b, at least the following types of time domain channel measurements are supported for UE reporting to LMF:
1. timing information;
2. paired timing information and power information.
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Furthermore, RAN1 would like to notify SA2 of the following:

1. RAN1 is still working on further details of training data collection and model inference of Case 3b and 2b. RAN1 may provide additional input to SA2 in the future.
2. For the related RAN work item (NR\_AIML\_air), Rel-19 WID ([RP-240774](https://www.3gpp.org/ftp/TSG_RAN/TSG_RAN/TSGR_103/Docs/RP-240774.zip)) has assigned Case 3b 1st priority, and Case 2b 2nd priority.
3. Note: in RAN1 agreement, "AI/ML based positioning" by itself refers to all positioning cases, including Case 3b and 2b.
4. Note: the working assumptions and agreements above are based on RAN1 understanding for RAN work item (NR\_AIML\_air).

# 2 Actions

**To SA2**

**ACTION:** RAN1 respectfully asks SA2 to take the above into account in their future work.

# 3 Dates of next TSG RAN 1 meetings

TSG RAN WG1 Meeting #118 19th – 23th Aug. 2024 Maastricht, NL

TSG RAN WG1 Meeting #118bis 14th – 18th Oct. 2024 China (TBC), CN