3GPP TSG RAN WG2 Meeting #116-e Draft R2-2111375

**Electronic meeting, 1st -12th November 2021**

**Agenda item:** 8.11.1

**Source:** Intel Corporation

**Title:** Report of offline discussion [AT116-e][623][POS] 38.305 CR for RAT-dependent positioning (Intel)

**Document for:**  Discussion and decision

# Introduction

This is the report of following offline discussion:

* [AT116-e][623][POS] 38.305 CR for RAT-dependent positioning (Intel)

Scope: Collect comments on the running CR preparatory to endorsement.

Intended outcome: Updated CR and report

Deadline: Tuesday 2021-11-09 0800 UTC

Rapporteur would like to split the discussion in two phases:

**Phase 1**: To collect comment on the draft running CR in R2-2109674; The **deadline for this 1st phase** of email discussion is **Friday 2021-11-05 1000 UTC (comments) .**

**Phase 2**: To check the updated version before the final deadline Tuesday 2021-11-09 0800 UTC

# Annex: companies’ point of contact

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| **Company** | **Point of contact** | **Email address** |
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# Phase 1 to collect comments on the draft running CR

The changes on Scheduled location time, storing capability in AMF are captured in section 5.4.4, 7.3.2, 7.3.3 and 7.3.4;

**Companies are invited to provide your comments on the changes shown in the running CR on Latency reduction;**

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| **Company’s name** | **Comments, if any** |
| vivo | - If no impact on section 7.3.4 is foreseen, the Editor’s Note can be removed.  - NRPPA->NRPPa in section 7.3.2, 7.3.3  **[Rapp] No change for now. At least it is still open on whether scheduled location time should be forwarded to UE and RAN.** |
| Apple | Some editorial corrections to the PRU text  “A Positioning Reference Unit (PRU) at a known location can perform positioning measurements (e.g., RSTD, RSRP, UE Rx-Tx Time Difference measurements, etc.) and report these measurements to a location server. In addition, the PRU can transmit SRS to enable TRPs to measure and report UL positioning measurements (e.g., RTOA, UL-AoA, gNB Rx-Tx Time Difference, etc.) from PRUs at known locations. The PRU measurements can be compared by a location server with the measurements expected at the known PRU location to determine correction terms for other nearby target devices. The DL- and/or UL location measurements for other target devices can then be corrected based on the previously determined correction terms.  From a location server perspective, the PRU functionality is realized by a UE with known location.”  **[Rapp] Ok.** |
| Qualcomm | **5.4.4:**  Editorial:  "The LMF may interact with the AMF to support the provision of UE positioning capability to the AMF as described in greater detail in TS 23.273 [35]."  **[Rapp] Ok.**  **7.3.2:**  **Step 2:** If a scheduled location time is provided in step 1, the LMF may not only provide assistance data to the UE "ahead of time". It may also provide a request location information, or measurement gaps, etc. "ahead of time". The meaning of "ahead of time" is also not clear. The same general sentence as in Step 3 can also be used here:  "If a scheduled location time is provided in step 1, the LMF may schedule location measurements to occur at or near to the scheduled location time."  This is a quite high-level procedure description anyway; no need to mention specific message names, etc.  **[Rapp] Not change for now. Based on RAN2 discussion, the main benefit is to provide assistance data ahead of time. But ok to remove the message name.**  **Step 3:** "via NRPPA MESREUEMENT REQUEST message" is not correct. An LMF may equally request UL E-CID measurements "ahead of time" or request SRS "ahead of time" etc. The same general sentence as for Step 2 above can be used:  "If a scheduled location time is provided in step 1, the LMF may schedule location measurements to occur at or near to the scheduled location time."  **[Rapp] ok to remove the message name.**  **7.3.3:**  Same comments as above |
| ZTE | 7.3.2  Step 2: If a scheduled location time is provided in step 1, the LMF may provide assistance data ahead of time and schedule location measurements to the UE via LPP RequestLocationInforamtion message at or near to the scheduled location time.  step 3: If scheduled location time is provided in step 1, the LMF may schedule location measurements to the NG-RAN via NRPPa MESREUEMENT REQUEST message at or near to the scheduled location time.  Same comments for 7.3.3  **[Rapp] Not change for now, should not the assistance data is provided to the UE?** |
| Lenovo, Motorola Mobility | 7.3.2  Also share the view that “ahead of time” in Step 2 is not clear and therefore suggested rewording as follows: “If a scheduled location time is provided in step 1, the LMF may ~~provide assistance data to the UE ahead of time and~~ schedule location measurements ~~by the UE via LPP RequestLocationInforamtion message~~ to occur at or near to the scheduled location time via the LPP RequestLocationInformation message”  7.3.3  Same comment as above  **[Rapp] Not change for now. Based on RAN2 discussion, the main benefit is to provide assistance data ahead of time. But ok to remove the message name.** |
| CATT | 7.3.2  1).The general procedures should not include dedicate message names here. Prefer to delete LPP RequestLocationInforamtion message and NRPPA MESREUEMENT REQUEST message.  **[Rapp] ok.**  2).The storage of UE positioning capability in AMF part can be deleted in Editor’s note now.  **[Rapp] Not change for now.** |
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**Summary:** See comments from Rapporteur on each companies’ suggestion.

One issue is still open, i.e. whether preconfigured assistance data should be described or not.

**Proposal 1: For latency reduce, to discuss whether preconfigured assistance data should be described in step 2 in 7.3.2 and 7.3.3..**

The changes on positioning in RRC\_INACTIVE are captured in section 5.2;

**Companies are invited to provide your comments on the changes shown in the running CR on positioning in RRC\_INACTIVE;**

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| **Company’s name** | **Comments, if any** |
| vivo | The following note is not entirely correct. E.g., the UL E-CID procedure in RRC\_INACTIVE is not supported as UE cannot send RRC measurement report during RRC\_INACTIVE.   |  | | --- | | NOTE: The positioning procedures between a UE and network for UEs in RRC\_CONNECTED state are also applied for UEs in RRC\_INACTIVE state using SDT. | | **[Rapp] not change for now. UL E-CID is performed by network. From UE perspective, it is not a positioning procedure.** | |
| Apple | The note language can be improved as follows: “NOTE: The positioning procedures between a UE and the network for UEs in RRC\_CONNECTED state also apply for UEs in RRC\_INACTIVE state using SDT.”  **[Rapp] Ok.** |
| Qualcomm | This NOTE is at a wrong place and seems also not correct. Section 5.2/Figure 5.2-1 shows the location service support by NG-RAN. As can be seen from the Figure, the positioning procedures between a UE and network are always instigated by an LMF. Therefore, SDT is not possible. The only UE triggered step is the MO-LR at Step 1c, but this is a location request and not a "positioning procedure".  RRC\_INACTIVE should be captured under 6.4 and 6.5. We only agreed that LPP and LCS messages can be transported in RRC\_INACTIVE with SDT. This affects section 6.4.2 and 6.5.2. For LCS messages, a new subsection should be added. But since there is no agreement on how to capture RRC\_INACTIVE in Stage 2 yet, an Editor's Note would be more appropriate at this stage.  In addition, the capability of just LPP/PDU message transport in RRC\_INACTIVE with SDT does not enable "positioning in RRC\_INACTIVE state". The individual steps for a positioning procedure need to be arranged such that positioning is indeed possible while the UE is in RRC\_INACTIVE.  **[Rapp] not change for now. It is also related to the offline discussion [Offline-625][POS] Proposals from RRC\_INACTIVE positioning summary (OPPO) whether it can be supported for all service type.** |
| ZTE | In 5.2, the note is better moved to the end of Fig 5.2-1 and those steps. We support adding a note in section 5.2, 6.4.2, 6.5.2, 6.5.3 for RRC\_INACTIVE, respectively. The note wording:  NOTE: The above positioning procedures between a UE and network for UEs in RRC\_CONNECTED state are also applied for UEs in RRC\_INACTIVE state using SDT.  **[Rapp] not change for now. In general, it would be good to avoid adding same note for every procedure. Let’s see if we can find a general section to capture such general statement, e.g.**  *The positioning procedures described in the specification between a UE and the network for UEs in RRC\_CONNECTED state also apply for UEs in RRC\_INACTIVE state using SDT.* |
| Lenovo, Motorola Mobility | The NOTE does not seem to be appropriate for this Section and can be removed.  **[Rapp] not change for now. It is also related to the offline discussion [Offline-625][POS] Proposals from RRC\_INACTIVE positioning summary (OPPO) whether it can be supported for all service type.** |
| Ericsson | Abbreviation of SDT can also be added.  **[Rapp] ok**  Further should we send RAN2 agreements and stage 2 formulation to SA2 so they capture it in their specification?  End to end details are captured in SA2 spec. So, it should be same also here.  **[Rapp] not change for now. It is also related to the offline discussion [Offline-625][POS] Proposals from RRC\_INACTIVE positioning summary (OPPO) whether it can be supported for all service type.** |
| CATT | The Note in the section 5.2 also should be added in section 6.4 and section 6.5 for RRC\_INACTIVE, respectively.  As for LCS message transferred under RRC\_INACTIVE via SDT, maybe another similar note “Note: LCS Message Transfer is applicable for UE with SDT in RRC\_INACTIVE” captured under section 7.3.3 & 7.3.4 is good enough.  **[Rapp] not change for now. In general, it would be good to avoid adding same note for every procedure. Let’s see if we can find a general section to capture such general statement, e.g.**  *The positioning procedures described in the specification between a UE and the network for UEs in RRC\_CONNECTED state also apply for UEs in RRC\_INACTIVE state using SDT.* |
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**Summary:** See comments from Rapporteur on each companies’ suggestion.

One issue is still open, i.e. whether the note should be added for 6.4 and 6.5. Rapporteur think that it is also related to the offline discussion 625 on how to capture the procedure, and would suggest to postpone the discussion.

The changes on On-Demand PRS transmission are captured in section 7.x;

**Companies are invited to provide your comments on the changes shown in the running CR on On-Demand PRS transmission;**

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| **Company’s name** | **Comments, if any** |
| vivo | For step 6, It is not agreed that LMF can provide the updated PRS configuration used for PRS transmission via posSI to the UE. We prefer not to support this solution which may cause very frequent system information update.  Therefore, we propose to remove it in the CR.  LMF provides the updated PRS configuration used for PRS transmission via LPP Provide Assistance Data message ~~or posSI~~ to the UE.  **[Rapp]No change for now.**  The baseline procedure was agreed in last meeting based on [R2-2108400](file:///C:/Users/mtk16923/Documents/3GPP%20Meetings/202108%20-%20RAN2_115-e,%20Online/Extracts/R2-2108400%20onDemand%20PRS%20email.docx) Report on [Post114-e][603][POS] Procedures and signalling for on-demand PRS (Ericsson)  Capture the steps provided above as a baseline, along with a note indicating it remains FFS if the UE can send the MO-LR to request on-demand PRS.  Pos SI was in step 6. |
| Qualcomm | **Step 3:**  "the LMF may obtain assistance information, e.g. UE measurements".  The use of "assistance information" is confusing and should be deleted, since "assistance information" is usually meant to be Assistance Data. In this case it's UE measurements.  **[Rapp] ok to remove.**  **Step 4:**  "If the LMF determines to perform on-demand PRS request,.." is not needed, since this is all what the Figure is about/shows anyhow.  **[Rapp]Ok to remove.**  **Step 5:**  "…if the request from the LMF is accepted." Is not needed, since the Figure shows the successful outcome only. I assume there will be the usual individual NRPPa message description in other sections with Request/Response/Failure.  **[Rapp]Ok to remove.**  **Step 6:**  "LMF provides the updated PRS configuration used for PRS transmission via LPP Provide Assistance Data message or posSI to the UE."  What does "or posSI" mean here? How would an LMF decide on LPP vs. posSI without knowing the UE capability for posSI? In addition, a LPP Request Assistance Data normally always results in a LPP Provide Assistance Data.  **[Rapp]Not change for now. We do not have UE capability on posSI.**  **NOTE 1** is already described at Step 3, no need to repeat.  **[Rapp]Ok to remove.**  **NOTE 2:**  The same Note is also applicable for LMF initiated on-demand PRS request. I.e., it is up to network (TRP) implementation to follow (accept/reject/ignore) on receiving LMF-initiated On-Demand PRS requests.  **[Rapp]Added.** |
| Nokia | In general, the UE-initiated on-demand PRS option is explicitly shown/described in the figure and steps where the steps are marked clearly as “In case of UE-initiated...” but the LMF-initiated on-demand PRS case is not that explicit. In our paper R2-2110956 we have a proposal 2 suggesting updates to make the LMF-initiated case also very explicit. We propose that these changes are also taken in to account in the baseline to be endorsed. Leave out proposal 1 for now as this is new and can be discussed online.  **[Rapp]Added.** |
| ZTE | Step 3 modification: The LMF determines the need for PRS transmission or change to PRS transmission characteristics. In case of LMF-initiated On-demand PRS, the LMF may obtain UE measurements, e.g. (ECID) SSB/CSI-RS RSRP measurements or (DL-AoD) DL-PRS RSRP measurements prior to step 3.  In this case note 1 is not needed.  **[Rapp]See the changes based on Nokia’s suggestion.**  In addition, we wonder if there is a need to separate UE-initiated and LMF-initiated on-demand PRS request procedures. If so there will be no ‘in case of UE-initiated on-demand PRS request’ or ’in case on LMF-initiated on-demand PRS request’  **[Rapp] Not change for now. We already agreed**  Put the stage 2 description for UE-initiated and LMF-initiated PRS request under the same framework. |
| Ericsson | Agree with Nokia we can have a step as below as mentioned in R2-2110956 and Note1 can be removed.  2b. In case of LMF-initiated on-demand PRS, the LMF may obtain measurements from the UE using some existing positioning methods to assist step 3 e.g., the LMF may obtain SSB/CSI-RS RSRP measurements (NR-ECID) or DL-PRS RSRP measurements (DL-AoD).  **[Rapp]Added.** |
| CATT | Step 1: whether it is mandatory is still FFS, better to add an editor note “Editor Note: FFS the step 1 is mandatory or optional present”  **[Rapp]This can be updated via post meeting email discussion, to capture agreements/open issues agreed made in this meeting.**  Step 3: Agree other company’s comment on step 3 to replace the “assistance information” of “UE measurements”.  **[Rapp]See the changes based on Nokia’s suggestion.**  Step 6: as for “LMF provides the updated PRS configuration used for PRS transmission via LPP Provide Assistance Data message or posSI to the UE”, we think posSI is not correct because the response of the LPP Request Assistance data message is not via posSI. If posSI here is only for the update of posSI, the posSI can be removed because the update posSI may happen in any case.  **[Rapp]see response to vivo and QC** |
| Ericsson | 1. In case of UE-initiated On-demand PRS, the LMF may configure the UE with available On-Demand PRS configurations via LPP Provide Assistance Data message or via posSI.  Pre-define may be one way; however, UE may also explicitly request without using any index? Anyhow for st2 we should use generic and how we do it can be left in stage 3.  **[Rapp1] we did not discuss “On-Demand PRS configuration”, would be good to confirm this in RAN2 first.** |

**Summary:** See comments from Rapporteur on each companies’ suggestion.

One issue is still open, i.e. whether posSI should be the response for On-Demand PRS request or not. Rapporteur would suggest to discuss this online.

**Proposal 2: For On-Demand PRS, to discuss whether posSI can be the response for On-Demand PRS request.**

The changes on PRU are captured in section 3.2 and 5.4.x;

**Companies are invited to provide your comments on the changes shown in the running CR on PRU;**

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| **Company’s name** | **Comments, if any** |
| vivo | More FFS are needed.  - FFS how to provide PRU location coordinates to the LMF.  - FFS how to enable the LMF to be aware of the PRU. |
| Qualcomm | Agree with vivo above.  - FFS PRU registration at LMF and management of PRUs |
| Nokia | We prefer that any changes to PRU section wait until we finish the email discussion [AT116-e][615]. These additional FFS can be added at the time we capture the decisions from outcome of [AT116-e][615]. |
| ZTE | Agree with Nokia |
| Lenovo, Motorola Mobility | Editorial correction:  “In addition, the PRU can transmit SRS to enable TRPs to measure and report UL positioning measurements from PRUs at a known location (e.g., RTOA, UL-AoA, gNB Rx-Tx Time Difference, etc.)”  Share Vivo’s FFS points with a minor addition:  - FFS how to provide PRU location coordinates and ensure accuracy/validity of the provided PRU location coordinates to the LMF. |
| Ericsson | Agree with Nokia |
| CATT | Agree with Nokia |
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**Summary:** Companies provided comments on Editor’s Note. Nokia also commented that any changes to PRU should wait until we finish the email discussion [AT116-e][615].

In addition, Lenovo provided editorial correction which seems correct.

**[Rapp] For PRU, capture editorial correct suggested by Lenovo. Further changes on new agreements or open issues on PRU should be captured in post meeting email discussion.**

# Summary report and proposals

**Proposal 1: For latency reduce, to discuss whether preconfigured assistance data should be described in step 2 in 7.3.2 and 7.3.3..**

**Proposal 2: For On-Demand PRS, to discuss whether posSI can be the response for On-Demand PRS request.**

# Reference

1. R2-2109673 Email discussion report on [609][POS] RAT-dependent stage 2 CR (Intel) Intel Corporation
2. R2-2109674 Email discussion [609] Running 38.305 CR for Positioning WI on RAT dependent positioning methods Intel Corporation draftCR Rel-17 38.305 16.6.0 B