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

Bengaluru, India, August 25-29, 2025

**Agenda item:** 8.1.1

**Source:** Qualcomm Incorporated (Rapporteur)

**Title:** Summary of [POST131][024][AI PHY] 37.355

**Document for:**  Discussion

# 1. Introduction

This document summarizes the following email discussion.

* [POST131][024][AI PHY] 37.355 (Qualcomm)

Intended outcome: Agree to final CR and then trigger LS to RAN1 on questions related to LPP21

Deadline: short for CR and 2 weeks after for LS

Companies are invited to provide their comments on the updated CR "Revision of R2-2505704\_(CR 37355-i50 AIML Pos)\_v00.docx" located in the 'docs' sub-folder for this email discussion in the Table in Section 3 below.

Questions to RAN1 related to Issue LPP-21 can be proposed in Section 4 below.

Deadline for comments/input:

- Comments on the updated CR: September 5th, 06:00 UTC.

- Questions to RAN1 on LPP-21: September 12th, 10:00 UTC.

# 2. Agreements

The following agreements from RAN2#131 and RAN1#122 are implemented in file "Revision of R2-2505704\_(CR 37355-i50 AIML Pos)\_v00.docx" located in the 'docs' sub-folder. All changes compared to Rev0 are indicated using yellow highlight in the CR.

## 2.1 RAN2#131

**Agreements on positioning**

1. Do not introduce a request for additional PRUs (e.g., a number of PRUs) in the Request Assistance Data message
2. "Batch reporting", i.e., reporting of up to 32 location results in a single report as supported for the current NR positioning methods, is also applicable to "NR AI/ML Positioning Case 1".
3. Keep NR-DL-AIML-RequestLocationInformation, excluding UE-assisted measurement parameters, and retain only UE-based and common parameters (e.g., nr-AssistanceAvailability).
4. For AI/ML positioning Case 1, the LocationInformationType field in CommonIEsRequestLocationInformation shall be set to locationEstimateRequired. Other values, including locationMeasurementsRequired, locationEstimatePreferred, locationMeasurementsPreferred, and locationEstimateAndMeasurementsRequired, are not applicable and shall not be used. No specification impact.
5. We do not introduce new error cause for the target device error causes.
6. Case 3a and Case 3b can be supported without new impact to LPP
7. Introduce list of global cell information (i.e., NCGIs, or PCIs with ARFCN) and TRP ID, as the request associated information to ensure consistency between training and inference.
8. The UE asks specific TRPs for PRS transmission with on-demand PRS configuration, i.e., within NR-On-Demand-DL-PRS-Request
9. Similar to BM, UE decides the applicable functionalities based on NW-side additional conditions (if provided), UE-side additional conditions (internally known by UE) and model availability in device. If nw side additional conditions are not provided then we follow BM conclusion. No stage 3 impacts.
10. Similar to AI PHY, when applicability changes the UE should report this to the LMF and only what changed. For now capture this at least in stage 2. Check offline if and how this would be implemented in stage 3.
11. Wait for RAN1 for LPP-21. Take what RAN1 gives us and we implemented. Can compile an LS for next meeting if we have questions.

## 2.2 RAN1#122

From the Chair Notes in [R1-2506557](https://www.3gpp.org/ftp/Meetings_3GPP_SYNC/RAN1/Inbox/R1-2506557.zip) (Session notes for 8.1 (Maintenance on AI/ML for NR Air Interface), Ad-Hoc Chair (Ericsson)):

**Agreement**

Update the following LPP parameters in higher layer parameter list to RAN2.

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|  | **Sub-feature group** | **RAN2 Parent IE** | **Parameter name in the spec** | **New or existing?** | **Description** | **Value range** | **Per (UE, cell, TRP, …)** |
| **Associated ID for Info #7** | UE-based positioning Case 1 | FFS for RAN2 | AssociatedID-TRP-LocationInfo | New | The associated ID (optional) provides implicit indication of Info #7. For given TRP(s), the same associated ID implies that geographical coordinates of the TRP(s) can be understood as consistent by the UE. The associated ID is not expected to provide the real value of Info #7 (i.e., geographical coordinates of the TRP(s) are not disclosed). An associated ID is configured per-cell (e.g., NCGI-r15). Note: Info #7 can be provided explicitly (as in legacy UE-based DL-TDOA) or implicitly by Associated ID. | FFS for RAN2 (e.g., 0..255) | Per cell |

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|  | **Sub-feature group** | **RAN2 Parent IE** | **Parameter name in the spec** | **New or existing?** | **Description** | **Value range** | **Per (UE, cell, TRP, …)** |
| **Assistance data Info #7** | UE-based positioning Case 1 | FFS for RAN2 | (It is up to RAN2 to decide which existing IEs to include for providing Info #7) | Existing | LMF can provide to UE the assistance information (optional) from legacy UE-based DL-TDOA: Info #7 in Table 8.12.2.1.0-1 in 38.305 v18.3.0. Note: Info #7 can be provided explicitly (as in legacy UE-based DL-TDOA) or implicitly by Associated ID. | Reuse existing | Per UE |

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|  | **Sub-feature group** | **RAN2 Parent IE** | **Parameter name in the spec** | **New or existing?** | **Description** | **Value range** | **Per (UE, cell, TRP, …)** |
| **Assistance data Info #1 ~ Info #6, Info #8 ~ Info #15** | UE-based positioning Case 1 | FFS for RAN2 | (It is up to RAN2 to decide which existing IEs to include for providing Info #1 ~ Info #6, Info #8 ~ Info #15) | Existing | LMF can provide to UE the assistance information (optional) from legacy UE-based DL-TDOA: Info #1 ~ Info #6, Info #8 ~ Info #15 in Table 8.12.2.1.0-1 in 38.305 v18.3.0. | Reuse existing | Per UE |

**Conclusion:**

RAN1 has no consensus whether the IE for assistance data Info#7 and AssociatedID-TRP-LocationInfo can be simultaneously enabled.

It is up to RAN2 to decide whether the IE for assistance data Info#7 and AssociatedID-TRP-LocationInfo can be simultaneously enabled.

Rev1 of the LPP CR also considers the UE feature list in R1-2506424 (see comment bubbles in "Revision of R2-2505704\_(CR 37355-i50 AIML Pos)\_v00.docx").

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| [R1-2506424](https://www.3gpp.org/ftp/Meetings_3GPP_SYNC/RAN1/Inbox/R1-2506424.zip) | Updated RAN1 UE features list for Rel-19 NR after RAN1 #122 | Moderators (AT&T, NTT DOCOMO, INC.) |

# 3. Comments Collection on LPP CR Rev1 – Now Closed

Please provide your comments on "Revision of R2-2505704\_(CR 37355-i50 AIML Pos)\_v00.docx" located in the 'docs' sub-folder in the Table below.

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| --- | --- | --- | --- | --- |
| Company | Clause/IE | Comments | Proposed Change (if any) | Rapporteur Comments |
| Apple |  | We disagree with CR Rapporteur’s following conclusion:  “**Conclusion:**  *RAN1 has no consensus whether the IE for assistance data Info#7 and AssociatedID-TRP-LocationInfo can be simultaneously enabled.*  *It is up to RAN2 to decide whether the IE for assistance data Info#7 and AssociatedID-TRP-LocationInfo can be simultaneously enabled*.”  According to the quoted RAN1 agreement, the NOTE in excel of Associated ID for Info #7 clearly sayit is explicit info#7 **or** implicit info#7 (not “and/or”).  **“**Note: Info #7 can be provided explicitly (as in legacy UE-based DL-TDOA) **or** implicitly by Associated ID.**”**  So, we understand that RAN1 has concluded that explicit info and implicit info can’t be simultaneously configured. | Following RAN1 excel, capture Info #7 can be provided explicitly (as in legacy UE-based DL-TDOA) **or** implicitly by Associated ID. | This is not my conclusion, this is RAN1's conclusion. Please check the RAN1 meeting notes as copied above in [R1-2506557](https://www.3gpp.org/ftp/Meetings_3GPP_SYNC/RAN1/Inbox/R1-2506557.zip), section 8.1.2.  Also, as lengthy discussed in RAN1, "or" does not mean "either…or".  If Apple prefer, we could still ask RAN1, but I would not expect any different answer from RAN1 as in this RAN1 conclusion… |
| Nokia | 6.4.3 / NR-DL-PRS-ProcessingCapability | No strong opinion but another option is to implement the available 58-2-x features and add FFS specific to the missing features/components. If more time is needed to implement these, we are fine to wait for an updated UE features list from RAN1. |  | I think now that the simplest implementation would be to indicate in the IE *NR-DL-PRS-ProcessingCapability-r16* the fields which are not applicable to Case 1 (e.g., via a NOTE in the field description table). I'll prepare a contribution to the next meeting (since this will take some time to sort out). |
| Nokia | 6.4.3 / NR-DL-PRS-QCL-ProcessingCapability | Text changes are confusing. If NR-DL-PRS-QCL-ProcessingCapability is also applicable for AIML positioning and the FFS is deleted, why does the text include “except for NR DL AI/ML positioning” |  | The IE *NR-DL-PRS-QCL-ProcessingCapability* is applicable to Case 1 (58-2-5, 58-2-6 are the same as already supported). This IE is included in all individual *method-ProvideCapabilities* IEs for NR positioning methods. RAN1 then clarified that the capabilities can not be set to different values for the individual NR positioning methods. Hence, we added this paragraph in question. However, this restriction seems not applicable to Case 1. I.e., for Case 1 a UE may set the values in IE *NR-DL-PRS-QCL-ProcessingCapability* differently than in the other NR positioning methods. So we need to somehow say that this paragraph is not applicable to Case 1. |
| Nokia | 6.4.3 / nr-TRP-RequestList | We suggest some updates to the field description. | ***nr-TRP-RequestList***  This field specifies a list of TRPs for which the on-demand DL-PRS configuration information is requested and comprises the following subfields:  - ***dl-PRS-ID*** specifies the DL-PRS ID of the TRP for which the on-demand DL-PRS is requested.  - ***nr-PhysCellID*** specifies the physical Cell-ID of the TRP for which the on-demand DL-PRS is requested.  - ***nr-CellGlobalID*** specifies the NCGI, the globally unique identity of a cell in NR, of the TRP for which the on-demand DL-PRS is requested, as defined in TS 38.331 [35].  - ***nr-ARFCN*** specifies the NR-ARFCN of the TRP's CD-SSB (as defined in TS 38.300 [47]) corresponding to *nr-PhysCellID*. | Updated in \_v01 accordingly (indicated in green highlight in \_v01). |
| Nokia | 6.4.3 / NR-TRP-LocationInfo-Implicit | The RAN1 agreement on Associated ID for Info#7 is still ambiguous due to their use of the term “Info#7”. Info#7 in 38.305 says: “include a transmission reference location for each DL-PRS Resource ID, reference location for the transmitting antenna of the reference TRP, relative locations for transmitting antennas of other TRPs”. So, does Info#7 map to just trp-Location-r16 (which is a relative location) or does Info#7 map to IE NR-TRP-LocationInfo? i.e., Info#7 also maps to relative location of dl-PRS-ResourceSetARP-r16 and dl-PRS-Resource-ARP-location-r16? | We suggest that we send LS to RAN1 to get clarifications on this. | I also think the RAN1 agreement is ambiguous when referring to "info#7". |
| Nokia | 6.4.3 / nr-AIML-AssociatedID | Associated ID is stated as per cell. So, it is clear that all TRPs under the same cell have the same associated ID. Does this mean different cells have different and unique associated IDs? Can different cells in different PFL have the same associated ID? If the same cell belong to different PFL should it have different associated ID for each PFL? | We suggest that we send LS to RAN1 to get clarifications on this. | I think this would be up to deployment. However, there is also the agreement that a "UE does not expect to receive different values of associated ID for TRPs belonging to the same NCGI-r15".  In my understanding, an "Associated ID" can only be unambiguous together with a NCGI. But this then seems to imply that a particular Cell/NCGI can be handled by a single LMF only (e.g., cell areas cannot overlap between LMFs, since then there is no guarantee that each LMF has the same understanding of a particular value of an "Associated ID" (e.g., different LMFs may use a different "Associated ID" for the same cell)). |
| Nokia | multiLocationEstimateInSameReport | Field description says “in a single measurement report”. In AIML pos case 1 we do not report measurements. | Suggest alternate wording like “in a single location report” or “in a single location information” or “in one instance of the provided location information” | Changed to "single location report" in \_v01 (indicated in green highlight in \_v01). |
| vivo | 6.4.3 / *NR-TRP-LocationInfo-Implicit* | We did not agree on whether associated ID is supported for TP-only PRS without belonging to a cell, so if *dl-PRS-ID* is removed, there is no way to support TP-only scenario. | It can be add as an EN whether *dl-PRS-ID* is needed for *TRP-LocationInfo-Implicit*, or we directly ask RAN1 about this issue. | We did agree to "Take what RAN1 gives us and we implement."…I agree with your observation, but I think for now we must assume that the TRP-ID/DL-PRS ID is irrelevant in this context (whether intentional or not, I do not know). Let's ask RAN1, as you suggested. |

# 4. Questions to RAN1 related to LPP-21: "Associated ID" for TRP Location Coordinates (IE *NR-TRP-LocationInfo-Implicit*)

Please propose questions to RAN1 related to LPP-21 in the Table below.

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| Company | Proposed Question to RAN1 | Reason/motivation for the question | Rapporteur Comments |
| Apple | Considering RAN2#131 agreement of associated ID can be per cell or multiple cell, we think RAN1 should re-visit their conclusion of per-cell associated ID. Furthermore, different from AI BM, associated ID of AI positioning is generated by LMF (rather than by cell in AI BM) because it is provided in LPP Assistance Data. Therefore, the associated ID is naturally applied to multiple cells.  **Agreements on associated ID**   1. Both single cell and multi-cell associated ID can be supported based on NW implementation (i.e., the network may allocate an Associated ID to a single cell and/or to multiple cells). 2. Associated IDs shall be unique within a PLMN in that they can only be associated with one same/similar beam deployment. FFS is we should have signalling indicating multi-cell. 3. We will not define areas. The Associated ID is 24 bits. | Ask RAN1 to re-visit their conclusion of per cell associated ID. | I'm not sure what question to ask RAN1? I don't think RAN2 can ask RAN1 via an LS to revisit conclusions or agreements? I think this must be contribution driven in RAN1.  However, maybe this issue is covered by the Nokia proposed questions below? |
| Nokia | Does one Associated ID identify the location coordinate of a single TRP in cell or does it identify a group of TRPs in a cell where each TRP has it’s own unique location coordinates within the cell?  Does the Associated ID have anything to do with identifying the location of the ARPs of the PRS Resource Sets and PRS Resources?  Do different cells have unique associated IDs? Can different cells in different PFL have the same associated ID? If the same cell belongs to different PFL, should it have different associated ID for each PFL? | Parameter description in the RAN1 parameter list in R1-2506424 is ambiguous and also missing additional details (incomplete description on usage of associated ID). | Added to the draft LS \_v00 |
| vivo | Whether TP-only scenario is supported for implicit indication on TRP location? | Per comment above. | Added to the draft LS \_v00 |
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