**3GPP TSG-RAN WG2 Meeting #124 R2-231xxxx**

**Chicago, USA, Nov. 13th – 17th, 2023**

**Agenda item:** 7.2.1

**Source:** Intel Corporation

**Title:** [Post123bis][412][POS] TS 38.355 (Intel)

**Document for:**  Discussion and decision

# Introduction

This is the report of following email discussion:

* [Post123bis][412][POS] TS 38.355 (Intel)

 Scope: Update the draft TS and generate an open issue list.

 Intended outcome: Draft TS and open issue list for next meeting

 Deadline: Long (Oct. 27th 1000 UTC)

#  Contact Information

Respondents to the email discussion are kindly asked to fill in the following table.

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|  |  |
|  |  |

# Discussion

In RAN2#123bis, RAN2 made good progress on sidelink positioning. Following agreements are related to SLPP specification:

* Capability related agreements (Based on [7]):

Note: Rapporteur assume the draft TP will be provided by Xiaomi in Nov meeting

Agreements:

Introduce the UE capability on supporting positioning mode(i.e. UE based, UE assisted) per positioning method in SLPP.

Introduce the UE capability on supporting periodical reporting per positioning method in SLPP.

Introduce the UE capability on supporting lower value of response time (e.g. 10ms) per positioning method in SLPP.

* RAN1 parameter related agreements (Based on [1]):

Agreements:

The SL-PRS sequence ID can be provided to the TX UE by the LMF/Server UE (via SLPP signalling). If the Tx UE does not receive a sequence ID via SLPP message from the server, the Tx UE is expected to select one by itself. FFS exact SLPP signalling.

For absolute sidelink positioning, the locations of the anchor UEs are provided to the entity that does the location calculation.

* General agreements related to SLPP specification (based on [2]):

Agreements:

Not support SLPP segmentation in Rel-18.

6 octets length session ID

Not to support initiator ID unless companies identify the use case for it.

FFS to introduce endSession Boolean value in the message header with/without the messageBody. When set to FALSE, endSession indicates an active SLPP session. When set to TRUE, endSession indicates the SLPP session has concluded. When set to TRUE, the message should always request an acknowledgement

Introduce an additional SLPP PDU (e.g., SLPP-PDU-Common-SL-PRS-Methods-Contents), which specifies common content for SL-PRS methods only. We still keep positioning specific PDU for future proof.

Working assumption: Add Range and Direction as one choice in the LocationCoordinates IE. We may revise it if RAN1 have different view.

Introduce the following SLPP position methods:

- SL-RTT,

- SL-AoA,

- SL-TDOA,

- SL-TOA.

The capability exchange can be performed between two peer UEs

Keep the EN - Editor’s note FFS if any UEs can request the capabilities from the peer UE., FFS on Endpoint A can also be the server UE

Same as proposal in 401, the provide assistance data message contains multiple SL-PRS configurations.

Reuse the Request/Provide Assistance Data messages for server to get the assistance data from Anchor UEs. FFS on how to capture.

The agreements for SLPP can be applied for LMF involved case unless the issue is identified. FFS on session ID handling since it is also related to forwarding case.

The server (LMF or UE) is expected to downselect based on which anchors are useful (considering anchor UE capabilities, geometry, QoS requirements, etc.), no stage 3 impact to our work. But related to SA2 work. Rely on companies’ internal coordination.

Not to discuss in RAN2 on Server UE Selection Indication procedure, rely on internal coordination with SA2 colleagues.

Not to introduce providing discovery information procedure.

In addition, following TPs were provided in RAN2#123bis. However further updates are needed based on the agreements made in RAN2#123bis:

* RAN1 parameter TP in R2-2310216;
* SLPP session and session procedure (4.1.2, 4.2 and session ID in SLPP-Message) in R2-2310219
* ASN.1 part in R2-2310220
* SLPP procedure in R2-2310221
* Transaction handling in R2-2310222 TS 38.355 v1.1.0

Rapporteur captured the changes in the draft TS 38.355 v1.2.0. Companies are invited to provide comments/suggestions on the draft TS.

Note: the changes are based on the version of TS 38.355 v1.1.0 with revision mark (change on change will be deleted in the final clean version);

## 3.1 Open issue for TS 38.355

The updated open issue list is shown in the table 1:

Table 1: open issue list for TS 38.355

|  |  |  |  |
| --- | --- | --- | --- |
| **Topic** | **Open issues** | **Related to the completion of the WI** | **Remark** |
| **4.1 SLPP general** | * 0 To complete 4.1.1 SLPP Configuration
 | Yes | TP provided by Rapporteur (need confirmation): 0* See draft TS 38.355 v1.2.0, user name R2-2310222
 |
| * 1 To complete 4.1.2 SLPP Sessions and Transactions
* 2 Editor’s note FFS on the definition of SLPP Session.
* 3 Editor's note FFS on the definition of sessionID.
* 4 FFS within what scope the session ID is unique.
* 5 LMF involved case, FFS on how to handle session for UEs involved in the same LMF involved SL based positioning and the relationship between routing ID/correlation ID and session ID. (RAN2#123bis the agreements for SLPP can be applied for LMF involved case unless the issue is identified. FFS on session ID handling since it is also related to forwarding case.)
* 6 FFS if this involves single or separate SLPP sessions (LMF  UE1 and UE1  UE2).
* 7Editor's note FFS on SLPP message header, e.g. cast type, UE ID
* 8 Editor's note FFS the details of initiator in SLPP-TransactionID.
* 9 RAN2#123bis, FFS to introduce endSession Boolean value in the message header with/without the messageBody. When set to FALSE, endSession indicates an active SLPP session. When set to TRUE, endSession indicates the SLPP session has concluded. When set to TRUE, the message should always request an acknowledgement
 | Yes | Resolved (based on RAN2 agreements or RANP agreements): 3, 4, 7, 8RAN2 already agreed * Reuse the LPP transaction mechanism to SLPP.
* 6 octets length session ID
* Not to support initiator ID unless companies identify the use case for it.
* the agreements for SLPP can be applied for LMF involved case unless the issue is identified. FFS on session ID handling since it is also related to forwarding case.

TP provided by Rapporteur (need confirmation): 1, 2* See draft TS 38.355 v1.2.0, user name R2-2310222 and R2-2310219

Company contribution: 5, 6, 9 |
| * 10 To complete 4.1.3 SLPP Position Methods
* 11 Editor’s note FFS on the supported positioning methods.
 | Yes | Resolved (based on RAN2 agreements): 11RAN2 already agreed * Introduce the following SLPP position methods:

- SL-RTT,- SL-AoA,- SL-TDOA,- SL-TOA.TP provided by Rapporteur (need confirmation): 10* See draft TS 38.355 v1.2.0, user name R2-2310222
 |
| * 12 To complete 4.1.4 SLPP Messages
 | Yes | TP provided by Rapporteur (need confirmation): 12* See draft TS 38.355 v1.2.0, user name R2-2310222
 |
| **4.2 Common SLPP Session Procedure** | * 13 To complete 4.2 Common SLPP Session Procedure
 | Yes | TP provided by Rapporteur (need confirmation): 13* See draft TS 38.355 v1.2.0, user name R2-2310219
 |
| **4.3 SLPP Transport** | * 14To complete 4.3 SLPP Transport
* 15 Editor's note FFS on whether SLPP message Segmentation is needed.
* 16 Editor's note FFS on the support of session-less operation.
* 17 Editor's note May be updated based on the discussion on session management.
* 18 Editor's note FFS on the support of broadcast/groupcast.
* 19 Editor's note FFS With regards to duplicate detection: the applicability of the 10min inactivity rule. With regards to retransmission: the applicability of the timeout period of 250ms.
 | Yes | Resolved (based on RAN2 agreements or RANP): 15, 16, 18RAN2 already agreed * Not support SLPP segmentation in Rel-18.

TP provided by Rapporteur (need confirmation): 14, 17* See draft TS 38.355 v1.2.0, user name R2-2310222

Solution to be provided by Rapporteur (need confirmation, see question 1): 19 |
| **5 SLPP Procedures** | * 20 To complete 5 SLPP Procedures
* 21 Editor's note The content of each section will be added in accordance with future agreements, not based on LPP legacy directly.
* 22 Editor's note FFS on whether to add procedure description in the field description as LPP.

**Capability exchange:*** 23 Editor's note FFS if the server obtains the capabilities from corresponding UE directly or for some UEs based on forwarding.
* 24 Editor's note FFS if any UEs can request the capabilities from the peer UE. FFS on Endpoint A can also be the server UE

**Assistance information exchange:*** 25 Reuse the Request/Provide Assistance Data messages for server to get the assistance data from Anchor UEs. FFS on how to capture.
* 26 FFS on whether anchor UE location can be obtained via this procedure;
* 27 Editor's note FFS whether the server can communicate with corresponding UE directly or for some UEs based on forwarding.
* 28 Editor's note FFS if any UEs can trigger the assistance data transfer procedure.

**Location information exchange:*** 29 Editor's note FFS if the server obtains the location information from corresponding UE directly or for some UEs based on forwarding.
* 30 Editor's note FFS if the procedure is used by server to obtain anchor location from the anchor UE;
* 31 Editor's note FFS if any UEs can trigger the location information transfer procedure.
 | Yes | RAN2 already agreed * Same as proposal in 401, the provide assistance data message contains multiple SL-PRS configurations.
* The SL-PRS sequence ID can be provided to the TX UE by the LMF/Server UE (via SLPP signalling). If the Tx UE does not receive a sequence ID via SLPP message from the server, the Tx UE is expected to select one by itself. FFS exact SLPP signalling.
* Reuse the Request/Provide Assistance Data messages for server to get the assistance data from Anchor UEs. FFS on how to capture.
* For absolute sidelink positioning, the locations of the anchor UEs are provided to the entity that does the location calculation.

TP provided by Rapporteur (need confirmation):, 20, 21, 22* See draft TS 38.355 v1.2.0, user name R2-2310221 and RAN2#123bis

Forwarding issue to be discussed in [Post 404]:, 23, 27, 29UE role issue rely on companies’ contribution: 24, 28, 31Solution to be provided by Rapporteur (need confirmation, , see question 2,3): 25, 26, 30 |
| **6.1 General** | * 32 Editor's note FFS on Need code (e.g. how to support no UL/DL), support of delta signalling, full configuration, import IE from LPP, setup/release.
* 33 Editor's note The structure may be updated based on RAN1 agreements/parameter list.
 | Yes | Resolved (based on RAN2 agreements or RANP): 33RAN2 already agreed * Introduce an additional SLPP PDU (e.g., SLPP-PDU-Common-SL-PRS-Methods-Contents), which specifies common content for SL-PRS methods only. We still keep positioning specific PDU for future proof.

Company contribution: 32 |
| **6.2 SLPP messages** | * 34 To complete 6.2 SLPP messages
* - Request Capabilities;
* - Provide Capabilities;
* - Request Assistance Data;
* - Provide Assistance Data;
* - Request Location Information;
* - Provide Location Information;
* - Abort;
* - Error.
 | Yes | TP provided by Rapporteur (need confirmation): 34See draft TS 38.355 v1.2.0, user name R2-2310220 |
| **To capture RAN1 /4 parameters** | General- Handling on positioning method specific parameters* 35 Editor's note FFS on whether any positioning method specific capability IEs should be grouped by positioning method.
* 36 Which parameters shall be put under common, which should be put under positioning method specific IE
 | Yes | TP provided by Rapporteur (need confirmation): 36* See draft TS 38.355 v1.2.0, user name R2-2310216 and RAN2#123bis

Wait for further inputs from RAN1/RAN4: 36Rapporteur will provide TP on latest RAN1 parameter in Nov meeting. Xiaomi to provide the TP on 35, see [Post][407] |
|  | Assistance data:* 37, The details of ProvideAssistanceData and RequestAssistanceData
* 38 How to inform the Rx UE of the parameters for the SL PRS configuration used by Tx UE (if it is done by server, how can server get the information)
* 39 How to capture SL-PRS configuration, common section and then invoked by positioning method specific IE or?
* 40 Capture RAN1 parameters
* 41 The SL-PRS sequence ID can be provided to the TX UE by the LMF/Server UE (via SLPP signalling). If the Tx UE does not receive a sequence ID via SLPP message from the server, the Tx UE is expected to select one by itself. FFS exact SLPP signalling.
 | Yes | Resolved (based on RAN2 agreements or RANP): 38, 39RAN2 already agreed * Introduce an additional SLPP PDU (e.g., SLPP-PDU-Common-SL-PRS-Methods-Contents), which specifies common content for SL-PRS methods only. We still keep positioning specific PDU for future proof.
* Same as proposal in 401, the provide assistance data message contains multiple SL-PRS configurations.
* Reuse the Request/Provide Assistance Data messages for server to get the assistance data from Anchor UEs. FFS on how to capture.

TP provided by Rapporteur (need confirmation): 37, 40* See draft TS 38.355 v1.2.0, user name R2-2310216 and RAN2#123bis

Solution to be provided by Rapporteur (need confirmation, see question 4): 41Wait for further inputs from RAN1/RAN4: 37,40Rapporteur will provide TP on latest RAN1 parameter in Nov meeting. |
|  | Measurement reporting:* 42 The details of Provide Location Information;
* 43 Mapping between measurement results and positioning methods
* 44 separate positioning methods for SL-RSTD and SL-RTOA
* 45 Capture RAN1 parameters
 | Yes | Resolved (based on RAN2 agreements or RANP): 42 (Ranging), 44RAN2 already agreed * Introduce an additional SLPP PDU (e.g., SLPP-PDU-Common-SL-PRS-Methods-Contents), which specifies common content for SL-PRS methods only. We still keep positioning specific PDU for future proof.
* Introduce the following SLPP position methods:
* - SL-RTT,
* - SL-AoA,
* - SL-TDOA,
* - SL-TOA.
* Working assumption: Add Range and Direction as one choice in the LocationCoordinates IE. We may revise it if RAN1 have different view.

TP provided by Rapporteur (need confirmation): 42,43, 45* See draft TS 38.355 v1.2.0, user name R2-2310216 and RAN2#123bis

Wait for further inputs from RAN1/RAN4: 42, 43, 45Rapporteur will provide TP on latest RAN1 parameter in Nov meeting. |
|  | Measurement request:* 46 The details of Request Location Information;
* 47 Capture RAN1 parameters
 | Yes | Resolved (based on RAN2 agreements or RANP): 46 (ranging)RAN2 already agreed * Working assumption: Add Range and Direction as one choice in the LocationCoordinates IE. We may revise it if RAN1 have different view.

TP provided by Rapporteur (need confirmation): 46, 47* See draft TS 38.355 v1.2.0, user name R2-2310216 and RAN2#123bis

Wait for further inputs from RAN1/RAN4: 46, 47Rapporteur will provide TP on latest RAN1 parameter in Nov meeting. |
| **To capture RAN1/RAN4 feature list** | To capture RAN1/RAN4 feature list* 48 The details of Request Capabilities and Provide Capabilities;
 | Yes | Xiaomi to provide the TP on 48, see [Post][407] |
| **To capture RAN2 feature list** | 49 To capture RAN2 feature list* FFS on support of scheduled location time
* FFS on support of triggerEvent
 | Yes | Xiaomi to provide the TP on 49, see [Post][407] |

**Note: the open issue list may be updated based on the discussion.**

**Question 1-Open issue 19:** “19 Editor's note FFS With regards to duplicate detection: the applicability of the 10min inactivity rule. With regards to retransmission: the applicability of the timeout period of 250ms”.

It was raised by a company in “[AT123][409][POS] TS 38.355 (Intel)”.

In RAN2#123bis, [8] discussed the issue, and proposed to introduce the flag end of session.

|  |  |
| --- | --- |
| In LPP a UE must maintain context for 10 minutes before terminating the LPP session. Specifically [4],

|  |
| --- |
| Sending and receiving sequence numbers shall be deleted in a server when the associated location session is terminated and shall be deleted in a target device when there has been no activity for a particular location session for 10 minutes. |

I.e., a UE does not know when a LPP session (which is always initiated by a server) has ended, and therefore, a rather arbitrary 10-minutes timer has been specified.Given the dynamic, mobile nature of sidelink UEs, a 10-minute inactivity time seems excessive. Rather, introducing an endSession indication subsequent to the Request/Provide Capabilities, Request/Provide Assistance Data, and Request/Provide Location Information transactions comprising an SLPP session, obviates the need for a 10-minute inactivity timer and enables a UE to recycle Session and other IDs.  |

However, as discussed in [2], the timer is still needed, regardless of whether we introduce the endSession.

From Rapporteur perspective, for sidelink positioning, both UE only operation and LMF involved operation are supported. At least for LMF involved operation, LPP values (10min and 250 ms) can be reused for SLPP. We do not need to specify different value for LMF involved operation and UE only operation.

**Q1: Do companies agree that 10min inactivity timer and minimum 250ms timeout period are reused for SLPP?**

1. **Yes**
2. **No (please comment)**

|  |  |  |
| --- | --- | --- |
| **Company’s name** | **Yes/No** | **Comments** |
| CATT | Yes | Unified mechanism is preferred.  |
| OPPO | Yes |  |
| vivo | Yes | Explicit session release indication is not needed. |
| ZTE | Yes |  |
| Lenovo | No | We don’t see the value for a unified mechanism.We think the 10min inactivity timer is too long and adds unnecessary complexity for the UE (for maintaining the SL positioning session context). Therefore, we prefer either to lower the timer value or to use an explicit start/end mechanism.On the minimum 250ms timeout period: it is still not clear to us how this minimum value has been derived. Logically, we think that for the direct communication between UEs the value may be too high. However, we are still checking this issue and may bring this issue up at next meeting. |
| LG | No | We don’ think that a fixed single value is suitable for sidelink positioning. We think an enhancement is needed for SLPP. Sidelink positioning based on NR PC5-link will support numerous use cases (e.g. V2X, public safety, commercial, and IIoT) in various coverage scenarios. It is different situation from Uu-based positioning under network controlling. To cover various cases, timers anc counters (e.g. session inactivity timer and ack wait timer) should be configured (default value can be used if not configured) depending on QoS parameters, environments and so on, which could avoid unnecessary power consumption and unexpected session close.  |
| Huawei, HiSIlicon | Yes |  |
| Samsung  | Yes  | We don’t think this incurs significant complexity in SLPP operation, too. |
| Qualcomm | Yes with comments | We are OK with retaining the 250ms minimum retransmission timeout period. We can also agree the 10 minute inactivity timer – but only as a backup to an explicit end session indication. If there is no explicit way to end an SLPP session, some UEs may continue to make measurements and/or transmit SL PRS after a session has ended which will waste resources and possibly interfere with other ongoing sessions. |

**Question 2 and 3-Open issue 25, 26, 30:**

* 25 Reuse the Request/Provide Assistance Data messages for server to get the assistance data from Anchor UEs. FFS on how to capture.
* 26 FFS on whether anchor UE location can be obtained via this procedure;
* 30 Editor's note FFS if the procedure is used by server to obtain anchor location from the anchor UE;

RAN2 has agreed:

For absolute sidelink positioning, the locations of the anchor UEs are provided to the entity that does the location calculation.

Reuse the Request/Provide Assistance Data messages for server to get the assistance data from Anchor UEs. FFS on how to capture.

Naturally, the locations of the anchor UEs should be part of assistance data of Anchor UEs, and therefore Request/Provide Assistance Data messages should be reused for server to get the locations of the anchor UE (as part of assistance data of Anchor UE).

Note: so far *anchorUE-LocationInformation* is captured in *CommonSL-PRS-MethodsIEsProvideAssistanceData* in the drat TS 38.355 v 1.2.0

**Q2: Do companies agree that Request/Provide Assistance Data messages is reused for server to get the locations of the anchor UE (as part of assistance data of Anchor UE)?**

1. **Yes**
2. **No (please comment)**

|  |  |  |
| --- | --- | --- |
| **Company’s name** | **Yes/No** | **Comments** |
| CATT | Yes | Known location info is required and provided in assistance data message, the estimated location is required and provided in provide location message. |
| OPPO | Yes | It is natural for the server to ask for the location info with the Request Assistance Data msg and wait for the feedback in the Provide Assistance Data message. |
| vivo | Yes |  |
| ZTE | Yes |  |
| Lenovo | Yes | Corresponding request flag (e.g “anchorUE-LocationInformationRequest ENUMERATED { true}”) should be added in Request Assistance Data message from server (LMF/server UE) to anchor UE (for both network-based and UE-only operations).[Lenovo2] Comment updated. |
| LG | Yes | Whenever location of anchor UE is changed, anchor UE can deliver its updated location via Provide Assistance Data msg (i.e. deliver procedure in addition to transfer procedure). In addition, location information of anchor UEs can be included with measurement reports (i.e. Provide Location Information msg).  |
| Huawei, HiSilicon | Yes | This is similar to the NRPPa procedure of TRP information exchange. The idea is that we don’t need to define a new NRPPa message between the UE and LMF, but can reuse the SLPP, just the direction of request and response is revsered. |
| Samsung  | Yes  | We think the purpose / use of Request/Provide AD can match with this case. |
| Qualcomm | No - See comment | We think the Request/Provide Location Information messages should be used which should work for any type of anchor UE – stationary or moving and knowing or not knowing its current location. The Request/Provide Assistance Data messages seem to work only for a stationary UE that knows its location – and will require support of GAD shapes and local coordinates in a Provide Assistance Data message (duplicating what is already supported by a Provide Location Information message). |

Regarding open issue 25 “- 25 Reuse the Request/Provide Assistance Data messages for server to get the assistance data from Anchor UEs. FFS on how to capture.”, Rapporteur think that we do not need to capture the agreements explicitly in stage 3. It can be reflected by ASN.1 part, e.g. “*anchorUE-LocationInformation* is captured in *CommonSL-PRS-MethodsIEsProvideAssistanceData*”.

**Q3: Do companies agree that in stage 3, the agreements “Reuse the Request/Provide Assistance Data messages for server to get the assistance data from Anchor UEs” is reflected implicitly via ASN.1 part, no specifical description is needed in procedure part?**

1. **Yes**
2. **No (please comment)**

|  |  |  |
| --- | --- | --- |
| **Company’s name** | **Yes/No** | **Comments** |
| CATT | Yes with comments | Location info of anchor UEs can be transferred between endpoint A and endpoint B. The wording of “from server to …” or “from … to server” won’t exist in the descriptions of Request/Provide AssistanceData because the location info of anchor UEs will be transferred “from server” or “to server”. |
| OPPO | Yes | Agree with CATT |
| vivo | No | Upon receiving a *RequestAssistanceData* message, Endpoint B shall generate a *ProvideAssistanceData* message as a response.Endpoint B shall:1> for each positioning method for which a request for assistance data is included in the message:2> if Endpoint B supports this positioning method:3> include the assistance data for that supported positioning method in the response message;1> set the IE S*LPP-TransactionID* in the response message to the same value as the IE S*LPP-TransactionID* in the received message;1. deliver the response message to lower layers for transmission.

Only method-specific procedure was captured in the current running CR. Other non-method associated descriptions should also captured in the procedure part, e.g., location.  |
| ZTE | Yes but | At this stage, assistance data should at least include anchor UE location and anchor UE sequence ID for SL-PRS transmission:anchor UE lcoation should be gathered by the server UE in both SL-TDOA and SL-TOA;However, server should not get anchor UE sequence ID for SL-PRS transmission when SL-TOA method is applied (SL-TOA is target UE sends SL-PRS and anchor UE receive). |
| Lenovo | Yes | We think the agreement can be captured in stage 2. We also suggest to clarify whether the server refers to “location server” or “server UE”.[Lenovo2] Comment updated. |
| LG | Yes | Each LPP message has a fixed direction, but SLPP messages should have flexible direction. My understanding is that the intention to use “Endpoint A/B” is to support flexible direction.  |
| Huawei, HiSilicon | Yes | But in the procedural description, we need to be careful about this. Legacy LPP spec seems to have specified the direction of the LPP message that is allowed. For example in the figure below. In the SLPP description, we may not need to specify what the entity is. But a general description, like entity A and entity B might be enough. |
| Samsung  | yes | Same view with Huawei that SLPP can have different description to only allow end point concept.  |
| Qualcomm | No | We do not believe the Request/Provide Assistance Data messages are the right ones. These messages are used in LPP to provide data from a server to a UE. An anchor UE is just a type of UE that can be used to transmit and/or measure SL PRS. Only a server UE (or LMF) should send assistance data. If the Provide Assistance Data message is defined to be sent by an anchor UE, there will end up being 2 types of Provide Assistance Data message – one type sent by an anchor UE and another type sent by a server UE or LMF. This may lead to new error cases and implementation problems if the 2 types get combined. |

**Question 4-Open issue 41:**

* The SL-PRS sequence ID can be provided to the TX UE by the LMF/Server UE (via SLPP signalling). If the Tx UE does not receive a sequence ID via SLPP message from the server, the Tx UE is expected to select one by itself. FFS exact SLPP signalling.

So *far sl-PRS-SequenceID* is captured in *CommonSL-PRS-MethodsIEsRequestAssistanceData* in the drat TS 38.355 v 1.2.0. The server will use Request Assistance Data message to obtain the assistance data from anchor, it can be used to configure *far sl-PRS-SequenceID*, and then anchor UE should reply Provide Assistance Data message containing assistance data including *sl-PRS-SequenceID.*

**Q4: Do companies agree that *sl-PRS-SequenceID* is contained in *CommonSL-PRS-MethodsIEsRequestAssistanceData* as shown in the drat TS 38.355 v 1.2.0 (as part of request assistance data of Anchor UE)?**

1. **Yes**
2. **No (please comment)**

|  |  |  |
| --- | --- | --- |
| **Company’s name** | **Yes/No** | **Comments** |
| CATT | No | The logic of sentences before Q4 is confusing. If the server already configures *sl-PRS-SequenceID* to anchor in Request Assistance Data, why is the ID provided to server in Provide Assistance Data message again? When LMF is involved, gNB provide the value of *sl-PRS-SequenceID* to LMF, and then LMF provide the value of *sl-PRS-SequenceID* inProvide Assistance Data.When server UE is involved, value of *sl-PRS-SequenceID* may be transferred between UEs in provide AD message. The request of ID may be included in request AD message. |
|  |  | In summary, the request of sequenceID can be included in ***CommonSL-PRS-MethodsIEsRequestAssistanceData;*** and the value of ***sl-PRS-SequenceID*** can be included in Provide Assistance Data message.sequence ID also can be provided by RAN1 sigaling implicitly, so the sequence ID is optional in SLPP message. |
| OPPO | No | Agree with CATT it seems awkward to send the *sl-PRS-SequenceID* in the RequestAssistanceData message, since such ID should be seen as one piece of assistance data. As a result, it should be included in ProvideAssistanceData message. |
| vivo | No | Agree with CATT and OPPO that the *sl-PRS-SequenceID* should be included in *ProvideAssistanceData* from LMF to Tx UE, if LMF decides the sequence ID.If the LMF relies on the Tx UE to decide the sequence ID, the LMF can send the request AD to Tx UE before triggering the SL-PRS transmission. The LMF may request other AD as well, e.g., location, ARP info of anchor UE. Thus no extra procedure overhead. |
| ZTE | No | Tx UE means SL-PRS Tx UE, not SLPP signing Tx UERx UE means SL-PRS Rx UE, not SLPP signing Rx UERapporteur says putting sequence ID in the RequestLocationInformation saves signling between Tx UE and server. However it only saves signaling in SL-TDOA method, not SL-TOA method(since in SL-TDOA, anchor UE location and anchor UE’s sequence ID can be both in a same provide/request AD message). In SL-TOA method, server should provide SL-PRS Tx UE(target UE) with sequence ID using ProvideAssistanceData, then server sends the sequence ID to the anchor UEs for them to receive SL-PRS. So for clearer understanding, we suggest to **use unified approach for SL-TDOA and SL-TOA, i.e., sequence ID should be only introduced in Provide Assistance Data message in both methods.** |
| Lenovo | No | We share the view from CATT that the logic for providing the sl-PRS-SequenceID to anchor UE in Request Assistance Data is confusing. We prefer to send the sl-PRS-SequenceID in Provide Assistance Data. In this context we don’t see the need to send request for the sl-PRS-SequenceID in Request Assistance Data. This enables the SL-PRS sequence ID to be provided in an unsolicited manner to the Tx UE, where the Tx UE can then use the sequence ID to generate the SL-PRS signal.[Lenovo2] Comment updated. |
| LG | No | Same view with previous comments. SL-PRS sequence ID is used when transmitting/receiving of SL-PRS between target UE and anchor UE, i.e., generally at Location Information transfer procedure. Before that, SL-PRS sequence ID should be delivered e.g., Provide Assistance Data msg.  |
| Huawei, HiSilicon | Yes |  |
| Samsung  | No  | We also have the same view with CATT. |
| Qualcomm | No |  |

**Q5: Is any issue missing from the list? Please add if any.**

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| **Company’s name** | **Section** | **Missing issues** |
| OPPO | 5 | We need to discuss the hybrid PC5+Uu positioning as the coming meeting is the last RAN2 meeting before the WI closes. In particular, we think that we could discuss if it is feasible to let SLPP message transmit the PC5 trigger condition towards the UE and in which particular message should we capture related IE, e.g., ProviAssistanceData msg.  |
| ZTE |  | Agree with OPPO that the hybird PC5+Uu positioning should be addressed since it is in the updated WID |
| Lenovo | 5 | We share the view from OPPO that potential impacts of Hybrid Uu+PC5 positioning /joint Uu+PC5 positioning should be discussed as an open issue considering it is within R18 WID scope.  |
| LG |  | We could not find SA2 overall procedure for hybrid positioning. Not sure RAN2 can finish stage-2/3 works for hybrid positioning in this release.  |
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## 3.2 Summary of the changes in the draft TS 38.355 v1.2.0

**1 Based on R2-2310222 (user name Yi (Intel), change based on latest agreements used RAN2#123bis as user name)**

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| **Change 1**: Based on the revised WID and RAN1 agreements on supported positioning method, following ENs can be deleted/updated directly.

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| * Editor’s note FFS on the supported positioning methods.
* Editor's note FFS on the support of session-less operation.
* Editor's note FFS on the support of broadcast/groupcast.
* Editor's note FFS on SLPP message header, e.g. cast type, UE ID
 |

**Change 2**: Abbreviations of positioning methods are added; Updated based on agreements:Introduce the following SLPP position methods:- SL-RTT,- SL-AoA,- SL-TDOA,- SL-TOA.**Change 3**: RAN2 has agreed “Reuse the LPP transaction mechanism to SLPP”, therefore the initiatorID (UE ID) in SLPP-TransactionID is needed and the corresponding EN “Editor's note FFS the details of initiator in SLPP-TransactionID.” can be deleted as well, and corresponding handling is added; **To our understanding, L2 ID can be used as initiatorID, i.e. to use the 16 most significant bits of the Layer-2 ID set to the identifier provided upper layers as defined in TS 23.287;** Updated based on agreements:Not to support initiator ID unless companies identify the use case for it.**Change 4**: general description on SLPP configuration based on Endpoint A and Endpoint B. |

**2 Based on R2-2310219 (user name R2-2310219)**

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| An SLPP session is used between UEs or a Location Server and an UE ~~the target device~~ in order to obtain location related measurements or a location estimate or to transfer assistance data. A single SLPP session is used to support a single location request (e.g., for a single SL-MT-LR, or SL-MO-LR ~~or NI-LR~~). Multiple SLPP sessions can be used between the same endpoints to support multiple different location requests (as required by TS 23.271 [6]).  |

**Proposal 1: take above SLPP session description as baseline (also in the TP).** Regarding issue 2 and 3, as proposed in [2], “*Proposal : For the UE-only scenario, the initiating UE needs to self-assign a unique session ID to be used for the positioning session and add initiating UE ID ( Layer 2 ID) together with the session ID, which ensures that the combination of initiating UE ID and session ID is unique.*”, Rapporteur captures it Layer 2 ID as part of session ID.Updated based on agreements:6 octets length session IDThen issue 5 “Editor's note FFS on SLPP message header, e.g. cast type, UE ID” can also be deleted. In addition, the text proposal on clause 4.1.2 SLPP Sessions and Transactions” and “4.2 Common SLPP Session Procedure” are also provided in the Annex. |

**3 Based on R2-2310220 (user name R2-2310220)**

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| Focus the messages not covered by the TP in [401], e.g. RequestCapabilities, ProvideCapabilities, RequestAssistanceData, ProvideAssistanceData, About and Error messages . (Change method A/B/C to SL AoA, SL TDOA, SL RTT, complete the Abort , Error.) Updated based on agreements:Introduce the following SLPP position methods:- SL-RTT,- SL-AoA,- SL-TDOA,- SL-TOA.In addition,**Proposal 1: Follow RRC style, remove C1 extension from message level and add a lateNonCriticalExtension under message IE.****Proposal 2: Follow RRC style, not use extension mark “…” under ENUMERATE, spare could be used instead.**  |

**4 Based on R2-2310221 (user name R2-2310221)**

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| To make the discussion simple, Rapporteur only provides the basic procedure in the text proposal and also adds Editor notes for new open issues, i.e.**Capability exchange:*** Only capture the capability transfer procedure between Endpoint A and Endpoint B;
* Editor's note FFS if the server obtains the capabilities from corresponding UE directly or for some UEs based on forwarding.
* Editor's note FFS if any UEs can request the capabilities from the peer UE.
* Note 1: target UE can use this procedure to get the capability of anchor UEs or server UE;
* Note 2: Server can use this procedure to get the capability of anchor UEs or target UE;

**Assistance information exchange:*** Only capture the assistance information exchange procedure between Endpoint A and Endpoint B;
* Editor's note FFS if the server configures AD for Rx UE or RxUE gets it from the Tx UE directly;

Updated based on agreements:Same as proposal in 401, the provide assistance data message contains multiple SL-PRS configurations. * Editor's note FFS if the procedure is used by server to config/obtain the assistance data from the Tx UE; FFS on whether anchor UE location can be obtained via this procedure;

Updated based on agreements:The SL-PRS sequence ID can be provided to the TX UE by the LMF/Server UE (via SLPP signalling). If the Tx UE does not receive a sequence ID via SLPP message from the server, the Tx UE is expected to select one by itself. FFS exact SLPP signalling.Reuse the Request/Provide Assistance Data messages for server to get the assistance data from Anchor UEs. FFS on how to capture.For absolute sidelink positioning, the locations of the anchor UEs are provided to the entity that does the location calculation.* Editor's note FFS whether the server can communicate with corresponding UE directly or for some UEs based on forwarding.
* Editor's note FFS if any UEs can trigger the assistance data transfer procedure.
* Note 1: the target can use this procedure to get the assistance data from anchor UEs or server UE;
* Note 2: the server can also use this procedure to get the assistance data from anchor UEs;

**Location information exchange:*** Only capture the Location information exchange procedure between Endpoint A and Endpoint B;
* Editor's note FFS if the server obtains the location information from corresponding UE directly or for some UEs based on forwarding.
* Editor's note FFS if the procedure is used by server to obtain anchor location from the anchor UE;
* Editor's note FFS if any UEs can trigger the location information transfer procedure.
* Note 1: the target can use this procedure to get the measurement results from anchor UEs;
* Note 2: the server can also use this procedure to get the measurement results from anchor UEs or target UE;

**Error handling*** Same as LPP except segmentation part since it is FFS.

Updated based on agreements:Not support SLPP segmentation in Rel-18.**Abort procedure*** Same as LPP;

Regarding the EN, Rapporteur think that LPP approach would be the good start, i.e. to add procedure description in the field description as LPP and therefore the following EN can be removed. Editor's note FFS on whether to add procedure description in the field description as LPP.**Proposal 1: Follow LPP principle on the procedure, i.e. to add procedure description in the field description as LPP.** |

**5 TP on RAN1 parameters in R2-2310216 (user name R2-2310216 and RAN2#123bis)**

**6 Capture following agreements (user name RAN2#123bis)**

The SL-PRS sequence ID can be provided to the TX UE by the LMF/Server UE (via SLPP signalling). If the Tx UE does not receive a sequence ID via SLPP message from the server, the Tx UE is expected to select one by itself. FFS exact SLPP signalling.

For absolute sidelink positioning, the locations of the anchor UEs are provided to the entity that does the location calculation.

Not support SLPP segmentation in Rel-18.

6 octets length session ID

Not to support initiator ID unless companies identify the use case for it.

Introduce an additional SLPP PDU (e.g., SLPP-PDU-Common-SL-PRS-Methods-Contents), which specifies common content for SL-PRS methods only. We still keep positioning specific PDU for future proof.

Working assumption: Add Range and Direction as one choice in the LocationCoordinates IE. We may revise it if RAN1 have different view.

Introduce the following SLPP position methods:

- SL-RTT,

- SL-AoA,

- SL-TDOA,

- SL-TOA.

The capability exchange can be performed between two peer UEs

Keep the EN - Editor’s note FFS if any UEs can request the capabilities from the peer UE., FFS on Endpoint A can also be the server UE

Same as proposal in 401, the provide assistance data message contains multiple SL-PRS configurations.

**Q6: Companies are invited to provide comments/suggestions on the draft TS 38.355 v1.2.0 in the following table.**

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| **Company** | **Section and issues** | **Suggestion** | **Rapporteur comments** |
| **CATT** | **4.1.3 SLPP Position Methods** | **Should be 4.1.3 SLPP Positioning Methods** |  |
| **CATT** | **Figure 4.1.1-1: SLPP Configuration for Control-Plane Positioning in NG-RAN** | **1. What the meaning of measurements (A, B or A+B) from endpoint A to B?****2. It seems that there is SLPP siganling between reference source and point A/B which is different from NRPPa.**  |  |
| **CATT** | 4.1.2 SLPP Sessions and TransactionsAn SLPP session is used between UEs or a Location Server and a UE in order to obtain location related measurements, | Prefer to add the wording in blue: An SLPP session is used between UEs or a Location Server and a UE in order to obtain location related measurements of sidelink signals. |  |
| **vivo** | In the Figure 4.1.1-1, there are not the definition of Measurement A and Measurement B.  | “easurements（A，B or A+B） -> Measurements. |  |
| **vivo** | 4.3.2Sending and receiving sequence numbers shall be deleted in a server when the associated location session is terminated and shall be deleted in a target device when there has been no activity for a particular location session for 10 minutes. Not only the target device, anchor UEs also needs to be considered. | shall be deleted in a target device -> shall be deleted in the UE(s) that participating in the location session |  |
| **Lenovo** | TS versioning | Strictly speaking v1.1.0 has not been endorsed at last meeting. So, update of the TS should be still v1.1.0 and not v1.2.0. |  |
| **Lenovo** | Figure 4.1.1-1 | To our understanding, measurements “A”, “B” refer to "NR PC5 radio signals. This should be reflected in the figure. |  |
| **Lenovo** | 4.1.3 SLPP Position Methods | In the sentence below “based on NR PC5 radio signals” can be added, see below.This version of the specification defines SL-TDOA, SL-TOA, SL-AoA and SL-RTT positioning methods based on NR PC5 radio signals. |  |
| **Lenovo** | 4.1.4 SLPP Messages | In the description of the fields “Sequence Number” and “Acknowledgement” the term “LPP” should be replaced by “SLPP”. |  |
| **Lenovo** | 5.1.3 Capability Indication procedure | In the sentence below the word “target” should be replaced by "Endpoint A":The Capability Indication procedure allows the target to provide unsolicited capabilities to the Endpoint B and is shown in Figure 5.1.3-1. |  |
| **Lenovo** | 6.2.2 Message definitions | In RequestAssistanceData-IEs: in the name of “slSL-TDOA-RequestAssistanceData” the redundant prefix “SL” should be removed.slSL-TDOA-RequestAssistanceData OCTET STRING OPTIONAL, |  |
| **Lenovo** | 6.3.1 CommonIEsAbort | In the description of “abortCause” the part “or triggeredReporting” should be removed since triggered reporting is not defined in CommonIEsRequestLocationInformation. |  |
| **Lenovo** | 6.5 CommonIEsRequestLocationInformation, IE LocationInformationType | Typo in ENUMERATED type value “rangenEstimateRequired”, i.e. letter “n” should be removed. |  |
| **Lenovo** | 6.5 CommonIEsRequestLocationInformation, IE ResponseTime | Field “responseTimeEarlyFix”: In LPP this was introduced to obtain early location information from a target for emergency call. We wonder whether SL positioning is applicable for emergency call. |  |
| **Lenovo** | 6.5 CommonIEsRequestLocationInformation, IE ResponseTime | IE type of field “unit”: extension marker is defined in ENUMERATED type. We understood that this should not be done.ENUMERATED { ten-seconds, ten-milli-seconds, ... } |  |
| **Lenovo** | 6.5 CommonIEsProvideLocationInformation | Field “earlyFixReport”: depends on the support of early location measurements or estimate for emergency call, see our comment above on field “responseTimeEarlyFix”. |  |
| **LG** | 4.1.1 Figure 4.1.1-1: SLPP Configuration for Control-Plane Positioning in NG-RAN | It seems that current figure 4.1.1-1 shows that Endpont A is target UE, Endpoint B is server UE (or LMF), and Reference Source is anchor UE in SL-TDOA. SLPP can be used between all types of UE except between anchor UEs. In addition, Reference Source should be UE as well as gNB for joint PC5+Uu (hybrid) positioning if suppored in this release.  |  |
| **Qualcomm** | SLPP-Message ::= SEQUENCE { transactionID SLPP-TransactionID OPTIONAL, endTransaction BOOLEAN, sequenceNumber SequenceNumber, sessionID SessionID, acknowledgement Acknowledgement OPTIONAL, slpp-MessageBody SLPP-MessageBody OPTIONAL, nonCriticalExtension SEQUENCE {} OPTIONAL | I don't think the sessionID can be mandatory present, since may not always be needed for LMF-UE.I don't think the sequenceNumber can be mandatory. It would only be needed if a sender decides to use the reliable transport features, and it is not present in an ACK. |  |
| **Qualcomm** | LocationInformationType ::= ENUMERATED { locationEstimateRequired, locationMeasurementsRequired, locationEstimatePreferred, locationMeasurementsPreferred, rangenEstimateRequired, rangeMeasurementsRequired, rangeEstimatePreferred, rangeMeasurementsPreferred}LocationCoordinates ::= CHOICE { ellipsoidPoint Ellipsoid-Point, ellipsoidPointWithUncertaintyCircle Ellipsoid-PointWithUncertaintyCircle, ellipsoidPointWithUncertaintyEllipse EllipsoidPointWithUncertaintyEllipse, polygon Polygon, ellipsoidPointWithAltitude EllipsoidPointWithAltitude, ellipsoidPointWithAltitudeAndUncertaintyEllipsoid EllipsoidPointWithAltitudeAndUncertaintyEllipsoid, ellipsoidArc EllipsoidArc, rangeAndDirection RangeAndDirection, ...} | This seems to cover only absolute location? How would relative location be handled?(same for relative velocity) |  |
| **Qualcomm** | SL-PRS-Config ::= SEQUENCE {-- For absolute sidelink positioning, the locations of the anchor UEs are provided to the entity that does the location calculation. anchorUE-LocationInformation LocationCoordinates OPTIONAL,  expectedSL-AzimuthAoA-AndUncertainty INTEGER(0..3599), -- expected-SL-AoA-and-Uncertainty expectedSL-ZenithAoA-AndUncertainty INTEGER(0..1799), -- expected-SL-AoA-and-Uncertainty ...} |  This should be needed only for SL-AoA (not common configuration). |  |
| **Qualcomm** | SL-PRS-MeasElement ::= SEQUENCE { los-NLOS-Indicator LOS-NLOS-Indicator OPTIONAL, -- sl-losNlosIndicator sl-AzimuthAoA-FirstPathResult INTEGER (TBD) OPTIONAL, -- sl-PRS-AoA sl-AzimuthAoA-LCS-GCS-Translation LCS-GCS-Translation OPTIONAL, -- sl-LCS-to-GCS-translation sl-POS-ARP-ID-Rx INTEGER (1..4) OPTIONAL, -- sl-pos-arpID-Rx sl-PRS-RxTxTimeDiffFirstPathResult INTEGER (TBD) OPTIONAL, -- sl-PRS-RxTxTimeDiff sl-PRS-RSRP-Result INTEGER (TBD) OPTIONAL, -- sl-PRS-RSRP sl-PRS-FirstPathRSRPP-Result INTEGER (TBD) OPTIONAL, -- sl-PRS-RSRPP sl-PRS-AdditionalPathList SL-PRS-AdditionalPathList OPTIONAL, sl-RSTD-FirstPathResult INTEGER (TBD) OPTIONAL, -- sl-PRS-RSTD sl-RTOA-FirstPathResult INTEGER (TBD) OPTIONAL, -- sl-PRS-RTOA sl-ZenithAoA-FirstPathResult INTEGER (TBD) OPTIONAL, -- sl-PRS-AoA sl-ZenithAoA-LCS-GCS-Translation LCS-GCS-Translation OPTIONAL, -- sl-LCS-to-GCS-translation ...} | It seems all measurements are proposed to be common among all SL-Pos methods? Why do we then have method specific PDUs?The AoA measurements should go into SL-AoA PDU, the RxTx into SL-RTT PDU etc.I.e., the purpose of this structure is that a UE which supports e.g., SL-RTT only should not see any ASN.1 related to SL-TDOA, SL-AoA, etc. |  |
| **Lenovo2** | 6.2.1 General message structure | In the NOTE2 below, “PDU” can be added.NOTE 2: An implementation supporting SL-RTT, SL-AoA, SL-TDOA, or SL-TOA must also support the *SLPP-PDU-CommonSL-PRS-MethodsContents* PDU. |  |
| **Lenovo2** | 6.4 Multiplicity and type constraint values + 6.6 SLPP PDU Common SL-PRS Methods Contents | Name of new constant “slMaxTxUEs” should better say “maxNrOfSLTxUEs”. |  |
| **Lenovo2** | 6.6 CommonSL-PRS-MethodsIEsProvideLocationInformation field descriptions | Field name “sl-AzimuthAoA-LCS-GCS-Translation” is duplicated and the second one (last entry in the table) should be changed to “sl-ZenithAoA-LCS-GCS-Translation”. |  |
| **Lenovo2** | 6.5 CommonIEsRequestLocationInformation | IE ReportingDuration is defined but not used and thus, can be removed. It is applicable only for triggered reporting.ReportingDuration ::= INTEGER (0..255) |  |
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# Summary

Based on the input from companies, we have the following proposals:

To be added;

#  Reference

[1] R2-2310216 Report of [Post123][401][POS] RAN2 impact from SL-PRS parameters (Intel) Intel Corporation

[2] R2-2311374 [AT123bis][401][POS] Progressing TS 38.355 (Intel) Intel Corporation

[3] R2-2310219 TS38.355 TP on SLPP session and session procedure Intel Corporation

[4] R2-2310220 TS38.355 TP on ASN.1 part Intel Corporation

[5] R2-2310221 TS38.355 TP on SLPP procedure Intel Corporation

[6] R2-2310222 TS 38.355 v1.1.0 Intel Corporation

[7] R2-2311390 Summary of [AT123bis][426][POS] Rel-18 positioning capabilities (Xiaomi) Beijing Xiaomi Mobile Software

[8] R2-2310912 Further Considerations on SLPP Design Qualcomm Incorporated