

3GPP TSG RAN WG1 #110bis-e R1-2210443

e-Meeting, October 10th – 19th, 2022

Source: Moderator (Xiaomi)

Title: Summary of [110bis-e-R18-Pos-01] Email discussion on incoming SA2 LS in R1-2208338 on terminology alignment for ranging/sidelink positioning

Agenda item: 9.5.1

Document for: Discussion

1 Introduction

This document is the summary of email discussion for the following:

[110bis-e-R18-Pos-01] Email discussion on incoming SA2 LS in R1-2208338 on terminology alignment for ranging/sidelink positioning by October 14 – Qun Zhao (Xiaomi)

Check point for 1st round discussion:

All companies, please provide your views for 1st round discussion before Tuesday, October 11th, 23:59 UTC. After that the moderator will try to conclude and initiate 2nd round discussions based on the received comments.

All companies, please provide your views for 2nd round discussion before Wed., October 12th, 23:59 UTC.

All companies, please provide your views for 3rd round discussion before Thursday, October 13th, 16:00 UTC.

All companies, please provide your views for 3rd round discussion before Friday, October 14th, 8:00 AM UTC.

2 Background

In RAN1#109-e, the following agreements on terminologies are made:

Agreement

For the purpose of RAN1 discussion during this study item, at least the following terminology is used:

- **Target UE:** UE to be positioned (in this context, using SL, i.e. PC5 interface).
- **Sidelink positioning:** Positioning UE using reference signals transmitted over SL, i.e., PC5 interface, to obtain absolute position, relative position, or ranging information.
- **Ranging:** determination of the distance and/or the direction between a UE and another entity, e.g., anchor UE.
- **Sidelink positioning reference signal (SL PRS):** reference signal transmitted over SL for positioning purposes.
- **SL PRS (pre-)configuration:** (pre-)configured parameters of SL PRS such as time-frequency resources (other parameters are not precluded) including its bandwidth and periodicity.
- Continue discussion on additional terminology clarification(s) such as: Initiator UE, Responder UE, Sidelink Positioning group, reference UE, etc, including whether such terminology is needed within RAN1 discussion.

Agreement

For the purpose of RAN1 discussion during this study item, at least the following terminology is used:

- **Anchor UE:** UE supporting positioning of target UE, e.g., by transmitting and/or receiving reference signals for positioning, providing positioning-related information, etc., over the SL interface.
 - FFS: clarification of the knowledge of the location of the anchor UE

FS_Ranging_SL has been established as a R18 Stage 2 Study Item with 71% completion up to SA2#152E. Terminologies, Architecture assumptions, Architecture requirements, General reference architecture, 8 Key Issues and their solutions are defined and documented in TR 23.700-86 v0.4.0.

On the terminologies, Ranging, SL Reference UE, Target UE, Assistant UE, Located UE, Sidelink Positioning, Positioning, Relative position, are defined by SA2 and some of them are either aligned or mapped with RAN definitions.

Additionally, the following terminologies are also defined by SA2: SL Positioning Server UE, SL Positioning Client UE, Network-assisted Operation, and UE-only Operation.

The terminologies that are defined by SA2 are copied as below:

Ranging: refers to the determination of the distance between two UEs or more UEs and/or the direction of one UE (i.e. Target UE) from another UE (i.e. Reference UE) via PC5 interface.

SL Reference UE: A UE, supporting positioning of target UE, e.g. by transmitting and/or receiving reference signals for positioning, providing positioning-related information, etc., using Sidelink.

NOTE 1: SL Reference UE is understood as "Anchor UE" in RAN1 TR 38.859 [x]

NOTE X: "Reference UE" mentioned in KIs and Solutions of this TR refers to "SL Reference UE".

Target UE: A UE whose distance, direction and/or position is measured with the support from one or multiple SL Reference UEs using Sidelink in the Ranging based service and Sidelink positioning.

Assistant UE: A UE supporting Ranging/Sidelink Positioning between a SL Reference UE and a Target UE over PC5, when the direct Ranging/Sidelink positioning between the SL Reference UE and Target UE cannot be supported. The measurement/result of Ranging/Sidelink Positioning between the Assistant UE and the SL Reference UE and that between the Assistant UE and the Target UE are determined and used to derive the Ranging/Sidelink Positioning result between Target UE and SL Reference UE.

Located UE: A SL Reference UE of which the location is known or is able to be known using Uu based positioning. A Located UE can be used to determine the location of a Target UE using Sidelink Positioning.

Editor's Note: Change term Network assisted UE and Second UE to Located UE throughout the document.

SL Positioning Server UE: A UE offering location calculation for Sidelink Positioning and Ranging based service. It interacts with other UEs over PC5 as necessary in order to calculate the location of the Target UE. Target UE or SL Reference UE can act as SL Positioning Server UE if location calculation is supported.

Editor's note: Change term Location Server UE to SL Positioning Server UE throughout the document.

SL Positioning Client UE: A third-party UE, other than SL Reference UE and Target UE, which initiates Ranging/Sidelink positioning service request on behalf of the application residing on it.

NOTE X: The SL Positioning Client UE does not have to support Ranging/Sidelink positioning capability, but a communication between the SL Positioning Client UE and SL Reference UE/Target UE has to be established, either via PC5 or via 5GC, for the transmission of the service request and the result.

Editor's note: Change term Third Party UE to SL Positioning Client UE throughout the document.

Sidelink Positioning: Positioning UE using PC5 to obtain absolute position, relative position, or ranging information.

Positioning: A functionality, which detects a geographical location and optionally, velocity (of e.g. a mobile terminal).

Network assisted Operation: Operation of Ranging/Sidelink Positioning with the involvement of 5GC NFs for the service request handling and result calculation.

UE-only Operation: Operation of Ranging/Sidelink Positioning in which the service request handling and result calculation are performed by UE.

NOTE X: For UE-only Operation, the communication among UEs are over PC5.

Relative position: An estimate of the UE position relative to other network elements or relative to other UEs.

Editor's note: Definition on the terminology of Ranging and Sidelink positioning will be aligned with RAN WGs, and will be revisited when there's any conclusion in RAN WGs.

SA2 asked to evaluate if the terminologies defined by SA2 are aligned and if any further updates are needed, and gives a feedback to SA2 [1].

3 Companies view

Some companies have provided their views in contributions, which are summarized as below:

Table 1: Summary of Companies views

Source	Views
[2]	<p>In RAN1’s view, the Target UE is UE to be positioned which is aligned with the definition of Target UE defined in SA2. And, the Anchor UE in RAN1 is defined as the UE supporting positioning of the target UE which can include the SL Reference UE, Assistant UE, and Located UE defined in SA2. Besides, the Sidelink positioning in RAN1 is defined as Positioning UE using reference signals transmitted via PC5, which is including absolute position, relative position, or ranging.</p>
[3]	<p>With regard to the definition of SL Positioning Client UE in the TR as follows, RAN1’s understanding is that, SL Reference UE and Target UE may also be a SL Positioning Client UE to initiate Ranging/Sidelink positioning service. RAN1 would like to request SA2’s confirmation</p> <p>With regard to the definition of SL Reference UE and Assistant UE in the TR as follows, from RAN1 perspective, if the direct Ranging/Sidelink positioning between the SL Reference UE and Target UE cannot be supported, and the positioning happens between Assistant UE and target UE, then the Assistant UE will be equivalent to an SL Reference UE. RAN1 would like to understand the clear difference between SL Reference UE and Assistant UE.</p> <p>With regard to the definition of Ranging and Relative position, RAN1 thinks Ranging could include only one of distance and direction. That’s because, if Ranging includes both distance and direction, it will be equivalent to Relative position.</p>
[4]	<p>It is RAN1 understanding that the role of anchor UE and reference UE may not be the same.</p> <p>One example is shown below where the position of a target UE relative to a reference UE is needed, but the SL positioning procedure involves other anchor UEs, which is currently under RAN1 evaluation.</p> <p>RAN1 suggests SA2 to look into the difference between anchor UE understood by RAN1 and reference UE defined by SA2 and check if the update to TR 23.700-86 is needed.</p>

[5]	Terminologies including target UE, sidelink positioning, and ranging defined by SA2 are not fully aligned with the terminologies defined by RAN1. SA2 can determine whether any further updates are needed for the terminologies defined by SA2.
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4 1st round discussion

4.1 On definition of SL Reference UE

In [4] it is proposed that the role of anchor UE and SL Reference UE may not be the same, as shown in the following example:

The definition of SL reference UE given by SA2 and the definition of anchor UE in RAN1 agreement are as following:

Anchor UE (RAN1): UE supporting positioning of target UE, e.g., by transmitting and/or receiving reference signals for positioning, providing positioning-related information, etc., over the SL interface.

FFS: clarification of the knowledge of the location of the anchor UE

SL Reference UE (SA2): A UE, supporting positioning of target UE, e.g. by transmitting and/or receiving reference signals for positioning, providing positioning-related information, etc., using Sidelink.

NOTE 1: SL Reference UE is understood as "Anchor UE" in RAN1 TR 38.859 [x]

NOTE X: "Reference UE" mentioned in KIs and Solutions of this TR refers to "SL Reference UE".

From Note 1 under definition of SL reference UE, SA2 understanding is that Anchor UE and SL Reference UE are the same.

Q1: Do you agree that the role of anchor UE and SL Reference UE may not be the same as shown in example in [4], and suggest SA2 to look into the difference between anchor UE understood by RAN1 and reference UE defined by SA2?

Feedback Form 1: Feedback Form for Q1

1 – Huawei Technologies Sweden AB
Yes. We think that is the reason why RAN1 introduced anchor UE instead of reference UE in the first place.
2 – Qualcomm Incorporated
The definition of a reference UE in SA2 corresponds to the definition of an anchor UE in RAN1. That other roles can exist does not require further action from RAN1 or SA2 at this point.

3 – InterDigital France R&D

There needs to be clarification what roles “SL Reference UE” or “Assistance UE” play in positioning methods (e.g., SL-TDOA, RTT-type solutions using SL, SL-AoA). For example, will their information be included in the measurement report? Do they serve as the reference in TDOA measurement?

4 – China Mobile E-Commerce Co.

In our views, the role of the reference UE shown in the above figure is similar as PRU, which may mitigate some errors between anchor UEs and help improve positioning accuracy, which is different from anchor UE defined by RAN 1 (a.k.a. SL reference UE defined by RAN2).

Whether RAN1 should inform SA2 to look into the difference depends on the discussion of whether reference UE (in the figure) will be introduced in RAN1 to further improve the accuracy.

5 – ZTE Corporation

NO, there is no definition for Reference UE in RAN1. We don't think any ambiguity.

6 – Samsung R&D Institute UK

No, We understand that they are the same terminology based on Note 1.

7 – CATT

In our view, the “SL Reference UE” define in SA2 is the same as the “Anchor UE” defined in RAN1, since the definitions of such UE in SA2 and RAN1 are almost the same descriptions. In addition, the Note 1 also points out that *SL Reference UE is understood as "Anchor UE" in RAN1 TR 38.859 [x]*. And we prefer to send the reply LS to SA2 to let SA2 change the “SL Reference UE” to “Anchor UE” to align with RAN1's terminology, in order to avoid any possible ambiguity.

8 – vivo Mobile Communication Co.

No, We understand that they are the same terminology based on the same descriptions

9 – Continental Automotive GmbH

The example in [4] seems to suggest that the role of SL reference UE and anchor UE may be different, but it is not clear why this difference occurs. E.g., would it make any difference if in Figure 1, the UE marked as “reference UE” is called “anchor UE” instead?

It seems that the example in [4] is making out a difference between a UE used as reference for relative positioning (called “reference UE” in Fig. 1) and a UE which aids the target UE in the positioning procedure by transmitting SL PRS signals (called “anchor UE” in Fig. 1). This difference, however, does not seem to directly follow from the existing definitions for SL reference UE (SA2) and anchor UE (RAN1) per se, which appear to be the same.

Overall, it is better to use the same term (say anchor UE) in both RAN1 and SA2.

10 – OPPO Beijing

No, in our understanding they are the same.

11 – Futurewei Technologies

In our understanding they provide the same functionality at the PHY layer level.

12 – Motorola Mobility Germany GmbH

[Lenovo]

No, based on the SA2 LS, we understand that the Reference UE is referring to the same functionality as that of the Anchor UE defined and agreed in RAN1. We should aim to align the terminology across WGs and avoid introducing redundant UE definitions, which complicate the overall discussion.

13 – Intel Corporation (UK) Ltd

No, we think they are effectively the same in terms of the core functionalities.

14 – Nokia UK

No. The confusion in [4] seems to stem from the fact that it is mixing SA2’s old definition of reference UE (“A UE who determines a reference plane and reference direction in the Ranging based service and Sidelink positioning”), which was relevant especially for relative positioning (that is, relative position is between target UE and reference UE), and SA2’s new definition of SL Reference UE.

4.2 On definition of Assistant UE

In [3] it is proposed if the direct Ranging/Sidelink positioning between the SL Reference UE and Target UE cannot be supported, and the positioning happens between Assistant UE and target UE, then the Assistant UE will be equivalent to a SL Reference UE. The Assistant UE defined by SA2 is:

***Assistant UE:** A UE supporting Ranging/Sidelink Positioning between a SL Reference UE and a Target UE over PC5, when the direct Ranging/Sidelink positioning between the SL Reference UE and Target UE cannot be supported. The measurement/result of Ranging/Sidelink Positioning between the Assistant UE and the SL Reference UE and that between the Assistant UE and the Target UE are determined and used to derive the Ranging/Sidelink Positioning result between Target UE and SL Reference UE.*

Q2: Do you agree that the Assistant UE will be equivalent to a SL Reference UE if the direct Ranging/Sidelink positioning between the SL Reference UE and Target UE cannot be supported, and the positioning happens between Assistant UE and target UE, and request SA2 to clarify the difference between SL Reference UE and Assistant UE?

Feedback Form 2: Feedback From for Q2

1 – Huawei Technologies Sweden AB

In general, we think that if relative positioning/ranging between the assistant UE (UE C) and the original reference UE (UE A) and the target UE (UE B) is initiated separately, then the pair of UE A and UE C and the pair of UE B and UE C also become two (reference UE, target UE) pairs, but assistant UE may not be a reference UE, because it could also be a target UE, and also the role appears in different positioning sessions.

In addition, assistant UE can also be an anchor UE from RAN1 perspective, which is related to the question in 4.1.

2 – Qualcomm Incorporated

RAN1 has not defined either term or role. In our view, this discussion is the scope of RAN2 and SA2, not RAN1.

3 – InterDigital France R&D

Similar to our response to Q1. It's not clear about the functionalities of "SL Reference UE" or "Assistance UE" in positioning methods.

4 – China Mobile E-Commerce Co.

The definition of Assistant UE seems contradictory with that of SL Reference UE defined by SA2. Assistant UE is a UE supporting ranging/sidelink positioning between a SL Reference UE and a Target UE over PC5 when the direct link between the two is not achievable. However, the definition of SL Reference UE is a UE supporting positioning of Target UE by transmitting and/or receiving reference signals. Then, in the case of Assistant UE, the one supporting Target UE is not SL Reference UE (as no direct link) but the Assistant UE, hence Assistant UE here is in fact the SL Reference UE.

5 – ZTE Corporation

From RAN1 perspective, there is no difference between Reference UE and Assistance UE. To make definition clear, it is better to reply LS to SA2 for clarification.

6 – Samsung R&D Institute UK

It would be good to ask for SA2 to clarify the difference and the purpose of the Assistant UE.

7 – CATT

Firstly, from RAN's perspective, only the SL positioning between UEs with direct sidelink connection is included in SID of RAN. Relative positioning between two UEs without direct SL connection is out of scope of SID. Secondly, according to the description of "The measurement/result of Ranging/Sidelink Positioning between the Assistant UE and the SL Reference UE and that between the Assistant UE and the Target UE are determined" in assistant UE, the operation of assistant UE and reference/target UE can be considered as combination of two separate SL positioning operations. How to use multiple the SL positioning results to acquire positioning between UEs without direct SL connection is up to SA2. So "Assistant UE" is "Anchor UE" in SL positioning operation from RAN's perspective. In our view, it is unnecessary to differentiate assistant UE from anchor UE. Therefore, there is no need to introduce "Assistant UE" in RAN.

8 – vivo Mobile Communication Co.

From RAN1 perspective, there is no difference between reference UE and assistance UE. And both are belong to the anchor UE defined in RAN1

9 – Futurewei Technologies

There is no SL Reference UE or Assistant UE defined at PHY layer. We are not sure that they are needed in addition to Anchor UE. Further clarification from SA2 on their potential functionality at PHY layer may be useful.

10 – Continental Automotive GmbH

Agree that assistant UE will be equivalent to SL reference UE if direct ranging/SL positioning between the SL reference UE and target UE cannot be supported, provided all the terms refer to the same positioning session.

From the definitions provided, it seems that the existence of a direct link between the target UE and SL reference UE is not necessary, but it is necessary between an assistant UE and the target UE and between assistant UE and SL reference UE. Moreover, the term "assistant UE" would be necessarily referring to a UE's behavior over multiple positioning procedures (with target UE and with SL reference UE). For a single positioning procedure, this terminology does not seem to be relevant.

11 – OPPO Beijing

Share the view that this Q is out of RAN1 scope.

12 – Motorola Mobility Germany GmbH

[Lenovo]

Although there may be cases where an Assistant UE may be beneficial for improved position estimation, e.g., in the case of no direct SL connection/NLOS between Anchor UE and Target UE, further discussion and study is required on the RAN1 impacts. Suggest sending a reply to SA2 to further clarify the RAN functionality of a Assistant UE and whether the Anchor UE may act as an Assistant UE.

13 – Intel Corporation (UK) Ltd

From the perspective of physical layer and RAN1, we are okay to clarify that an assistant UE would simply be a anchor UE, which in our view, is same as reference UE as discussed in the previous question. In this regard, we see the notion of "assistant UE" being transparent to RAN1 and an LS to SA2 may not be strictly necessary.

14 – Nokia UK

Out of scope of RAN1.

However, here is our understanding:

The assistance UE acts as anchor UE for ranging/positioning towards the target UE and as a target UE for ranging/positioning towards the SL Reference UE.

4.3 On definition of SL Positioning client UE

In [3] it is proposed that SL Reference UE and Target UE may also be a SL Positioning Client UE to initiate Ranging/Sidelink positioning service. The definition of SL positioning client UE given by SA2 is:

SL Positioning Client UE: A third-party UE, other than SL Reference UE and Target UE, which initiates

Ranging/Sidelink positioning service request on behalf of the application residing on it.

NOTE X: The SL Positioning Client UE does not have to support Ranging/Sidelink positioning capability, but a communication between the SL Positioning Client UE and SL Reference UE/Target UE has to be established, either via PC5 or via 5GC, for the transmission of the service request and the result.

Editor's note: Change term Third Party UE to SL Positioning Client UE throughout the document.

From the above definition, SL positioning client UE is a UE other than SL Reference UE and Target UE. Note that the definition does not preclude that the ranging/sidelink positioning service request can be also triggered from the upper layer/application layer of Target UE/SL reference UE.

Q3: Do you agree that SL Reference UE and Target UE may also be a SL Positioning Client UE to initiate Ranging/Sidelink positioning service, and request SA2 confirmation?

Feedback Form 3: Feedback Form for Q3

1 – Huawei Technologies Sweden AB

We think that for simplicity, when it comes to relative positioning or ranging only between two UEs, due to the reciprocity of UE relative positions, SL positioning client UE that initiates the location/ranging request should be an anchor UE from RAN1 perspective.

2 – Qualcomm Incorporated

The role of an SL positioning client UE is orthogonal to the UE's role as a target or reference. That said, like Q2, this discussion is in the scope of RAN2 and SA2, not RAN1.

3 – InterDigital France R&D

This discussion seems to be out of RAN1 scope.

4 – China Mobile E-Commerce Co.

The SL positioning client is an entity that initiates SL positioning service to obtain location of itself or other UE(s), we think that it is decoupled with the role in positioning (e.g., SL Reference UE, Target UE), SL Reference UE and Target UE can also be SL positioning client in our view.

5 – ZTE Corporation

- In SA2's definition, the client UE is a UE other than SL Reference UE and Target UE . However, from RAN1 perspective, the client UE can be SL Reference UE or a target UE. The understanding between RAN1 and SA2 is different. Hence, we suggest ask SA2 to confirm whether a client UE can be a reference UE or a target UE.

6 – Samsung R&D Institute UK

This is not RAN1 scope but it would be good to ask for SA2 to explain why SL Reference UE and Target UE cannot be the SL Positioning Client UE?

7 – CATT

Since “SL Positioning client UE” is a UE which initiates Ranging/Sidelink positioning service request, “SL Positioning Server UE” may be a Target UE or an Anchor UE or a third-party UE. We prefer to send the reply LS to SA2 to confirm whether a client UE can be a anchor UE or a target UE.

8 – vivo Mobile Communication Co.

Yes, maybe one of the UEs can be a SL Positioning Client UE to initiate Ranging/Sidelink positioning service. But it may be out of RAN1 scope

9 – Futurewei Technologies

SL Positioning Client operates at the application layer. Not sure how this maps at the PHY layer where we defined anchor and target node for positioning purposes. In our opinion both anchor and target nodes can trigger positioning signaling. Not clear one to one mapping to Positioning Client. Is such concept needed at the Phy layer?

10 – OPPO Beijing

Ranging/Sidelink positioning service initiation is out of RAN1 scope.

11 – Continental Automotive GmbH

Agree that SL Reference UE and Target UE may also be a SL Positioning Client UE to initiate ranging/sidelink positioning service, and to request SA2 confirmation on this.

12 – Motorola Mobility Germany GmbH

[Lenovo]

The role of SL Positioning Client UE is not clear in addition to the already defined Anchor UE and Target UE. Suggest to clarify with SA2 whether the Anchor UE and/or Target UE may act as a SL Positioning Client UE, although they mentioned in their LS that “*SL Positioning Client UE: A third-party UE, other than SL Reference UE and Target UE, which initiates Ranging/Sidelink positioning service request on behalf of the application residing on it.*”

There is no clear motivation of a 3rd party UE, lacking SL Positioning capabilities, taking part in a SL positioning session. In addition, SL Positioning session initiation/termination is up to RAN2/SA2 scope.

13 – Intel Corporation (UK) Ltd

So far for SL communications for the physical layer there is no hierarchy between different UEs. It would be best if the SA2 concepts would continue to be transparent to the physical layer, which in our understanding, is currently the case considering the definitions we have agreed in RAN1. Any further interpretations of “SL positioning client UE” can be left to RAN2 and SA2 without impacting RAN1 study.

14 – Nokia UK

Out of scope of RAN1.

4.4 On definition of Ranging

In [3] it is proposed that “ranging could include only one of distance and direction”. In the definition of ranging in both SA2 definition and RAN1 agreement, the wording “distance and/or direction” are used:

Ranging (SA2): refers to the determination of the distance between two UEs or more UEs and/or the direction of one UE (i.e. Target UE) from another UE (i.e. Reference UE) via PC5 interface.

Ranging (RAN1): determination of the distance and/or the direction between a UE and another entity, e.g., anchor UE.

Q4: Do you agree that it is RAN1 understanding that ranging could include only one of distance and direction?

Feedback Form 4: Feedback Form for Q4

1 – Huawei Technologies Sweden AB

No. We think from location service KPI perspective, relative positioning requirement (horizontal accuracy and vertical accuracy) is not equivalent to the requirement of distance and direction. From the location service request and response, requesting both distance and direction with a specific QoS requirement cannot be directly converted to requesting relative positioning with a corresponding QoS.

It may affect QoS response fit in the QoS request.

In addition, note that several of the ranging use cases (e.g. in TR 22.855) have a requirement on the distance and a requirement on the direction.

We see the need to include both distance and direction in ranging.

2 – Qualcomm Incorporated

RAN1 already agreed that ranging could include only one of distance or direction.

3 – InterDigital France R&D

According to the agreement made in RAN1#109 in AI#9.5.1.3, ”**Ranging:** determination of the distance and/or the direction between a UE and another entity, e.g., anchor UE”, both distance and direction can be included in ranging.

<p>4 – China Mobile E-Commerce Co.</p> <p>No. We think that ranging can include both distance and direction.</p>
<p>5 – Samsung R&D Institute UK</p> <p>YES. ranging could include only one of distance or direction.</p>
<p>6 – CATT</p> <p>No. According the definitions of Ranging in both SA2 and RAN1, the ranging may include both the distance and direction.</p>
<p>7 – vivo Mobile Communication Co.</p> <p>No□the ranging may include both the distance and direction.</p>
<p>8 – Futurewei Technologies</p> <p>Distance and/or direction may be included in ranging.</p>
<p>9 – OPPO Beijing</p> <p>Yes, this is aligned with the definition of Ranging in RAN1.</p>
<p>10 – Continental Automotive GmbH</p> <p>According to the agreement in RAN1#109-e: ”Ranging: determination of the distance and/or the direction between a UE and another entity, e.g., anchor UE.”</p> <p>The use of ”and/or” implies that ranging can include both distance and direction. But as indicated in [3] this would make the definition equivalent to that of relative positioning, except for the QoS aspect pointed out by Huawei above. So, either ”and/or” in the definition of ranging agreed in RAN1#109-e should be changed to just ”or”, or the QoS aspect should be clarified in RAN1’s response.</p>
<p>11 – Motorola Mobility Germany GmbH</p> <p>[Lenovo]</p> <p>Based on the RAN1 definition, ranging may include distance, direction or <u>both</u> distance and direction.</p>
<p>12 – Intel Corporation (UK) Ltd</p> <p>No, distance and direction can both be included as part of ranging but also be limited to one of the two.</p>
<p>13 – Nokia UK</p> <p>The question seems somewhat ambiguous. Ranging can determine</p> <ul style="list-style-type: none">- distance only

- direction only
- both distance and direction

4.5 Others

Q5: Do you think any other updates are needed for terminologies defined by SA2? If there is any, please indicate which terminology needs to be updated and the detailed request.

Feedback Form 5: Feedback Form for Q5

1 – InterDigital France R&D

From RAN1 perspective, roles of “SL Reference UE” or “Assistance UE” play in positioning methods (e.g., SL-TDOA, RTT-type solutions using SL, SL-AoA) should be clarified.

2 – Motorola Mobility Germany GmbH

[Lenovo]

- Clarify with SA2 if an Anchor UE may assume the role of a Located UE, since the Anchor UE location is usually assumed to be known.

5 2nd round discussion

5.1 summary of 1st round discussion

Regarding the first question on role of SL reference UE and anchor UE, 14 companies provide comments. 10 companies think that SL reference UE and anchor UE are the same at least at PHY layer level, and 2 companies think they may play different role. 1 companies think clarification from SA2 on what roles/functionality “SL Reference UE” or “Assistance UE” play in positioning Methods would be needed. 2 companies suggest to ask SA2 to change “SL Reference UE” to “Anchor UE”.

Regarding the second question on assistant UE, 14 companies provide their comments. 6 companies think at least from RAN1 perspective Assistant UE is anchor UE. 5 companies suggest to ask confirmation or clarification to SA2 on PHY functionality of a Assistant UE and whether the Anchor UE may act as an Assistant UE. 4 companies thinks this question is out of scope of RAN1.

Regarding the third question on SL Positioning Client UE, 14 companies provide their comments. 9 companies think this question is out of scope of RAN1. 5 companies support to ask confirmation from SA2 on whether target UE and anchor UE can initiates Ranging/Sidelink positioning service request. The moderator agrees that ranging/positioning service request should be RAN2 issue, and thus suggest to not discuss on this issue further. Proponent companies can raise the issue in RAN2 as the LS from SA2 is also sent to RAN2.

Regarding the 4th question on Ranging, 13 companies provide their comments. 11 companies think ranging

can include both distance and direction. 1 company thinks ranging can include only one of distance or direction. 1 company can accept ranging including both distance and direction, but suggest to send response to SA2 to clarify QoS aspects from RAN1 perspective. Considering most companies think Ranging defined by SA2 is aligned, and QoS issue is also RAN2 issue, the moderator suggests that we do not need further discussion on this issue.

Regarding the 5th question, 1 company suggests to clarify the roles of “SL Reference UE” or “Assistance UE” play in positioning methods from RAN1 perspective. This suggestion can be combined considered in the first and second questions. 1 company suggests to clarify with SA2 if an Anchor UE may assume the role of a Located UE. From moderator understanding, this issue may not be directly related to the request from SA2, and RAN1 can discuss and make our own decision on this issue.

5.2 Proposals for 2nd round discussion

Based on the comments received from 1st round discussion, the moderator’s observation is that at the current stage RAN1 did not have consensus on which terminology defined by SA2 needs to be further updated. Therefore, the moderator suggest the following proposal to feedback to SA2. Please provide your comment if you have concern.

Proposal 1: Regarding SA2 request to evaluate if any further updates are needed, RAN1’s response is “RAN1 has no consensus on which terminology defined by SA2 needs to be further updated”.

Feedback Form 6: Pls provide comment if you have concern on proposal 1

<p>1 – ZTE Corporation</p> <p>If the subsequent proposal 2 is not agreeable, the reply LS will not be needed. The SL from SA2 is more like a information, the feedback is not mandated.</p>
<p>2 – CATT</p> <p>In the LS, SA2’s question is “<i>RAN WGs evaluates if the terminologies defined by SA2 are aligned and if any further updates are needed</i>”. Since the majority agree that the role of “SL Reference UE” and “Anchor UE” are the same, but they are not aligned in the terminologies. Hence, we prefer to send the reply LS to let SA2 to update the “SL Reference UE” to “Anchor UE” to align with RAN1’s terminology, in order to avoid any possible ambiguity in the future.</p>
<p>3 – Beijing Xiaomi Mobile Software</p> <p>To CATT:</p> <p>From moderator’s understanding, there seems to be no strong motivation to request SA2 to change the name of terminology to align with what is defined for RAN1 evaluation purpose, given that SA2 has noted that they are understood the same. I would like to welcome other companies to express views on this.</p>
<p>4 – CATT</p> <p>To FL:</p>

In fact, RAN2 had followed the terminology of "Anchor UE" defined in RAN1, if we have the chance to align the important terminology of "Anchor UE" among RAN1/RAN2/SA2, it will avoid possible ambiguity among the specs from different groups. Hence, we prefer to let SA2 align the terminology of Anchor UE with RAN1, since they had sent the LS to RAN1 and ask possible alignment on the terminologies.

5 – Huawei Technologies Sweden AB

whether SA2 needs to update the terminology should be their business and what we can do in RAN1 or in the possible LS reply is indicating whether there is difference and what the difference is if any.

6 – LG Electronics Inc.

The definition texts of SL reference UE in SA2 and Anchor UE in RAN1 are identical. Also according to *NOTE 1: SL Reference UE is understood as "Anchor UE" in RAN1 TR 38.859 [x]*, SA2 seems to recognize that two terminologies are same in meaning. Probably there could be minor difference from SA2 perspective and their purpose, they are same at least from RAN1 perspective. From the facts above, what RAN1 can do is just to confirm that those two terminologies are same from RAN1 perspective. We suggest to inform SA2 of the above statement through a reply LS.

7 – Intel Ireland

In our understanding at least the SA2's definition of SL Reference UE and RAN1's definition of Anchor UE are the same. There might be slight differences in terms of functionality unrelated to the phy. functionality. Thus, these are not necessarily relevant for RAN1. We suggest that RAN1 indicates this to SA2 in a reply LS.

8 – Qualcomm Incorporated

In our view, SA2's Reference UE maps to RAN1's Anchor UE since the definitions are the same.

Regarding the proposal itself, we share the view that there is no need to send a no-consensus reply to SA2

9 – Nokia UK

SA2's SL reference UE corresponds to RAN1's anchor UE. Unless there is some other reason to send a reply LS we don't think it's a good use of our time to send a reply LS just to state there is no consensus.

10 – Futurewei Technologies

We think that sending a "no consensus reply" is not necessary as does not bring and additional information or clarification to SA2, it may just create some confusion on our stand. We prefer to inform SA2 on our definitions and leave SA2 to decide if their definitions need updated or changed.

As there are companies request to ask clarification on SL reference UE and Assistant UE from SA2, the moderator would like to try the following proposals on clarification from SA2. To resolve the concern from companies who think some terminologies are out of RAN1 scope, the clarification can be limited on the impact of PHY layer. Please provide your comments if you have concern.

Proposal 2: In the response LS, RAN1 asks SA2 to clarify "Is there any difference on physical layer functionalities among Anchor UE, Assistant UE and SL reference UE?"

Feedback Form 7: Please provide comment if you have concern on proposal 2

1 – ZTE Corporation

We are OK to send LS to confirm SA2's understanding. If the LS is sent, it is better to CC to RAN2 and RAN3 as well.

2 – vivo Mobile Communication Co.

We wonder whether RAN1 view should be added such as "from RAN1 perspective they seems no difference on physical layer"

3 – CATT

Since the majority (10 from 14 companies) agrees that the role of "SL Reference UE" and "Anchor UE" are the same in the 1st round discussion, RAN1 can conclude on this issue, we don't need to ask SA2 to clarify difference between "Anchor UE" and "SL reference UE". But SA2 can clarify the difference between "SL reference UE" and "Assistant UE".

Hence, we prefer, in the response LS, RAN1 asks SA2 to clarify "Is there any difference on physical layer functionalities between Assistant UE and SL reference UE?"

In addition, we prefer RAN1's view on this question can be added in the reply LS. In our view, there is no difference on physical layer functionalities between Assistant UE and SL reference UE.

4 – Huawei Technologies Sweden AB

as said, anchor UE could play more than reference UE though in some cases they could be the same UEs. We believe this is the single noteworthy point that could be made to SA2 in the possible LS reply because RAN1 only defined anchor UE but rather assistant UE or reference UE.

5 – LG Electronics Inc.

From our understanding on the definition of Assistant UE in SA2, the Assistant UE is used only when there is no direct link between the Target UE and SL reference UE. From RAN1 perspective at least in NR positioning based on Uu link, PRS or SRS is transmitted and received only between the Target entity (UE) and the Server entity (gNB). There is no such operation where a third entity participates in positioning between UE and gNB. This situation can be considered as 'blocked' channel or NLOS case. So, in this case, only Assistant UE can participate in SL positioning as Anchor UE to support the Target UE's positioning. We don't need a UE connecting Target UE and Anchor UE, from RAN1 perspective. But we are ok with sending a reply LS to confirm the difference between the meanings/roles of UEs defined in SA2.

6 – Intel Ireland

There is, in our understanding, no difference in the physical layer functionalities of SL reference UE/Anchor UE and Assistant UE. In fact it is desired that any distinction between these are transparent to the physical layer. It would be important to make SA2 aware of this in a reply LS.

7 – Qualcomm Incorporated

We do not agree with the proposal. These UE roles are outside of RAN1’s scope and do not impact the work in RAN1.

8 – Nokia UK

No. First of all, in RAN1 we don’t really need to know since assistant UE is used in SA2 procedures above the physical layer. Secondly, SA2 may not know the exact physical layer functionality of the assistant UE.

9 – Futurewei Technologies

We agree with QC and NOK that trying to reinterpret the SA2 definitions through PHY layer definitions is out of RAN1 scope, and not necessary. The SA2 definitions may comprise some functionality not necessarily reflected in PHY layer. We prefer to reply by providing SA2 our definitions, for target and anchor nodes, and leave SA2 to interpret them in relation to their definitions.

6 3rd round discussion

6.1 summary of 2nd round discussion

From the discussion in the 2nd Round, 3 companies do not agree to send reply LS just stating that RAN1 has no consensus, and 3 companies do not agree to send LS to ask SA2 clarification. 4 companies suggest to include RAN1 understanding into the reply LS.

6.2 Proposal for the 3rd round discussion

From moderator point of view, it seems that majority companies agree that there is no difference between Anchor UE and SL reference UE, and assumes that there is no PHY layer functionality difference between SL reference UE and assistant UE defined by SA2. If we can get consensus in RAN1, it would be beneficial to inform this RAN1 understanding to SA2 and thus SA2 can decide by themselves whether to update the terminologies with this RAN1 understanding. Therefore, the following proposal is proposed. Pls provide your comments on whether you can accept this direction.

Proposal: Reply to SA2 with the following including RAN1 understanding: “From RAN1 perspective, there is no difference between Anchor UE and SL reference UE, and RAN1 assumes that any distinction between Assistant UE and SL reference UE is transparent to RAN1. RAN1 asks SA2 to take this into account and decide whether to further update the terminologies defined by SA2.”

- Append RAN1 agreement on terminologies in the reply LS

Feedback Form 8: Pls indicate whether you can accept the proposal

1 – Continental Automotive GmbH Accept the proposal.
2 – OPPO Beijing Support the proposal.
3 – Intel Corporation (UK) Ltd Support the proposal.
4 – Samsung R&D Institute UK Support the proposal.
5 – LG Electronics Inc. We're ok with the proposal.
6 – China Mobile E-Commerce Co. We are fine with the proposal.
7 – CATT Support the proposal.
8 – ZTE Corporation Support
9 – Nokia UK OK
10 – InterDigital France R&D Regarding "any distinction between Assistant UE and SL reference UE is transparent to RAN1", should it be "the functionality of Assistant UE is transparent to RAN1"? The intention is to state that Assistant UE can serve as the anchor UE or target UE. The assistant UE may need to derive its position to serve its purpose. Do we have correct understanding?

7 4th round discussion

It seems that we are converging to an agreement. 10 companies provided comments in the last round discussion and 9 companies can accept the proposal in round 3.

To Interdigital: From moderator understanding, RAN1 will only consider SL positioning between target UE and anchor UE. And thus from RAN1 perspective the assistant UE functions as an anchor UE when supporting

positioning of the target UE. Hope this can clarify your question and you can be flexible to accept the proposal.

The same proposal as the last round is proposed:

Proposal: Reply to SA2 with the following including RAN1 understanding: “From RAN1 perspective, there is no difference between Anchor UE and SL reference UE, and RAN1 assumes that any distinction between Assistant UE and SL reference UE is transparent to RAN1. RAN1 asks SA2 to take this into account and decide whether to further update the terminologies defined by SA2.”

In addition, the draft reply LS based on the proposal has been uploaded to the draft folder:

[https://www.3gpp.org/ftp/tsg_ran/WG1_RL1/TSGR1_110b-e/Inbox/drafts/9.5\(FS_NR_pos_enh2\)/9.5.1/R1-221XXXX_reply%20LS%20to%20SA2%20on%20terminology%20alignment.docx](https://www.3gpp.org/ftp/tsg_ran/WG1_RL1/TSGR1_110b-e/Inbox/drafts/9.5(FS_NR_pos_enh2)/9.5.1/R1-221XXXX_reply%20LS%20to%20SA2%20on%20terminology%20alignment.docx)

Feedback Form 9: Pls indicate whether you can accept the proposal and draft reply LS

1 – InterDigital France R&D Thank you very much for clarification. The texts are ok from our perspective.
2 – Nokia UK Still OK. In the draft LS, the meeting numbers for the next RAN1 meetings are wrong (should be 111, 112 instead of 110, 111).
3 – Beijing Xiaomi Mobile Software To Nokia: Thanks for the careful check, the revised version is uploaded in https://www.3gpp.org/ftp/tsg_ran/WG1_RL1/TSGR1_110b-e/Inbox/drafts/9.5(FS_NR_pos_enh2)/9.5.1/R1-221XXXX_reply%20LS%20to%20SA2%20on%20terminology%20alignment.docx
4 – CATT OK with the updated reply LS in which the meeting numbers are corrected.
5 – LG Electronics Inc. We’re ok with the updated proposal and document.
6 – Samsung R&D Institute UK We are OK for the updated proposal
7 – Qualcomm Incorporated We are ok with the updated LS.
8 – Intel Corporation (UK) Ltd Support.

9 – China Mobile E-Commerce Co.

Support the updated LS.

10 – Continental Automotive GmbH

Accept the proposal and the draft LS with updated meeting numbers.

7.1 Summary of the 4th round discussion

All companies can support or accept the proposal and the draft reply LS (after correction of the meeting number). Therefore, the moderator thinks the following proposal and the draft reply LS (after correction) are stable.

Proposal: Reply to SA2 with the following including RAN1 understanding: “From RAN1 perspective, there is no difference between Anchor UE and SL reference UE, and RAN1 assumes that any distinction between Assistant UE and SL reference UE is transparent to RAN1. RAN1 asks SA2 to take this into account and decide whether to further update the terminologies defined by SA2.”

The draft reply LS (after correction) is in

[https://www.3gpp.org/ftp/tsg_ran/WG1_RL1/TSGR1_110b-e/Inbox/drafts/9.5\(FS_NR_pos_enh2\)/9.5.1/R1-221XXXX_reply%20LS%20to%20SA2%20on%20terminology%20alignment_v1.docx](https://www.3gpp.org/ftp/tsg_ran/WG1_RL1/TSGR1_110b-e/Inbox/drafts/9.5(FS_NR_pos_enh2)/9.5.1/R1-221XXXX_reply%20LS%20to%20SA2%20on%20terminology%20alignment_v1.docx)

The moderator would thank all the valuable comments and flexibility of companies.

8 Summary and conclusion

The draft LS in R1-2210550 is endorsed. The Final LS in R1-2210567 is uploaded.

9 Reference

- [1] R1-2208338 LS on Terminology Alignment for Ranging/Sidelink Positioning SA2, Xiaomi
- [2] R1-2208580 Draft Reply LS on Terminology Alignment for Ranging/Sidelink Positioning vivo
- [3] R1-2209208 Draft Reply LS on Terminology Alignment for Sidelink Positioning ZTE
- [4] R1-2209843 Discussion on terminology alignment for ranging/SL positioning Huawei, HiSilicon
- [5] R1-2210033 [Draft] Reply LS on Terminology Alignment for Ranging/Sidelink Positioning xiaomi