

Section rearrangement
Variant of RAN-R18-WS-non-eMBB-CEWiT Version 0.0.3
RAN

3GPP TSG RAN Rel-18 workshop

RWS-210558

Electronic Meeting, June 28 - July 2, 2021

Agenda Item: 4.2

Source: CEWiT

Title: Email discussion summary for [RAN-R18-WS-non-eMBB-CEWiT]

Document for: Discussion

1 Introduction

This email discussion summary covers the following document: - **RWS-210491** "Views on study of sidelink based positioning in Rel. 18"

The purpose of this document is to gather comments and questions if any from companies on the proposed study on sidelink positioning.

2 General Comments

Companies are encouraged to provide general comments about the proposals.

Feedback Form 1: General Comments on the overall topic and proposals if any along with extending support or no support (with reason if possible)

1 – Beijing Xiaomi Mobile Software

1. Do you think the commercial and public safety use cases and requirements identified in SA1 Ranging WI(TR22.855/TS22.261) should be taken into account?

2. According to the definition and the KPI requirements of relative positioning and ranging in TS22.261 (see below), do you agree that relative positioning and ranging are different, i.e. relative positioning requires to acquire the 2D/3D coordinates (e.g. the horizontal accuracy of relative positioning set requirements on both distance accuracy and angle accuracy) while Ranging requires to acquire only one component of 2D/3D coordinates (either distance or angle) and thereby only set requirements on one component (either distance or angle)?

- relative positioning: relative positioning is to estimate position relatively to other network elements or relatively to other UEs.

- Ranging: refers to the determination of the distance between two UEs and/or the direction of one UE from the other one via direct communication connection.

3. Do you think unlicensed band should be considered? If so, what frequency range is considered(e.g. 60GHz)?
4. What bandwidth do you think is needed to achieve 10cm distance accuracy and 2 degree angle accuracy?
5. For in coverage case, do you think UE based SL-positioning should also be supported?
6. Do you think power consumption and Redcap UE should be taken into account?

2 – Intel Corporation (UK) Ltd

Q1: Could you clarify the functionality of master UE and why it is needed on top of anchor UE?

Q2: Could you clarify motivation behind the intention to specify anchor UE selection procedure and why it cannot be left up to UE implementation?

3 – Lenovo (Beijing) Ltd

Q1: Is there any coordination between master-UE and anchor-UEs in P6? If yes the coordination is dynamic or semi-static?

Q2: In P7 what's the benefit for configuration signaling over Uu compared with the architecture in P6?

3 [Round 1] Questions if any on topic and/or proposals

Companies are encouraged to provide questions if any on the proposals in this section. The answers of which will be provided in the answer section below.

3.1 [Round 1] Questions and comments

Feedback Form 2: Specific questions or comments

1 – Intel Corporation (UK) Ltd

Repeated our questions in a right section:

Q1: Could you clarify the functionality of master UE and why it is needed on top of anchor UE?

Q2: Could you clarify motivation behind the intention to specify anchor UE selection procedure and why it cannot be left up to UE implementation?

4 [Round 1] Answers by Moderator

Thank you very much for the questions and comments in round 1. Please find detailed answers to the questions below.

4.1 Reply to Beijing Xiaomi Mobile software:

1. Yes, commercial, and public safety use cases for ranging should be considered under sidelink based positioning. For example, as described in 22.261, A mass casualty incident (MCI) like a fire, accident will

demand high accurate ranging service. In such a case, due to large gatherings, Uu link service may be overwhelmed with large traffic. In such cases, the sidelink based positioning along with Uu will certainly help to achieve the required accuracy (sub-meter level) and latency to locate the human lives for first responders. This is one example; but certainly, many such examples can be stated where sidelink positioning and ranging will help to achieve the required service level KPIs.

2. Yes we agree with you, they are different.

3. We do not have any specific view on this. For short distance ranging and positioning, the 60 GHz band can be studied further.

4. The accuracy of positioning and measurements in general depends on implementation. However, based on evaluations, the accuracy for 10 cm can be achieved for 90% UEs using, at least, 100 MHz bandwidth. As far as accuracy of angles measurements is concerned, for 32 antenna systems (1, 4, 2, 1, 4), 2-degree angle accuracy can be achieved for 70% of the UEs if the angle measurement windows are configured by the LMF.

5. For in-coverage, UE-based SL positioning will be helpful in certain scenarios where the consumer of positioning and ranging information is UE itself. In such cases, latency will be saved to a great extent but at cost of computation complexity and more power consumption. Therefore, where latency is critical in such cases, UE-based positioning can be used. On other hand, UE configured positioning (architecture on Page 6) may not be efficient in an in-coverage scenario. This is because the network will have more information about surrounding UEs in coverage which it can use optimum way as compared with UE configured positioning and ranging service.

6. As per requirements captured in TS 22.261, 5G access networks are required to support energy-saving mode as well as to support UE using small batteries. Similarly, in ranging service KPI captured in TS 22.855 demands certain power consumption requirements especially for IoT devices e.g., UE to operate at Service Level 1 for at least 12 years using less than 1800 mWh of battery capacity. To fulfill this requirement, power consumption reduction techniques should be considered. Therefore, specifications agreed in power saving and Redcap UE work items can act as bases for study and enhancements for sidelink positioning.

4.2 Reply to Intel Corporation UK Ltd:

1. A master UE could be one that is connected to the network in an in-coverage or partial coverage scenario. Similarly, in out-of-coverage scenarios, the master node may be directly connected to LMF. It can help with the configuration and triggering of the resources and provide assistance information from the network (LMF/gNB) to hidden and anchor UEs. This information can be time/angle measurement windows which helps in reducing the measurement and reporting overhead. On the other hand, the role of anchor UE is to just perform the measurements and report them back to the target or transmit the reference signal over the configured resources.

2. The accuracy of positioning is limited by the LoS path. The anchor UE selection ensures that the (anchor) UEs selected for positioning have LoS communication with the hidden/target UE. Many times a NLoS UE can have a higher RSRP compared to a distant LoS UE. In such cases, it's important to select suitable devices. The procedure can be left for UE implementation but requires a huge amount of resources, especially in high mobility scenarios. Assistance information from RSUs and network can help in optimizing the resources. Moreover, at this point, we feel its good to keep it open for all the possibilities.

4.3 Reply to Lenovo Beijing Ltd :

1. Master-UE can be considered as UE which will act as a reference for the positioning measurements. This can be a road-side unit (RSU) or a fixed UE deployed for positioning purposes. In out-of-coverage scenarios (where Uu link is not available for anchor and/or hidden UEs) master-UE will perform coordination with anchor-UEs with respect to configuring the anchor nodes, synchronization, configuration of positioning method, etc. In case of partial coverage or in-coverage scenario, the master node may act as a relay node which will pass the configuration information from the positioning server (LMF) to the anchor and/or hidden node. In all cases, there will be coordination between the master node and anchor and/or hidden nodes. This coordination can be static or dynamic. We are mainly looking at it as an LPP message relaying from the position server (LMF) to the anchor and/or hidden UEs. Master UE should be capable of establishing the link with LMF and anchor/hidden UEs and should be able to convey the configuration information to anchor/hidden UEs. It should also be capable of collecting the positioning measurements and forwarding them to the LMF if final positioning is estimated at the LMF (UE-assisted positioning).

2. In Network configured and UE based sidelink positioning architecture[P7], LMF is assumed to be connected over Uu link through gNB unlike in case of UE-configured and UE-based sidelink positioning [P6] where is assumed to have connection of LMF with master node directly. The benefit of Network configured and UE-based sidelink positioning architecture is that the network can take more holistic decisions on the selection of appropriate anchor nodes and can coordinate better among the anchor nodes w.r.t. resource management, assistance information, synchronization etc. It is like mode 1 resource allocation in NR-V2X for positioning. Here the assumption is that at least master node has Uu link established with at least one gNB.

5 [Round 2] Questions if any on topic and/or proposals

Feedback Form 3: Specific questions or comments for round 2

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6 [Round 2] Answers

No specific questions were raised in this round of discussion.

7 Summary

In [RAN-R18-WS-non-eMBB-CEWiT] email discussion, two rounds of Q&A have carried out for study on sidelink based positioning. 3 companies participated in the discussion and raised a total of 10 questions on different aspects of proposals in the RWS-210491. Moderator has provided the answers to all questions raised by the companies. Questions were focusing on,

1. Applicable commercial and public safety use cases
2. UE capabilities and considerations for desired accuracy and latency with respect to power consumption required bandwidth and operating bands.
3. Expected architecture changes for enabling sidelink positioning.

We can derive the following observation from the discussion,

Observation 1: It is necessary to bring out necessary use cases (commercial and public safety) for sidelink positioning and sidelink positioning use cases and requirements in TR 22.261 and TR 22.855 can be considered as baseline.

Observation 2: It is necessary to study the possible options of architecture changes required for enabling the sidelink positioning.