

Email discussion summary for [RAN-R18-WS-crossFunc-Sharp] - Version 0.0.3
RAN

3GPP TSG RAN Rel-18 Workshop RWS-210640

Electronic Meeting, June 28 - July 2, 2021

Agenda Item: 4.3

Source: Sharp Corp.

Title: Email discussion summary for RAN-R18-WS-crossFunc-Sharp

1 Introduction

This document is intended to capture questions and comments raised from interested companies regarding Sharp's contributions to the Rel-18 Workshop on agenda item 4.3, and provide answers to those questions and comments. Your feedback is very much appreciated.

This discussion covers the following documents:

**Table 1: Sharp's contributions for the RAN Rel-18 Workshop
AI 4.3**

RWS-210224	Views on a ranging service for Rel-18
RWS-210225	Views on Rel-18 AI/ML for RAN1/RAN2

2 General Comments To The Tdocs

2.1 General comments

Feedback Form 1: General comments

2.2 Answers to general comments

[Answer table to be added by Moderator]

3 A Ranging Service For Rel-18 (RWS-210224)

3.1 Round 1 Questions

Feedback Form 2: Round 1 questions on a ranging service for Rel-18

1 – SHARP Corporation

Thank you for the slides with many detailed use cases.

Regarding the use case of CSI-RS overhead reduction, it is shown that AI based CSI-RS compression achieved even better throughput performance than that with full CSI-RS overhead. It is understandable that approaching performance could be achieved by AI based method, since less CSI-RS ports are used. We are appreciated to see some clarifications:

- The underlying reasons of achieving even better throughput
- Definition of throughput and the intermediate steps from estimation to throughput if possible

2 – CATT

Ranging service can be covered by relative positioning.

3 – Intel Technology India Pvt Ltd

- (1) Is ranging envisioned as equivalent to UE-UE relative positioning from RAN perspective?
- (2) What is the NW's role in enabling this feature?

4 – Beijing Xiaomi Mobile Software

1. 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.

2. Do you think unlicensed band should be considered? If so, what frequency range is considered (e.g. 60GHz)?

3. For in coverage case, do you think UE based SL-positioning should also be supported?

4. Do you think power consumption and Redcap UE should be taken into account?

5 – SHARP Corporation

Sorry but please ignore the comments from Sharp above, which was intended for other NWM thread.

6 – Huawei Tech.(UK) Co.. Ltd

Is the ranging based on SL or Uu-link? We imagine it would be SL, but the paper does not mention.

7 – Sony Europe B.V.

Thanks for the contribution. Ranging is an interesting topic.

Q1) Is there a study item phase or is the proposal to directly specify something in a work item?

Q2) What physical layer is used in ranging? What are the RAN1 impacts?

3.2 Round 1 Answers

Question / Comment	From	Answer
Ranging service can be covered by relative positioning.	CATT	Thank you for your comment.
Is ranging envisioned as equivalent to UE-UE relative positioning from RAN perspective?	Intel	Ranging and UE-UE relative positioning are not equivalent from the RAN perspective.
What is the NW's role in enabling a ranging feature?	Intel	- Allocation of NW time/frequency resources between ranging enabled device. - Measurement coordination
Are relative positioning and ranging different?	Xiaomi	There are important technical differences between ranging and relative positioning.
Should a discussion on a ranging feature consider the use of unlicensed bands? If so, what frequency range is considered (e.g. 60GHz)?	Xiaomi	1) The usage of unlicensed bands by a ranging feature should be considered. 2) Spectrum licensed to mobile network operators (including FR2), and unlicensed spectrum can be considered. We see that 52600 MHz – 71000 MHz is an important area for consideration.
For in coverage use case, should UE based SL-positioning also be supported?	Xiaomi	It should be studied.
Should power consumption and Redcap UE be taken into account by a ranging feature?	Xiaomi	Power consumption and resource efficiency are important considerations. A ranging feature should take both into account.
Is the ranging based on SL or Uu-link?	Huawei	The new SA1 requirements for Ranging based service captured in TS22.261 indicate that ranging refers to the determination of the distance between two UEs and/or the direction of one UE from the other one via direct device connection. The direct device connection indicates the use of PC5.
Is there a study item phase or is the proposal to directly specify something in a work item?	Sony	A study is needed.
What physical layer is used in ranging? What are the RAN1 impacts?	Sony	- PC5 link is used - Allocation of NW time/frequency resources between ranging enabled device, and measurement coordination

Figure 1: Round 1 answers on a ranging service for Rel-18

3.3 Round 2 Questions

Feedback Form 3: Round 2 questions on a ranging service for Rel-18

3.4 Round 2 Answers

[Answer table to be added by Moderator]

4 Rel-18 AI/ML For RAN1/RAN2 (RWS-210225)

4.1 Round 1 questions

Feedback Form 4: Round 1 questions on Rel-18 AI/ML for RAN1/RAN2

1 – LG Electronics France

Q) In the figure for “Beam management (DL) with AI/ML assistance”, you consider UE reporting mobility related information to network, from which it seems that network performs ML task for e.g., beam quality prediction. Do you also consider UE-sided prediction for this as well and for other use cases?

2 – Sony Corporation

Thanks for the contribution. We have a question.

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Does “Data collection / measurement reporting in RAN1: enhance performance feedback (training data, inference data)” mean that the training data and inference data is feedback in PHY layer?

4.2 Round 1 answers

Questions/Comments	Answers
<p>1 – LG Electronics France</p> <p>Q) In the figure for “Beam management (DL) with AI/ML assistance”, you consider UE reporting mobility related information to network, from which it seems that network performs ML task for e.g., beam quality prediction. Do you also consider UE-sided prediction for this as well and for other use cases?</p>	<p>Generally, we also would like to consider UE side predication but for a long-term study. Considering complexity issues such as how to deliver the ML model to UE, we believe this might be better to be done in releases after Rel-18. For Rel-18, as a start point of RAN1/RAN2 standardization, we think it is proper to constraint the scope, e.g., UE reports related information required by gNB for AI/ML.</p>
<p>2 – Sony Corporation</p> <p>Does “Data collection / measurement reporting in RAN1: enhance performance feedback (training data, inference data)” mean that the training data and inference data is feedback in PHY layer?</p>	<p>Yes. The motivation is that for some use cases requiring quick feedback of training/inference data, extra performance feedback/information report in addition to what current CSI report can provide is needed in PHY layer. We also share the view that it is important to select the important use case with more benefits but less specification efforts required. Enhancements in PHY layer or higher layers should be analyzed case-by-case.</p>

Figure 2: Round 1 answers on Rel-18 AI/ML for RAN1/RAN2

4.3 Round 2 questions

Feedback Form 5: Round 2 questions on Rel-18 AI/ML for RAN1/RAN2

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4.4 Round 2 answers

[Answer table to be added by Moderator]

5 Email Discussion Summary

Thank you for all the questions asked, which were addressed within the email discussion.

Two contributions from Sharp are submitted to agenda item 4.3: Ranging (RWS-210224) and AI/ML (RWS-210225). During the first round Sharp received 9 questions/comments for Ranging and 2 questions for AI/ML. We received no further questions or comments in round 2 for either document.

5.1 Ranging Service for Rel-18 (RWS-210224).

During round 1, we received questions/comments from 5 companies. There were three clarifying questions asked regarding a Ranging Service and what is its relationship to UE-UE Relative Positioning. There were two questions asked regarding if Ranging in Rel-18 should be a study or work item. Finally, four questions were asked concerning the impact of Ranging Service on the Physical layer, transport links and spectrum usage. One company indicated that the requirements of a Ranging Service can be covered by Relative Positioning.

5.2 Rel-18 AI/ML For RAN1/RAN2 (RWS-210225).

We have received questions from 2 companies in round 1 and no comment in round 2. Answers have been provided to the above mentioned questions.