

3GPP TSG RAN Meeting #98-e RP-223453

Electronic Meeting, December 12-16, 2022

Title: Moderator's summary for discussion [98e-13-R18-AIML-Air]

Agenda item: 9.2.8

Source: Moderator (RAN1 VC, CMCC)

Document for: Discussion&Decision

1 Introduction

According to the scope of SID[1], the representative sub use cases for each use case for characterization and baseline performance evaluations will be finalized by RAN#98.

- Finalize representative sub use cases for each use case for characterization and baseline performance evaluations by RAN#98

Targeting the representative sub use cases of this objective, contributions[2,3,4,5,6] have presented their views on which RAN1 agreed sub use case could be confirmed/endorsed by RAN. In these 5 contributions, [2,3,5,6] propose RAN to confirm /endorse the below RAN1 agreed sub use cases as representative sub use cases for the initial set of use cases:

- **CSI feedback enhancement**
 - **Spatial-frequency domain CSI compression using two-sided AI model**
 - **Time domain CSI prediction using UE sided model**
- **Beam management**
 - **Spatial-domain DL beam prediction for Set A of beams based on measurement results of Set B of beams**
 - **Temporal DL beam prediction for Set A of beams based on the historic measurement results of Set B of beams**
- **Positioning accuracy enhancements for different scenarios**
 - **direct AI/ML positioning**

o **AI/ML assisted positioning**

[4] proposes to remove the sub use case “**Time domain CSI prediction using UE sided model**” for **CSI feedback enhancement** while confirming all other sub use cases.

[3] also proposes to prioritize discussion for “General aspects” in RAN1, if possible, especially those have RAN2 dependency, otherwise, it mentions the possibility of putting RAN2 discussion on hold until RAN2 scope becomes clear, considering the status of the last RAN2’s discussion.

[6] additionally proposes to refine the objectives of SID and make corresponding update, including 3 additional aspects:

1. Further refine the sub use cases for beam management: For BM-Case1 and BM-Case2, beams in Set A and Set B should be in the same Frequency Range,
2. Further refine the sub use cases for Positioning accuracy enhancements,
3. Further refine the Protocol Aspects in RAN2.

Moderator has excerpted related agreements here for easy reference.

Table 1: Moderator has excerpted related agreements here for easy reference.

<p>RAN1#109-e Agreement Spatial-frequency domain CSI compression using two-sided AI model is selected as one representative sub use case.</p> <ul style="list-style-type: none">• Note: Study of other sub use cases is not precluded.• Note: All pre-processing/post-processing, quantization/de-quantization are within the scope of the sub use case.
<p>RAN1#111 Agreement Time domain CSI prediction using UE sided model is selected as a representative sub-use case for CSI enhancement. Note: Continue evaluation discussion in 9.2.2.1. Note: RAN1 Defer potential specification impact discussion at 9.2.2.2 until the RAN1#112b-e, and RAN1 will revisit at RAN1#112b-e whether to defer further till the end of R18 AI/ML SI. Note: LCM related potential specification impact follow the high level principle of other one-sided model sub-cases.</p>

<p>Conclusion Joint CSI prediction and CSI compression is NOT selected as one representative sub-use case for CSI feedback enhancement use case.</p> <p>Conclusion CSI accuracy enhancement based on traditional codebook design is NOT selected as one representative sub-use case for CSI feedback enhancement use case.</p> <p>Conclusion Temporal-spatial-frequency domain CSI compression using two-sided model is NOT selected as one representative sub-use case for CSI enhancement use case.</p>

Table 2: Related RAN1 agreements on “Beam management”

<p>RAN1#109-e Agreement For AI/ML-based beam management, support BM-Case1 and BM-Case2 for characterization and baseline performance evaluations</p> <ul style="list-style-type: none">• BM-Case1: Spatial-domain DL beam prediction for Set A of beams based on measurement results of Set B of beams• BM-Case2: Temporal DL beam prediction for Set A of beams based on the historic measurement results of Set B of beams• FFS: details of BM-Case1 and BM-Case2• FFS: other sub use cases <p>Note: For BM-Case1 and BM-Case2, Beams in Set A and Set B can be in the same Frequency Range</p>
<p>RAN1#110b-e Conclusion For AI/ML based beam management, RAN1 has no consensus to support on studying any other sub use case in addition to BM-Case1 and BM-Case2</p>

Table 3: Related RAN1 agreements on “Positioning accuracy enhancement”

RAN1#109-e

Agreement

For further study, at least the following aspects of AI/ML for positioning accuracy enhancement are considered.

- Direct AI/ML positioning: the output of AI/ML model inference is UE location
 - E.g., fingerprinting based on channel observation as the input of AI/ML model
 - FFS the details of channel observation as the input of AI/ML model, e.g. CIR, RSRP and/or other types of channel observation
 - FFS: applicable scenario(s) and AI/ML model generalization aspect(s)
- AI/ML assisted positioning: the output of AI/ML model inference is new measurement and/or enhancement of existing measurement
 - E.g., LOS/NLOS identification, timing and/or angle of measurement, likelihood of measurement
 - FFS the details of input and output for corresponding AI/ML model(s)
 - FFS: applicable scenario(s) and AI/ML model generalization aspect(s)
- Companies are encouraged to clarify all details/aspects of their proposed AI/ML approaches/sub use case(s) of AI/ML for positioning accuracy enhancement

RAN1#110b-e

Agreement

- Study and provide inputs on benefit(s) and potential specification impact at least for the following cases of AI/ML based positioning accuracy enhancement
 - Case 1: UE-based positioning with UE-side model, direct AI/ML or AI/ML assisted positioning
 - Case 2a: UE-assisted/LMF-based positioning with UE-side model, AI/ML assisted positioning
 - Case 2b: UE-assisted/LMF-based positioning with LMF-side model, direct AI/ML positioning
 - Case 3a: NG-RAN node assisted positioning with gNB-side model, AI/ML assisted positioning
 - Case 3b: NG-RAN node assisted positioning with LMF-side model, direct AI/ML positioning

RAN1#111

Agreement

For AI/ML based positioning accuracy enhancement, direct AI/ML positioning and AI/ML assisted positioning are selected as representative sub-use cases.

2 Views collection and Proposals (Initial Round)

2.1 For the representative sub use cases

From RAN1 agreements excerpted as above in section 1, the representative sub use cases for CSI feedback enhancement, BM management and positioning are already agreed in RAN1, as well as the proposal from companies, it seems there is no strong motivation to discuss it any more in this RAN meeting, especially the work load issue of CSI prediction and baselines for the benchmark of performance comparison have already been discussed when those agreement were made in RAN1. Regarding the solution level down-selection under a certain sub use case proposed by [6], it can be up to WGs discussion without needing to update the SID.

Therefore, from moderator’s view, it is proposed,

Proposal 2.1-1: Confirm the following representative sub use cases according to RAN1 agreements for the initial set of use case as below.

- **CSI feedback enhancement**
 - **Spatial-frequency domain CSI compression using two-sided AI model**
 - **Time domain CSI prediction using UE sided model**
- **Beam management**
 - **Spatial-domain DL beam prediction for Set A of beams based on measurement results of Set B of beams**
 - **Temporal DL beam prediction for Set A of beams based on the historic measurement results of Set B of beams**
- **Positioning accuracy enhancements for different scenarios**
 - **direct AI/ML positioning**
 - **AI/ML assisted positioning**

Feedback Form 1: Besides the workload and evaluation related comments, is there any strong concern on endorsing the proposal 2.1-1?

1 – New H3C Technologies Co.
Support FL proposal.
2 – vivo Mobile Communication Co.
Thanks for moderator’s summary. We support the proposal from the moderator based on RAN1 agreements.

<p>3 – NVIDIA</p> <p>These representative sub use cases have been extensively discussed and agreed in RAN1. We support to endorse them at RAN plenary.</p>
<p>4 – CAICT</p> <p>We support FL's proposal.</p>
<p>5 – Samsung Electronics Co.</p> <p>We have no concern on endorsing the propose 2.1-1 and should support with equal priority.</p>
<p>6 – Ericsson LM</p> <p>This is a procedure point. Reading the SID, from outside we do not see the need for this being discussed at RAN and neither confirm any WG decisions up until this point. This as the SID says that the RAN1 should make these decisions which it has done. So the absent of endorsing this will be the something to our understand. Hence we do not need and should not do anything at RAN regarding this.</p>
<p>7 – Google Inc.</p> <p>Support the proposal</p>
<p>8 – NTT DOCOMO INC.</p> <p>Fine with the proposal</p>
<p>9 – CATT</p> <p>Thanks for moderator's summary. We support this proposal and also think according to the SID, we need to endorse the representative sub use cases in this meeting.</p>
<p>10 – MediaTek Beijing Inc.</p> <p>We support the proposal.</p>
<p>11 – Guangdong OPPO Mobile Telecom.</p> <p>We are fine with moderator's proposal. Meanwhile, we share similar view as Ericsson that there is no need to make any agreement in RAN plenary level, because it does not change WG-level status. But we are open to either approval of this proposal or no agreement/conclusion in RAN plenary.</p>
<p>12 – VODAFONE Group Plc</p> <p>We support the proposal.</p>
<p>13 – Nokia Corporation</p> <p>We support Moderator's proposal to confirm the sub-use cases according to the RAN1 agreement.</p>

<p>14 – Apple Hungary Kft.</p> <p>Support FL proposal to endorse RAN1 agreed sub-use cases</p>
<p>15 – Futurewei Technologies</p> <p>We do not see the need for RAN to do anything here. Note that the objective is "Finalize representative sub use cases for each use case for characterization and baseline performance evaluations by RAN#98" not "in RAN#98". RAN1 has now made such decisions as tasked by RAN via WID objective. As usual practice, no RAN confirmation is needed. Therefore, we do not support this proposal.</p>
<p>16 – Spark NZ Ltd</p> <p>we support Ericsson's view</p>
<p>17 – InterDigital</p> <p>We agree with Ericsson and Futurewei. No specific endorsement is needed in RAN as it is not the check-point, rather deadline to finalize representative sub use cases in RAN1.</p>
<p>18 – KT Corp.</p> <p>We support moderator's proposal.</p>
<p>19 – ZTE Corporation</p> <p>We agree with views from some companies that this proposal will not change the ongoing RAN1 work. RAN1 already finished their work according to the SID. Therefore, RAN-level agreement is not necessary.</p>
<p>20 – NEC Corporation</p> <p>Fine with the proposal.</p>
<p>21 – China Mobile Com. Corporation</p> <p>We support the proposal based on RAN1 agreements.</p>
<p>22 – Fujitsu Limited</p> <p>Fine with the proposal.</p>
<p>23 – Spreadtrum Communications</p> <p>Fine with the proposal</p>
<p>24 – Intel Technology India Pvt Ltd</p> <p>we support the proposal (support agreement in RAN) – perhaps add clarification "Set A is a set of beams for DL beam prediction and Set B is a set of beams for DL beam measurement"</p>

<p>25 – HUAWEI TECHNOLOGIES Co. Ltd.</p> <p>We are fine with the proposal, although it is not really needed since RAN1 agreements are already achieved.</p>
<p>26 – AT&T</p> <p>We are fine with confirming all the representative sub use cases agreed in RAN1.</p>
<p>27 – LG Electronics France</p> <p>We support moderator’s proposal</p>
<p>28 – Motorola Mobility UK Ltd.</p> <p>[Lenovo] The SI text ”Finalize representative sub use cases...by RAN#98” is not a RANP checkpoint and so no RAN level confirmation or endorsement on the agreed sub use cases is needed.</p>
<p>29 – Xiaomi Communications</p> <p>[Xiaomi] From our perspective, we still think now it is not the right time to study AI-based time-domain CSI prediction. We prefer to study this sub use case after the time domain CSI prediction in R18 MIMO enhancement project is stable . But we can accept moderator’s proposal for progress</p>
<p>30 – CEWiT</p> <p>We support FL’s proposal.</p>
<p>31 – Telia Company AB</p> <p>Fine with the proposal based on RAN1 agreement.</p>
<p>32 – TURKCELL</p> <p>We support Ericsson’s view.</p>
<p>33 – Sony Group Corporation</p> <p>We support FL’s proposal.</p>
<p>34 – Qualcomm CDMA Technologies</p> <p>We agree with the Moderator’s proposal but as stated by other companies, we do not see the need for RAN endorsement.</p>

As indicated in section 1, [6] has proposed to further refine the sub use cases for beam management: **For BM-Case1 and BM-Case2, beams in Set A and Set B should be in the same Frequency Range**, from moderator’s view, it can be left to RAN1 discussion, however, if we can have some conclusion on it in this meeting, it is more than welcome, so moderator would like to set question 1,

Question 2.1-1: Is there any strong concern on endorsing proposal“For BM-Case1 and BM-Case2, beams in Set A and Set B should be in the same Frequency Range” in RAN?

Feedback Form 2: Is there any strong concern on endorsing proposal“For BM-Case1 and BM-Case2, beams in Set A and Set B should be in the same Frequency Range” in RAN?

<p>1 – New H3C Technologies Co.</p> <p>Support endorsing proposal“For BM-Case1 and BM-Case2, beams in Set A and Set B should be in the same Frequency Range” in RAN</p>
<p>2 – NVIDIA</p> <p>It’s more reasonable to leave this discussion to RAN1.</p>
<p>3 – vivo Mobile Communication Co.</p> <p>We are fine to to further limit the use cases to the same frequency range. But as the moderator explained, this can be up to WG’s discussion.</p>
<p>4 – CAICT</p> <p>We also prefer to leave this discussion to RAN1.</p>
<p>5 – Samsung Electronics Co.</p> <p>We have no concern on Set A and B in the same Frequency Range but better to discuss in WG.</p>
<p>6 – Ericsson LM</p> <p>This should be discussed in the WGs and not in RAN plenary.</p>
<p>7 – Google Inc.</p> <p>We have strong concern. This should be discussed in RAN1. In addition, this proposal is not aligned with RAN1 agreements.</p>
<p>8 – NTT DOCOMO INC.</p> <p>Support endorsing proposal “For BM-Case1 and BM-Case2, beams in Set A and Set B should be in the same Frequency Range” in RAN. When the different frequency range is assumed for Set A and Set B, one practical scenario belongs to BM-Case3. However, RAN1 made the conclusion not to support studying any other sub use case in addition to BM-Case1/2. Hence, it is reasonable to endorse the proposal.</p>
<p>9 – CATT</p> <p>This proposal is aligned with RAN1 agreements. We support this proposal.</p> <p>In RAN1#109 meeting, it’s agreed that for BM-Case1 and BM-Case2, Beams in Set A and Set B can be in the same Frequency Range. Moreover, BM-Case3, which is beam prediction for higher frequency band (e.g., a band in FR2) based on measurement results of lower frequency band(s) (e.g., a band in FR1), is precluded based on RAN1#110bis agreement. Thus, this proposal is aligned with RAN1 agreement. No further discussion is needed in RAN1.</p> <p>Thus, we think in RAN we should endorse this proposal to avoid further discussion in WGs, which can save the online timing in WGs.</p>

<p>10 – Guangdong OPPO Mobile Telecom.</p> <p>The level of details should be discussed in WGs, e.g. in RAN1. We prefer not to discuss this issue in the RAN plenary.</p>
<p>11 – Nokia Corporation</p> <p>In our view detailed technical discussion on the assumptions should continue in RAN1 rather than in RAN. Therefore, in our view there is no need to decide any further technical details in RAN.</p>
<p>12 – Apple Hungary Kft.</p> <p>This discussion should be left to RAN1.</p>
<p>13 – Futurewei Technologies</p> <p>We think this should be left to RAN1 discussion.</p>
<p>14 – Spark NZ Ltd</p> <p>RAN1 is the place for these discussions</p>
<p>15 – InterDigital</p> <p>We also prefer to leave this discussion in RAN1.</p>
<p>16 – KT Corp.</p> <p>KT prefer to leave this discussion in RAN1</p>
<p>17 – ZTE Corporation</p> <p>We have no concern on this proposal. And we also agree that this proposal can be handled in RAN1.</p>
<p>18 – MediaTek Beijing Inc.</p> <p>We support to endorse the proposal in RAN, which is aligned with RAN1 agreement. But we are also fine to leave it to RAN1.</p>
<p>19 – NEC Corporation</p> <p>As pointed out by some other companies, we also think it should be RAN1 discussions.</p>
<p>20 – China Mobile Com. Corporation</p> <p>We prefer to leave this discussion to RAN1.</p>
<p>21 – Spreadtrum Communications</p> <p>Prefer to handle it in RAN1</p>

<p>22 – Intel Technology India Pvt Ltd</p> <p>we are OK to leave this to WG discussions</p>
<p>23 – HUAWEI TECHNOLOGIES Co. Ltd.</p> <p>We are fine with the proposal. Fine to leave it to RAN1 discussion as well.</p>
<p>24 – LG Electronics France</p> <p>To our understanding, BM in different FR was captured as BM-Case3 in RAN1 discussion so it is naturally out of scope of BM-Case1 and BM-Case2. It is fine to clarify this in RAN, but if it is controversial, it would be better to leave this to WG discussion.</p>
<p>25 – Motorola Mobility UK Ltd.</p> <p>[Lenovo] We are fine to agree the proposal for beams in Set A and Set B are in the same Frequency Range for both BM-Case1 and BM-Case2. However, this can be left to RAN1 discussion, taking in to account RAN1#110b-e conclusion of no consensus to support on studying any other sub use case in addition to BM-Case1 and BM-Case2, i.e., which includes no consensus to study BM-Case3 - Beam prediction for higher frequency band (e.g., a band in FR2) based on measurement results of lower frequency band(s) (e.g., a band in FR1).</p>
<p>26 – Xiaomi Communications</p> <p>[Xiaomi] we are OK with the proposal if a quick consensus can be reached during the RANP meeting. If there is still some controversy, we prefer to leave it in the WG meeting</p>
<p>27 – Fujitsu Limited</p> <p>We are fine the proposal, and also think it can be left to RAN1 discussion.</p>
<p>28 – CEWiT</p> <p>We have no concern with the proposal, but we prefer RAN1 to discuss it.</p>
<p>29 – TURKCELL</p> <p>We prefer to leave this discussion to RAN1.</p>
<p>30 – Sony Group Corporation</p> <p>We prefer to leave this discussion to RAN1.</p>
<p>31 – Qualcomm CDMA Technologies</p> <p>We prefer to leave it to RAN1 to discuss/decide.</p>

2.2 For work arrangement in RAN1 and RAN2

For the proposal from [3], it can be up to WG detailed management and RAN guidance is not needed. It seems we can leave it to RAN1 to assess the issues to be discussed case by case, and provide appropriate time allocation for the issues.

For the proposal from [6], from moderator's view, we can leave it to WG for the time being based on the coordination between RAN1 and RAN2, even fall back one step, is not expected that the newly refined objectives become a hint of priority of some WG and then block the related discussion in other WG and the newly refined objectives can cover all the components. However, moderator would like to collect companies' view on the proposals [3,6] for facilitating RAN2 discussion on Protocol aspects.

Question 2.2-1: Is there need to discuss and provide further RAN guidance on the spotlight of RAN1 and RAN2 discussion for AI/ML for air interface? If your answer is yes, how to avoid deadlock between RAN1 and RAN2 due to "who should first discuss these"?

Feedback Form 3: Is there need to discuss and provide further RAN guidance on the spotlights of RAN1 and RAN2 discussion for AI/ML for air interface? If your answer is yes, please elaborate a bit about how to avoid deadlock between RAN1 and RAN2 aroused by "which group should firstly discuss these spotlights"?

<p>1 – New H3C Technologies Co.</p> <p>No need to provide further RAN guidance on RAN1 and RAN2 negotiation on AI/ML technical issue for air interface</p>
<p>2 – NVIDIA</p> <p>We consider the current progress in WGs are reasonable and do not see strong motivation to provide RAN guidance at this stage.</p>
<p>3 – CAICT</p> <p>We are open to have RAN guidance on the spotlights of RAN1 and RAN2 discussions.</p>
<p>4 – vivo Mobile Communication Co.</p> <p>RAN2 arranged two long email discussions after November: model delivery and data collection. In our understanding, these two issues are the two most important issues to be studied in RAN2 parts of Rel-18 RAN AI/ML.</p> <p>We believe such arrangements have already highlighted the corresponding spotlights of RAN2. If RAN guidance are provided, they can be in such directions. Otherwise, we don't see the need to micro-manage current discussion procedure in WGs.</p>
<p>5 – Ericsson LM</p> <p>For the current RAN plenary we agree with the RAN2 chair that no additional guidance is needed. As VIVO brings up there are email discussions in RAN2 targeting the next RAN2 meeting. This will hopefully be sufficient. If the situation does not improve after the Feb WG meetings we can revisit this at the next RAN plenary in March instead.</p>

6 – Google Inc.

We failed to see the necessity for additional guidance.

7 – MediaTek Beijing Inc.

NO. Changing RAN2 scope or clarifying RAN1/RAN2 interaction is not needed. We know for sure that there is going to be RAN2 impact. Based on RAN1 agreements, RAN2 is able to identify the aspects which has less RAN1 dependency and study on those aspects first. RAN2 can initiate the study on other topics when RAN1 progress allows. Furthermore, just as mentioned by vivo, there are already long emails toward RAN2#121 to discuss what to do. We don't think it helps much to clarify/change R2 scope now.

8 – NTT DOCOMO INC.

We do not think additional guidance is necessary, even though we are open. If RAN needs to provide the guidance, RAN2 focus should be model delivery and data collection.

9 – Guangdong OPPO Mobile Telecom.

The current progress of AI/ML in WGs are quite good. And RAN1 and RAN2 has started to cooperate on related issues. Although a closer coordination is expected, we do not see need so far to provide RAN guidance for this SI at current stage. Furthermore, such kind of micro-management of RAN plenary should be avoided as much as possible, from our perspective.

10 – CATT

Yes. We think it's helpful to give RAN guidance to improve the RAN1 and RAN2 interaction. The RAN guidance can be such as model transfer/delivery and data collection, which can let RAN1 give more online time on those aspects and give more inputs to RAN2 to be further discussed in RAN2.

11 – MediaTek Inc.

RAN2 Chair: There is an issue in R2 that it seems difficult to make agreements also on topics that would typically be in R2 scope, with the reason that "R1 is working on this" (and R1 is working on all parts of the AIML scope), e.g. the "model ID" is an architectural information element, tie-ing together a number of procedures, i.e. typically within R2 scope .. However, AIML is a new topic, this is just a SI and for SIs WG usually extend into other groups areas, SO responsibility confusion is expected. RAN2 will attempt to make progress, there will likely be some overlap with RAN1, hopefully no conflict. Anyway I think now is too early for TSG RAN intervention. I hope the Rapporteur companies can help coordinate R1-R2 as things move ahead, at every meeting, to avoid too much overlap/wasted work ..

12 – Nokia Corporation

No, in our view there is no need to provide additional guidance from RAN to RAN1 and RAN2 especially as this full release long study is still in an early phase.

13 – Futurewei Technologies

We do not think any RAN intervention is needed at this meeting.

14 – Apple Hungary Kft.

We think the current progress in RAN2 is good, and thereby no need for RAN guidance.

15 – InterDigital

No need for RAN guidance at this point

16 – KT Corp.

No need for RAN guidance at this point

17 – ZTE Corporation

We don't see the need to have RAN guidance. As commented by companies, RAN2 is already focusing on model delivery and data collection. The coordination can be done across working groups and Rapporteurs are responsible for the progress of this SID. Therefore, at this point, RAN guidance is not necessary.

18 – NEC Corporation

No strong need for a guidance from RAN.

19 – Spreadtrum Communications

We also think there is no need for RAN guidance at this point.

20 – China Mobile Com. Corporation

We share same view with Vivo and Ericsson that RAN2 has focused on model delivery and data collection after November meeting, and RAN guidance is not necessary at this point.

21 – Intel Technology India Pvt Ltd

We understand companies' view not to have additional guidance as it is initial phase of study and hard to clearly divide work scope between RAN1 and RAN2. Nevertheless, considering the struggle in RAN2 in making progress, we wonder if RAN plenary can provide general guidance based on some points commented by RAN2 chair:

- continue studying and making progress for AI/ML
- Unless there is any direct conflict, RAN2 discussion/conclusion should not be blocked with the reason "RAN1 is working on this".

22 – HUAWEI TECHNOLOGIES Co. Ltd.

As there are quite limited discussions at WGs on this issue, we think it may hardly converge quickly at RAN. In addition, there is vague boundary between RAN1 and RAN2 for some of the procedures at this moment. Thus there is no need to provide the guidance at this plenary. RAN1 and RAN2 may separately discuss the potential impacts on protocols based the agreements of both WGs, and coordinate with LS.

23 – AT&T

We agree that it is a hard to clearly divide scope between RAN1 and RAN2, especially with AI/ML being a new SID. We sympathize with the view that effort should be put on not blocking any WG progress, because another WG is working on it. The delineation of the work between RAN1/RAN2 can be left to the WGs coordination, however, and RAN guidance is not necessary at this point. This can be revisited if needed at the next plenary.

24 – LG Electronics France

At this stage, we see no strong need to provide RAN guidance on this issue

25 – Motorola Mobility UK Ltd.

[Lenovo] At this time, we don't see the need for additional RAN guidance to RAN1 and RAN2.

26 – Fujitsu Limited

We think there is no need to have RAN guidance at this stage.

27 – CEWiT

No need to have RAN guidance at this stage.

28 – TURKCELL

There is no need for RAN guidance.

29 – Sony Group Corporation

We also share the view that there is no immediate need to have RAN guidance at this stage.

30 – Tejas Networks Ltd.

No need for RAN guidance.

31 – Qualcomm CDMA Technologies

No guidance required at this point as there are no specific examples of inconsistent agreements. We should continue monitoring the situation at future RAN meetings.

Anyway, to facilitate the discussion when possible, e.g., when companies' view are quite aligned, from moderator view, it can be proposed,

Proposal 2.2-1: Leave the work arrangement about what to be discussed or what to be prioritized to WGs.

Feedback Form 4: Could you agree with Proposal 2.2-1?

1 – New H3C Technologies Co. Support this proposal.
2 – NVIDIA Support Proposal 2.2-1.
3 – CAICT Support FL’s proposal.
4 – Samsung Electronics Co. Support Moderator’s proposal
5 – vivo Mobile Communication Co. Support moderator’s proposal. RAN2 study would be well shaped based on the latest email discussion topics: model delivery and data collection, which are the most important two issues for RAN2 study for Rel-18 AI/ML.
6 – Ericsson LM Support Moderator’s proposal
7 – Google Inc. Support the proposal
8 – MediaTek Beijing Inc. Support the proposal.
9 – NTT DOCOMO INC. Support the proposal.
10 – Guangdong OPPO Mobile Telecom. Support the moderator’s proposal.
11 – CATT Support the moderator’s proposal.

<p>12 – Nokia Corporation</p> <p>We support the moderator’s proposal.</p>
<p>13 – Futurewei Technologies</p> <p>Support the proposal.</p>
<p>14 – Apple Hungary Kft.</p> <p>Support the proposal</p>
<p>15 – Spark NZ Ltd</p> <p>support the moderator proposal</p>
<p>16 – InterDigital</p> <p>Support the proposal</p>
<p>17 – KT Corp.</p> <p>Support moderator’s proposal</p>
<p>18 – ZTE Corporation</p> <p>Support this proposal.</p>
<p>19 – NEC Corporation</p> <p>Fine with the proposal.</p>
<p>20 – China Mobile Com. Corporation</p> <p>Support the proposal.</p>
<p>21 – Spreadtrum Communications</p> <p>Support</p>
<p>22 – Intel Technology India Pvt Ltd</p> <p>Just to clarify, we raised the issue of prioritization of ”General aspects” in RAN1 because we have 6 sub-agenda items for 3 use-cases and ”General aspects” is the 7-th sub-agenda item with RAN2 dependency and framework discussion for all use-cases. Therefore absent RAN guidance on division of work-scope, we hope that the rapporteur companies/WG-chair manage TUs for this sub-agenda going forward.</p>
<p>23 – HUAWEI TECHNOLOGIES Co. Ltd.</p> <p>Support</p>

24 – AT&T support this proposal. With the understanding that prioritization on general aspects should be made with items that have cross WG dependencies given top priority, such decisions can be made at the WGs level.
25 – LG Electronics France We support moderator’s proposal
26 – Motorola Mobility UK Ltd. [Lenovo] Support Moderator’s proposal.
27 – Fujitsu Limited Support.
28 – CEWiT We support the proposal.
29 – TURKCELL We support the proposal.
30 – Sony Group Corporation We support the proposal.
31 – Tejas Networks Ltd. We support the proposal
32 – Qualcomm CDMA Technologies We support Moderator’s proposal.

2.3 Summary and Proposals from Initial Round

For the representative sub use cases, during the initial round discussion on proposal 1

Proposal 1: Confirm the following representative sub use cases according to RAN1 agreements for the initial set of use case as below

- **CSI feedback enhancement**
 - **Spatial-frequency domain CSI compression using two-sided AI model**
 - **Time domain CSI prediction using UE sided model**
- **Beam management**

- **Spatial-domain DL beam prediction for Set A of beams based on measurement results of Set B of beams**
- **Temporal DL beam prediction for Set A of beams based on the historic measurement results of Set B of beams**

- **Positioning accuracy enhancements for different scenarios**
 - **direct AI/ML positioning**
 - **AI/ML assisted positioning**

27 of 33 companies are fine to endorse proposal 2.1-1, and the other 6 think it is out of RAN's discussion. Indeed, all the presentative sub use cases are agreed in RAN1, and there is no check point set for RAN checking, but some companies show concern on related RAN1 agreements, in this sense, moderator think it not bad to endorse this proposal in this meeting. **Anyway, it looks we can end this discussion and take this proposal to GTW.**

For the question 1 “Is there any concern proposal ”For BM-Case1 and BM-Case2, beams in Set A and Set B should be in the same Frequency Range””, after the initial round check, vast majority of companies believe it should be discussed in RAN1, let's leave it to RAN1, and end the discussion on it in this meeting.

For work arrangement in RAN1 and RAN2, one question and one proposal are raised for views collection,

- **Question 2:** Is there need to discuss and provide further RAN guidance on the focus of RAN1 and RAN2 focus for AI/ML for air interface? If your answer is yes, how to avoid deadlock between RAN1 and RAN2 due to “who should first discuss these ”?

- **Proposal 2:** Leave the work arrangement about what to be discussed or what to be prioritized to WGs.

All companies agree to leave the work arrangement about what to be discussed or what to be prioritized to WGs, but worthwhile to note RAN2 chair's comment “AI/ML is a new topic, this is just a SI and for Sis WG usually extend into other groups' areas, so responsibility confusion is expected. RAN2 will attempt to make progress. There will likely be some overlap with RAN1. Hopefully no conflict, especially with the reason that “RAN1 is working on this”.....”, from moderator's observation, RAN1 faces the same issues, hopefully, it should be a common understanding that “Some WG is working on this.....” should not be frequently used to block some of the discussion in this uncultivated territory. So let's end this discussion in this meeting.

3 Views collection and Proposals (Second Round)

NO further views collection and Proposals in NWM.

4 Proposals

Proposal 1: Confirm the following representative sub use cases according to RAN1 agreements for the initial set of use case as below

- CSI feedback enhancement
 - Spatial-frequency domain CSI compression using two-sided AI model
 - Time domain CSI prediction using UE sided model
- Beam management
 - Spatial-domain DL beam prediction for Set A of beams based on measurement results of Set B of beams
 - Temporal DL beam prediction for Set A of beams based on the historic measurement results of Set B of beams
- Positioning accuracy enhancements for different scenarios
 - direct AI/ML positioning
 - AI/ML assisted positioning

Proposal 2: Leave the discussion on “For BM-Case1 and BM-Case2, beams in Set A and Set B should be in the same Frequency Range” to RAN1

Proposal 3: Leave the work arrangement about what to be discussed or what to be prioritized to WGs.

5 Reference

1. RP-221348, Revised SID: Study on Artificial Intelligence (AI)/Machine Learning (ML) for NR Air Interface, June 2022
2. RP-222932, Discussions on use case selection for AIML for air interface, CAICT, December 12-16, 2022.
3. RP-222979, Finalization of sub use-cases for Rel-18 AI-ML SI, Intel Corporation, December 12-16, 2022.
4. RP-223090, Discussion on representative sub use case for AI/ML in NR air interface, Xiaomi Communications, December 12-16, 2022.

<https://nwm-trial.etsi.org/#/documents/8315>

5. RP-223096, Finalization of Rel-18 RAN AI/ML representative sub use cases, vivo, December 12-16, 2022.
6. RP-223129, Views on the sub-use cases and RAN2 progress of R18 AI/ML, CATT, December 12-16, 2022.