RAN-R18-WS-crossFunc-SONY - Version 0.0.3
RAN

3GPP TSG RAN Rel-18 workshop **RWS-210643**

Electronic Meeting, June 28 - July 2, 2021

Agenda Item: **4.3**

Source: **Sony**

Title: **NWM discussion on Sony Cross-functionality contributions**

Document for: **Discussion**

1 Introduction

This document is used for the email discussion for the Sony contributions on Cross-functionalities for Release-18. Sony submitted the following contributions in this agenda item:

RWS-210301: Views on NR Positioning for Rel-18

RWS-210306 : Introducing Reconfigurable Intelligent Surfaces for 5G-Advanced

RWS-210316 : Sidelink Enhancements for Rel-18

RWS-210317: Rel-18 Upper Layer Mobility Enhancements

RWS-210364 : Rel-18 RAN2 Enhancements for XR

RWS-210365 : RAN2 Enhancements for Relays, IAB, NTN, MBS

RWS-210379 : Rel-18 Upper Layers Misc. Features: AS Security Enh, NPN Enh, Inter UE coordination

The document is structured as follows:

Section 2: General comments on Sony documents for cross functionality.

Section 3: Questions, comments and answers on RWS-210301 (Views on NR Positioning for Rel-18).

Section 4: Questions, comments and answers on RWS-210306 (Introducing Reconfigurable Intelligent Surfaces for 5G-Advanced).

Section 5: Questions, comments and answers on RWS-210316 (Sidelink Enhancements for Rel-18).

Section 6: Questions, comments and answers on RWS-210317 (Rel-18 Upper Layer Mobility Enhancements).

Section 7: Questions, comments and answers on RWS-210364 (Rel-18 RAN2 Enhancements for XR).

Section 8: Questions, comments and answers on RWS-210365 (RAN2 Enhancements for Relays, IAB, NTN, MBS).

Section 9: Questions, comments and answers on RWS-210379 (Rel-18 Upper Layers Misc. Features: AS Security Enh, NPN Enh, Inter UE coordination).

Section 10: Summary of the NWM discussion on Sony documents submitted under AI4.3.

2 General questions and comments on Sony documents

2.1 Round 1: Questions and comments on Sony documents for cross functionality

The following feedback form is for general comments on the Sony documents for cross functionality (RWS-210301, RWS-210306, RWS-210316, RWS-210317, RWS-210364, RWS-210365, RWS-210379).

Feedback Form 1: 2.1 Round 1: Questions and comments on Sony documents for cross functionality

2.2 Round 2: Further Questions and comments on Sony documents for cross functionality

There were no general comments on the Sony documents for Cross functionality in Round 1. The feedback form below allows for general questions and comments in round 2.

Feedback Form 2: Further Questions and comments on Sony documents for cross functionality

3 RWS-210301 (Views on NR Positioning for Rel-18)

NR Positioning enhancements in Rel-17 addressed IIOT use cases fulfiling the requirements like <0.2 m horizontal accuracy, <1m vertical accuracy, and < 100 msec end-to-end latency for position estimation. Further work is required to address Rel-17 leftovers and SA1 requirements on ranging based services. Further

UE localisation is also required in certain use cases/scenarios with specific requirements (e.g. accuracy, latency, power consumption, integrity). For example, positioning for RedCap, V2X and NTN features.

RWS-210301 made the following proposals. These proposals could be pursued in various work items.

Proposals:

Further enhanced positioning (FePOS):

Further enhancements on accuracy and latency reduction

Enhancement to reduce UE power consumption, including supporting low power high accuracy

Enhancement to support network efficiency

Integrity aspects for RAT dependent

Study the requirements and solutions (including positioning techniques) to support ranging based service requirements

RedCap positioning:

Study positioning requirements for RedCap devices in FR1 and FR2

Support Redcap devices with high accuracy positioning with low latency and low power consumption

V2X positioning:

Specify technical solution (particularly RAT dependent) to support relative and absolute positioning for V2X positioning according to the use-cases / requirements in TR38.845

NTN positioning

Study support of positioning without GNSS for legacy NR NTN deployment scenarios in LEO, MEO, GEO, including:

Identify scenarios and deployments for multi-satellites NTN positioning evaluation

Study on RAT dependent positioning methods for NTN

Continue with the normative work based on the study outcome.

It is expected there is a limited TU availability for positioning. Prioritize:

NR FePOS Work Item in Rel-18, particularly to further enhance positioning accuracy, reducing latency, device efficiency, and integrity.

Normative work to support V2X positioning in Rel-18.

3.1 Round 1: RWS-210301: questions and comments

Questions / comments are invited on the above proposals or on other aspects of the document.

Feedback Form 3: Round 1: RWS-210301: questions and comments

1 – CATT

Sony is the only company to bring up NTN positioning on NR Positioning for Rel-18.

2 – Beijing Xiaomi Mobile Software

- Q1: 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.
- Q2: Do you think unlicensed band should be considered? If so, what frequency range is considered (e.g. 60GHz)?
- Q3: Do you think is there a need to define new accuracy requirement for RedCap positioning or just reuse the requirement defined for eMBB?
- Q4: Do you think is there a need to have a short study phase to clarify the requirement for RedCap and perform the evaluation to see if there is gap to reach that requirement?

3 – InterDigital Communications What is the advantage of RAT dependent NTN positioning over GNSS? For integrity for RAT dependent, can we use the GNSS integrity as the starting point?
4 – Lenovo (Beijing) Ltd For NTN Positioning, NR NTN is currently assuming the device is equipped with GNSS receiver, but the NTN positioning issues without GNSS have also been discussed in NTN topic, so do you think this enhancement feature should be discussed in NTN SI or as part of NR positioning specific SI? Furthermore, what's the specific issues for positioning without GNSS for legacy NTN scenario compared with TN scenario, seems some legacy positioning technique in TN can also be reused?
5 – LG Electronics Inc. Q1: What's the difference/benefit of NTN positioning compared to conventional GNSS/GPS positioning? Q2: Regarding multi-satellite NTN positioning evaluation, if you have any preference for evaluation scenario, could you explain more?
6 – Intel Corporation (UK) Ltd Q1: Please elaborate on specific aspects of integrity for RAT dependent solutions and whether it is considered for Uu / sidelink or both radio-interfaces? Q2: What enhancements are envisioned for supporting NTN, given that it is traditionally considered ideal use case of GNSS based positioning methods?

3.2 Round 1: Answers for RWS-210301 comments

Table 1: Answers to questions / comments on RWS-210301

Question	**SONY answer**
(**CATT**): Sony is the only company to bring up NTN positioning on NR Positioning for Rel-18.	Thank you for the comment. Just to clarify, NTN positioning was included in our contribution as a proposal from other companies in order to have a complete list of potential Rel-18 areas. To this extent, as you can see from the last slide of RWS-210301, Sony is not proposing NTN-positioning for Rel-18

(**Xiaomi**) - Q1: 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)?	Thank you for the questions. We agree that we should stick to the definition as defined in TS22.261.
(**Xiaomi**) - Q2: Do you think unlicensed band should be considered? If so, what frequency range is considered (e.g. 60GHz)?	We are quite open in term of frequency allocation. The question is about the prioritization. As a background, ranging is still considered as "device-to-device" type of operation. The current device-to-device communication is using sidelink. Sidelink communication is currently only considering licensed-FR1. We consider starting with the lower frequency first (e.g., either licensed or unlicensed). We can initiate the study on higher frequency (e.g., above 52 GHz).
(**Xiaomi**) - Q3: Do you think is there a need to define new accuracy requirement for RedCap positioning or just reuse the requirement defined for eMBB?	We could have a short study (e.g., a study within a WI) to check whether it is still possible to reuse the Rel-17 IIoT positioning target in term of accuracy and latency.
(**Xiaomi**) - Q4: Do you think is there a need to have a short study phase to clarify the requirement for RedCap and perform the evaluation to see if there is gap to reach that requirement?	We think so. This could easily be handled in 1-2 meetings within a work item.
(**IDC**): What is the advantage of RAT dependent NTN positioning over GNSS? For integrity for RAT dependent, can we use the GNSS integrity as the starting point?	Thank you for the questions. As clarified already, Sony is not proposing NTN positioning for Rel-18; The topics we prefer to see in Rel-18 are listed in the last slide of our contribution. Due to limited time units, the scope of integrity in Rel-17 was focused only to consider GNSS integrity. Yes, it can be used as starting point due to the potential commonalities of integrity aspects in GNSS and RAT dependent.

(**Lenovo**): For NTN Positioning, NR NTN is currently assuming the device is equipped with GNSS receiver, but the NTN positioning issues without GNSS have also been discussed in NTN topic, so do you think this enhancement feature should be discussed in NTN SI or as part of NR positioning specific SI? Furthermore, what's the specific issues for positioning without GNSS for legacy NTN scenario compared with TN scenario, seems some legacy positioning technique in TN can also be reused?	Thank you for the questions. We think this feature should be discussed within NTN topic. In TN, the transmitter (e.g., gNB/TRP) for the downlink-based positioning is stationary or fixed in a location while in NTN, the transmitter (e.g., the satellite) for the downlink-based positioning is moving depending on the satellite altitude. This is quite challenging for positioning in NTN.
(**LGE**) What's the difference/benefit of NTN positioning compared to conventional GNSS/GPS positioning?	Thank you for the questions. As clarified already, Sony is not proposing NTN positioning for Rel-18; The topics we prefer to see in Rel-18 are listed in the last slide of our contribution
(**LGE**) Regarding multi-satellite NTN positioning evaluation, if you have any preference for evaluation scenario, could you explain more?	We do not have any strong preference.
(**Intel**) Please elaborate on specific aspects of integrity for RAT dependent solutions and whether it is considered for Uu / sidelink or both radio-interfaces?	Thank you for the questions. It can be the integrity aspect of UE-based, UE-assisted, and network-based for RAT dependent We think we should start first with integrity aspect of Uu.
(**Intel**) What enhancements are envisioned for supporting NTN, given that it is traditionally considered ideal use case of GNSS based positioning methods?	As clarified already, Sony is not proposing NTN positioning for Rel-18; The topics we prefer to see in Rel-18 are listed in the last slide of our contribution.

3.3 Round 2: RWS-210301: further questions and comments

In the feedback form in this section, we invite responses to the answers that we provided to the round 1 comments. We also invite further new comments and questions on RWS-210301

Feedback Form 4: Round 2: questions and comments on RWS-210301

1 – Beijing Xiaomi Mobile Software

Thank you for the response.

We also support redcap positioning and sidelink positioning in Rel-18.

For redcap positioning, we prefer to identify whether Rel-17 IIoT positioning requirements can be reused or not first.

3.4 Round 2: Answers for RWS-210301 comments

Table 2: Answers to questions / comments on RWS-210301

Questions	SONY Answers
Beijing Xiaomi Mobile Software Thank you for the response. We also support redcap positioning and sidelink positioning in Rel-18. For redcap positioning, we prefer to identify whether Rel-17 IIoT positioning requirements can be reused or not first.	Thank you for your further clarifications on your preferences related to Redcap and sidelink positioning, which seems to be in line with our view.

4 RWS-210306 (Introducing Reconfigurable Intelligent Surfaces for 5G-Advanced)

Broadly speaking Intelligent surfaces are electromagnetically active man-made structures that can be used to reshape the propagation environment such as to improve capacity, coverage and energy efficiency. They come in different flavours and Reconfigurable Intelligent Surfaces (RIS) are mature and technology widely available and can be standardised.

RIS can improve coverage and capacity in various use cases. 3GPP can start with a study phase on channel model and start with simulation scenarios and network layout, RIS device modelling and propagation aspects. The study can then focus on PHY and upper layer aspects. Detailed study phase objectives can be found in RWS-210306.

RWS-210306 made the following proposals.

Proposal:

Depending on the time available for new topics in Rel 18, it is proposed to study Reconfigurable Intelligent Surfaces and start with SI that will the address the channel model for RIS.

4.1 Round 1: RWS-210306: questions and comments

Questions / comments are invited on the above proposals or on other aspects of the document.

Feedback Form 5: Round 1: RWS-210306: questions and comments

1 – ZTE Corporation

Thanks for your proposal. We also have strong interests on this topic and share the views that we need to initialize this work at least from channel model. W.r.t your proposal, following questions for clarification:

Q1: Is there any specific consideration to enhance the RS design for channel estimation? Do we need to focus on the new pattern or new configuration?

Q1: For the mobility management part and RIS device selection, does this refer to the mobility for gNB-UE and gNB-RIS link or we still need to handle the mobility between RIS and UE□

2 – KDDI Corporation

Thank you very much for your proposals. We are also interested in RIS, as mentioned in our contribution (RWS-210300). In order to understand your proposal more concretely, let us ask you a few questions below.

<Q1>

There is also a reference to smart repeater in Slide 5. It may be too early to discuss this, but do you envision that an interface for smart repeater will be discussed first, and then possibly whether it can be reused in RIS?

<Q2>

Also in Slide 5, you mentioned ”Mobility management and RIS device selection” as one of the study items. In relation to this study item, is the UE supposed to be aware of which RIS it is connected to?

3 – China Unicom

Thanks for the contribution and we also regard RIS as an interesting and promising technique.

Please clarify the requirements on the interface for RIS to obtain control information from gNB to enhance beam management, CSI-Feedback and demodulation.

4 – KT Corp.

Happy to see Sony’s interest in this topic. Do you see any needs for channel modelling study for RIS?

4.2 Round 1: Answers for RWS-210306 comments

Table 3: Answers to questions / comments on RWS-210306

Questions	**SONY Answers**
(**ZTE**) Q1: Is there any specific consideration to enhance the RS design for channel estimation? Do we need to focus on the new pattern or new configuration?	Thank you for your question. We foresee that this is an area in which, potentially, enhancements to, e.g., RS capacity for RIS might be needed. It is still early to exclude any possibility, and we are open to study this in an SI.
(**ZTE**) Q1: For the mobility management part and RIS device selection, does this refer to the mobility for gNB-UE and gNB-RIS link or we still need to handle the mobility between RIS and UE□ (**KDDI corporation**) <Q2> Also in Slide 5, you mentioned ”Mobility management and RIS device selection” as one of the study items. In relation to this study item, is the UE supposed to be aware of which RIS it is connected to?	These are very good questions. It seems that mobility can be considered at two levels, upper and lower level. At both levels, in traditional deployments with stationary gNB and RIS, it is mainly changes in the RIS-UE channel that need to be tracked, e.g., via BM procedure At upper level, a suitable RIS needs to be associated with a UE as the UE moves. Whether this is transparent or not to the UE is a question that can be part of the SI, in our opinion.

(**KDDI corporation**) <Q1> There is also a reference to smart repeater in Slide 5. It may be too early to discuss this, but do you envision that an interface for smart repeater will be discussed first, and then possibly whether it can be reused in RIS?	Thank you for question. As you mention, it is still early to say whether a common interface design will be able to satisfy the needs of both smart repeaters and RIS. We see, however, potential synergies in this area that could help reducing standardization efforts. We are therefore open to study, in the SI, an interface design that could encompass both
(**China Unicom**) Please clarify the requirements on the interface for RIS to obtain control information from gNB to enhance beam management, CSI-Feedback and demodulation	This is a very relevant question. The RIS-gNB control link needs to be able to support beam management information, as you have pointed out. The amount of information that the link should support needs to be studied. Some mechanism for timing synchronization needs to be considered, as well
(**KT Corp.**) Do you see any needs for channel modelling study for RIS?	Thank you for this question. Yes, we do foresee a need for studying channel modeling in the SI, as proposed in our contribution. Near-field effects and reparametrization of CDL models are examples of aspects to study, should one be able to accurately evaluate the benefits of deploying RIS
[**Intel Corporation (UK) Ltd**] What kind of deployment scenarios of RIS you are considering (e.g. operator deployed or user deployed)?	Good question. We consider both as possible deployments that can be studied. Note that even if a RIS is user-deployed, it might still be controlled/influenced by the gNB
[**Intel Corporation (UK) Ltd**] Do you envision potentially negative impact due to deployment of RIS on other operator deployment?	Thank you for this question. RISs are passive devices that redirect signals rather than radiating new ones. This being said, potential interference and unwanted emissions are, of course, of crucial importance and need to be studied.
[**Intel Corporation (UK) Ltd**] What are the benefits of RIS compared to conventional RRH deployment?	This is also a good question. Contrary to RIS, remote radio heads (RRHs) are active devices. Furthermore, they typically require a high-capacity link to transfer waveforms from the gNB control unit to be radiated at the RRH. Compared to RRHs, we foresee RIS deployments to offer lower complexity and more flexibility to operators.

4.3 Round 2: RWS-210306: further questions and comments

In the feedback form in this section, we invite responses to the answers that we provided to the round 1 comments. We also invite further new comments and questions on RWS-210306

Feedback Form 6: Round 2: questions and comments on RWS-210306

1 – ZTE Corporation

Thanks for replies. It's really useful for us to identify the essential work for future based on common interests.

For the mobility part, more clarification on the "a suitable RIS needs to be associated with a UE as the UE moves" is preferred. Does it mean that the gNB will conduct the scheduling or association between UE and RIS based on the collected information from UE side? W.r.t whether this part is transparent or not to UE, we are prefer to do it in transparent way, otherwise, the required protocol for RIS may be complicated including mutual information exchange.

Moreover, according to the 1st round discussion, it seems that potential overlapping on the discussion with repeater, e.g., for the interface design, is expected. So, I just wonder from your perspective, any views on how to organize the corresponding study for these two topics? Is it possible to start with the SI phase first to identify the issue (e.g., common design or not) and specify the necessary aspect later in one item?

2 – China Unicom

Thank you for your replies in round 1. We also want to discuss with you about:

Are there any L2 functions should be included in RIS for Active control? Or RIS is only a L1 divice?

4.4 Round 2: Answers for RWS-210306 comments

Table 4: Answers to questions / comments on RWS-210306

Questions	**SONY Answers**
(**ZTE**) Thanks for replies. It's really useful for us to identify the essential work for future based on common interests. For the mobility part, more clarification on the "a suitable RIS needs to be associated with a UE as the UE moves" is preferred. Does it mean that the gNB will conduct the scheduling or association between UE and RIS based on the collected information from UE side? W.r.t whether this part is transparent or not to UE, we prefer to do it in transparent way, otherwise, the required protocol for RIS may be complicated including mutual information exchange	Thank you for your feedback. We also believe that the NWM discussions have been useful. Regarding the mobility part, we envision the gNB collecting information from UEs and scheduling/associated available RISs to UEs, as the UEs move. Other ways of carrying about this association might also be proposed. We believe that this aspect can be studied in an SI. Regarding transparency of RIS to UE, this can be a starting point. However, we should not preclude discussing this in the SI. There might be advantages of the UE being aware of the RIS

(**ZTE**) Moreover, according to the 1st round discussion, it seems that potential overlapping on the discussion with repeater, e.g., for the interface design, is expected. So, I just wonder from your perspective, any views on how to organize the corresponding study for these two topics? Is it possible to start with the SI phase first to identify the issue (e.g., common design or not) and specify the necessary aspect later in one item?	Thank you for this question. During the first round Q&A, several companies have pointed out various commonalities between RISs and smart repeaters, e.g., their interfaces toward the gNB. In this regard, it has been suggested that in order to minimize standardization efforts, one should strive to standardize as much a common interface as possible. Therefore, a joint RIS / smart repeater study item to address, at least, a common interface design would seem appropriate to us
China Unicom) Thank you for your replies in round 1. We also want to discuss with you about: Are there any L2 functions should be included in RIS for Active control? Or RIS is only a L1 divice?	Thank you for your further question. In our view, the essential function that RISs provide is their ability to select a reflection / transmission direction (beam), indicated via a control interface. Our preference is to keep RISs devices simple, i.e., L1 devices. But whether this can be limited to L1 is for further study

5 RWS-210316 (Sidelink Enhancements for Rel-18)

Sidelink enhancements for Rel-18 should support increased data rates for use cases like home entertainment including XR and V2X advanced sensor information sharing, enhanced reliability and reduced latency particularly in a factory environment, Rel-17 leftovers for power saving, sidelink positioning (discussed in RWS-210301) and sidelink relays (discussed in RWS-210365).

RWS-210316 made the following proposals.

Proposal:

The following sidelink enhancements are supported in Rel-18:

Intra band / inter band carrier aggregation.

Operation in new carrier frequencies such as unlicensed band and FR2.

Enhancements to enable transmission for improved reliability and reduced latency.

Enhancements on UE power saving.

5.1 Round 1: RWS-210316: questions and comments

Questions / comments are invited on the above proposals or on other aspects of the document.

Feedback Form 7: Round 1: RWS-210316: questions and comments

1 – Classon Consulting [for FUTUREWEI] We also support sidelink FR2 and unlicensed enhancements, see RWS-210039 and https://nwm-trial.etsi.org/#/documents/4 . Do you feel that the sidelink enhancements for FR2 should include work on CSI feedback?
2 – LG Electronics Inc. Q1: For the latency and reliability enhancements, can you give some examples of the candidate technologies beyond what is under discussion in Rel-17?
3 – Huawei Tech.(UK) Co.. Ltd What reliability enhancements are you interested in, with what targets/requirements?
4 – CATT For "Enhancements to enable transmission for improved reliability and reduced latency and Enhancements on UE power saving", can you provide more detailed objectives ?
5 – Intel Corporation (UK) Ltd What kind of deployment scenarios of RIS you are considering (e.g. operator deployed or user deployed)? Do you envision potentially negative impact due to deployment of RIS on other operator deployment? What are the benefits of RIS compared to conventional RRH deployment?

5.2 Round 1: Answers for RWS-210316 comments

Table 5: Answers to questions / comments on RWS-210316

Questions	SONY Answers
[**FUTUREWEI**] We also support sidelink FR2 and unlicensed enhancements, see RWS-210039 and https://nwm-trial.etsi.org/#/documents/4714 . Do you feel that the sidelink enhancements for FR2 should include work on CSI feedback?	Thank you for your question. We think the CSI feedback would be important to support efficient beam management and improved resource efficiency in FR2 though we may need to carefully consider specification loads in WGs

[**LG Electronics Inc.**] Q1: For the latency and reliability enhancements, can you give some examples of the candidate technologies beyond what is under discussion in Rel-17?	Thank you for your question. We think the latency and reliability enhancements in sidelink is necessary for industrial-IoT use-case. We also think some URLLC features in Uu link could be baseline. Especially mini-slot based transmission in sidelink should be supported for low latency communication. For the reliability enhancement, the hierarchical structure where one UE schedules the transmission of another UE should be supported if it is not supported in Rel-17. We also think the inter-UE coordination proposed in RWS-210379 can improve the reliability as well as the throughput
[**Huawei Tech.(UK) Co.. Ltd**] What reliability enhancements are you interested in, with what targets/requirements?	Thank you for your question. Please see the answer to LGE
[**CATT**] For ”Enhancements to enable transmission for improved reliability and reduced latency and Enhancements on UE power saving”, can you provide more detailed objectives ?	Thank you for your question. On the enhancement for the improved reliability and reduced latency, please see the answer to LGE. On the enhancement for UE power saving, we think WUS/GTS in sidelink is an important feature for further power saving especially for devices with small batteries, and also continued work for Uu and SL DRX alignment is needed if down-prioritized in Rel-17
[**Intel Corporation (UK) Ltd**] What kind of deployment scenarios of RIS you are considering (e.g. operator deployed or user deployed)? Do you envision potentially negative impact due to deployment of RIS on other operator deployment? What are the benefits of RIS compared to conventional RRH deployment?	Thank you for your question. Please see the answer to your question in section 4.2

5.3 Round 2: RWS-210316: further questions and comments

In the feedback form in this section, we invite responses to the answers that we provided to the round 1 comments. We also invite further new comments and questions on RWS-210316

Feedback Form 8: Round 2: questions and comments on RWS-210316

1 – Huawei Tech.(UK) Co.. Ltd Thanks for the response, for mini-slot structure, are there any concerns regarding efficiency (or other) on extra overhead such as sidelink AGC and gap symbols?
2 – LG Electronics Inc.

Q1: For the introduction of mini-slot based transmissions, do you think these new transmissions should be able to coexist with Rel-16/17 sidelink operations in the same resource pool?

5.4 Round 2: Answers for RWS-210316 comments

Table 6: Round 2: Answers on RWS-210316

Questions	SONY Answers
Huawei Tech.(UK) Co.. Ltd Thanks for the response, for mini-slot structure, are there any concerns regarding efficiency (or other) on extra overhead such as sidelink AGC and gap symbols?	Thank you for the question. We think the mini-slot based transmission can achieve a low latency communication at the cost of some efficiency. But we are open for improving the efficiency for the URLLC communication as a further enhancement if necessary.
LG Electronics Inc. 13 Q1: For the introduction of mini-slot based transmissions, do you think these new transmissions should be able to coexist with Rel-16/17 sidelink operations in the same resource pool?	Thank you for the question. That's good point. We think the coexistence in the same resource pool should be considered as much as possible generally. But since we think a main use-case of the URLLC on sidelink would be industrial IoT and it could be different from Rel-16/17 target, the coexistence might not be necessary. We think RAN1 can discuss whether the coexistence is supported or not

6 RWS-210317 (Rel-18 Upper Layer Mobility Enhancements)

UL mobility, a mobility management framework, relies on the reference signal transmitted from UE which could potentially reduce measurement reporting overhead and power consumption, was not specified in 5G NR.

With the advent of AI, a UE may play a bigger role in mobility management instead of simply reporting measurements and then waiting for network action. The evolution to a UE centric wireless network will demand a mobility management framework that considers the movement and characteristics of individual UEs.

RWS-210317 made the following proposals.

Proposal: Study mobility enhancement aspects related to:

UL RS based mobility.

Use cases and deployment scenarios where UE can play a bigger role in mobility management.

There are two different aspects in the proposal i.e. UL RS based mobility and UE centric mobility.

6.1 Round 1: RWS-210317: questions and comments

Questions / comments are invited on the above proposals or on other aspects of the document.

Feedback Form 9: Round 1: RWS-210317: questions and comments

1 – ZTE Corporation For UL RS based mobility, is it used in ILDE state, CONNECTED state, or both? Thanks.
2 – Beijing Xiaomi Mobile Software We see benefit to introduce AI in mobility management. Especially in FR2, legacy mobility management can't adopt to the rapidly changing radio channel condition. ML-aided mobility could provide better performance from respective of throughput and ping-pong handover. UE based prediction may be more preferred, considering UE location is a key factor to improve mobility management and UE may refuse to expose location information to NW. One question is whether this AI model should be specified in 3GPP or up to UE/NW implementation?
3 – Nokia Corporation Could you please share what the actual problem is with the currently specified mobility framework, that would justify the study on UL mobility? How is power consumption optimized in UL mobility, if that assumes the UE shall be sending the UL RSs, likely to multiple cells to allow UL mobility? w.r.t "UE plays a bigger role", it is not clear what role you have in mind for? Making decisions or providing more elaborated information to the network?

6.2 Round 1: Answers for RWS-210317 comments

Table 7: Answers to questions / comments on RWS-210317

Questions	SONY Answers
UL RS based mobility **ZTE:** For UL RS based mobility, is it used in ILDE state, CONNECTED state, or both? Thanks	Thank you for the question. In our opinion, we should start with RRC_Connected mode first and once the benefits are established then we can start with IDLE/INACTIVE mode.

Nokia: Could you please share what the actual problem is with the currently specified mobility framework, that would justify the study on UL mobility? How is power consumption optimized in UL mobility, if that assumes the UE shall be sending the UL RSs, likely to multiple cells to allow UL mobility?	Thank you for your questions. In our understanding, power consumption is one of the motivations for UL RS based mobility. Power consumption is reduced as the UE only needs to send UL RS that are received by multiple cells, rather than performing multiple DL measurements. The power consumption benefits are documented in TR38.802 section 9.1.4. UL RS based mobility can also improve the handover performance and paging miss probability, as documented in TR38.802 section 9.1.4. But other use cases where UL mobility will be useful are UL coverage limitation in general and in dense network deployments where mobility based on DL RS may not accurately determine the UL performance of the target cell. UE shall send one UL RS based on the configuration and one or more cells may receive it
UE based mobility **Xiaomi**: We see benefit to introduce AI in mobility management. Especially in FR2, legacy mobility management can't adopt to the rapidly changing radio channel condition. ML-aided mobility could provide better performance from respective of throughput and ping-pong handover. UE based prediction may be more preferred, considering UE location is a key factor to improve mobility management and UE may refuse to expose location information to NW. One question is whether this AI model should be specified in 3GPP or up to UE/NW implementation?	Thank you for your support and question. We think that ideally all options should be studied but this may not be realistic. An approach whereby AI models are left to UE/NW implementation could be a good starting point. However, these aspects cannot completely be left to implementation and on the other hand 3GPP should not get involved in the detailed AI model design. So, a balance needs to be achieved and probably defining the input parameters and the outcome of AI model is a good way forward in our opinion
Nokia: w.r.t "UE plays a bigger role", it is not clear what role you have in mind for? Making decisions or providing more elaborated information to the network?	Thank you for your question. We think that UE may assist the network decision as it has more awareness of its radio conditions and could be the starting point

6.3 Round 2: RWS-210317: further questions and comments

In the feedback form in this section, we invite responses to the answers that we provided to the round 1 comments. We also invite further new comments and questions on RWS-210317

Feedback Form 10: Round 2: questions and comments on RWS-210317

7 RWS-210364 (Rel-18 RAN2 Enhancements for XR)

Flexible L2 header:

Every MAC SDU generated has PDCP/RLC header in addition to MAC header. The existing L2 header design will impose heavy control signaling overhead as well as processing overhead especially in an extremely high throughput network. The existing L2 header is not context aware to e.g. to adopt a proper header according to the scenario/requirement/deployment. For example, in case of no segmentation there may be information which can be optimized in the header.

TCP ACK suppression:

5Gbps DL traffic can generate around 60 to 90Mbps of UL TCP ACK traffic. Same situation will occur for heavy UL traffic and corresponding DL TCP ACK traffic. This is of concern with video streaming applications using progressive download where video files are transferred.

Priority handling for I-frames:

Priority of critical data within a DRB was discussed for LTE but not agreed due to LTE PDCP behavior. Such prioritization should take place without discard of other packets.

RWS-210364 made the following proposals.

Proposal: RAN may start normative work on

Design of L2 header with flexible format and adjustment of its format per packet if necessary.

Context aware L2 header selection.

TCP ACK enhancements

Priority of critical message

There are three different aspects in the proposal i.e. flexible L2 header, TCP ACK enhancements, and priority of critical messages (I-frames).

7.1 Round 1: RWS-210364: questions and comments

Questions / comments are invited on the above proposals or on other aspects of the document.

Feedback Form 11: Round 1: RWS-210364: questions and comments

1 – LG Electronics Inc.

We support TCP ACK enhancements and priority of critical messages. We have similar proposal for TCP boosting in R2-210226. We are also supportive of flexible L2 headers.

One question on TCP ACK enhancements. Do you only consider TCP ACK suppression? What do you think about TCP ACK prioritization, explained in our paper?

2 – MediaTek Inc.

Thanks for the good contribution. We have some questions below to know more about the enhancements.

- For context aware L2 header selection per packet, what's the expected RAN2 spec impact and whether it is too large change for Rel-18?
- For TCP ACK suppression for intensive XR DL traffic, is the TCP assumed to be used for XR media? What's the usage of UDP and TCP for XR data?
- For priority of critical data within a DRB, how well can CODEC handle this kind of prioritization? What's the expected RAN capacity gain?

3 – Apple Benelux B.V.

The main example of potential L2 header optimizations you provide seems to be related to duplication. Is that so? Do you envision other enhancements, not necessarily related to duplication? Was the TCP ACK overhead calculated assuming ACK piggybacking or not?

7.2 Round 1: Answers for RWS-210364 comments

Table 8: Answers to questions / comments on RWS-210364

Questions	SONY Answers
Flexible L2 Header **Mediatek**: Thanks for the good contribution. We have some questions below to know more about the enhancements. For context aware L2 header selection per packet, what's the expected RAN2 spec impact and whether it is too large change for Rel-18?	Thank you for your comments. We think RAN2 should start with a study and analyse impacts in Rel-18.

TCP ACK enhancements **LGE**: We support TCP ACK enhancements and priority of critical messages. We have similar proposal for TCP boosting in R2-210226. We are also supportive of flexible L2 headers. One question on TCP ACK enhancements. Do you only consider TCP ACK suppression? What do you think about TCP ACK prioritization, explained in our paper?	Thank you for your comments and support. Yes, we are ok to combine all relevant enhancements.
Mediatek: For TCP ACK suppression for intensive XR DL traffic, is the TCP assumed to be used for XR media? What's the usage of UDP and TCP for XR data?	Thank you for your comment. TCP ACK enhancement is in general applicable for any heavy DL traffic. In our understanding, there is much focus now on UL heavy traffic and any TCP ACK enhancements done for DL should also be applicable for UL traffic as well.
Priority of critical information **Mediatek**: For priority of critical data within a DRB, how well can CODEC handle this kind of prioritization? What's the expected RAN capacity gain	Thank you for your comment. Just for clarification that the priority of critical message should not be always performed but under special conditions when e.g. network is congested
Apple: The main example of potential L2 header optimizations you provide seems to be related to duplication. Is that so? Do you envision other enhancements, not necessarily related to duplication? Was the TCP ACK overhead calculated assuming ACK piggybacking or not?	Thank you for your comments Yes, duplication is one of the examples showing L2 header overhead and other scenarios are not precluded. We think TCP ACK piggybacking has been discussed in the past and we are ok to study all aspects.

7.3 Round 2: RWS-210364: further questions and comments

In the feedback form in this section, we invite responses to the answers that we provided to the round 1 comments. We also invite further new comments and questions on RWS-210364

Feedback Form 12: Round 2: questions and comments on RWS-210364

1 – Fujitsu Limited

Thank you for the contribution.

We have interest in TCP ACK handling in P5. This topic has been discussed e.g. in RP-180346/RP-180347 and we still think that excessive ACK generation is still non-negligible issue. For the proposal TCP ACK "suppression", do you mean that the intention is TCP ACK "discarding", where congested TCP ACK is discarded from the data buffer?

2 – HuaWei Technologies Co.

Thanks for the paper. For priority handling for I-frames, do you have any consideration on how to identify the critical packet within a DRB? Do you think CN should be involved?

3 – MediaTek Inc.

Thanks for the detailed reply.

For XR media DL transmission, could you elaborate on whether UDP or TCP or both should be used?

7.4 Round 2: Answers for RWS-210364 comments

Table 9: ROund 2: Answers to RWS-210364 comment

Questions	SONY Answers
1 – Fujitsu Limited Thank you for the contribution. We have interest in TCP ACK handling in P5. This topic has been discussed e.g. in RP-180346/RP-180347 and we still think that excessive ACK generation is still non-negligible issue. For the proposal TCP ACK ”suppression”, do you mean that the intention is TCP ACK ”discarding”, where congested TCP ACK is discarded from the data buffer?	Thank you for your comment. Yes, our understanding seems to be aligned that TCP ACK is an issue that needs addressing in the standards and we would like to discuss TCP ACK for UL as well as DL traffic and agree that discarding is one of the potential solutions
HuaWei Technologies Co. Thanks for the paper. For priority handling for I-frames, do you have any consideration on how to identify the critical packet within a DRB? Do you think CN should be involved?	Thank you for your comment. We think that such awareness of critical message is necessary in RAN because either a separate DRB or prioritisation within a DRB is needed for such messages
MediaTek Inc. Thanks for the detailed reply. For XR media DL transmission, could you elaborate on whether UDP or TCP or both should be used?	Thank you for your comment and sorry if it was not clear from our response in the first round. We think that both UDP and TCP have their own advantages and disadvantages for carrying media streams. At this moment we think that both may be used.

8 RWS-210365 (RAN2 Enhancements for Relays, IAB, NTN, MBS)

RWS-210365 proposed that the following are supported in Rel-18.

Relays

Introduce UE-to-UE relay for both L2 and L3 Relays

Enhancements to UE to NW relay for L2 relays:

Service continuity on Inter-gNB cases

Group mobility for relay switch

IAB enhancements

Load balance enhancement for IAB:

Dual-protocol-stacks for mobility, load balancing and packet duplication

CHO enhancement in order to support load balance

Mobile IAB node and adaptive activation/deactivation

IAB node on unlicensed band for new use case

NTN enhancements

Support UE without GNSS capability

Regenerative payload based GEO/LEO scenarios

Relay-based architecture for NTN

Satellite based positioning

MBS enhancements

Multicast support for RRC Inactive UEs (if not included in Rel-17)

Support multiple MCCH, e.g., to support different service types.

MBS specific BWP (Option 2A) depending on UE capability for RRC-CONNECTED UEs.

RLC-AM for PTM

These are mainly leftover topics from Rel-17.

8.1 Round 1: RWS-210365: questions and comments

Questions / comments are invited on the above proposals or on other aspects of the document.

Feedback Form 13: Round 1: RWS-210365: questions and comments

1 – CATT

Thanks for the contribution.

On relay:

We generally agree that relay work should continue in Rel-18, as stated in our paper RWS-210407. Then we have a question for clarification. In your paper, seems service continuity only concerns inter-gNB mobility case, and group moblity, but what is your view on indirect/indirect path switching, i.e., would that also relate to the motivation of service continuity?

On MBS:

We agree NR MBS enh in R18 is needed.

2 – BBC

BBC supports the evolution of NR MBS under Rel-18 and the topics you propose generally seem relevant to us as potential enhancements for NR MBS.

3 – LG Electronics Inc.

Regarding Dual-protocol-stacks for mobility in IAB enhancement, is this to enhance existing DAPS to support zero-interruption by mobility?

4 – Fraunhofer HHI

On IAB:

Thanks for the contribution. Fraunhofer supports some of the identified topics, specifically mobile IAB (RWS-210320).

Could the following also be clarified:

#1) Does Sony envisage enhancements for DAPS and CHO, and the operation in the unlicensed spectrum to be a part of Mobile IAB?

5 – ZTE Corporation

Thanks for the contribution, we have got only one question:

- For RLC AM of PTM, do you think the same complexity issues raised in Rel-17 discussion still applies to the next releases?

6 – Intel Corporation (UK) Ltd

For IAB, what does adaptive activation/deactivation mean? Is this for a group of UE accessing to a mobile IAB node while fixed IAB node is also detected? Or the mobile IAB-node's adaptive activation/deactivation according to the number of accessed UE.

7 – Apple Benelux B.V.

Can you elaborate on the Relay-based architecture for NTN? In particular, where in the architecture a relay node would be deployed?

8.2 Round 1: answers for RWS-210365 comments

Table 10: Answers to questions / comments on RWS-210365

Questions	**SONY Answers**
Relays **CATT**: Thanks for the contribution. On relay: We generally agree that relay work should continue in Rel-18, as stated in our paper RWS-210407. Then we have a question for clarification. In your paper, seems service continuity only concerns inter-gNB mobility case, and group moblity, but what is your view on indirect/indirect path switching, i.e., would that also relate to the motivation of service continuity?	Thank you for your comments. Yes, we think Relay-Relay handover should also be part of Rel-18.
MBS **CATT:** On MBS: We agree NR MBS enh in R18 is needed.	Thank you for your comments and support.
BBC: BBC supports the evolution of NR MBS under Rel-18 and the topics you propose generally seem relevant to us as potential enhancements for NR MBS	Thank you for your comments and support
ZTE: Thanks for the contribution, we have got only one question: - For RLC AM of PTM, do you think the same complexity issues raised in Rel-17 discussion still applies to the next releases?	Thank you for your comments. We think reliability for multicast PTM is important and should be included in Rel-18 scope. We are aware that there are counter proposals based on RLC and PDCP.
IAB **LGE**: Regarding Dual-protocol-stacks for mobility in IAB enhancement, is this to enhance existing DAPS to support zero-interruption by mobility?	Thank you for your comments. Learning from Rel-17 discussions, we think it is better to call it Dual protocol stack (or a better name) rather than DAPS and its enhancements
Fraunhofer: On IAB: Thanks for the contribution. Fraunhofer supports some of the identified topics, specifically mobile IAB (RWS-210320). Could the following also be clarified: #1) Does Sony envisage enhancements for DAPS and CHO, and the operation in the unlicensed spectrum to be a part of Mobile IAB?	Thank you for your comments. We think Rel-17 should be the baseline for mobile IAB but ok to consider enhancements. We are in favour of deployment of IAB on unlicensed band in a controlled environment (predictable channel access) and where backhaul link is unlicensed.

Intel: For IAB, what does adaptive activation/deactivation mean? Is this for a group of UE accessing to a mobile IAB node while fixed IAB node is also detected? Or the mobile IAB-node's adaptive activation/deactivation according to the number of accessed UE.	Thank you for your comments. We realized that probably adaptive activation/deactivation term is confusing. What we actually meant is that a mobile IAB node can be switched on/off based on the need. If there are no UEs then mobile IAB node can be switched off. It can be switched on once UEs start moving in
Apple: Can you elaborate on the Relay-based architecture for NTN? In particular, where in the architecture a relay node would be deployed?	Thank you for your comments. in our understanding, Relay was studied in the NTN SI but not included in the WID. At this stage, we are not proposing a new architecture

8.3 Round 2: RWS-210365: further questions and comments

In the feedback form in this section, we invite responses to the answers that we provided to the round 1 comments. We also invite further new comments and questions on RWS-210365

Feedback Form 14: Round 2: questions and comments on RWS-210365

1 – Omnispace

We support with your list of features NTN. We think Regenerative payloads should be a high priority for Rel18 as it will enable operators have more flexibility with deployment once NTN has achieved reasonable traction.

8.4 Round 2: Answers to RWS-210365 comments

Table 11: Round 2: Answers to RWS-210365

Questions	**SONY Answers**
Omnispace We support with your list of features NTN. We think Regenerative payloads should be a high priority for Rel18 as it will enable operators have more flexibility with deployment once NTN has achieved reasonable traction	Thank you for your comments and support.

9 RWS-210379 (Rel-18 Upper Layers Misc. Features: AS Security Enh, NPN Enh, Inter UE coordination)

AS security enhancements:

Current AS security protects (Ciphering and integrity protection) L3 signaling and lower layer signaling is not protected. RAN/RAN2 received an LS on "User location identification from Carrier Aggregation secondary cell activation messages" from GSMA highlighting the vulnerability of unprotected lower layer signaling. Further, due to virtualization of base station, different functions may be hosted by different stakeholders. It is important to have a trust relationship between UE and network even for L2/L1 signaling.

NPN enhancements:

Rel-17 NPN enhancements introduced RAN impacts due to UE on boarding and credentials held by third party. Continuing the same theme, Rel-18 should allow on demand 5G network deployment and on demand services from third party. For example, a mobile operator may provide special contents only to those inside a stadium and/or within a certain period of time, and to subscribers agreed to use this service. Providing these contents or on demand service may require specific and dynamic QoS support, network/UE configuration and policies/ provisioning.

Inter UE coordination:

For high throughput and user experience, Inter UE coordination over Uu and SL should be explored.

RWS-210379 made the following proposals.

Proposals:

RAN and SA should coordinate and start the normative work in RAN on protection of lower layer signaling

RAN to start normative work on:

Mechanism for UE to discover/trigger on-demand third party services

Mechanism for UE to explore charging and other aspects

RAN to start normative work on L2 architecture, functionalities and interfaces for data splitting and aggregation in sidelink considering coordination with Uu link

There are three different aspects in the proposal i.e. AS security enhancements, NPN enhancements, and inter UE coordination.

9.1 Round 1: RWS-210379: questions and comments

Questions / comments are invited on the above proposals or on other aspects of the document.

Feedback Form 15: Round 1: RWS-210379: questions and comments

1 – Samsung Electronics Polska Thanks for the paper. We have few questions: On slide2, any particular reason to mention MAC CE? On slide3, which L1 signalling (e.g. DCI, Transport block, PUCCH, etc.) do you consider?
2 – Apple Benelux B.V. It appears that the security and the NPN enhancements have mostly higher layer implications and therefore should start in SA, aren't they?

9.2 Round 1: answers for RWS-210379 comments

Table 12: Answers to questions / comments on RWS-210379

Questions	SONY Answers
Samsung: Thanks for the paper. We have few questions: On slide2, any particular reason to mention MAC CE? On slide3, which L1 signalling (e.g. DCI, Transport block, PUCCH, etc.) do you consider?	Thank you for your comments. On MAC-CE, this is based on GSMA LS. On L1 signaling, we think integrity protection of DCI contents is important. We don't see a strong need for PUCCH but ok to follow majority. Regarding the encryption of transport block, we think the overall solution will become bulky and end up with double encryption in certain cases and with limited benefit.
Apple: It appears that the security and the NPN enhancements have mostly higher layer implications and therefore should start in SA, aren't they?	Thank you for your comments. We think security work can start in parallel in both SA3 and RAN2 so that RAN2 can provide guidance to SA3. We are open to discuss NPN work.

9.3 Round 2: RWS-210379: further questions and comments

In the feedback form in this section, we invite responses to the answers that we provided to the round 1 comments. We also invite further new comments and questions on RWS-210379

Feedback Form 16: Round 2: questions and comments on RWS-210379

1 – FGI Could you illustrate more on the NPN proposals, i.e., mechanism for UE to discover/trigger on-demand third party services and mechanism for UE to explore charging and other aspects? It seems that 3GPP

cannot restrict the third party and third party services. The charging seems to be core network issues. What kinds of impacts would you expect on RAN?

9.4 Round 2: Answers to RWS-210379 comments

Table 13: Round 2: Answers to RWS-210379

Questions	SONY Answers
FGI Could you illustrate more on the NPN proposals, i.e., mechanism for UE to discover/trigger on-demand third party services and mechanism for UE to explore charging and other aspects? It seems that 3GPP cannot restrict the third party and third party services. The charging seems to be core network issues. What kinds of impacts would you expect on RAN?	Thank you for your question. Group IDs are transparent to AS layer in Rel-17 and cell selection/reselection is not impacted. We think that Rel-18 should address the scenario where e.g. UE is camped on a macro cell and interested in a service available in a stadium cell and should be able to select the stadium cell even if in the good coverage of macro cell. The cell disappears after the event is over in the stadium. We expect charging remains a Core network issue but RAN may be involved in updating the terms of new service (as an alternative to OTT).

10 Summary of email discussion

This section captures the summary of email discussion on Sony inputs to AI4.3 of the RAN plenary Release-18 workshop. The email discussion was held via NWM using the NWM tag of "RAN-R18-WS-crossFunc-SONY".

The email discussion was based on the following Sony input documents:

RWS-210301: Views on NR Positioning for Rel-18

RWS-210306 : Introducing Reconfigurable Intelligent Surfaces for 5G-Advanced

RWS-210316 : Sidelink Enhancements for Rel-18

RWS-210317: Rel-18 Upper Layer Mobility Enhancements

RWS-210364 : Rel-18 RAN2 Enhancements for XR

RWS-210365 : RAN2 Enhancements for Relays, IAB, NTN, MBS

RWS-210379 : Rel-18 Upper Layers Misc. Features: AS Security Enh, NPN Enh, Inter UE coordination

Our summary of the email discussions of these documents is as follows:

RWS-210301: Views on NR Positioning for Rel-18

We received questions from six companies in the first Q&A round, and one in the second round.

For the question related to NTN-positioning, we responded that it is not our priority. For ranging and relative positioning, we responded that we should stick to the SA defined requirements. On unlicensed band; we think further study of different frequency bands can be done, starting on the lower range. For the question related to IIoT, we think it should be studied if possible to reuse the Rel-17 IIoT positioning targets in term of accuracy and latency. And when it comes to Integrity, we think it can be studied for Uu to start with.

RWS-210306 : Introducing Reconfigurable Intelligent Surfaces for 5G-Advanced

We received questions from five companies in the first Q&A round, and two in the second one. Several companies recognized commonalities between RISs and smart repeaters, and a common interface was suggested. The issue of whether 3GPP should address RISs and smart repeaters in separate items or in a joint one (our preference) was also brought up. Other issues raised were the need for channel modeling and enhancements to channel estimation, CSI feedback and mobility, envisioned deployment use cases, potential interference between operators and benefits of RISs w.r.t. remote radio heads.

RWS-210316 : Sidelink Enhancements for Rel-18. We received questions from four companies for more detailed objectives on URLLC, FR2 operation and power saving in sidelink. Especially for the sidelink URLLC, we replied that a mini-slot based transmission could be a potential enhancement, and then received follow-up questions on concerns regarding efficiency due to extra overhead and coexistence with Rel-16/17 sidelink operations. We responded that both concerns don't necessarily have to be solved in Rel-18 but could be discussed at some stage in 3GPP if necessary.

RWS-210317: Rel-18 Upper Layer Mobility Enhancements

On UL mobility whereby an UL RS is transmitted from the UE and received by the network, we received questions from two companies. One company asked if UL mobility is applicable to all RRC states. We replied that starting with RRC_Connected mode will be a good starting point and other states may be covered eventually. The other company asked to clarify the problem statement and we replied based on the historical discussions in TR 38.802 and that power saving, handover performance, paging miss probability can be improved with UL mobility in normal and especially dense deployments where UL performance degradation may not be accurately predicted based on DL RS.

On UE based mobility whereby AI models in the UE assist in mobility, we received questions from two companies. One company expressed the benefit for FR2 and raised the question about our approach for AI model being specified. We replied that specifying the input parameters and the outcome of AI model may be a good starting point. The other company asked the role of network in this proposal and we replied that UE may assist the network and not overtaking the role of network for mobility.

No company provided input to second round.

RWS-210364 : Rel-18 RAN2 Enhancements for XR

On Flexible L2 header whereby it is proposed that L2 header has a flexible format, we received questions/comments from three companies during first and second round. One company asked if it is a big change to specify in Rel-18. Our response is that this should be studied in Rel-18. The other company asked if L2 header optimization is needed for duplication use case only and we responded that this is one of the

example scenarios. The other company expressed the support for this topic.

On TCP ACK enhancements whereby TCP ACKs for UL/DL are suppressed, we received questions/comments from four companies in first round of which one company raised the question during the second round as well. One company asked if we would like to extend the scope to include ack prioritization. Our response is that we are ok to combine similar proposals. The other company asked if TCP will be used for XR traffic and our response is that it should be viewed as a general enhancement and TCP may also be used for media streams. The other company asked if ACK piggybacking was considered and our response is that all schemes can be studied. One company expressed support for this proposal.

On prioritization of critical message i.e. prioritize I-frames over P-frames in scenarios where RAN is congested, we received question/comments from two companies; one in each round. One company wanted to know how well CODECs can handle such prioritization and benefits for RAN capacity gain. Our response was that such prioritization takes place under special conditions like RAN congestion and does not affect RAN capacity and CODEC performance. The other company wanted to know if we foresee any CN impacts. We think that RAN should be aware and how it is achieved should be discussed further.

RWS-210365 : RAN2 Enhancements for Relays, IAB, NTN, MBS

On SL Relays enhancements, we received question from one company asking our views on indirect-indirect mobility. We responded that this should be part of Rel-18.

On IAB enhancements, we received questions/comments from three companies. One company wanted to clarify if Dual active protocol stack proposal is based on enhancing DAPS. Our response is that based on rel-17 discussions we should avoid using DAPS or DAPS like terminology. One company wanted us to clarify the term adaptive act/deact used in our paper. We clarified the term is used to express mobile IAB on/off depending on traffic. One company asked if we envisage enhancements of DAPS and CHO for mobile IAB and our response is that Rel-17 should be the baseline for mobile IAB.

On MBS enhancements, we received questions/comments from three companies. Two companies supported MBS enhancements in general. One company asked if same complexity issues as raised in Rel-17 also apply to next release regarding RLC-AM support for PTM. Our response that reliability for multicast PTM is important and we are aware that there were competing proposals on this topic.

On NTN enhancements, we received comments from two companies. One company supported the objectives with supporting regenerative payload as high priority objective. Other company asked if we propose a new architecture for relays in NTN and our response is that we don't consider a new architecture at this stage.

RWS-210379 : Rel-18 Upper Layers Misc. Features: AS Security Enh, NPN Enh, Inter UE coordination

On AS security enhancements proposing protection of L1/L2 signaling, we received questions/comments from two companies. One company asked why MAC-CE is mentioned and which L1 signaling should be protected. We responded that MAC-CE is based on the LS from GSMA and think DCI protection should be high priority. The other company asked if SA should start the work first. In our understanding a coordination between RAN and SA is needed.

On NPN enhancements proposing UE cell selection/reselection to prioritize cells deployed on-demand, we received question from two companies. One company asked if this should start in SA first and we responded that we are open for discussion. The other company asked details of RAN impacts and we clarified the gaps compared to Rel-17 and this question was received during the second round.