3GPP TSG RAN Release 18 Workshop RWS-210578

Electronic Meeting, 28th June – 2nd July 2021

Agenda Item: 4.2

Source: Discussion Moderator (Lenovo)

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

Document for: Online discussion

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1 Introduction

This document is the template for online discussions related to Lenovo/Motorola Mobility contributions to Agenda 4.2 - non-eMBB functional evolution. The following documents were submitted:

1. RWS-210255 Motivations for vehicle/drone mounted relay in Rel-18

2. RWS-210256 Potential high layer related enhancements for XR and cloud gaming in Rel-18

3. RWS-210262 Views on further RedCap Enhancement in Rel-18

4. RWS-210261 Views on further SL enhancement in Rel-18

5. RWS-210417 Sidelink for IIoT

6. RWS-210257 Proposals for using unlicensed spectrum for sidelink communication for Rel-18 (Originallyin Agenda item 4.1)

7. RWS-210418 Positioning - On General Evolution and Relative Positioning

Kindly use Section 2 to submit any questions and comments you may have to these above documents in the appropriate feedback forms.

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2 Round 1 Questions/Comments

2.1 RWS-210255 Motivations for vehicle/drone mounted relay in Rel-18

Feedback Form 1:

1 – Beijing Xiaomi Mobile Software

Regarding the End-to-end QoS, is there a requirement for network to distinguish the in-side and out-side UE? Current QoS framework seems to be enough.

2 – China Telecommunications

Could you please provide your prefernece(L2 or L3) and the reason of relay protocol stack?

We also think drone-based relay is useful in specific scenarios. What is the challenge of it compared with ground vehicles relay?

3 – ZTE Corporation

Thanks for the contribution. We are interested to the VMR scenario. Considering the widely deployed high speed train and high speed carriges, mobile relay is very useful to ensure the service continuity and reduce latency. I have two question for clarification.

1) For the control of mobile UE access, it is not clear to us why idle UE should not camp on relay. For the idle UE, if it moves together with the relay, it is more appropriate for the idle UE to camp on the relay UE without continuously perform cell reselection.

2) For the end-to-end QoS during mobility, does it mean the potential enhancements to support multi-hop QoS ensurance or the service continuity during the HO between mobile relay and other stationary network node?

4 – Qualcomm Incorporated

Question on P2: are you considering Drone-based relay to be included in Drone/UAV proposal or some other proposal e.g. Relay or IAB?

5 – vivo Mobile Communication Co.

What is the IAB-like relay, is it a new network node or certain involvement of IAB node?

What may be potential enhancement to IAB?

L3 relay is mentioned, what's the motivation for L3 relay when IAB is specified as L2?

If group mobility is supported for SL relay, do we need any additional enhancement?

Is drone based relay to included in your P2?

2.2 RWS-210256 Potential high layer related enhancements for XR and cloud gaming in Rel-18

Feedback Form 2:

1 – Classon Consulting

[for FUTUREWEI]

WealsothinkenhancementsareneededinRel-18forapplication-orientedQoScontroltosupportlow/bounded latencyhighthroughputtransmissionofXRdatabursts. PleaseseeRWS-210040page8andNW https://nwmtrial.etsi.org/#/documents/4751 .

2 – HuaWei Technologies Co.

Q1. We think new metric is useful to reflect XR experience, and we share similar view this can be discussed in QoE. Do you think this also requires SA4 involvement to identify which parameters can have influence on the user experience?

Q2. we share similar view that identifying multi streams and importance of packets can be helpful for the RAN capacity improvement, do you think such enhancements require an E2E mechanism involving CN and 3GPP SA2?

3 – China Telecom Corporation Ltd.

Thank you for the contribution. We think it is necessary to study the potential high layer related enhancements for XR and cloud gaming. In order to give users a better experience, it needs to support the flexible awareness between Applications and RAN, which parameters do you think are the most important?

4 – Spreadtrum Communications

Q1How to redesign the QoS framework and MAC scheduling based on synchronization of multiple streams?

Q2Shall the TCP be applied for XR? Why not UDP?

5 – China Mobile International Ltd

In general, we also think cross-layer optimization is needed for XR. Could you elaborate more about " The synchronization of multiple steams and importance handling for different frame types/different packets of the same frame types may have impact on QoS framework design and MAC scheduling."

6 – LG Electronics Inc.

1. Regarding "synchronization of multiple streams", what kind of synchronization do you mean? Do youmean same transmission delay for packets belonging to different packet stream?
2. Regarding "importance handling for different frame types/different packets of the same frame types",do you assume some kind of packet inspection in AS layer?
3. Regarding "TCP related cross layer optimization", which layer are you talking about? What kind ofcross layer optimization you propose?

7 – ZTE Corporation

Do you have some examples of new QoE metrics for XR?

8 – Qualcomm Incorporated

1) What does "flexible 5QI" mean?
2) Can you provide more explanation on why synchronization of multiple streams would have additionalbenefit over current handling?

9 – China Unicom

Thanks for the contribution, we have some questions for clarification:

We have similar view that QoS differentiation and QoE enhancement should be supported in R18. What is the expected performance improvements if XR QoE is introduced in R18

2.3 RWS-210262 Views on further RedCap Enhancement in Rel-18

Feedback Form 3:

1 – Classon Consulting

FUTUREWEI supports studying redcap positioning, but should be in positioning not redcap

2 – Intel Corporation (UK) Ltd

<Intel>

Q1. How to motivate introducing further reduced BW UEs for FR2 when the minimum complexity associated with support of FR2 bands would likely offset the simplifications from BW reduction only?

3 – Ericsson LM

Regarding further reduced UE bandwidth (RWS-210262), we would like to ask what potential UE cost reductionyouexpect fromreduction from20 MHz to 5-10MHz? The estimatesfrom CATT(RWS-210409) and Ericsson (RWS-210313) indicate that according to the established cost evaluation methodology (TR 38.875), there may not be a very significant further cost reduction compared to 20 MHz.

4 – Qualcomm Incorporated

1) What is your view on the co-existence of UEs with different power classes ?

2) Could you elaborate why 14 dBm is proposed for lower power class ?

5 – LG Electronics Inc.

Thanks for the contribution. We have the following questions.

Q1) Using power saving techniques up to Rel-17, our expectation on additional power saving in Rel-18 is marginal in connected mode. What is your view on this. Can you share your target for performance enhancement, if any, or do you want to start with the study phase to check if there is room for improvement?

Q2) We agree that coexistence b/w RedCap UEs and non-RedCap UEs should always be taken into account. Regarding whether the coexistence should be an objective in the WID, do you see it necessary to have the coexistence as an WID objective, rather than kind of a note or a baseline assumption for Rel-18?

6 – Samsung Electronics Co.

1. With 10MHz or 5MHz BW, how much additional cost reduction do you expect compared with currentRedCap, and simple restriction,e.g. restrict BW for PDSCH or restrict TBS? In the annex A, it seems like SSB/CORESET 0 are expected to be reused, is this correct? However, for PDCCH in CORESET 0, the coverage might have more serious issue compared with 20MHz DL BW. Do you think some coverage recovery is expected?

2. What kind of technique is expected for further power saving for RedCap, e.g., ZP-WUS? why suchtechniques are specific to RedCap to be discussed in RedCap WI other than general power saving for all type of device?

2.4 RWS-210261 Views on further SL enhancement in Rel-18

Feedback Form 4:

1 – Classon Consulting

WealsosupportsidelinkFR2enhancements, seeRWS-210039andhttps://nwm-trial.etsi.org/#/documents/47 .

2 – LG Electronics Inc.

Q: Rel-16 already supports CSI measurement and reporting in sidelink. Can you elaborate the additional enhancements you proposed for CSI in this document?

3 – Huawei Tech.(UK) Co.. Ltd

In proposal 3, what additional CSI feedback is envisioned, since it is included in Rel-16?

4 – Qualcomm Technologies Int

CSI measurement is listed as part of feedback enhancements for link adaptation, is there a proposal to use the feedback channel to report CSI? Or is this still CSI reporting from Rel-16?

2.5 RWS-210417 Sidelink for IIoT

Feedback Form 5:

1 – Intel Corporation (UK) Ltd

<Intel>

Q1. What is your view on enhancement for better latency and reliability?

2 – Qualcomm Incorporated

Slide #4 talks about coverage extension using sidelink in industrial settings. Could you elaborate on scenarios where we expect a coverage hole? For outdoor industrial use-cases like process automation, we can see value to coverage problem being addressed via sidelink, but wanted to see if you also see coverage holes being possible for indoor factories.

2.6 RWS-210257 Proposals for using unlicensed spectrum for sidelink communication for Rel-18

Feedback Form 6:

1 – Classon Consulting

Wealsosupportsidelinkunlicensedenhancements, seeRWS-210039andhttps://nwm-trial.etsi.org/#/documen
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2 – Huawei Tech.(UK) Co.. Ltd

Given the different functionalities of SSB and S-SSB, what is the strong motivation to introduce DRS to SL-U?

2.7 RWS-210418 Positioning - On General Evolution and Relative Positioning

Feedback Form 7:

1 – CATT

In general we share the similar views with Lenovo on the issues that needs to be considered for LPHAP for IIoT and SL Positioning.

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. What bandwidth do you think is needed to achieve 10cm distance accuracy and 2 degree angle accuracy?
- Q3: As for low power high accuracy positioning, what spec impact will be introduced?
- Q4: Do you think Redcap UE should be taken into account?
- Q5: In page 2, for enable large amount of concurrent UEs performing positioning, does it imply Rel17 positioning solutions can't support large amount of concurrent UEs performing positioning? What is the challenge to supporting it?
- Q6: In page 6, for Cooperative positioning procedures using network-assisted and UE-based positioning techniques, does it mean the cooperative between Uu positioning and sidelink positioning?
3 – Qualcomm Incorporated How do you see the different bands being used? Will coordination signaling and PRS be sent in different bands?

4 – LG Electronics Inc. Q1: For clarification, could you explain more the meaning of "combination of network-assisted and UEbased positioning methods." mentioned in Tdoc(RWS-210418)

3 Round 1 Answers from Lenovo/Motorola Mobility

3.1 RWS-210255 Motivations for vehicle/drone mounted relay in Rel-18

Feedback Form 8:

1 – Lenovo (Beijing) Ltd

Response to Xiaomi:

According to the SA1 SID, vehicle relays may provide service to UEs inside the vehicle and in the vicinity of the vehicle. If the relay is mounted in bus, the relative velocity between relay and UE inside the vehicle is zero. However, the relative velocity between relay and the 'outside' UE is not zero (e.g 50km/hour). Therefore, it is possible that there are two different handover boundaries for two types of UE in the network implementation. Therefore, it is helpful to network to determine when to perform handover if network can distinguish inside-UE and outside-UE.

2 – Lenovo (Beijing) Ltd

Response to China Telecommunications:

If L2 relay protocol stack is applied, the legacy IAB specification for IAB can be reused to the vehicle mounted relay. Otherwise, we have no L3 relay for Uu interface. Therefore, we prefer to reuse the current L2 IAB protocol stack.

If drone-based relay is used, some aspects different from ground vehicle relay should be studied. e.g the drone should be replaced if the power is not enough. The legacy mobility mechanism could be not sufficient for the 'replace'.

3 – Lenovo (Beijing) Ltd

Response to ZTE:

The vehicle base station relay may serve both UEs inside/outside the vehicle. We agreed with you that the idle UE inside the relay can camp on the relay.

The service continuity during the HO between mobile relay and another stationary network node should be considered. It may happen in the scenario that the 'outside' UE switches to the gNB when the mobile relay leaves.

4 – Lenovo (Beijing) Ltd

Response to QC:

It depends on the scope e.g. whether IAB-like architecture only is considered. If the architecture of both SL relay can IAB are considered, it could be separate topic for vehicle/drone mounted relay.

5 – Lenovo (Beijing) Ltd

Response to Vivo:

If the protocol stack of L2 relay can be used as the vehicle mounted relay, it is reasonable to reuse the legacy relay e.g. IAB node. Some specific issue for vehicle/drone-based relay should be studied. For example, if group mobility is supported, network need to determine which UE can be added in the group since vehicle relays may provide service to UEs inside the vehicle and in the vicinity of the vehicle.

If L3 relay can be used in vehicle mounted relay, L3 SL relay can be reused.

In addition, we see the use case to introduce the drone-based relay. Some enhancement could be needed for drone-based relay case.

3.2 RWS-210256 Potential high layer related enhancements for XR and cloud gaming in Rel-18

Feedback Form 9:

1 – Lenovo Information Technology

[Response to Futurewei]: thanks for your comments. Your proposals on SDAP enhancement for low latency high throughput communications are quite interesting. We also think some of proposals can be applied to XR data bursts.

[Response to Huawei Q1]: yes, we support to define new metrics to reflect XR experience and SA4 should be involved.

[Response to Huawei Q2]: yes, identifying multi steams is an end-to-end solution, which needs SA2 involvement.

[Response to ChinaTelecom]: the parameters may include: [1] RAN assisted codec adaptation for XR service; [2] user experience information such as application buffer status (which may be supported in Rel17, but more information could be helpful which depends on SA4 discussion); [3] application data unit information.

[Response to Spreadtrum Q1]: XR applications have multiple types of frames and streams (such as data and control streams). Different frames and streams may have different QoS requirements. This has impact on QoS framework in which case SA2 should be involved. The details of how to enhance MAC scheduling need further study.

[Response to Spreadtrum Q2]: As defined in SA4 spec, some XR service are based on HTTP/TCP: As described in Section 6.2.3 in TR 26.928, for viewport dependent streaming, updated tracking and sensor information impacts the network interactivity. Typically, due to updated pose information, HTTP/TCP level information and responses are exchanged every 100-200 ms in viewport-dependent streaming.

[Response to CMCC]: XR applications have multiple types of frames and streams. Different streams may have different QoS requirements (such as data and control streams). Different frames may have different importance such as I-frame and P-frame for video. And it is also possible that the packets of the same frame type have different importance. The details of how to enhance MAC scheduling needs further study.

Delivery time of different frames and/or data streams should be synchronized to a certain extent in order to ensure acceptable Quality of Experience (QoE) for XR.

[Response to LG Q1]: delivery time of different frames and/or data streams should be synchronized to a certain extent in order to ensure acceptable Quality of Experience (QoE) for XR.

[Response to LG Q2]: DPI in RAN is not our consideration. Some assistance information from CN or UE to indicate the importance is preferred.

[Response to LG Q3]: As studied in TR 36.933, the behavior of TCP assumes that network congestion is the primary cause for packet loss and high delay. In cellular networks the bandwidth available for each UE can vary by an order of magnitude on a TTI basis due to changes in the underlying radio channel conditions. Such changes can be caused by the movement of devices or interference, as well as changes in system load due to bursty traffic sources or when other UEs enter and leave the network. TCP has difficulties adapting to these rapidly varying conditions. If the E2E delay increases, the TCP RTT increases and the TCP throughput may decrease, which may impact the user experience.

[Response to ZTE]: we support to define a new metric to reflect XR experience and SA4 should be involved. SA4 may define the detailed metric later. So far, we haven't clear view from RAN point's view.

[Response to QC Q1]: The 'flexible 5QI' is used in TR 26.928. More flexible 5QIs and QoS support addressing differentiated latency requirements in the range of 10ms up to potentially several 100ms and with bitrate guarantees.

[Response to QC Q2]: delivery time of different frames and/or data streams should be synchronized to a certain extent in order to ensure acceptable Quality of Experience (QoE) for XR.

2 – Lenovo Information Technology

[Response to China Unicom]: we suppose SA4 should define some new metrics for QoE reporting

3.3 RWS-210262 Views on further RedCap Enhancement in Rel-18

Feedback Form 10:

1 – Lenovo (Beijing) Ltd

Many thanks for all the comments and questions!

[To Intel] Not that clear of the meaning of "minimum complexity associated with support of FR2 bands", could you please clarify a bit? Thanks.

[To Ericsson] Yes, the cost reduction from 20MHz to 5MHz is not that significant than that from 100MHz to 20MHz, but still has 10%. More cost reduction might be achieved with more restrictions. Besides, we may obtain power saving gain from reduced BW.

[To Qualcomm] A1: One way might be configuring separate BWP(s) for RedCap low power class UEs, so as to reduce the impact to legacy UEs, but this is just a very initial thinking. It could be FFS.

A2: Frankly in our mind 14dBm is just a reference (as the minimum value in LTE IoT) for discussion. We need to clarify the use cases for Rel.18 RedCap and then decides the power class.

[To LG] A1: The power saving gain for connected mode might not that noticeable, but we are open to further study it. Also it is noted additional power saving is obtained from reduced BW. We may check if further power saving can be achieved with reduced BW.

A2: It should be Ok to take the coexistence issue as a note, just same with what we do in Rel.17 RedCap WID. But technically, coexistence issue is always a high priority issue in our understanding.

[To Samsung] A1: There might be around 10% additional cost reduction if following the model in 38.875. More cost reduction might be achieved with more restrictions. We are open if reusing legacy SSB and CORESET0. And we expect there is some coverage recovery for DL with reduced BW.

A2: Reduced BW already achieves some power saving gain. We can study if further power saving gain can be obtained based on reduced BW. ZP-WUS is interesting and we are open to study it either in RedCap or in other AI.

3.4 RWS-210261 Views on further SL enhancement in Rel-18

Feedback Form 11:

1 – Lenovo (Beijing) Ltd **@Classon Consulting**: Thanks for the support of FR2 enhancement. Let's further discuss the detailed FR2 issues, e.g., beam management, CSI feedback, etc., in next step.
2 – Lenovo (Beijing) Ltd **@ LG Electronics:** Thanks for the comments. We think information of PMI/RI needs to be enhanced for sidelink in Rel-18 especially for unicast transmission.
3 – Lenovo (Beijing) Ltd **@ Huawei:** Thanks for the comments. We think information of PMI/RI needs to be enhanced for sidelink in Rel-18 especially for unicast transmission.
4 – Lenovo (Beijing) Ltd **@ Qualcomm:** Thanks for the comments. On one hand, we think information of PMI/RI needs to be enhanced for sidelink inRel-18especiallyforunicasttransmission. Ontheotherhand, besideofRel-16CSIreportingmechanism, using PSFCH for CSI reporting is also preferred from our side for latency reduction purpose.

3.5 RWS-210417 Sidelink for IIoT

Feedback Form 12:

1 – Motorola Mobility España SA @Intel Sidelink latency improvement using sub-slot scheduling should be investigated and reliability improvement using sub-slot repetitions, faster link adaptation etc., should be investigated @Qualcomm coverage depends on the network deployment inside factories, obstruction from movement of cranes, fork lifters etc., and presence of metal structures. Massive wireless sensor network targeting conditional monitoring is one use case requiring coverage extension. Moreover, sidelink relaying provides link redundancy to achieve high reliability.

3.6 RWS-210257 Proposals for using unlicensed spectrum for sidelink communication for Rel-18

Feedback Form 13:

1 – Lenovo (Beijing) Ltd

@Classon Consulting:

Thanks for the support of unlicensed sidelink. Let's further discuss the detailed issues, e.g., spectrum, channel design, etc., in next step.

2 – Lenovo (Beijing) Ltd

@Huawei:

Thanks for the good comments. DRS is introduced from Rel-16 NR-U. Due to LBT, the gNB can not transmit SSB at the predefined occasion when LBT is failed. So there is a discovery window specified to provide candidate SSB occasions to the UE. We think such window is also needed for Tx UE to provide candidate S-SSB occasions when S-SSB is transmitted on unlicensed spectrum.

3.7 RWS-210418 Positioning - On General Evolution and Relative Positioning

Feedback Form 14:

1 – Motorola Mobility Germany GmbH

1- CATT

Reply R1: Thank you for your support, and likewise based on CATT's contribution (RWS-210414), we

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share similar views on the overall evolution of Rel-18 Positioning especially in terms of SL Positioning and positioning support for new UE types.

2-Beijing Xiaomi Mobile Software

Reply to R1-Q1: Thank you for your questions, we share the similar views on the definitions between

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ranging and relative positioning. However, relative positioning and ranging need not be mutually exclusive as ranging can be an enabler to obtain the position relative to other network elements or relative to other UEs, i.e. the relative position.

Reply to R1-Q2: Generally speaking, as you know the distance and angular accuracy would not only

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depend on the bandwidth corresponding to time/phase resolution of the received CIR but on a number of other factors including positioning reference signal design, link quality, number of antennas, type of positioning method used, LOS/NLOS/multipath condition between Tx and Rx, etc. We're still studying these aspects, but you are welcome to share your initial views on accuracy impacts if you have already have made some conclusive studies here.

Reply to R1-Q3: The spec impact can be fully understood during a potential WG-level study and will

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depend on the type of L1/L2 enhancements that satisfy the energy requirements needed by LPHAP UEs as noted in TS 22.104 and therefore we would be open to such a study.

Reply to R1-Q4: Yes, positioning for RedCap UEs should also be a Rel-18 consideration provided that

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there are non-overlapping requirements in relation to LPHAP UEs, which are to be addressed.

Reply to R1-Q5 With an ever-increasing density of devices to be simultaneously positioned with a high

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degree of accuracy in a given geographic area, especially in an IIoT environment, additional improvements may be investigated in relation to current Rel-17 solutions, which further consider spectrally efficient positioning mechanisms despite challenging channel conditions.

Reply to R1-Q6: Yes, the information/results from positioning methods using the Uu link and SL can be

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exploited in a cooperative fashion to improve the overall positioning performance.

3-Qualcomm Inc.

Reply R1-Q1: Thank you for your question. The multi-carrier transmission of the PRS in different bands

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including licensed/unlicensed bands can be leveraged in a coordinated fashion through suitable signalling mechanisms to improve the positioning accuracy depending on the selected positioning method.

4-LG Electronics Inc.

Reply to R1-Q1: Thank you for your question. We can further elaborate that the intention of this point is to

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potentially exploit positioning information/results from the Uu link as well as SL to cooperatively improve the overall positioning performance.

4 Round 2 Questions/Comments

Thank you for your questions and comments to our proposals on non-eMBB evolution in R18. We have provided answers and comments where appropriate in section 3. Kindly input any further questions and comments you may have in this section.

4.1 RWS-210255 Motivations for vehicle/drone mounted relay in Rel-18

Feedback Form 15:

4.2 RWS-210256 Potential high layer related enhancements for XR and cloud gaming in Rel-18

Feedback Form 16:

1 – China Unicom

Thanks for your answers. Flexible 5QI may be involved in RAN2 and RAN3 sides based on our understanding. Could you please explain the further impacts of 5QI on RAN2/3 procedures in detail?

4.3 RWS-210262 Views on further RedCap Enhancement in Rel-18

Feedback Form 17:

1 – Ericsson LM

Regarding the potential UE power saving from further UE bandwidth reduction, we would like to ask what potential gain there might be from hardcoded UE bandwidth reduction to 5-10 MHz compared to what can be achieved from simply configuring the UE-specific bandwidth part to 5-10 MHz?

2 – Intel Corporation (UK) Ltd

Follow-up to round #1: *To elaborate our previous comment, for FR2, the expected UE cost/complexity (absolute) is non-negligible, even with reduced BW support. Considering this as one of the factors, in Rel-17, the BW of 100 MHz was agreed upon for RedCap. We are wondering if defining yet another reduced BW for FR2 (e.g., 50 MHz) can be sufficiently justified considering practical needs and use-cases, cost/complexity savings, and spec efforts.*

3 – Lenovo (Beijing) Ltd

To Ericsson: UE specific BWP can be configured to UE only when UE is RRC connected. Lower BW achieves lower power consumption for RRC inactive/idle UEs. Besides, current standard don't support very narrow BWP, since CORESET size is max. 3 OFDM symbols in time domain, which means max. AL in narrow BWP is low and can't achieve good coverage.

To Intel: 100MHz is obviously "overqualified" to meet just less than 5Mbps data rate for low end RedCap devices. There is room for BW reduction for lower cost, especially if considering other restrictions, like HARQ process reduction, etc.

4.4 RWS-210261 Views on further SL enhancement in Rel-18

Feedback Form 18:

1 – Huawei Tech.(UK) Co.. Ltd

Thanks for the response. Is it then the case you propose to support SL MIMO in Rel-18 for unicast, and does this also include SL MU MIMO for unicast?

2 – LG Electronics Inc.

Q1: For the PMI reporting in your answer, how many antenna ports do you consider?

4.5 RWS-210417 Sidelink for IIoT

Feedback Form 19:

4.6 RWS-210257 Proposals for using unlicensed spectrum for sidelink communication for Rel-18

Feedback Form 20:

4.7 RWS-210418 Positioning - On General Evolution and Relative Positioning

Feedback Form 21:

5 Round 2 Answers from Lenovo/Motorola Mobility

5.1 RWS-210255 Motivations for vehicle/drone mounted relay in Rel-18

Feedback Form 22:

5.2 RWS-210256 Potential high layer related enhancements for XR and cloud gaming in Rel-18

Feedback Form 23:

1 – Motorola Mobility UK Ltd.

The end-to-end QoS framework for XR should be further discussed in SA2. As discussed in SA4, new 5QIs for XR are needed. At least signalling the new 5QI from CN to RAN are needed. whether RAN can assist 5QI adjustment needs further discussion.

5.3 RWS-210262 Views on further RedCap Enhancement in Rel-18

Feedback Form 24:

1 – Lenovo (Beijing) Ltd

Thanks for further comments/questions.

[To Ericsson] UE specific BWP can be configured to UE only when UE is RRC connected. Lower BW achieves lower power consumption for RRC inactive/idle UEs. Besides, current standard don't support very narrow BWP, since CORESET size is max. 3 OFDM symbols in time domain, which means max. AL in narrow BWP is low and can't achieve good coverage.

[To Intel] FR2 100MHz is obviously "overqualified" to meet just less than 5Mbps data rate for low end RedCap devices. There is room for BW reduction for lower cost, especially if considering other restrictions, like HARQ process reduction, etc.

5.4 RWS-210261 Views on further SL enhancement in Rel-18

Feedback Form 25:

1 – Lenovo (Beijing) Ltd

@Huawei:

Thanks for the comments. Yes, the intention is to support only SU-MIMO for sidelink unicast in Rel-18. In the meanwhile, we are open to support MU-MIMO for sidelink.

2 – Lenovo (Beijing) Ltd

@LGE:

Thanks for the comments. Since the intention is to support MIMO for sidelink unicast in Rel-18, up to 8 antenna ports can be considered so as to support max 8 layers in sidelink unicast.

5.5 RWS-210417 Sidelink for IIoT

Feedback Form 26:

5.6 RWS-210257 Proposals for using unlicensed spectrum for sidelink communication for Rel-18

Feedback Form 27:

5.7 RWS-210418 Positioning - On General Evolution and Relative Positioning

Feedback Form 28:

6 Summary

Vehicle/Drone Mounted Relay: Companies expressed strong interest in seeing further work on mobile and drone mounted relays. Details regarding L2 or L3 relay, handover for UEs within vehicle and outside vehicle and QoS handling, and Idle mode camping are among other issues that need to be further discussed.

XR and Cloud Gaming: Interest was expressed in defining new metrics for quantifying user experience, e2e QoS framework design, and cross layers optimizations. More discussion is necessary to understand on the detailed solutions e.g. multi-streams synchronizations and differentiated treatment of packets.

RedCap Enhancements: There was significant interest on supporting further complexity reduction in Rel.18, including further reduced BW for low-end RedCap devices, more power saving and introduction of lower power class UEs. Some questions were raised about the cost/complexity/power saving gain of lower BW, which need to be further discussed.

Sidelink Enhancements:

1. Support for further sidelink enhancement was expressed by several companies. The detailed mechanisms and channel on CSI measurement and reporting including PMI/RI for supporting MIMO for sidelink unicast were discussed.
2. Using unlicensed spectrum for sidelink communication is supported by companies. Questions on motivation to introduce discovery signal to unlicensed sidelink were raised.
3. On the proposal to enhance sidelink for IIoT, there was discussion on the functionality needed in sidelink to ensure latency and reliability and the applicability of sidelink for various coverage scenarios.

Positioning - General Evolution and Relative Positioning: Various clarifications were desired on the evolution of positioning and relative (SL) positioning in Rel-18. Similar views on the study issues relating to Low Power High Accuracy (LPHAP) Positioning and SL Positioning were shared by some companies. There was also discussion on “network-assisted and UE-based positioning techniques” relating to cooperative positioning using both Uu and SL. There was no contentious issue identified.