RAN-R18-WS-non-eMBB-KT - Version 0.0.5
RAN

3GPP TSG RAN Release-18 Workshop **RWS-210577**

Electronic Meeting, June 28 – July 2, 2021

Source: **KT Corp.**

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

Agenda item: **4.2**

Document for: **Discussion**

1 Introduction

This NWM document intends to cover discussion summary based on KT's contribution RWS-210362. Following 6 items for non-eMBB-driven functional evolutions are considered for standardization in Release-18:

- Air-to-Ground Communications

- Enhancements for UL Heavy Communications

- Security Enhancements

- RedCap Enhancements

- Sidelink Enhancements/Sidelink Relay

- Positioning Enhancements

According to the guideline from the RAN chair, it is suggested to follow the timeline below:

Round 1 Q&A: Questions: June 14 8:00 UTC – June 17 8:00 UTC; Answers: June 17 8:00 UTC – June 18 23:59 UTC

Round 2 Q&A: Questions: June 21 8:00 UTC – June 23 8:00 UTC; Answers: June 23 8:00 UTC – June 24 18:00 UTC

Before June 25 18:00 UTC, email discussion summary is to be uploaded

2 Round 1 Q&A

2.1 Air-to-Ground Communications

There are needs for extreme long range (e.g. 20km) communications requested from customers. Potential use cases include drone/UAV control security/monitoring/management system for low altitude (e.g. 150m and below).

Feedback Form 1: Company questions/comments for Air-to-Ground Communications

1 – Asia Pacific Telecom co. Ltd We wonder if this is related to Rel-17 NTN. Companies are proposing RAN4 shall lead a new WI for ATG in Rel-18.
2 – Intel Corporation (UK) Ltd Q: Is it necessary to specify new channel model for long range communication with UAV?

KT's answers for questions regarding Air-to-Ground Communications:

Regarding Asia Pacific Telecom's question, KT believes that current Release-17 NTN focuses on satellite use cases such as LEO and GEO. KT's proposal on ATG aims to specify extreme long range network using low band (e.g. 900MHz) for controlling drones and UAVs. Additionaly, for use cases requiring high data rate (such as sending image/video from drones), KT prefers to include dual connectivy support when drone/UAV is also located within NR coverage.

Answers for Intel's question, we believe that channel modeling for low bands has already been done in the past.

2.2 Enhancements for UL Heavy Communications

Some B2B customers request 1:1 DL:UL ratio apart from 4:1 or 3:1 which is widely used for B2C customers. As using different DL:UL ratio may cause severe interference even with isolated deployment where mass coverage is still available, enhancements for UL heavy communications could be beneficial for private network deployment with different TDD ratio.

Feedback Form 2: Company questions/comments for Enhancements for UL Heavy Communications

1 – Sony Europe B.V. We agree that heavy UL is important in future 5G services. In Slide 4 (numbered as page 03), you mentioned a DL:UL ratio of 1:1. Do you (as operator) expect a ratio where UL > DL, e.g. DL:UL ratio of 1:2 or 1:3?
2 – Huawei Tech.(UK) Co.. Ltd Thank you for the contribution. We would like to better understand how in your view the interference for

UE to/from private UE and gNB to/from private gNB could be handled by specifications.

KT's answers for questions regarding UL heavy communications:

Regarding Sony's question, indeed we receive requests from customers for UL>DL ratio. Especially, for surveillance usage, customers are requesting minimal usage of DL compared to UL. However, other than this case we are yet to find the use case for UL>DL ratio and since this is not a common TDD configuration we haven't had a chance to discuss this in the standard meetings. If there are needs for UL>DL ratio, we believe this can be considered in Release-18.

For Huawei's request on further clarification, we continuously receive request for private 5G network with UL:DL ratio of 1:1 but we explain to our customers that since the site for private 5G network also has public macrocell coverage which is set to UL:DL ratio of 1:3, it is not possible for the different configuration. However, if private gNB or UE is being isolated from macrocell (i.e. no public 5G coverage), and/or if private gNB vs. macrocell interference cancellation can be supported, we hope to satisfy more customers. We would like to hear more on feasibility of this issues from other 3GPP members.

2.3 Security Enhancements

As more private gNBs likely to be deployed in future, protection from fake basestations could be issues on security. Also, due to coverage limitations more operators are sharing their network (e.g. MORAN, MOCN) which may encounter security problems. With blockchain and Quantum Key Distribution (QKD) technology being developed to be used with 5G, 3GPP needs to ensure that these new technologies are securely supported.

Feedback Form 3: Company questions/comments for Security Enhancements

No question/comment received in the Round 1 Q&A.

2.4 RedCap Enhancements

Different types of wearable devices are coming into market which may not be able to support with legacy NB-IoT and/or eMTC. On-going Release-17 RedCap WI can be further enhanced to cope with new services/applications based on metaverse, AR/VR and MR.

Feedback Form 4: Company questions/comments for RedCap Enhancements

1 – Huawei Tech.(UK) Co.. Ltd

Thank you for the contribution. The "RedCap UE which can further support devices requiring larger BW with higher number of MIMO layers" is a bit unclear to us, in relation to "In order to reduce the cost of the incoming wearable devices, full 5G support should be avoided". It seems that those devices may be almost like full 5G devices. Is the intent to specify a REDCAP UE with bandwidth between 20 MHz and 100 MHz in FR1?

KT's answer for question regarding RedCap enhancement:

Answering Huawei's question, we totally agree having 1Rx, 20MHz channel bandwidth for devices with limited form factor. However, devices like AR glasses, VR gaming devices which does not have form factor limitations can get the benefits by having larger channel BW (e.g. 40MHz) which still allow cost-effective device availability compared to using full 5G modem. This will definitely boost the 5G market creating solid ecosystem.

2.5 Sidelink Enhancements/Sidelink Relay

In order to compete with other available technologies, 3GPP specification needs to be further matured. Also, some missing parts from sidelink relay should be specified in Release-18.

Feedback Form 5: Company questions/comments for Sidelink Enhancements/Sidelink Relay

No question/comment received in the Round 1 Q&A.

2.6 Positioning Enhancements

3GPP has been continuously enhancing positioning technology. As customers still demand more precise positioning technology, enhancements should be continued in Release-18.

Feedback Form 6: Company questions/comments for Positioning Enhancements

No question/comment received in the Round 1 Q&A.

3 Round 2 Q&A

3.1 Air-to-Ground Communications

Please provide questions and comments for Round 2 Q&A by June 23 8:00 UTC

Feedback Form 7: Questions/comments for Air-to-Ground Communications Round 2 discussions

No questions or comments received for Round 2 Air-to-Ground Communications Q&A discussion.

3.2 Enhancements for UL Heavy Communications

Please provide questions and comments for Round 2 Q&A by June 23 8:00 UTC

Feedback Form 8: Questions/comments for Enhancements for UL Heavy Communications Round 2 discussion

No questions or comments received for Round 2 Enhancements for UL Heavy Communications Q&A discussion.

3.3 Security Enhancements

Please provide questions and comments for Round 2 Q&A by June 23 8:00 UTC

Feedback Form 9: Questions/comments for Security Enhancements Round 2 discussions

No questions or comments received for Round 2 Security Enhancements Q&A discussion.

3.4 RedCap Enhancements

Please provide questions and comments for Round 2 Q&A by June 23 8:00 UTC

Feedback Form 10: Questions/comments for RedCap Enhancements Round 2 discussions

No questions or comments received for Round 2 RedCap Enhancements Q&A discussion.

3.5 Sidelink Enhancements/Sidelink Relay

Please provide questions and comments for Round 2 Q&A by June 23 8:00 UTC

Feedback Form 11: Questions/comments for Sidelink Enhancements/Sidelink Relay Round 2 discussions

1 – Huawei Tech.(UK) Co.. Ltd

Thank for KT's answer to our question in round 1. Assuming the private network uses small cells, then for the different DL/UL configuration between the Macro and the private network we have proposals to mitigate the gNB-gNB CLI by some advanced solutions, e.g. UL muting RE to accurately measure the gNB-gNB CLI and suppress it by the receiver. This may help to reduce the impact the gNB-gNB CLI. For the UE-UE CLI, the UE in the Macro cells are the victims and this is basically less serious due to lower UE transmitting power at the private network and large area distribution of the UE in the Macro cell.

KT's answer for Round 2 Q&A Discussion on Sidelink Enhancements/Sidelink Relay:

Thanks to Huawei for the comment which I believe should be under Enhancements for UL Heavy Communications. KT agree with Huawei on suggestions and looking forward to discuss more on improving

gNB to gNB and UE to UE interference for different TDD radio used by private 5G versus macrocell in Release-18 and beyond.

3.6 Positioning Enhancements

Please provide questions and comments for Round 2 Q&A by June 23 8:00 UTC

Feedback Form 12: Questions/comments for Positioning Enhancements Round 2 discussions

No questions or comments received for Round 2 Positioning Enhancements Q&A discussion.

4 Summary

In this clause round 1 and 2 Q&A discussion result of 6 items proposed for non-eMBB-driven functional evolutions are summarized.

Air-to-Ground Communications

As needs for extreme long range communications for drone/UAV control is requested from customers, KT proposed to initiate Air-to-Ground Communications work in Release-18. Clarification on the difference between current Release-17 NTN work has been made as ATG work is intend to build extreme long range terrestrial network.

Enhancements for UL Heavy Communications

As requested from B2B customers on their own private 5G network, UL:DL ratio of 1:1 coexisting with macrocell using different UL:DL ratio needs to be supported. Some comments included whether UL>DL ratio also needs to be considered and KT believe that this is good candidate configuration to be considered in Release-18. Some suggestions were also given on interference cancellation between private gNB/UE versus macro gNB/UE.

Security Enhancements

KT proposed needs for security enhancements as self deployed private 5G network will be more popular. Also as many operators are sharing their network to expand the coverage, security enhancement should be considered for this use case. Also 5G is being used for blockchain and QKD technoloy which requires high level of security.

RedCap Enhancements

RedCap is targeting wearable devices and KT believes that where will be devices which don't need full 5G support but needs for improved performance compared to current Release-17 RedCap specifications. RedCap enhancements should handle these devices which will create another business opportunity for 5G industry.

Sidelink Enhancements/Sidelink Relay

As sidelink enhancements been done in past releases to support V2X, more mature specification seems to be

needed to compete against other available technologies. Release-17 sidelink relay only considers UE-to-Network relay and missing UE-to-UE relay should be specified in Release-18.

Positioning Enhancements

Positioning technology has been continuously evolving from the previous releases. KT is proposing new technology such as carrier-phase positioning for further enhancement of location based service for commercial network.