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

RAN

3GPP TSG RAN Rel-18 workshop RWS-210587

Electronic Meeting, June 28 - July 2, 2021

Agenda Item: 4.2

Source: Omnispace

Title: RAN-R18-WS-non-eMBB-Omnispace

Document for: Discussion

1 Introduction

This email discussion summary covers the Q&A of the following Omnispace documents:-

RWS-210158 Discussion on NTN NR-FR1 enhancements

RWS-210159 Discussion on NTN IOT enhancements

2 Round 1 Comments on Proposals

2.1 RWS-210158 Discussion on NTN NR-FR1 enhancements

Provide any comments on the proposals.

Feedback Form 1: Comments and questions on RWS-210158

1 – Asia Pacific Telecom co. Ltd We share the same view that support of smaller bandwidth (<5 MHz BW) for Cubesats is needed. However, we wonder how small it requires for a power-saving purpose.
2 – THALES We thank you for your proposals About proposal 1, what kind of Tx power, noise figure are you considering for the UE (e.g. for first responders) ? About proposal 3, what kind of techniques to mitigate PAPR do you have in mind ?
3 – Sony Corporation Thanks for the contribution. We have a question.

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What kind of mobility enhancement are you considering in proposal 2?”

4 – HUAWEI TECHNOLOGIES Co. Ltd.

On the proposal regarding ”BWP multiplexing to effectively facilitate NR channel assignments <5MHz”, can you clarify a bit the implication of BWP multiplexing? It is something like multiple active BWP within a CC?

5 – CATT

Thanks for the contribution, question for clarification:

For Satellite power and spectrum efficiency features,you mentioned NR channel assignments <5MHz, this is linked to the further enhancement of RedCap?

2.2 RWS-210159 Discussion on NTN IOT enhancements

Provide any comments and questions on the proposals

Feedback Form 2: Comments and questions on RWS-210159

1 – Asia Pacific Telecom co. Ltd

We share the same view that IDLE mode enhancement might be needed. However, we wonder how to enhance for non-GNSS UEs.

2 – Sony Europe B.V.

We are generally supportive of these proposals.

We would particularly welcome consideration of more realistic assumptions (proposal 1).

On proposal 2, we would like to consider power saving enhancements for both IDLE mode and CONNECTED mode.

Question on proposal 3: are you proposing a study phase? Our view is that R18 should support eMTC co-existence with NR-NTN, which is probably a low hanging fruit anyway.

3 – HUAWEI TECHNOLOGIES Co. Ltd.

Q1: On the support of UEs without GNSS, can you provide some information on the target use cases and an estimated scale of the devices from commercial point of view?

4 – CATT

Currently, we should focus on the scope of Rel-17 IoT NTN WI firstly, any leftovers or enhancement to be done in Rel-18 could be further considered.

SI phase may be needed if we want to support some new functio(s).

5 – Qualcomm Incorporated

For idle mode power saving enhancements, could you elaborate on the techniques you have in mind?

3 Round 1 - Answers

3.1 RWS-210158 Discussion on NTN NR-FR1 enhancements

1 – Asia Pacific Telecom co. Ltd

[Q] **We share the same view that support of smaller bandwidth (<5 MHz BW) for Cubesats is needed. However, we wonder how small it requires for a power-saving purpose.**

[A] Thanks for your support. We think support for nx1.4MHz channels could be a good compromise to conform with LTE numerology.

Support for smaller channels will enable the satellite operators to optimise allocation of the limited power budget per beam, to match the capacity requirements for a given service area. This is very important for optimal operation of satellite services since we need to support multiple beams within very constrained power and spectrum resources.

We propose a study to see how this can be achieved with minimal changes to the existing NR numerology, as it would affect the structure of the SSB.

This feature has also been proposed for terrestrial application by Anterix in **RWS 210035** (NR Support for FDD Bandwidths less than 5 MHz), so it's not a unique requirement for NTN.

2 – THALES

[Q1] **About proposal 1, what kind of Tx power, noise figure are you considering for the UE (e.g. for first responders) ?**

[A1] New class UE with *Circular Polarization Antenna support, TX Power 26dBm, NF 3dB, Gain 3dB* and we also propose the *HPUE* support to be extended to NTN.

[Q2] **About proposal 3, what kind of techniques to mitigate PAPR do you have in mind ?**

[A2] Satellite TX Power is very limited so PAPR reduction would more important than is the case in terrestrial deployment. Some of the techniques for reducing OFDM PAPR that can be considered in the study include Selected Mapping and Crest Factor Reduction (with relaxed EVM requirements). We can also consider low PAPR waveforms like SC-OFDM on the DL.

3 – Sony Corporation

[Q] **What kind of mobility enhancement are you considering in proposal 2?**

[A] We would like the connected mode NR features that will not be included in Rel-17 to be fully supported in Rel18.

4 – HUAWEI TECHNOLOGIES Co. Ltd.

[Q] **On the proposal regarding "BWP multiplexing to effectively facilitate NR channel assignments <5MHz", can you clarify a bit the implication of BWP multiplexing? It is something like multiple active BWP within a CC?**

[A] The motivation for our proposal is to enable support of eMTC channels within one 5MHz NR channel due to spectrum limitations in S-Band and allow the flexibility in the allocation of spectrum resources across multiple satellite beams.

We propose a study to investigate how we can accommodate smaller nx1.4MHz BWPs in one 5MHz NR channel.

The details of our proposal for enabling smaller NR BW i.e. <5MHz is as in indicated in response to Q1 by Asia Pacific Telecom as this would be a prerequisite for this feature.

3.2 RWS-210159 Discussion on NTN IOT enhancements

1 – Asia Pacific Telecom co. Ltd

[Q] **We share the same view that IDLE mode enhancement might be needed. However, we wonder how to enhance for non-GNSS UEs.**

[A] We would like to leverage on the NR-NTN SI work on this topic. We expect the following enhancement would be required a) enhancement to PRACH Preambles/Formats b) enhancement to time and freq sync to enable the UEs to acquire cell in a short observation window.

2 – Sony Europe B.V.

[Q] **On proposal 2, we would like to consider power saving enhancements for both IDLE mode and CON- NECTED mode.**

[A] Agreed

[Q] **On proposal 2, we would like to consider power saving enhancements for both IDLE mode and CON- NECTED mode.**

[A] Agreed

3 – HUAWEI TECHNOLOGIES Co. Ltd.

[Q1] **On the support of UEs without GNSS, can you provide some information on the target use cases and an estimated scale of the devices from commercial point of view?**

[A1] Our target use-cases will be low-cost battery powered IoT devices. The global Market for these devices could be very high. We don't have an estimate for number at the moment.

4 – CATT

[Q] **Currently, we should focus on the scope of Rel-17 IoT NTN WI firstly, any leftovers or enhancement**

to be done in Rel-18 could be further considered.SI phase may be needed if we want to support some new functio(s).

[A] Agreed

5 – Qualcomm Incorporated

[Q] **For idle mode power saving enhancements, could you elaborate on the techniques you have in mind?**

[A] NTN will introduce new use-cases in Rel17 which are unique from the existing terrestrial use-cases. We would like a study to evaluate how idle mode power saving can be enhanced in the new scenarios.

4 Round 2 Further Comments on Proposals

4.1 RWS-210158 Discussion on NTN NR-FR1 enhancements

Provide any further comments/questions on the proposals and answers

Feedback Form 3: Round 2 - Comments and questions on RWS-210158

1 – HUAWEI TECHNOLOGIES Co. Ltd.

Thanks for the response. here is a fullow-up question. It seems that the proposal is to have eMTC support within NR NTN spectrum (for e.g. co-existence?). Can you clarify the reason why there is an impact to NR channel assignment?

4.2 RWS-210159 Discussion on NTN IOT enhancements

Please provide your comments/questions on the proposal and and answers

Feedback Form 4: Round 2 - Comments and questions on RWS-210159

5 Round 2 - Answers

5.1 RWS-210158 Discussion on NTN NR-FR1 enhancements

[Q] **Thanks for the response. here is a fullow-up question. It seems that the proposal is to have eMTC support within NR NTN spectrum (for e.g. co-existence?). Can you clarify the reason why there is an impact to NR channel assignment?**

[A]Thanks for your comments: This because we are proposing to deploy eMTC + NR within Bandwidth <= 5MHz. For this to be possible NR numerology would need to support reduced Bandwidth i.e < 5MHz in order to free some resources for eMTC.

6 Summary

Thank you for all of your question. The major points raised are summarized below.

6.1 NTN NR-FR1 enhancements

1. Support for smaller NR Bandwidth (<5MHz) : One company indicated that this feature is important for cubesats due to power constraints. We share the same view since most of the satellite spectrum available in S-Band is segmented and less than 5MHz.

2. eMTC and NR co-existence in smaller NR Bandwidth(<=5MHz) :- One company raised the question how we propose to deployed this feature. Our view it that the NR support for smaller bandwidth (<5MHz) will also be needed in order to fit both NR and eMTC channels in the same Bandwidth. We believe that coexistence of eMTC and NR will enable operators to serve a wider market with very constrained power and spectrum resources.

3. New UE type with for NTN: One company showed interest in our proposal for a new higher EIRP UE. This UE would support TX power 26dBm , NF 3dB, Gain 3dB and circular polarization.

4. DL PAPR reduction: Once company showed interest in this feature which is important in satellite communications.

6.2 NTN NR-IoT enhancements

1. Idle Mode enhancement: One company declared support for this feature.

2.Power savings enhancement for both Idle mode and connected mode : Once company supported our proposal.

2. UEs without GNSS :- Two companies showed interest in this feature. We expect some enhancement to the time and frequency synchronisation will be needed to enable UEs to work with no GNSS.

4. One company was for the view that we should focus on Rel17 IoT NTN WI first and any leftovers or enhancement to be done in Rel-18 could be considered.

6.3 Conclusion

Other companies have made similar proposals as covered in this email discussion. The RAN-R18 workshop should aim to come up with a list of the common proposals so that they can be considered for Rel18.