RAN-R18-WS-crossFunc-Telecom_Italia - Version 0.0.3
RAN

3GPP TSG RAN Rel-18 workshop

RWS-210645

Electronic Meeting, June 28 - July 2, 2021

Agenda Item: 4.3

Source: Telecom Italia

Title: Email discussion summary for [RAN-R18-WS-crossFunc-Telecom_Italia]

1 Introduction

This email discussion summary covers the following document

[1] RWS-210033, 3GPP R18 RAN Requirements, Telecom Italia

The rest is structured as follows. Section 2 is used to collect questions/comments to the tdoc and Section 3 provides corresponding answers.

2 Questions/Comments to RWS-210033

The contribution provides the following proposals.

For each proposal this document provides a feedback form. Answers to the questions are provided in Section 3

1. General aspects

a) 3GPP Rel 18 should focus on solving issues found in deployed networks

b) Focus on green economy

c) Ensure alignment with SA

d) New use cases should be defined based on market demand

e) Enhancements of existing features should be limited only if there are clear requirements based on feedbacks from deployed networks

f) Enhancements of features not yet deployed should be avoided, waiting for feedbacks from deployed networks

Feedback Form 1: [1st round QA] General aspects

2. Improve energy efficiency

a) Define KPIs based on energy efficiency to be associated to any new proposal

b) Define solutions to improve gNB and network energy consumption

Feedback Form 2: [1st round QA] Improve energy efficiency

3 Improve TDD performance – fixed frame format

Improve performance when fixed frame format is imposed and optimize for "deterministic" applications

3.1 UL throughput

a) Support of multiple Tx antennas in the UE

b) Improve UL Carrier Aggregation / Dual Connectivity techniques

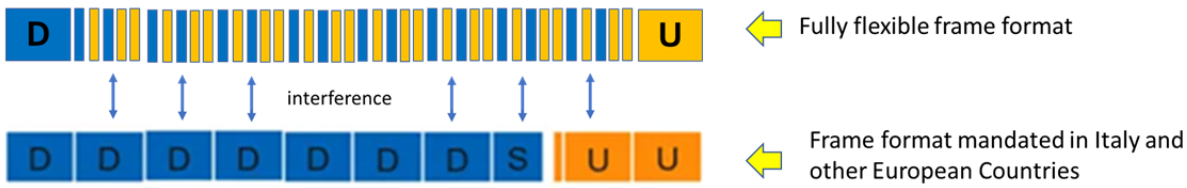
c) Evaluate solutions for UEs not-power limited and not-size limited

3.2 RTT latency

a) By defining resource allocation (e.g. the by pre-allocating PRBs)

3.3 Manage latency Jitter

In FR1 the current regulation in Europe imposes inter-operator frame synchronization to avoid co-channel (at the border between countries) and adjacent-channel interference (within a country)



The "regulated" frame structure has a major impact on performance (latency and throughput)

TDD Frame Format	DL [Mbps]	UL [Mbps]
n78, SCS 30 kHz, TDD 80 MHz	256 QAM, MIMO 4x4	64 QAM, no MIMO
DDDDDDDSUU (8:2 Italy)	1380	80

Latency:
RTT 3.42 ms (eMBB devices)
RTT 3.02 ms (URLLC devices)
TR 37.910, frame format DDDSU, 0% PER
Note: format DDDDDDDSUU has worse performance

Figure 1:

Feedback Form 3: [1st round QA] Improve TDD performance – fixed frame format

1 – ZTE Corporation

With more and more UL-heavy applications are emerging, we share similar views that UL performance should be further enhanced, especially for TDD operation. We also think enhancements on CA and UL MIMO are the straightforward and effective way to go.

But, we are not sure whether do you have any specific enhancements regarding these aspects to propose? In our contribution RWS-210479 (NWM link: https://nwm-trial.etsi.org/#/documents/4776), we provide a list of specific enhancements including aspects related to CA, UL MIMO, UE coordination etc. Appreciated to hear your views on these enhancements.

2 – Samsung Electronics Polska

Thanks for the paper. In slide 7, 8 and 9, we agree that current TDD configuration can be deployed for flexible setting and by regulation and avoid inter-operator cross link interference, it is not possible to enjoy full benefit of dynamic TDD. To allow flexible frame format, there will many issues to be solved in the practical deployment. To address similar issues and have benefits in terms of latency and coverage, we suggested XDD operation for enhancing fixed TDD. Placing UL subband in the middle of TDD band, we can have FDD-like operation in TDD band with minimal cross-link interference handling. Do you have such duplex enhancement in mind? can you share your view how to enhance in TDD?

see answers in Section 3

4. Improve TDD performance – allow flexible frame format

Define techniques to allow flexible frame format in FR1 TDD operations (macro and micro cell coverage)

4.1 Ensure feasibility of non-synchronous networks in different scenarios (macro-macro, macro-pico)

4.2 Enhancements of Cross Link Interference management techniques

4.3 Intra and inter-operator coordination

a) Definition of interfaces to exchange information between different PLMNs to manage cross-operators interference (inter-operator RRM)

b) Note: this technique could also be used to minimize interruption time at the border between countries

Feedback Form 4: [1st round QA] Improve TDD performance – allow flexible frame format

1 – ZTE Corporation

As commented above, we agree that UL enhancements for TDD is desirable. Allowing flexible TDD configuration in real deployment is also a promising way. Therefore, we share that corresponding enhancements for better coordination and lower interference is needed.

see answers in Section 3

5. Future proof devices

5.1 3GPP should define performance requirements and conformance testing to ensure that UE upgraded over the air are still compliant to 3GPP specifications and to the regulatory requirements

5.2 Requirements for multi standard UEs

Feedback Form 5: [1st round QA] Future proof devices

6. Base stations performance and testing

6.1 Testing methodologies should be specified to ensure compliance of the overall chain, including test mode interfaces

6.2 Specify OTA performance requirements and test methodologies

Feedback Form 6: [1st round QA] Base stations performance and testing

1 – Intel Corporation (UK) Ltd

Does the proposal assume dedicated requirements for different components (CU/DU) or for the complete a BS employing different components (i.e. E2E)?

see answers in Section 3

7. EMF management

7.1 Define procedures to measure, report/expose in a standard format and adjust if required the emission limits

a) Work done in other bodies should be the basis for 3GPP activity (not re-invent the wheel)

7.2 Define procedures to shape the antenna pattern and emitted power to ensure the emission limits are respected, e.g. by reducing the EIRP in a given direction if a building is too close to the mast

Feedback Form 7: [1st round QA] EMF management

8. UE RF performance indicator

Define a scale of UE RF performance based on OTA TRP and TRS measurements

The classification, as in the case of energy efficiency, allows the customer to discriminate devices

For example:

a) Outperforming devices are classified class “A” or above

b) Class “D” devices are underperforming and service may not be available in all the network

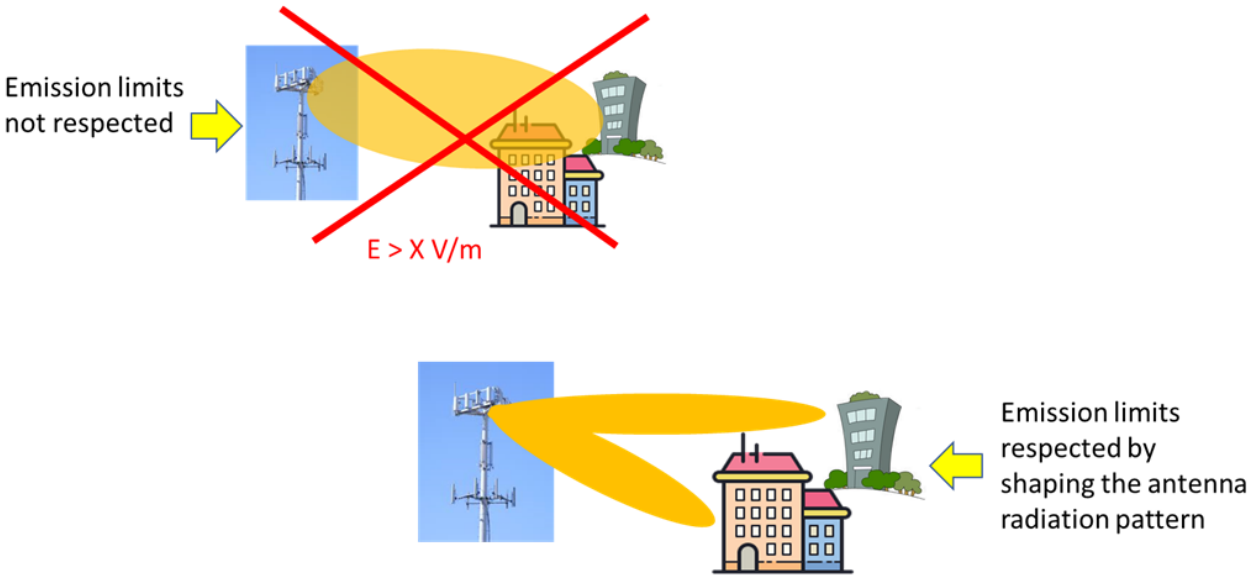


Figure 2:

Feedback Form 8: [1st round QA] UE RF performance indicator

1 – Intel Corporation (UK) Ltd

Is it expected that there will be some different sets of requirements in the specs?

Is it expected that there will be some capability signalled to the network and, if so, how will gNB or operator use the proposed indicator?"

see answers in Section 3

3 Answers by moderator

This Section provides the answers to the questions received during the first round

3 Improve TDD performance – fixed frame format

To **ZTE** - Thanks for your feedback. The scenarios we have in mind are both related to eMBB (smartphone like) and industrial / other applications (e.g. devices that may not be limited in power and size / number of antennas). In our opinion solutions like UL MIMO and Carrier Aggregation improvements are the easiest to achieve. We appreciate the suggestions from ZTE, and in particular the "Virtual User" concept looks similar to some of our ideas. To extend the concept it could be interesting for non-eMBB to have the possibility to split the device in a "central unit" and more "remote units", each able to support multiple antennas. in such a way the computational and RF limitations of smartphones could be solved. As a general comment, the proposals from ZTE look promising and going in the right direction

To **Samsung** - Thanks for the question. See the answer to ZTE for the general aspects. I confess the point you raised was not included in our proposal, but it is surely worth considering. A counter question for my understanding: it seems to me that with XDD operation some level of coordination among different operators is still required (every operator need to define the same frame format with UL sub-band). Could you confirm

my understanding is correct?

4. Improve TDD performance – allow flexible frame format

to **ZTE -** many thanks for the feedback. Yes for us this is the requirement we need to fulfill, otherwise TDD operation will be a limiting factor

6. Base stations performance and testing

To **Intel -** Thanks for the question. This is indeed a good point, and as a first approach what need to be ensured is the E2E performance (which likely have regulatory impact). However, some dedicated performance requirement could be required to e.g. ensure the signalling is conform to the specifications

8. UE RF performance indicator

This indicator is strongly connected with TRP and TRS performance requirements (which, if I am not wrong, is not signaled to the network). Therefore, it is intended as a way to inform the owner of the device about its more or less good RF performance. It could be of value to investigate the possibility to signal to the network the device class, in order to decide how to manage it

4 Round 2 Q/A

This Sections contains the Round 2 Q/A

Feedback Form 9: Round 2 Q/A

1 – Huawei Tech.(UK) Co.. Ltd Thank you for the contribution. One question on page 8 targeting higher UL MIMO order with more Tx antennas (e.g. 3Tx, 4Tx), is this targeting commercial smartphones or other types of devices, or both? We have also provided some proposals for UL throughput improvements in RWS-210436.
2 – Samsung Electronics Polska Thanks for reply, as we presented in XDD slides, XDD rely on subband seperation for DL and UL and this is mainly because to avoid coordination between operators. By placing UL subband for example in the middle (assumed neighboring operators used both low and upper channels), DL subband acks guard-band between operatros so that cross-link interference between opertors can be handled. By setting different number of XDD slot (having both DL and UL subband), operators can have their own DL to UL ratio without coordination.

Answers

to **Huawei -** many thanks for the question. It would be great to have solutions improving performance for smartphones. However, due to implementation complexity / size constraint, the use of higher order MIMO in UL is targeting especially devices that are not constrained in size, complexity, power consumption. Therefore the main target are applications for Verticals (e.g., factory automation, TV troupe uploading video during live events, ...)

to **Samsung -** many thanks for the clarification. Any solution to reduce the inter-operator coordination is of high interest to us