[94e-49-R17-RF-FR2-WID] - Version 0.0.4
RAN

3GPP TSG-RAN Meeting #94e **RP-213626**

Electronic Meeting, 6 – 17 December 2021

Agenda item: **9.3.4.8**

Source: **RAN4 Vice-Chair (Intel)**

Title: **Moderator's summary of discussion [94e-49-R17-RF-FR2-WID]**

Document for: **Discussion and decision**

1 Introduction

This document is the summary of the email discussion [94e-49-R17-RF-FR2-WID] on potential revision of the "Further enhancements of NR RF requirements for frequency range 2 (FR2)" WI (NR_RF_FR2_req_enh2). Based on the discussions the recommendations will be provided.

The following documents are covered in this email thread.

Table 1: Tdoc list

Tdoc	Title	Source
RP□213378	Applicable Scenarios of UL Gaps	Apple

2 Initial round

2.1 Discussion

Issue #1: Applicability of FR2 UL gaps to FR2 serving cells in (NG) EN-DC, NE-DC, NR-DC, and SA scenarios

RP□213378 provides a discussion on applicability of FR2 UL gaps to EN-DC, NE-DC, NR-DC and SA scenarios and the following proposal is made:

Proposal #1: Revise the WID of NR_RF_FR2_req_enh2 to capture that the work of UL gaps applies to (NG) EN-DC, NE-DC, NR-DC and SA.

Please indicate your views on Proposal #1 and share views on whether FR2 UL gaps for self-calibration and monitoring are applicable for FR2 serving cells in EN-DC/NE-DC/NR-DC/SA scenarios.

Feedback Form 1: Issue #1: Applicability of FR2 UL gaps to FR2 serving cells in (NG) EN-DC, NE-DC, NR-DC, and SA scenarios

1 – AT&T GNS Belgium SPRL

We support Proposal #1. Limiting this feature to SA only would not address the majority of FR2 deployments.

2 – MediaTek Inc.

Thank RAN-plenary colleagues for clarification. Additionally, we wonder whether UL-gaps signalling is per-Band capability or per-Carrier capability. We are fine with the proposal with per-band UL-gap capability and open for further discussion.

3 – Apple Hungary Kft.

We support the proposal. UL gap is applicable to all FR2 serving cells in FR2. Since FR2 bands can be configured to UE as SCG in EN-DC, MCG in NE-DC, MCG/SCG in NR-DC, or SA, we see no reason to limit the UL gap to SA only. Therefore, we would like to make it clear in the WID that both MR-DC/NR-DC and SA are supported for UL gaps.

In addition, it has already agreed that FR2 UL gap does not cause any FR1 interruption in RAN4 101-e. Once UL gap is enabled on FR2 bands, operating in MR-DC/NR-DC is straightforward.

4 – Guangdong OPPO Mobile Telecom.

Support the proposal. UL gap can be allied to all the cases with FR2 bands.

5 – ZTE Corporation

We also support the proposal 1, FR2 UL gap could be applicable for all scenarios e.g. NG) EN-DC, NE-DC, NR-DC and SA. With such kind of specific WID updates, this could give clear guidance in future RAN2 and RAN4 work.

6 – Intel

We also support the proposal. We don't see why UL gaps are not applicable for any of the mentioned deployments. Whether to limit the configuration for NR-DC is another discussion.

7 – Ericsson LM

We are fine with proposal 1

8 – TELECOM ITALIA S.p.A.

we support proposal 1

9 – Nokia Corporation

We cannot accept the proposal unless it is guaranteed there are no impacts to LTE: Yes, FR2 UL gaps can be used in NR, but it shall never have impact to LTE operation in (NG)EN-DC or NE-DC. There should be no attempt to make the eNB aware of any FR2 UL gaps, and the use of FR2 UL gaps cannot affect LTE operation. That would be both unnecessary and enlarge the scope.

Hence, we can accept the proposal **IF** it can be made clear there **shall be no eNB or LTE RRC impacts** from enabling UL gaps for MR-DC - see Q2 for our proposed wording.

10 – Huawei Technologies France

We support proposal 1.

Issue #2: WI objectives update in RP□213378

The following WID update is proposed in RP□213378 (proposed text marked **as bold**):

Table 2:

UL gaps for self-calibration and monitoring. [RAN4 RF/RRM, RAN2] Study and, if feasible, introduce UE specific and NW configured gap for general self-calibration and monitoring purposes including

- UE Tx power management
- Coherent uplink MIMO

– Phase 1: Study and clearly identify the performance gain over the current baseline (Rel.16 requirements) Study of RF performance evaluation/testability related to UE self-calibration and monitoring. Study network impact of UE emissions during UL gap, if any.

– Phase 2: Specify the UL gap configuration(s), related UE capability and interruptions, if needed, based on the identified performance gain in Phase 1 and UE fall back behaviour i.e. if gaps are not available for UE requesting gaps. Discussion on release independence aspects.

– **Note: The work of UL gaps includes (NG) EN-DC, NE-DC, NR-DC and SA.**

Please indicate whether you agree with updated WI objectives proposed in RP□213378. If not, please, indicate an alternative wording.

Feedback Form 2: Issue #2: WI objectives update in RP□213378

1 – AT&T GNS Belgium SPRL

We think that the proposed note adds useful information concerning the applicability of the UL gap.

2 – Apple Hungary Kft.

Agree with updated WI objective with the added notes.

3 – Intel

We support this approach to make the WID clearer.

4 – Ericsson LM

Fine with the proposal

5 – TELECOM ITALIA S.p.A.

ok

6 – Nokia Corporation

See Q1- we cannot accept the note as it is as this can imply LTE RRC or eNB changes. We can accept a modified note that makes this clear:

Note: The work of UL gaps includes (NG) EN-DC, NE-DC, NR-DC and SA. UL gap operation shall have no impacts to eNB operation or LTE RRC.

2.2 Moderator summary

Issue #1: Applicability of FR2 UL gaps to FR2 serving cells in (NG) EN-DC, NE-DC, NR-DC, and SA scenarios

10 companies provided comments. 9 companies supported the ”Proposal #1”. One company (Nokia) disagreed and can accept the proposal if it can be made clear there shall be no eNB or LTE RRC impacts from enabling UL gaps for MR-DC.

Issue #2: WI objectives update in RP□213378

6 companies provided comments. 5 companies supported the proposed WID revision. One company (Nokia) suggested additional note that ”UL gap operation shall have no impacts to eNB operation or LTE RRC.”

It is moderator understanding that majority companies are fine with the proposed change to clarify that FR2 UL gaps are applicable to FR2 serving cells in (NG) EN-DC, NE-DC, NR-DC, and SA scenarios. Meantime, further discussion is needed in the intermediate round on whether the change proposed by Nokia is an acceptable way forward and whether FR2 UL gap operation shall have impacts to eNB operation or LTE RRC.

3 Intermediate round

3.1 Discussion

For the intermediate round moderator suggests to discuss an alternative proposal

Proposal #1: The work of FR2 UL gaps includes (NG) EN-DC, NE-DC, NR-DC and SA. FR2 UL gap operation shall have no impacts to eNB operation or LTE RRC.

Companies are encouraged to share views if Proposal #1 is an acceptable way forward and share views on UL gap operation impacts to eNB operation or LTE RRC (if any).

Feedback Form 3: Please provide views on Proposal #1 and whether FR2 UL gap operation shall have impacts to eNB operation or LTE RRC.

1 – Qualcomm Technologies Int

Generally we are fine with the proposal but question for clarification since the note uses word "operation". Does that mean specified operation within 3GPP requirements?

2 – Apple Hungary Kft.

Support the proposal.

3 – ZTE Corporation

Based on the agreement made in last RAN4 meeting as following:

No interruption across FR. FR2 UL gap does not cause FR1 interruption.

Therefore it makes sense that **FR2 UL gap operation shall have no impacts to eNB operation or LTE RRC.**

4 – Intel

We agree that FR2 UL gap operation will have no impact to eNB operations or LTE RRC. We could accept to add the note into the WID to clarify.

5 – Nokia Corporation

As we proposed the addition to the note, we of course support it.

Just to clarify: As ZTE pointed, we thought this was the intention all along, but we wanted to make it clear to avoid unnecessary discussions in WGs.

For the QC question on "operation": The intent was just to say that whatever UE does with UL gaps doesn't impact LTE system. So interruptions to LTE are not allowed (same as for NR, since LTE is FR1), and LTE eNB need not be even aware that UE is using UL gaps for FR2 (as those would be configured by gNB). So no inter-node coordination is needed for the UL gaps in case of (NG)EN-DC or NE-DC, it's fully up to gNB to configure UL gaps.

6 – MediaTek Inc.

We are fine with modified proposal.

7 – Ericsson LM

We are fine with the proposal

3.2 Moderator summary

7 companies provided comments in the intermediate round and all companies are fine with Proposal #1.

Based on a discussion it is recommended to endorse the Proposal #1 in the intermediate round

Proposal #1: The work of FR2 UL gaps includes (NG) EN-DC, NE-DC, NR-DC and SA. FR2 UL gap operation shall have no impacts to eNB operation or LTE RRC.

Moderator recommends to capture the changes on top of revised WID RP-213108 (Nokia). Note that this tdoc was not included in this email discussion (or any other) and it includes additional formal changes on the

specification impacts.

An updated draft WID was uploaded to the Inbox:
https://www.3gpp.org/ftp/tsg_ran/TSG_RAN/TSGR_94e/Inbox/Drafts/%5B94e-49-R17-RF-FR2-WID%5D/draft%20RP-21xxxx%20Revised%20WID%20on%20further%20NR%20RF%20Enhancements%20for%20FR2%20-%20rm.docx.

Companies are encouraged to check the draft WID in the final round.

4 Conclusions

Based on the discussion it is recommended to endorse the following proposals

Proposal #1: The work of FR2 UL gaps includes (NG) EN-DC, NE-DC, NR-DC and SA. FR2 UL gap operation shall have no impacts to eNB operation or LTE RRC.

Proposal #2: Approve revised WID RP-213666