3GPP TSG-RAN WG2 Meeting #117-e R2-220xxxx

Electronic, February 21 – March 03, 2022

Agenda item: 8.24.1

Source: Apple

Title: Summary of [Post117-e][058][NR17] FR2 UL Gap (Apple)

Document for: Discussion

# 1 Introduction

This is the summary of the following email discussion.

 **[Post117-e][058][NR17] FR2 UL Gap CRs (Apple)**

      Scope: Reflect progress including R2 117-e. Take into account late LS from RAN4. CR approval

      Intended outcome: Agreed CRs

      Deadline: Short Post

# 2 Contact info

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| --- | --- | --- |
| Company Name | Contact Person | Email Address |
| OPPO | ZhongdaDu | duzhongda@oppo.com |
| Apple | Yuqin Chen | yuqin\_chen@apple.com |
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# 3 Phase 2 Discussion on CR(s)

This is to discuss the CR set for FR2 UL gap. In the CR to TS38.331, the rapporteur would like to highlight several points.

1) FR2 UL gap is configured in *measGapConfig*.

2) Following current UAI framework, the UE reporting on FR2 UL gap is based on the NW configuration, but no prohibit timer is introduced. Main reason is according to RAN4 agreements, fast reporting should be allowed to switch the FR2 UL gap from *activate* to *deactivate*, or vice versa.

3) The FR2 UL gap preference includes two parameters: *ul-GapFR2-Request-r17* and *ul-GapFR2-PatternPreference-r17*. The *ul-GapFR2-PatternPreference-r17* is only included when *ul-GapFR2-Request-r17* is set to *activated*.

**Question 1:** Do companies agree with the three points mentioned above?

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| Company | Points agreeable | Points not agreeable | Comments |
| OPPO | 1,2 | 3 | One parameter should be sufficient[Rapporteur]: I think we had a lot of unnecessary discussion on how to interpret the release of one UAI feature, which costs a lot of efforts in RAN2. That is why we prefer a clean design. I will wait for more input on this question. |
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**Question 2:** Please indicate your comments on the CR to TS38.331. Comments can also be added into the draft CR.

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| Company | Clause | Comments |
| Huawei, HiSilicon |  | We are not sure “body proximity sensing” is the term used in RAN4? Better we have the consistent term across WGs.For UAI, not sure whether we need explicit indication of request (de)activation, the gap pattern preference can somehow implicates the request is activated?[Rapporteur]: I prefer using two fields since it makes the spec clearer. |
| OPPO |  | We also think *ul-GapFR2-PatternPreference-r17* sufficient. This is optional IE, its absence means no preference.In addition the equation to calculate T is not correct. When UGRP is 5ms, T should be 1. But UGRP/10 will be zero.[Rapporteur]: Thanks for spotting this critical issue. I have proposed one revised formula in v2 rapporteur version and would like to collect companies’ views.1> if *gapUL-FR2* is set to *setup*:2> if an FR2 UL gap configuration is already setup, release the FR2 UL gap configuration;2> setup the FR2 UL gap configuration indicated by the *measGapConfig* in accordance with the received *gapOffset*, i.e., the first subframe of each gap occurs at an SFN and subframe meeting the following condition:SFN mod *T* = FLOOR(*gapOffset*/10);subframe = *gapOffset* mod 10, and subframe = (*gapOffset*+*UGRP*) mod 10;with *T* = max {1, UGRP/10} as defined in TS 38.133 [14]; |
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**Question 3:** Please indicate your comments on the CR to TS 38.321. Comments can also be added into the draft CR.

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| Company | Clause | Comments |
| Huawei, HiSilicon |  | In Phase 1 we understand Vivo proposed an alternative way to change the spec, which is similar as what we described for measurement gap. We think this may be a better approach.[Rapporteur]: vivo’s change was in RAR section, which is for DL reception but not UL transmission. |
| OPPO |  | 1, This is to change UE’s behavior, so “Radio Access Network” should not be ticked2, the title is not proper considering only RACH procedure is impacted[Rapporteur]: There are actually more changes from my views if look into RAN4 WF. But that was not captured in RAN4 LS to RAN2. More discussion might be needed in next RAN2 meeting.3, the category of the CR should not be “B”, instead “F” maybe better[Rapporteur]: I will check with Juha whether B or F should be used. I thought this is a CR package for UL gap, thus the same category B should be used.4, 37.340 is core spec but not test spec[Rapporteur]: Confusion comes from that there is only one row for core spec. Will fix it later. |
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**Question 4:** Please indicate your comments on the CR to TS37.340. Comments can also be added into the draft CR.

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| Company | Clause | Comments |
| Huawei, HiSilicon |  | We are not sure whether stage 2 specification change is really needed. Also we think even if it needs to be added, the current text does not explain what is UL gap and it is bit of unclear context. We suggest to postpone this.[Rapporteur]: I think which entity is responsible for FR2 UL gap configuration should be captured in spec. I added one sentence into the current TP to explain when UL gap is configured. |
| OPPO |  | Have no strong opinion. But considering this feature is also applicable for SA, should we also put single line in 38300 otherwise it looks like SA is missed in this feature, or?[Rapporteur]: I checked with Benoist (stage 2 spec rapporteur) before #117 meeting. Rapporteur was not enthusiastic with 300 CR. Let’s decide later. |
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**Question 5:** Anything missing?

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# 4 Conclusion

[TBA]

# 5 Annex: Previous RAN2 agreements

Agreements from RAN2#116 meeting:

* At least the following three parameters are included in FR2 UL gap configuration.

a) gapOffset

b) ugl

c) ugrp

* Agree to use explicit configuration on *ugl* and *ugrp* for FR2 UL gap configuration (same as in NR meas gap configuration).
* Using UAI message to indicate the need of FR2 UL gap activation/deactivation, if RAN4 agrees with the need.
* Activate/deactivate FR2 UL gap by RRC (no agreement in RAN2 for MAC CE for now).
* Will send LS with questions (discuss details in ph2)

Agreements from RAN2#116bis meeting:

* In SA deployment:

- For timing reference in synchronous FR2 CA configuration, the SFN and subframe of any FR2 serving cell can be used in the gap calculation.

- For timing reference in asynchronous FR2 CA configuration, the SFN and subframe of the serving cell on FR2 frequency indicated by the *refFR2ServCellAsyncCA* (FFS on the field name) is used in the gap calculation.

* The following responsible network entity on FR2 UL gap configuration in different deployment scenario are agreed:

- EN-DC: SN

- NE-DC: MN

* For EN-DC/NE-DC, there is no need to coordinate FR2 UL gap configuration between MN and SN.
* In EN-DC and NE-DC, use FR2 serving cell inside the CG with FR2 band as timing reference for the SFN and subframe calculation in FR2 UL gap calculation.
* For NR-NR DC without FR2-FR2 BC considered, the responsible network entity on FR2 UL gap configuration is MN.
* For NR-NR DC without FR2-FR2 BC considered, FFS on the details on MN-SN coordination.

The Following three points are agreed under condition that R4 would agree to such scenario (otherwise they are N/A):

* 1: For NR-NR DC with FR2-FR2 BC considered (if RAN4 agrees to support), MN is responsible for FR2 UL gap configuration.
* 2: In NR-NR DC with FR2-FR2 BC considered, agree that MN informs SN about the FR2 UL gap pattern configured.
* 3: In NR-DC with FR2-FR2 BC considered, *refServCellIndicator* is used to indicate the timing reference serving cell:

- For FR2 UL gapconfiguration with synchronous CA, for the UE in NR-DC with FR-FR2 band combination configured, the SFN and subframe of the serving cell indicated by the *refServCellIndicator* is used in the gap calculation.

- For FR2 UL gap configuration with asynchronous CA, for the UE in NR-DC with FR2-FR2 band combination configured, the SFN and subframe of the serving cell indicated by the *refServCellIndicator and refFR2ServCellAsyncCA* is used in the gap calculation.

* RAN2 to support that UE explicitly indicates the need of FR2 UL gap activation/deactivation using UAI message.
* From RAN2 perspective, MAC CE based FR2 UL gap activation/deactivation is not supported.
* UE supporting FR2 UL gap should also support R16 MPE reporting.
* Wait for RAN4 on the detailed UE capability reporting.

[4a, Alt2 is agreed]

* For NR-NR DC without FR2-FR2 BC, for timing reference for the SFN and subframe calculation in FR2 UL gap calculation: Follow legacy FR2 gap that the timing reference of FR2 UL gap can be PCell, PSCell or MCG FR2 serving cell, as indicated by *refServCellIndicator.* In asynchronous FR2 CA, *refFR2ServCellAsyncCA* is together used in the gap calculation.
* CRs to be provided for next meeting (Apple)

Agreements from RAN2#117 meeting:

* [058] Noted
* [058] In NR-DC, timing reference for FR2 UL gap is based on the SFN/subframe of FR2 serving cell.
* [058] SN configures FR2 UL gap to UE if FR2 bands are only configured in SCG.
* [058] In NR-DC without FR2-FR2 band combination, there is no need to support MN and SN coordination to enable FR2 UL gap.
* [058] FR2 UL gap design does not support NR-DC with FR2-FR2 band combination. FFS how to capture the restriction in spec.
* [058] In TS 38.331, for FR2 UL gap configuration, capture the values of *ugl* with {0.125ms, 0.25ms, 0.5ms, 1.0ms}, and the values of *ugrp* with {5ms, 20ms, 40ms, 160ms}.
* [058] Capture that UE indicates the preferred FR2 UL gap patterns using UAI message in TS 38.331.
* [058] Reflect that RACH procedure is prioritized over FR2 UL gap in TS 38.321.
* [058] Wait for more input from RAN4 on FR2 UL gap UE capability.