3GPP TSG-RAN WG2 #118 R2-220xxxx

eMeeting, 09th May – 20th May, 2022

Agenda Item: 6.24.1

Source: Apple

**Title: Summary of [AT118-e][041][NR17] FR2 UL gap (Apple)**

Document for: Discussion and decision

# 1 Introduction

This is the summary of the following email discussion.

* [AT118-e][041][NR17] FR2 UL gap (Apple)

 Scope: Treat R2-2205666, R2-2204507, R2-2205659, R2-2205667, R2-2205392

 Ph1 Determine agreeable parts, Ph2 agree CRs

 Intended outcome: Report, Agreed CRs

 Deadline: Schedule 1

# 2 Discussion

## 2.1 On RAN4 LS in R2-2204507

Rapporteur thinks this LS can be just noted as RAN4 has no questions to RAN2.

**Question 1: Do companies agree to note the RAN4 LS R2-2204507?**

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| **Company** | **Yes / No** | **Comments** |
| MediaTek | Yes |  |
| Huawei, HiSilicon | Yes |  |
| Ericsson | No | We have some questions (also relevant for the 38306 CR based on RAN4 parameter list discussed in [026]):1. UE capability to support UL gap pattern
	* UE capability type: per UE and the corresponding optionality can be referred to the agreements in RAN4#102e
		+ UE is mandated to support at least one of UL MGP #1 and #3.
		+ The other gap patterns, except for the one or two selected mandatory gap pattern(s) #1 and #3, are optional
	* This UE capability applies to the cases of single FR2 UL CC, intra-band FR2 CA and inter-band FR2-FR2 CA/DC
	* When UE indicates it supports a UL gap configuration, it means it supports this gap configurations for all bands where UL gap is needed.
	* The gap for FR2 has no impact on FR1
2. UE capability to indicate if UL gap is needed for MPE purpose
	* UE capability type: per band and optional
	* This UE capability applies to the cases of single FR2 UL CC, intra-band FR2 CA and inter-band FR2-FR2 CA/DC.
	* When UE indicates it supports this capability for a band, it means UL gap is needed for an active CC in this band for MPE purpose. When UL gap capability is not indicated for a band, it only means UL gap is not needed for MPE purpose for the band, or there is no MPE issue in the band.
3. UE capability for inter-band FR2-FR2 CA/DC to indicate if UL transmission is feasible during UL gap when it is configured/activated
	* UE capability type: per band per band combination and optional
	* This UE capability applies to inter-band FR2-FR2 CA/DC only. RAN4 will further confirm IBM case in next meeting.
	* When UE indicates it supports this UE capability for a band in a band combination, it means it supports UL transmission during the configured UL gap in the band of the band combination. When UE indicates it does not support this UE capability for a band in a band combination, it means UL transmission is not feasible during the configured UL gap in the band of the band combination.

It is noted that there is only one common configured UL gap in FR2-FR2 inter-band CA/DC from configuration perspective. |
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## 2.2 RIL(s) and Class 0 issues (R2-2205666, R2-2205667)

The conclusion from R2-2205666 is on FR2 UL gap RIL(s) and Class 0 issues is copied below:

**Proposal 1: Agree the following RIL(s) and Class 0 issues and reflect them in rapporteur CR.**

**- RIL: Z151, Z152, A803, A804, A807, A808**

**- Class 0 issues: 155, 156, 193, 425**

**Question 2: Do companies agree the proposal 1 in [1]?**

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| **Company** | **Yes / No** | **Comments** |
| MediaTek | Yes |  |
| Huawei, HiSilicon | Yes |  |
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**Question 3: Do companies have comments on the CR R2-2205667 to address the RIL(s) and Class 0 issues?**

It is also fine to add the comments into the CR.

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| **Company** | **Comments** |
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## 2.3 MAC CR in R2-2205659

The reason for change is copied below:

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| RAN4 agreed with the following UE behavior in FR2 UL gap in R4-2206511.*During UL gaps, except for the signals used for random access procedure according to TS 38.321, CG-PUSCH (type 1 and 2) and PUCCH allocations for SR and LRR [and for the signals used for other RAN4 agreed procedures], UE is not required to conduct transmission to the corresponding NR serving cells in FR2 single CC, intra-band CA. For inter-band FR2-FR2 CA/DC, UE may or may not be required to conduct transmission to the corresponding NR serving cells based on UE capability whether UL transmission within a gap is feasible.* Note that CR 1191 (R2-2204231) already captured that RACH procedure is prioritized during FR2 UL gap. |

The summary of change:

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| Capture that during FR2 UL gap, if UE does not support UL Tx transmission, UE should not perform certain actions. CG-PUSCH, PUCCH for SR and LRR are the exceptions. |

**Question 4: Do companies have comments on R2-2205659?**

**It is also fine to add comments to the CR.**

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| **Company** | **Comments on the change** |
| MediaTek | We are okay to have MAC CR and add a section for Handling of FR2 UL gap.  |
| Huawei, HiSilicon | We agree with the intention, but not sure what is the *[and for the signals used for other RAN4 agreed procedures]* and whether this would further impact RAN2.  |
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## 2.4 Discussions on release of UAI preference in R2-2205392

The discussion in R2-2205392 is not limited to FR2 UL gap, but a rather generic one on UAI message.

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| **Observation 1:** There is some ambiguity with the release of FR2 UL gap preference indication in the UAI.**Observation 2:** The issue with the release of UAI preference indications exist for several UAI fields.And proposed the following:**Proposal 1:** Add NOTE to 5.7.4.3 indicating the following: "When UE includes an indication that requires not including certain fields, UE is still required to include the parent field to ensure network comprehends the message as requesting release of a previously indicated configuration." |

**Question 5: Do companies agree with Proposal 1 in R2-2205392 to add a note.**

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| **Company** | **Yes / No** | **Comments on the Note in Proposal 1** |
| MediaTek | See comment | We support the intention of R2-2205392. However, the discussion is more general, not just UL FR2 gap and seems not limited to Rel-17. If we are going to have this kind of NOTE, it is not so suitable in the CR for UL FR2 gap.In addition, we are not so sure the wording in the NOTE is clear. Perhaps we have to change the procedure text. For example, for UL FR2 gap cases, it could be2> if the UE has a preference for FR2 UL gap configuration:3> set *ul-GapFR2-PatternPreference* to the preferred FR2 UL gap pattern;2> else (if the UE has no preference for the FR2 UL gap configuration):3> include *ul-GapFR2-Preference but* do not include *ul-GapFR2-PatternPreference* in the *UL-GapFR2-Preference* IE.It seems request more discussion. |
| Huawei, HiSilicon |  | We understand this is not specific to FR2 UL GAP, so better we discuss this under general AI so that all affected features can be reviewed jointly.  |
| Ericsson | See comment | We agree on the (general, not UL\_CA) problem and on the intention with the Note, but need to work more on the wording, or if other solution with proper procedure text is more feasible |
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# 3 Conclusions

**[TBA]**

# 4 References

[1] R2-2204507 LS to RAN2 on UL gap in FR2 RF enhancement (R4-2206608; contact: Apple) RAN4 LS in Rel-17 NR\_RF\_FR2\_req\_enh2-Core To:RAN2 Cc:RAN1

[2] R2-2205666 Summary of [Pre118-e][004][NR17 FR2 UL Gap] 38331 CR and rapporteur resolutions (Apple) Apple discussion Rel-17 NR\_RF\_FR2\_req\_enh2 Late

[3] R2-2205659 Correction on FR2 UL gap Apple CR Rel-17 38.321 17.0.0 1279 - F NR\_RF\_FR2\_req\_enh2

[4] R2-2205667 Addressing FR2 UL gap RILs [Z151, Z152, A803, A804, A807, A808] Apple CR Rel-17 38.331 17.0.0 3110 - F NR\_RF\_FR2\_req\_enh2 Late

[5] R2-2205392 [N129] Corrections to FR2 UL gaps Nokia, Nokia Shanghai Bell discussion Rel-17 NR\_RF\_FR2\_req\_enh2-Core Late

Chair: General?