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

2022 eMeeting, 09th May – 20th May, 2022

Agenda Item: 6.0.3

Source: MediaTek Inc.

**Title: Report of [AT118-e][027][NR17] Gap Coordination (MediaTek)**

Document for: Discussion and decision

# 1 Introduction

This is report for the following AT118-e mail discussion.

* [AT118-e][027][NR17] Gap Coordination (MediaTek)

Scope: Treat R2-2205290, R2-2205768, R2-2206011 and other relevant input if any.

Intended outcome: Report (expect to progress TPs W2 if applicable).

Deadline: W1 Friday (online CB W2 Monday if needed).

First Deadline – Please provide comments before W1 Friday May 13th 1200 UTC

# 2 Contact Points

Respondents to the email discussion are kindly asked to fill in the following table.

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| --- | --- | --- |
| Company | Name | Email Address |
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# 3 Discussion

## 3.1 Gap priority for non-MGE gaps

The gap priority is agreed to be introduced for concurrent gaps (MGE gaps) based on RAN4 LS R2-2203844. It is used to define the UE behavior/requirement while multiple gap configurations are overlapped in time domain. Since there are also other gaps introduced in Rel-17, it is proposed in R2-2205768 to have this gap priority for non-MGE gaps (i.e. MUSIM gap, pre-configured positioning gap, and NTN gaps). Rapporteur would like to check other company’s view on whether to extend the gap priority configuration to non-MGE gaps.

Note that rapporteur understanding the proposal is for ASN.1 forward compatibility and introducing this gap priority to non-MGE gaps does not change Rel-17 RAN4 requirement (i.e. there is still no RAN4 requirement for joint configuration).

**Question 1: Do companies agree to introduce gap priority configuration for MUSIM gap,** **pre-configured positioning gap, and NTN gaps?**

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| **Company** | **Agree or not** | **Comments** |
| ZTE | Agree | We share the same understanding as rapporteur.  RAN4 is not required to define corresponding requirements in Rel-17, but as indicated in RAN4 LS, for forward compatibility, they expect RAN2 can extend the signalling for other gap purpose.  Usually, requirements can be defined later than RRC signalling, but once requirements are defined in Rel-18, there is no problem to apply the requirements to Rel-17 UEs. |
| Apple | Agree | RAN4 LS in R2-2203844 mentions “considering forward compatibility on inter-working with other features (e.g., MUSIM, NTN, Positioning), RAN4 recommends 5 levels”. Our interpretation is RAN4 thinks it is allowed to configure priority to MUSIM gap, ePositioning gap, and NTN gap. |
| LGE | Agree | Same understanding as Apple. |
| OPPO | Agree | We’re fine to follow RAN4 suggestion even if the relevant RAN4 requirements are defined in later release. |
| Ericsson | See comment | We are OK to introduce the gap priority configuration into the features. However, as this creates spec impact, it will logically trigger further discussions in the other WIs (different than MGE).  Hence, as highlighted by Huawei and Samsung, we can for now introduce more than 2 priority levels by considering the other gap features (see Q3). But for the sake of progress, we can stick to introducing the configuration into MGE, while waiting for the other WI’s input (and eventually RAN4’s). |
| Qualcomm Inc | Agree |  |
| Intel | Agree | There is discussion in MUSIM WI of priority on gap. And since all gaps (across different purpose) may have high chance of overlapping in time domain, therefore, priority applies across all gaps will be needed. |
| Huawei, HiSilicon | See comments | When determining the value range of gap priorities, we can take all WIs into account, but there's no need to add the priority configuration into MUSIM/Positioning at the moment. For NTN, it is pending on whether NTN gaps will reuse the concurrent gaps framework. Note that RAN4 is not asking for adding the priority configuration for all features in R17. |
| Samsung | See comments | We have same view as Huawei i.e. it is sufficient to decide the value range of gap priorities by taking all WIs into account for now. Also for MUSIM gap, it is not clear to us how NW can decide it correctly in the sense that they are used by UE for operations in another network. |
| vivo | No | MUSIM gap priority is discussing in MUSIM topic. Obviously the Collison of MUSIM gap is R18 scope, if priority is reused can be left R18 MUSIM topic in RAN4. |
| Nokia | See comments | Similar view as Huawei. |
| CATT | See comments | Share the same view with Huawei and Nokia. |
| Xiaomi | See comments | The issue is under discussion in RAN4 and we can wait for RAN4 input. |
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**Summary: TBD**

In [R2-2205768](file:///D:/Documents/3GPP/tsg_ran/WG2/RAN2/2205_R2_118-e/Docs/R2-2205768.zip), there are some further details if we agree to have gap priority configuration for non-MGE gaps. If companies agree to configure gap priority for non-MGE gaps, please provide comment on the further details.

**Question 2: If agreed to have gap priority for non-MGE gaps, companies are invited to provide comment on the further details of gap priority configuration. Please comment on below proposals from R2-2205768.**

* **Proposal 2: Gap priority is configured per gap configuration (not per gap feature).**
* **Proposal 3: For R17 positioning gaps, the network can configure the same or different priorities for different pre-configured positioning gaps.**
* **Proposal 5: Do not define complex field existence condition for gap priority field, keep using “Optional –Need R”.**

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| **Company** | **Comments** |
| ZTE | (Proponent)  Agree.  The working mechanism of gap priority is simple and crude, it is better to make the signalling more flexible, so the network is able to configure different priorities for different gap configurations.  e.g. 40ms MGRP with lower priority, 160ms MGRP with higher priority for R17 positioning gaps. |
| Apple | Agree with the proposals.  For R17 positioning gaps, since only one can be activated, it is fine to have the same priorities. |
| LGE | Agree with the proposals. |
| OPPO | The proposals seem fine. |
| Ericsson | OK with the proposals. However, given our answer to Q1, any agreement on this matter is subject to whether the gap priority for non-MGE gaps is introduced. |
| Qualcomm Inc | Fine with proposals, although P3 seems to be against RAN4 recommendation. |
| Intel | P2: gap priority should be configured per gap level instead of feature. That will allow network has more flexibility and not necessary put one feature high priority than the other.  P3: Network should be able to configure same or different priority for POS gap in the gap configured including the one which will be activated using MAC CE. Since those gaps may also overlap in time domain to avoid undefine UE behaviour. (POS also discussing this so we can merge result)  P5: we think the gap priority is configured as an integer and can be optional. But if one gap is configured priority, then all gaps should be configured with priority. Otherwise, we need to define if some gaps are not associated a priority, will they be considered lowest priority? |
| Huawei, HiSilicon | Agree but.  On P3: We agree that positioning gaps can use the same priority, but as we commented in Q1, it can be postponed when the priority configuration is added for positioning gaps, e.g. when RAN4 plans to define requirements for the case where positioning MG overlaps with the RRM gaps |
| Samsung | Fine with P2 and P5. For P3, we think that there is no rush to decide P3 for now i.e. it can be discussed in next release. |
| vivo | Agree with Huawei. |
| Nokia | OK for P2 and P5. For P3, it can be postponed as mentioned by Huawei and Samsung. |
| CATT | Ok with P2 and P5. For P3, it is against RAN4 recommendation. We can postponed it when the requirement is clear. |
| Xiaomi | OK for P2 and P5. For P3, wait for RAN4’s progress. |
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**Summary: TBD**

## 3.2 Maximum number of gap priority

In current 38.331 v17.0.0, the definition for maximum number of gap priority is still FFS.

– *GapPriority*

The IE *GapPriority* is used to identify the priority of a gap configuration.

***GapPriority* information element**

-- ASN1START

-- TAG-GAPPRIORITY-START

GapPriority-r17 ::= INTEGER (1..maxNrOfGapPri-r17)

-- TAG-GAPPRIORITY-STOP

-- ASN1STOP

maxNrOfGapPri-r17 INTEGER ::= ffsUpperLimit -- Maximum number of gap priority level is FFS

No matter this gap priority could be configured for non-MGE gap or not, RAN2 has to define the maximum number of priority level. There are several Tdoc proposed different value with range from 8 to 32. Rapporteur would like to check more companies’ view on this.

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| **Companies** | **Proposals** |
| Huawei  [R2-2205290](file:///D:/Documents/3GPP/tsg_ran/WG2/RAN2/2205_R2_118-e/Docs/R2-2205290.zip) | Proposal 1: The maximum number of gap priorities is 8. |
| ZTE  [R2-2205768](file:///D:/Documents/3GPP/tsg_ran/WG2/RAN2/2205_R2_118-e/Docs/R2-2205768.zip) | Proposal 4: Define the maximum number of gap priority levels as 16 or 32. |
| MediaTek  [R2-2205229](file:///D:\Documents\3GPP\tsg_ran\WG2\RAN2\2205_R2_118-e\Docs\R2-2205229.zip) | M606 – Define the maximum number of gap priority to 32 |
| Ericsson  [R2-2206015](file:///D:/Documents/3GPP/tsg_ran/WG2/RAN2/2205_R2_118-e/Docs/R2-2206015.zip) | Proposal 3 The maximum number of priority levels could range from 5 to 8. RAN2 to discuss whether there is a real motivation to consider a greater number. |
| CATT  [R2-2204976](file:///D:/Documents/3GPP/tsg_ran/WG2/RAN2/2205_R2_118-e/Docs/R2-2204976.zip) | Proposal 1: The maximum number of both gap priority and gap ID is 8. |
| Vivo  [R2-2204823](file:///D:/Documents/3GPP/tsg_ran/WG2/RAN2/2205_R2_118-e/Docs/R2-2204823.zip) | Proposal 4: Maximum number of gap priority level is 8 for forward compatibility on other features |
| Xiaomi  [R2-2205227](file:///D:/Documents/3GPP/tsg_ran/WG2/RAN2/2205_R2_118-e/Docs/R2-2205227.zip) | Proposal 2: The maximum number of gap priority can be 8. |

**Question 3: Companies are invited to provide their views on maximum number of gap priority.**

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| **Company** | **Preferred max value** | **Comments** |
| ZTE | 16 or 32 | As agreed in RAN4, when the collision happens, UE always ignore the gap duration which with lower priority. So larger value range does not bring additional complexity in UE implementation.  Considering there are up to 16 pre-configured positioning gap, and we suggest to configure gap priority as per-gap configuration level, so we think the maximum number should be 16 or 32. |
| Apple | 8 | 8 is reasonable value to go. |
| LGE | 8 |  |
| OPPO | 8 or 16 | 8 is sufficient considering the real use case, considering the ASN.1 forward compatibility, 16 can be acceptable. |
| Ericsson | 8 | 8 seems to be a more than reasonable and sufficient value. This considering that RAN4 informed that 2 levels are enough for MGE, though 5 are recommended for forward compatibility and other inter-working features. |
| Intel | 8 | 8 should be enough |
| Huawei, HiSilicon | 8 |  |
| Samsung | 8 | 8 is sufficient. |
| vivo | 8 |  |
| Nokia | 8 |  |
| CATT | 8 |  |
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**Summary: TBD**

## 3.3 Joint Configuration limitation

In RAN2#117e, RAN2 sent an LS R2-2203879 on gap coordination and asking RAN4 the maximum of the gaps that could be activated simultaneously.

In [R2-2206011](file:///D:/Documents/3GPP/tsg_ran/WG2/RAN2/2205_R2_118-e/Docs/R2-2206011.zip), it is proposed to describe joint configuration limitation in field description of each related gap configuration fields (If separate RRC configuration structure is confirmed). Rapporteur understands that we could wait for RAN4 reply and then discuss the RAN2 SPEC impact. Nevertheless, let try to collect companies’ view on this proposal.

**Question 4: Companies are invited to provide comment on the following proposal from** [**R2-2206011**](file:///D:/Documents/3GPP/tsg_ran/WG2/RAN2/2205_R2_118-e/Docs/R2-2206011.zip)**.**

* **Proposal 1 If separate RRC configuration structure is confirmed for the different features (e.g., MUSIM, MGE), RAN2 spec to describe the maximum number of active gaps and joint configuration restrictions, in each related gap configuration fields.**

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| **Company** | **Comments** |
| ZTE | Agree with the intention.  But we can only specify it after we receive the feedback from RAN4. |
| Apple | It’s always good to have the useful information captured in the field description. |
| LGE | Agree to specify the limitation in the field description but further inputs are needed from RAN4 on the joint configuration limitation. |
| OPPO | If RAN2 thinks it’s hard to give the restrictions for all cases, the safer way is to just refer to RAN4 spec, we believe RAN4 is also discussing the joint configuration limitation issue. |
| Ericsson | (proponent)  We agree that RAN2 needs to wait for RAN4’s further input on this matter as we are aware that this is currently being discussed in that WG. In this sense, an alternative solution/approach could be needed.  Regarding OPPO’s comment, this is also an option (complement) in case no clean/clear field description is achievable. |
| Qualcomm Inc | Support the intention of waiting for RAN4. |
| Intel | Wait for RAN4 input. |
| Huawei, HiSilicon | Wait for RAN4 input. |
| Samsung | Wait for RAN4 input |
| vivo | Agree with intention, however it should be RAN4 discussion. |
| Nokia | Wait for RAN4 input |
| CATT | Wait for RAN4 input |
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**Summary: TBD**

# 4 Conclusions

Base on the discussion in section 2, we propose the following:

**Proposal 1:**

# 5 References

[1]