3GPP TSG-RAN WG2 #118e R2-2206453

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

Agenda Item: 6.22.3.2

Source: MediaTek Inc.

**Title: Report of [AT118-e][059][MGE] Concurrent MG (MediaTek)**

Document for: Discussion and decision

# 1 Introduction

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

* [AT118-e][059][MGE] Concurrent MG (MediaTek)

Scope: Based on the on-line agreements progress the related details, Progress remaining issues, and attempt to converge

Intended outcome: Report, TP if needed.

Deadline: for online CB W2 TUE

Deadline – Please provide comments before W2 Monday May 16th 1000 UTC

The online discussion note is copied below for reference.

[R2-2205229](file:///C:\Users\mtk65284\Documents\3GPP\tsg_ran\WG2_RL2\TSGR2_118-e\Docs\R2-2205229.zip) [E033][E034][H652][M604][M605][M606] Correction on ToAddModList and Gap ID for multiple gap configurations MediaTek Inc. draftCR Rel-17 38.331 17.0.0 F NR\_MG\_enh-Core Late

DISCUSSION points 1 and 2

* ZTE wonder whether the new list can be used to configure legacy gaps. Ericsson think that legacy patterns can be configured with the new list. MTK agrees.
* Huawei think that concurrent gaps is applicable to the new list but think that for e.g. NCSG also legacy extension makes sense and is simpler (it applies to legacy configs). Ericsson think it is cleaner to use the new list and think any restrictions can be handled in the field descriptin. MTK think that if we use the new list we use it for all cases.
* Samsung think there are benefits e.g. wrt signalling overhead if using the legacy gaps. Think there are no issues with ambiguity for reusing legacy gaps. MTK think we didn’t discuss the implicit association without ID, and this isn’t preferred
* Intel prefer the current structure, but is ok with the new proposal, but not sure about legacy gaps what it means. If we go with this, legacy gaps remain in the old configuration.
* Nokia think that legacy gaps can e.g. be for all freqs etc, Think that legacy gaps shall be possible with concurrent gaps, and can use the legacy gap configuration for legacy gaps.
* ZTE think the difference between concurrent and legacy gaps is just whether there is one or more. Think it is easier to just assume the new list, then can add and legacy gaps becomes concurrent gaps.
* Vivo think legacy configuration can be used together with the new Rel17 configuration.
* CATT support that concurrent gaps doesn’t reuse the legacy configuration.
* Apple point out that concurrent gaps is used as baseline for other
* QC has the same understanding as Ericsson. Same configuration as legacy can be provided with the new structure.
* Huawei think R2 need to figure out whether legacy gaps and concurrent gaps can be configured together with concurrent gaps. R4 has replied that for concurrent gaps association need to be ensured. Think the main point is the association with frequency .. Ericsson agrees the association is mandatory.
* MTK think the new configuration applies the association and it is required, and indeed think that the new list can configure legacy gaps, without association.
* Apple point out that preconfig MG and NCSG uses concurrent gaps as framework

Chair: Assume that if we go with new list a E033, then the new list/new configuration will be used for all cases that go beyond R15 R16 supported cases.

* We go with E033 E034, assuming that new list/new configuration will be used for all cases that go beyond R15 R16, continue offline (if issues are found can still CB and revert)

# 2 Contact Points

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

|  |  |  |
| --- | --- | --- |
| Company | Name | Email Address |
| MediaTek (Rapp) | Felix Tsai | chun-fan.tsai@mediatek.com |
| Intel (Rapp) | Candy Yiu | Candy.yiu@intel.com |
| Apple | Yuqin Chen | yuqin\_chen@apple.com |
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| CATT | Shijie | shijie@catt.cn |
| Xiaomi | Yi Xiong | xiongyi3@xiaomi.com |
| Huawei, HiSilicon | Lili Zheng | zhenglili4@huawei.com |
| Samsung | Aby K Abraham | Aby.abraham@samsung.com |
| Ericsson | Felipe Arraño Scharager | felipe.arrano.scharager@ercisson.com |
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# 3 Discussion

## 3.1 Clarification on E033/E034 approach

During the online discussion, it was agreed that we adopt E033/E034 and check whether there is concern on this direction. The CR [R2-2205229](file:///D:\Documents\3GPP\tsg_ran\WG2\RAN2\2205_R2_118-e\Docs\R2-2205229.zip) is written with the assumption that E033/E034 were agreed. Rapporteur would like to explain the operation of this approach to see if companies are okay with this.

The following is the resultant ASN.1 code assuming that R2-2205229 is agreed.

MeasGapConfig ::= SEQUENCE {

gapFR2 SetupRelease { GapConfig } OPTIONAL, -- Need M

...,

[[

gapFR1 SetupRelease { GapConfig } OPTIONAL, -- Need M

gapUE SetupRelease { GapConfig } OPTIONAL -- Need M

]],

[[

gapToAddModList-r17 SEQUENCE (SIZE (1..maxNrofGapId-r17)) OF GapConfig-r17 OPTIONAL, -- Need N

gapToReleaseList-r17 SEQUENCE (SIZE (1..maxNrofGapId-r17)) OF MeasGapId-r17 OPTIONAL, -- Need N

]]

}

GapConfig ::= SEQUENCE {

gapOffset INTEGER (0..159),

mgl ENUMERATED {ms1dot5, ms3, ms3dot5, ms4, ms5dot5, ms6},

mgrp ENUMERATED {ms20, ms40, ms80, ms160},

mgta ENUMERATED {ms0, ms0dot25, ms0dot5},

...,

[[

refServCellIndicator ENUMERATED {pCell, pSCell, mcg-FR2} OPTIONAL -- Cond NEDCorNRDC

]],

[[

refFR2ServCellAsyncCA-r16 ServCellIndex OPTIONAL, -- Cond AsyncCA

mgl-r16 ENUMERATED {ms10, ms20} OPTIONAL -- Cond PRS

]]

}

GapConfig-r17 ::= SEQUENCE {

measGapId-r17 MeasGapId-r17,

gapType-r17 ENUMERATED {perUE, perFR1, perFR2},

gapOffset-r17 INTEGER (0..159),

mgl-r17 ENUMERATED {ms1, ms1dot5, ms2, ms3, ms3dot5, ms4, ms5, ms5dot5, ms6},

mgrp-r17 ENUMERATED {ms20, ms40, ms80, ms160},

mgta-r17 ENUMERATED {ms0, ms0dot25, ms0dot5, ms0dot75},

refServCellIndicator-r17 ENUMERATED {pCell, pSCell, mcg-FR2} OPTIONAL, -- Cond NEDCorNRDC

refFR2ServCellAsyncCA-r17 ServCellIndex OPTIONAL, -- Cond AsyncCA

preConfigInd-r17 ENUMERATED {true} OPTIONAL, -- Need R

nscgInd-r17 ENUMERATED {true} OPTIONAL, -- Need R

gapAssociationPRS-r17 ENUMERATED {true} OPTIONAL, -- Need R

gapSharing-r17 MeasGapSharingScheme OPTIONAL, -- Need R

gapPriority-r17 GapPriority-r17 OPTIONAL, -- Need R

...

}

With this ASN.1 code

* **Understating 1** - The legacy fields (*gapFR2*, *gapFR1*, *gapUE*) could configure R15/R16 gap with legacy IE *GapConfig*. The legacy fields CANNOT be used to configure any of the R17 MGE features
* **Understating 2** - The new fields (*gapToAddModList-r17* and *gapToReleaseList-r17*) could configure one or multiple gaps with the new IE *GapConfig-r17*. All new R17 MGE gap features should be configured by these new fields.
* **Understating 3** – The new fields could still configure “legacy*”* gap.

During the online discussion, it was confusing while companies talking about the “legacy” gap. It may be good to clarify what kind of gap configuration we are talking about.

There could be two kind of configuration

* Type 1 gap configuration - A gap is setup by legacy fields (*gapFR2*, *gapFR1*, *gapUE*)
* Type 2 gap configuration - A gap is setup by new fields (*gapToAddModList-r17*). However, this gap is NOT configured with pre-MG indicator (*preConfigInd-r17*) and is NOT configured as NCSG (*nscgInd-r17*). In addition, this gap is not associated with specific frequencies. (It is the only per UE gap or FR1 gap or FR2 gap)
  + In this case, this “legacy” gap will be configured with a gap ID which is used for release purpose only.

The question is that do we consider Type 2 gap configuration as “legacy” gap and is it allowed to be configured as understanding 3. Please also note that Type 2 gap configuration is already possible (from ASN.1 signaling point of view) in current v17.0.0.

**Question 1: Companies are invited to provide comments on above understandings 1-3 based on the ASN.1 code from R2-2205229. In particular, do you think we should allow type 2 gap configuration for a UE supports any of R17 MGE features?**

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| **Company** | **Comments** |
| Intel | We have the same understanding 1 and 2. As for understanding 3, in term of signaling POV, it is feasible to do. However, as in discussion do we want to have type 2 to be configured in gapConfig-r17. It seems like it is matter of taste. However, if we separate the gapConfig between legacy and r17, we have slightly preference to not allow legacy to configure in gapConfig-r17. In this case, gap ID is mandatory. |
| Apple | Our preference is to only allow understanding 1 and 2. It is not clear to us, if to allow using the new list to configure legacy, why do we need to change the structure? |
| LGE | Regarding understanding 3, we cannot see any reason to use the new fields to configure the legacy gap, though it is possible from signalling perspective. If different fields are used for the legacy gap configuration between the source and target gNB, the delta configuration cannot be used, and it may bring possible confusion. |
| CATT | To keep it simple, type 2 gap configuration is not preferred. In addition, delta configuration cannot be applied according to the above ASN.1 structure as all configurations for a R17 gap need to be included in GapConfig-r17. |
| Xiaomi | We are ok with Understating 1 and 2. For understanding 3, we have some concern about using new fields to configure type 2 gap. It will be confused which fields will be used to configure legacy gap if understanding 3 is agreed. |
| Huawei, HiSilicon | Same view as Apple that Understanding 3 is not preferred.  In our understanding, legacy gaps refer to gaps without association to frequency layers, nor pre-configuration indication, nor NCSG indication. |
| Ericsson | We agree with the understandings.  Specially, we would like to comment on the motivation of having Understanding 3 and the “Type 2” configuration. For this, we would like to highlight what we raised in [R2-2206015](http://www.3gpp.org/ftp//tsg_ran/WG2_RL2/TSGR2_118-e/Docs//R2-2206015.zip), particularly what is proposed in RIL [E030].  The latter relates to the fact that the R17 ToAddMod structure allows for an efficient one-step “transformation” of gaps. In this regard, if a (type 2) “legacy gap” is configured using the ToAddModList, then the NW can, in a single step, turn this gap into a pre-configured MG by simply configuring the preConfigInd. This is possible, as there is a one-to-one mapping between legacy patterns and pre-configured MG patterns.  (Notice that a similar procedure could be done for NCSG)  Additionally, the operation described above could be considered in the other direction (i.e., from Pre-MG to “legacy”, or from NCSG to “legacy”). |
| ZTE | Ok with understanding 1, 2 and 3. Support Type 2 gap configuration.  Regarding whether to support Type 2 gap configuration. our understanding is that:  1. Same view as Ericsson, it allows more flexible network implementation, e.g. it allows the network to easily change from ‘legacy’ to concurrent gaps, and ‘legacy’ to NCSG or pre-configured MG”.  2. “Legacy gap” may also be enhanced in future, if that happens and new IEs are introduced, will RAN2 treat it as R15/R16 gap? Or R17 gap? We don’t hope RAN2 to discuss every time whether a new IE should be added only to *gapConfig*, or both *gapConfig* and *gapConfig-r17*.  3. From network perspective, configuration restriction is not preferred unless there is additional benefit or risk. Based on the comments above, we haven’t seen clear technical problem caused by type 2 gap configuration. The issue raised by LGE can be handled by network implementation, please note, this ‘problem’ also exists when pre-configured MG is enabled. |
| Nokia | OK for understanding 1 and 2. For understanding 3, we have similar view as LG. The legacy gap configuration (no association to frequency) is always configured in the legacy field, to support delta configuration. |
| MediaTek | Our view is that type 2 configuration should be allowed as explained by Ericsson and we support understanding 1 to 3. |
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**Summary 1**

Some companies support understanding 3 (type 2 gap configuration), but majority don’t want to support this. It is not clear to the rapporteur why there is somehow strong resistance to allow type 2 configuration. While adding a new field to replace the original one, we usually allow new filed to configure all scenario. Even in current v17.0.0 version, the procedure text and ASN.1 allow this kind of configuration. Some companies prefer to use legacy field so that they can have *delta configuration*. It is not clear that what kind scenario we can only use legacy field for delta configuration. So, rapporteur suggest to have more online discussion to clarify whether type 2 gap configuration is supported.

**Proposal will be made together with summary 3.**

Rapporteur does not really see the need to mix the usage of legacy field and new field. Based on the online agreement the new field is assumed to be **“used for all cases that go beyond R15 R16”**. Mixing usage of legacy and new field may just bring additional confusion. Either the NW setup a gap using the new field or using the legacy field. In the CR R2-2205229, this is clarified as below.

|  |
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| ***gapToAddModList***  A list of of measurement gap configuration to be added or modified. The network does not setup a measurement gap using this field together with *gapFR1*, *gapFR2*, or *gapUE*. In this version of the specification, the network configures this field only in NR standalone. |

With above understandings, let’s clarify on how to use the ASN.1 code.

* Case 1 – For R15/R16 UE or UE does not support the new R17 MGE features
  + The NW use legacy field to configure the R15/R16 gap
* Case 2 – For UE supports any of the R17 MGE features
  + Case 2.1 (For NW does not support R17 MGE features)
    - The NW use legacy field to configure the R15/R16 gap
  + Case 2.2 (For NW supports R17 MGE features)
    - The NW could still use legacy field to configure the R15/R16 gap.
    - The legacy field should not be setup together with the new field, but
      * The NW could release the R15/R16 gap via legacy field and setup new gaps via new field. (For example, while handover from R15/R16 gNB to new gNB)
      * The NW could release gaps configured by new field using *gapToReleaseList-r17* and setup R15/R16 via legacy field (Not sure the use case though)
    - It would be easier for the NW to just use the new field to configure different kinds of gap scenario including the “legacy” gap scenario as in understanding 3.
      * For example, the NW can reconfigure between pre-MG gap and “legacy” gap (or between NCSG and “legacy” gap) by using *gapToAddModList-r17* with corresponding ID.
      * If there is only one “legacy” gap configured via *gapToAddModList-r17*, it also easy to add a second gap via the new field and set the corresponding association to make it concurrent gap configuration.

**Question 2: Companies are invited to comment whether they have concern or different view on above usage of the new ASN.1 code? Please also comment on whether there is concern on restriction of setup a gap using new field and legacy filed simultaneously.**

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| **Company** | **Comments** |
| Intel | Case 1 ok  Case 2.1 ok  Case 2.2: since it is possible to configure legacy gap and r17 gap simultaneously (e.g. legacy and pre-configured gap and legacy and NCSG gap), we think it is cleaner if legacy gap (always on and no association to frequency or purpose) is always configured in the legacy field. Similarly, r17 gaps will be configured in the new list. |
| Apple | Case 1 and 2.1 OK  For Case 2.2, as I explained in online session, legacy gap and R17 gap can be configured together for NCSG and Pre-MG. For original concurrent gap, we agree it is indeed debatable as discussed online. Please see below agreement from RAN4 LS(s):  R4-2202616 (Pre-MG):   * + Independent of whether the UE supports concurrent measurement gaps, the following operations are supported (subject to UE capabilities for per-FR gap and pre-configured gap):     - legacy FR1 gap + pre-configured FR2 gap     - legacy FR2 gap + pre-configured FR1 gap   R4-2206890 (NCSG):   * RAN4 confirms the following combinations are supported:  1. NCSG FR1 gap + NCSG FR2 gap 2. Legacy FR1 gap + NCSG FR2 gap 3. Legacy FR2 gap + NCSG FR1 gap   R4-2202604 (Original concurrent gap for association between MO/freq and gap):  **Q1 –** Can Rel-17 concurrent gaps be configured together with legacy gap? If ‘yes’, what would be the UE behavior?   * RAN4 response: From RAN4 requirement perspective, RAN4 would like to ensure that the association of frequency layers or dedicated use cases to measurement gaps shall be clearly understood by both UE and Network for all configured measurements. How the association is up to RAN2. |
| LGE | For case 2.2:  We slightly prefer not to allow the NW to use the new fields to configure the legacy gap. If so, the NW should be able to configure the legacy field together with the new fields. |
| CATT | Ok with case 1 and case 2.1.  For case 2.2, we prefer:  - To keep it simple, legacy gap is always configured in the legacy field. There is no strong motivation to introduce implicit association at this late stage.  - R17 new gaps are configured via the new field.  - According to RAN4 LS, it is supported to configure legacy gap and r17 gap simultaneously. |
| Xiaomi | Ok with case 1 and case 2.1.  For case 2.2, we also prefer to use legacy field to configure legacy gaps and use new field to configure gaps for R17 MGE features. For some specific cases (eg: Legacy gap + NCSG gap or Legacy gap + pre-configured gap), new field and legacy field can be used together to configure legacy gap and R17 gap. |
| Huawei, HiSilicon | Case 1 and Case 2.1: ok.  As we commented online, pre-configured MG and NCSG can be configured together with legacy gaps, so including only concurrent gaps in the new list is a cleaner solution from our perspective. But is seems the majority view is to include all the R17 features into the new list.  We can live with the majority view, but we don’t see a strong motivation to add gap ID into legacy gaps and enable the transformation between legacy gaps and R17 gaps. |
| Samsung | Case 1 and Case 2.1: ok.  For case 2.2,we will need to support the combinations requested by RAN4 for preconfigured gap and NCSG along with legacy gaps.  For concurrent gaps, we prefer to use one of the gaps as legacy gap through an implicit association, but can accept the majority view. We will need to capture the understandings clearly in the minutes and specs as needed. |
| Ericsson | The restriction in the CR proposed by the Rapporteur should be sufficient. With it, it is up to the NW to decide how to configure gaps as the UE won’t expect both procedures to be used. |
| ZTE | Ok with Case 1 and Case 2.1.  For Case 2.2, as Apple clarified, the legacy gap can be configured together with NCSG and pre-configured MG.  So in summary, our understanding is that:  1. legacy field and new field can be configured together if the new field is used to configure pre-configured MG or NCSG;  2. legacy field and new field can not be configured together if concurrent gaps are configured; |
| Nokia | We don’t agree the description “*The network does not setup a measurement gap using this field together with gapFR1, gapFR2, or gapUE*.”  As indicated by other companies, for case2.2, we also think it’s better use legacy fields (*gapFR1, gapFR2, or gapUE*) to configure legacy gap and use new field “*gapToAddModList*” for Rel-17 gaps. In our understanding, according to RAN4 LS(s), the legacy gap can be configured simultaneously with pre-configured gap, NCSG gap and concurrent gap.  That is, the legacy gap and concurrent should be supported to work together. For example, if NW configured a UE with legacy gap for mobility measurements and plan to use the concurrent gap for PRS measurements (using a separate GP than the GP used for mobility measurements) it is **not** reasonable to force the network to change legacy implementation in the field such that all mobility measurement SHALL be configured using concurrent gaps. Otherwise, force that network can only use either legacy or concurrent will limit the use of the feature and force impact on current implementations if network want to use concurrent gaps. |
| MediaTek | We prefer to have the restriction as in our proposed CR. In our view, this makes the concept much simpler. |
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**Summary 2:**

On whether to support simultaneous gap configuration for both legacy field and new filed. Rapporteur understand most company want to support simultaneous configuration for NCSG and pre-configured gap. For example, one FR1 gap configured by *gapFR1* and the other FR2 NCSG gap configured by *gapToAddModList-r17*. Some companies intend to support have simultaneous configuration for concurrent gap but it seems request more discussion on how to do the implicit association. Rapporteur suggest agree the following principle proposed by ZTE.

* Legacy field and new field can be configured together if the new field is used to configure pre-configured MG or NCSG;
* Legacy field and new field can NOT be configured together if concurrent gaps are configured.

**Proposal will be made together with summary 3.**

In addition, it seems quite straightforward that we define measurement gap ID as mandatory field if we agreed E033/E034. As in other list, the ID is always needed to identify an entry. In this way, we avoid the complex conditional code specified for *measGapId-r17* as in current v17.0.0.

**Question 3: Do companies agree to** **define gap ID as mandatory field in the new R17 IE *GapConfig-r17* (as in R2-2205229)?**

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| --- | --- | --- |
| **Company** | **Agree or not** | **Comments** |
| Intel | Agree if | If the new IE gapConfig-r17 only for r17 MGE gaps. |
| Apple | Agree | It should be mandatory with E033/E034 agreed. And does this also justify the legacy gap should not be configured by Rel-17 field? |
| LGE | Yes | Even if the understanding 3 in Q1 is agreed, it does no harm to have. |
| CATT | Agree | To keep it simple. |
| Xiaomi | Yes | If the gap structure of E033/E034 is agreed, it can be mandatory. |
| Huawei, HiSilicon | Agree |  |
| Ericsson | Agree |  |
| ZTE | Agree |  |
| Nokia | Agree |  |
| MediaTek | Agree |  |
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**Summary 3:**

All companies agree to define gap ID as mandatory filed in new R17 IE GapConfig-r17.

**Summary for section 3.1**

From the comments on Q1 to Q3, there seems no major objection to go with E033/E034. It is suggested to confirm that and ASN.1 code in R2-2205229 could be used as baseline for CR discussion.

**Proposal 1: RAN2 to agree E033/E034 and confirm that new list/new configuration will be used for all cases that go beyond R15 R16.**

**Proposal 2: RAN2 to take CR R2-2205229 as baseline to implement E033/E034 with the following clarifications**

* **[To Discuss] Whether the new filed (the new list) could setup a gap that is NOT configured with any R17 MGE features (i.e. functional equivalent to R15/R16 gap)**
* **Legacy field and new field can be configured together if the new field is used to configure pre-configured MG or NCSG.**
* **Legacy field and new field can NOT be configured together if concurrent gaps are configured.**
* **Define gap ID as mandatory field in the new R17 IE GapConfig-r17.**

## 3.2 Configuration limitation of NCSG and pre-MG

The configuration limitation on combination of legacy gap and NCSG gap was mentioned by [R2-2205692](file:///D:/Documents/3GPP/tsg_ran/WG2/RAN2/2205_R2_118-e/Docs/R2-2205692.zip) and also discussed during the online session. The intention (based on RAN4 LS [R2-2204474](file:///D:/Documents/3GPP/tsg_ran/WG2/RAN2/2205_R2_118-e/Docs/R2-2204474.zip)) is to clarify that the following case 1), 2), 3) are supported and there is configuration limitation on case 4), 5) and 6).

[R2-2204474](file:///D:/Documents/3GPP/tsg_ran/WG2/RAN2/2205_R2_118-e/Docs/R2-2204474.zip) LS on R17 MG enhancement - NCSG (R4-2206890; contact: Apple) RAN4 LS in Rel-17 To:RAN2 Cc:RAN1

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| RAN4 reached the following agreements:   * RAN4 confirms the following combinations are supported:  1. NCSG FR1 gap + NCSG FR2 gap 2. Legacy FR1 gap + NCSG FR2 gap 3. Legacy FR2 gap + NCSG FR1 gap  * RAN4 confirms that the following combinations are not supported from RAN4 requirement perspective:   1. One legacy perUE gap + one NCSG perUE gap   2. One legacy perUE gap + NCSG FR1 gap   3. One legacy perUE gap + NCSG FR2 gap |

Please also note that in RAN4 LS [R2-2202160](file:///D:/Documents/3GPP/tsg_ran/WG2/RAN2/2202_R2_117-e/Docs/R2-2202160.zip), the same limitation applies to pre-configured MG (We can actually replace the “NCSG xxx gap” with “pre-configured xxx gap” in above 6 cases).

It should be possible the use the new field in [R2-2205229](file:///D:\Documents\3GPP\tsg_ran\WG2\RAN2\2205_R2_118-e\Docs\R2-2205229.zip) to configure the supported cases (case 1), 2), 3)). And we can have some clarification on field description to say that case 4), 5), 6) are not supported. One example to clarify the configuration limitation is shown below. So, rapporteur understands that the LS from RAN4 does not prevent us from using E033/E034 approach.

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| ***gapToAddModList***  A list of of measurement gap configuration to be added or modified. The network does not setup a measurement gap using this field together with *gapFR1*, *gapFR2*, or *gapUE*. The network configures at most one NCSG or pre-configured gap for one gap type and in this case the network does not configure any other gaps with same *gapType*. In this version of the specification, the network configures this field only in NR standalone. |

**Question 4: Do companies agree that the new field in** [**R2-2205229**](file:///D:\Documents\3GPP\tsg_ran\WG2\RAN2\2205_R2_118-e\Docs\R2-2205229.zip) **could configure the supported cases in** [**R2-2204474**](file:///D:/Documents/3GPP/tsg_ran/WG2/RAN2/2205_R2_118-e/Docs/R2-2204474.zip) **and it is possible to add configuration limitation in field description for the non-supported cases? Please also comment whether you think the configuration limitation in field description is needed and any wording suggestion.**

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| **Company** | **Agree or not** | **Comments** |
| Intel | Not agree | Similar to previous question, we slightly prefer to separate legacy gap configuration and r17 gaps. We think this is a less confusion configuration. Of course, if majority of the companies prefer allowing legacy gap to be configured in the new list for technical reason, we will be ok. |
| Apple | Agree | I guess this question is independent from Question 1? If I did not mistake the question, the restriction seems reasonable. |
| LGE |  | We are OK to specify the limitation in the field description. |
| CATT |  | Ok to specify the limitation. But we wonder how to prevent case 4 and case 5 as there are different gap types. |
| Xiaomi |  | Ok to specify the limitation. |
| Huawei, HiSilicon | Agree |  |
| Samsung | Agree |  |
| Ericsson | Agree |  |
| ZTE | Agree | The principle of pre-configured MG and NCSG are same as legacy gap, i.e. either per-UE or per-FR, one gap for each gap type. Just for a given gap type, the gap can be legacy gap, NCSG or pre-configured MG.  Maybe it is sufficient to say:  The network configures at most one NCSG or pre-configured gap for a given gap type. |
| Nokia |  | OK to specify the limitation for NCSG and Pre-MG. Please refer to our response to Q2 about legacy gap and Rel-17 gap configuration restriction. |
| MediaTek | Agree |  |
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**Summary 4:**

A clear majority supports the intention of [R2-2205692](file:///D:/Documents/3GPP/tsg_ran/WG2/RAN2/2205_R2_118-e/Docs/R2-2205692.zip). It is suggested to agreed the intention and how to capture this in the SPEC could be further discussed.

**Proposal 3: RAN2 agree to capture the restriction on the allowed combinations of NCSG/pre-configured MG and legacy gaps. FFS on how to capture it.**

## 3.3 Maximum number of gap ID

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

– *MeasGapId*

The IE *MeasGapId* used to identify a per UE or per FR measurement gap configuration.

***MeasGapId* information element**

-- ASN1START

-- TAG-MEASGAPID-START

MeasGapId-r17 ::= INTEGER (1..maxNrofGapId-r17)

-- TAG-MEASGAPID-STOP

-- ASN1STOP

maxNrofGapId-r17 INTEGER ::= ffsUpperLimit -- Maximum number of measurement gap ID is FFS

According to the proposals so far, most companies suggest to define the maximum value as 8 or 16. Rapporteur would like to check more companies’ view on this.

|  |  |
| --- | --- |
| **Companies** | **Proposals** |
| Ericsson  [R2-2206015](file:///D:/Documents/3GPP/tsg_ran/WG2/RAN2/2205_R2_118-e/Docs/R2-2206015.zip) | Proposal 4 Set the number of maximum gap IDs to 16. |
| MediaTek  [R2-2205229](file:///D:\Documents\3GPP\tsg_ran\WG2\RAN2\2205_R2_118-e\Docs\R2-2205229.zip) | M605 – Define the maximum number of gap ID to 16 |
| 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 2: The maximum number of measurement gap ID is up to the maximum number on total gaps for all activated features. It is decided based on RAN4 input. |
| Xiaomi  [R2-2205227](file:///D:/Documents/3GPP/tsg_ran/WG2/RAN2/2205_R2_118-e/Docs/R2-2205227.zip) | Proposal 1: The maximum number of gap ID can be 8. |

**Question 5: Companies are invited to provide their views on maximum number of gap ID.**

|  |  |  |
| --- | --- | --- |
| **Company** | **Preferred max value** | **Comments** |
| Intel | 16 |  |
| Apple | 16 | With ePositioning gap agreement (ePostioning gap max number is 16), seems 16 should be supported. |
| LGE |  | No strong view, but we are also ok with 16. |
| CATT | 8 | Currently positioning pre-configured measurement gaps are defined separately with MGE with separate positioning preconfigured measurement gap configuration ID. We don’t need to consider the max number for positioning pre-configured measurement gaps.  Furthermore, bitmap maybe introduced for pre-configured gaps. In order to save signalling overhead, it is not preferred to define a long bitmap with 16 bits. |
| Xiaomi | 8 | If using the MGE structure to configure pre-configured positioning gaps is supported, 16 is also OK for us. |
| Huawei, HiSilicon | 8 | Agree with CATT that positioning gaps are configured in a separate list. So 8 should be enough (even if gaps from other WIs are also considered). |
| Samsung | 8 | May use a separate upperlimit(16) for ePOS gaps |
| Ericsson | 16 | Let us notice that some of the configured gaps could eventually have the same priority (e.g., the case for ePOS gaps). However, each needs a distinct ID. Hence, we think that having 16 seems more reasonable. |
| ZTE | 8 | RAN2 has agreed to use a separate list for ePoS gaps, and separate gap ID will be used, e.g. no need to ensure the gap ID is unique between ePoS gap and MGE. |
| Nokia | 8 | Agree with CATT and Huawei. |
| MediaTek | 16 or 8 |  |
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**Summary 5:**

Majority prefers to define maximum number of concurrent gap to 8. Some intent to define it as 16 since ePOS WI agreed to have 16 pre-configured positioning measurement gap. In ad-hoc meeting, RAN2 already agree to use separate list for ePOS gap and MGE gap, so it since not so related to ePOS gap. It is suggested to follow majority view.

**Proposal 4: Define the maximum number of gap ID to 8.**

## 3.4 Others

In R2-2206015, it is proposed to allow delta configuration for the gap configured by the new list.

[R2-2206015](file:///D:/Documents/3GPP/tsg_ran/WG2/RAN2/2205_R2_118-e/Docs/R2-2206015.zip) On [E030] and further concurrent MG aspects Ericsson discussion Rel-17 NR\_MG\_enh-Core

**Proposal 1 Let a UE modify/reconfigure a R17 gap (instead of directly releasing it) when the *measGapId* in *GapConfig(-r17)* matches one that has already been setup.**

Rapporteur understands the intention is to delete the yellow highlight clause below. Note that we have this kind of release first behavior for legacy field because *SetupRelease* structure is used for that. It is not possible to release and setup and the same time while using *SetupRelease*. Since a list is used for new field, it maybe fine to have delta configuration for this.

|  |
| --- |
| 1> for each *GapConfig* received in *gapFR1ToAddModList*:  ~~2> if an FR1 measurement gap configuration associated with the~~ *~~measGapId~~* ~~indicated by the~~ *~~GapConfig~~* ~~is already setup, release the FR1 measurement gap configuration;~~  2> setup an FR1 measurement gap configuration indicated by the *GapConfig* in accordance with the received *gapOffset*, i.e., the first subframe of each gap occurs at an SFN and subframe meeting the following condition:  …. |

**Question 6: Do companies agree P1 from** [**R2-2206015**](file:///D:/Documents/3GPP/tsg_ran/WG2/RAN2/2205_R2_118-e/Docs/R2-2206015.zip) **?**

|  |  |  |
| --- | --- | --- |
| **Company** | **Agree or not** | **Comments** |
| Intel |  | No strong view. Either delta configuration or release is fine with us. |
| Apple | See comments | Don’t see big difference. This procedure follows legacy gap handling. If there is no strong motivation, should we better just follow legacy gap handling? |
| LGE | Agree | The ToAddMod structure enables the UE to modify the configuration without release, so it is better to use ‘modify’ instead of ‘release & setup’ in this case. |
| CATT | See comments | We support delta configuration. But according to the proposed ASN.1 in section 3.1, some fields in GapConfig-r17 are mandatory present while the other fields in GapConfig-r17 are configured with Need R. So there is no different if only the yellow highlight clause above is deleted.  In order to support delta configuration, we prefer to define a separate IE to include GapConfig with Need M. An example is shown below (Details please see R2-2204976):  MeasGapConfig ::= SEQUENCE {  gapFR2 SetupRelease { GapConfig } OPTIONAL, -- Need M  ...,  [[  gapFR1 SetupRelease { GapConfig } OPTIONAL, -- Need M  gapUE SetupRelease { GapConfig } OPTIONAL -- Need M  ]],  [[  gapUEToAddModList-r17 SEQUENCE (SIZE (1..maxNrofGapId-1-r17)) OF GapConfigEnhance-r17 OPTIONAL, -- Need N  gapUEToReleaseList-r17 SEQUENCE (SIZE (1..maxNrofGapId-1-r17)) OF MeasGapId-r17 OPTIONAL, -- Need N  gapFR1ToAddModList-r17 SEQUENCE (SIZE (1..maxNrofGapId-1-r17)) OF GapConfigEnhance-r17~~GapConfig~~  OPTIONAL, -- Need N  gapFR1ToReleaseList-r17 SEQUENCE (SIZE (1..maxNrofGapId-1-r17)) OF MeasGapId-r17 OPTIONAL, -- Need N  gapFR2ToAddModList-r17 SEQUENCE (SIZE (1..maxNrofGapId-1-r17)) OF GapConfigEnhance-r17~~GapConfig~~  OPTIONAL, -- Need N  gapFR2ToReleaseList-r17 SEQUENCE (SIZE (1..maxNrofGapId-1-r17)) OF MeasGapId-r17 OPTIONAL -- Need N  ]]  }  GapConfigEnhance-r17 ::= SEQUENCE {  measGapId-r17 MeasGapId-r17 OPTIONAL, -- Cond GapID  gapConfig-r17 GapConfig OPTIONAL, -- Need M  gapAssociationPRS-r17 ENUMERATED {true} OPTIONAL, -- Need R  gapSharing-r17 MeasGapSharingScheme OPTIONAL, -- Need R  gapPriority-r17 GapPriority-r17 OPTIONAL, -- Need R  ...  } |
| Xiaomi | No strong view | Delta configuration is also ok. |
| Huawei, HiSilicon |  | No strong view. |
| Samsung | No strong view |  |
| Ericsson | Agree | To improve readability, one could also consider that instead of directly removing the clause, it could be modified to capture the procedure (i.e., mention that when the measGapId matches one that is already present in the list, then the associated measurement gap is *reconfigured*). |
| ZTE | Yes | The IE names “ToAddModList”, so we understand delta configuration should be supported. |
| Nokia | No | Similar view as Apple. Why not follow legacy gap handling for simplicity ? It is not clear about the motivation to differentiate legacy gap and Rel-17 gap for modification procedure. |
| MediaTek | Yes |  |
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**Summary 6:**

There are wide support to have this delta configuration. Rapporteur suggest to agree the Ercisson proposal and how to capture it could be further discussed.

**Proposal 5: RAN2 intends to support modify/reconfigure on a R17 gap (instead of directly releasing it) when the *measGapId* in *GapConfig(-r17)* matches one that has already been setup. FFS how to modify this in SPEC.**

In R2-2206113, it is proposed to add conditional code for *associatedMeasGapSSB* and *associatedMeasGapCSIRS*. The main intention is to clarify this field shall be presented if concurrent gap (i.e. more than one gap) is configured.

[R2-2206113](file:///D:\Documents\3GPP\tsg_ran\WG2\RAN2\2205_R2_118-e\Docs\R2-2206113.zip) [H653] Corrections on associatedMeasGapSSB and associatedMeasGapCSIRS Huawei, HiSilicon CR Rel-17 38.331 17.0.0 3173 F NR\_MG\_enh-Core

**Clarify that *associatedMeasGapSSB* and *associatedMeasGapCSIRS* are mandatorily present for concurrent gaps.**

Rapporteur would like to collect company’s view on this CR.

**Question 7: Do companies the intention of CR R2-2206113 ? Any comment on the TP?**

|  |  |  |
| --- | --- | --- |
| **Company** | **Agree or not** | **Comments** |
| Intel | agree |  |
| Apple | See comments | Without considering NTN gaps, the proposal is correct. But last RAN2 meeting agreed the following on NTN. If RAN4 confirms the feasibility that two measurement gaps could be associated with the same frequency layer, the condition would require update.   1. could be configured simultaneously for each gap type (per-UE /per-FR1/per-FR2) confirmed in MGE WI, i.e., more than 2 simultaneous measurement gaps for each gap type are NOT considered in R17 NR NTN. 2. Send LS to RAN4 asking if it's feasible/possible, for NTN, that two measurement gaps could be associated with the same frequency layer   [Rapp] Our understanding is that the intention of R2-2206113 is not conflict with NTN assumption. Agree that further update may be needed. |
| LGE | Agree |  |
| Xiaomi | Agree |  |
| Huawei, HiSilicon | Agree |  |
| Samsung | See comments | ***associatedMeasGapSSB* and *associatedMeasGapCSIRS need to be mandatorily present only if the corresponding reference signal is configured.***  ***Thus associatedMeasGapSSB* can be based on conditional for *SSBorAssociatedSSB and associatedMeasGapCSIRS can be based on conditional for CSI-RS*** |
| Ericsson | Agree |  |
| ZTE | See comments | Agree with Samsung. |
| Nokia | Agree with modification | Agree with the intention.  However, we don’t agree the description in “reason for change”. In our understanding, the concurrent gaps can be configured together with legacy gap but there is no need to indicate gap id in MO for legacy gap. Hence the reason for change should be modified in the CR. |
| MediaTek | Agree |  |
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**Summary 7:**

There is support on the intention of R2-2206113. Some further comment on how to capture and could be discussed in the CR.

**Proposal 6: RAN2 agree to clarify that *associatedMeasGapSSB* and *associatedMeasGapCSIRS* are mandatorily present for concurrent gaps. FFS on how to capture it.**

# 4 Conclusions

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

**Proposal 1: RAN2 to agree E033/E034 and confirm that new list/new configuration will be used for all cases that go beyond R15 R16.**

**Proposal 2: RAN2 to take CR R2-2205229 as baseline to implement E033/E034 with the following clarifications**

* **[To Discuss] Whether the new filed (the new list) could setup a gap that is NOT configured with any R17 MGE features (i.e. functional equivalent to R15/R16 gap)**
* **Legacy field and new field can be configured together if the new field is used to configure pre-configured MG or NCSG.**
* **Legacy field and new field can NOT be configured together if concurrent gaps are configured.**
* **Define gap ID as mandatory field in the new R17 IE GapConfig-r17.**

**Proposal 3: RAN2 agree to capture the restriction on the allowed combinations of NCSG/pre-configured MG and legacy gaps. FFS on how to capture it.**

**Proposal 4: Define the maximum number of gap ID to 8.**

**Proposal 5: RAN2 intends to support modify/reconfigure on a R17 gap (instead of directly releasing it) when the *measGapId* in *GapConfig(-r17)* matches one that has already been setup. FFS how to modify this in SPEC.**

**Proposal 6: RAN2 agree to clarify that *associatedMeasGapSSB* and *associatedMeasGapCSIRS* are mandatorily present for concurrent gaps. FFS on how to capture it.**