**3GPP TSG-RAN WG4 Meeting # 104-e R4-22XXXXX**

**Electronic Meeting, 15 – 26 Aug 2022**

**Agenda item:** 9.9.3

**Source:** Moderator (MediaTek inc.)

**Title:** Email discussion summary for [104-e][211] NR\_MG\_enh\_1

**Document for:** Information

# Introduction

This document is the email discussion summary for [104-e][211] NR\_MG\_enh\_1 with the following topics covered

* Topic 1: General (AI 9.9.1)
* Topic 2: [Core requirement maintenance] Multiple concurrent and independent MG patterns (AI 9.9.1.2)
* Topic 3: [Performance requirements] Multiple concurrent and independent MG patterns (AI 9.9.2.2)

List of candidate target of email discussion for 1st round and 2nd round

* 1st round: Collect views from companies. Make early decision on issues with clear consensus. Decide on the scope, priority, options and tentative agreement to be discussed in the 2nd round.
* 2nd round:
  + Conclude the issues identified in the 1st round.
  + Revise and endorse draft CRs

Contact information

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| --- | --- | --- |
| **Company** | **Name** | **Email address** |
| MediaTek inc | Ato Yu | Ato.yu@mediatek.com |
| Xiaomi | Xuhua Tao | taoxuhua@xiaomi.com |
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Note:

1. Please add your contact information in above table once you make comments on this email thread.
2. If multiple delegates from the same company make comments on single email thread, please add you name as suffix after company name when make comments i.e. Company A (XX, XX)

# Topic #1: General (AI 9.9.1)

*Main technical topic overview. The structure can be done based on sub-agenda basis.*

## Companies’ contributions summary

|  |  |  |
| --- | --- | --- |
| **T-doc number** | **Company** | **Proposals / Observations** |
| R4-2212031 | OPPO | CR: CR to enhanced gap configuration for RRM requirements applicability |

## Open issues summary

Moderator: No open issue in this AI.

## Companies views’ collection for 1st round

### Open issues

Moderator: No open issue in this AI.

### CRs/TPs comments collection

*For close-to-finalize WIs and maintenance work, comments collections can be arranged for TPs and CRs. For ongoing WIs, suggest to focus on open issues discussion on 1st round.*

|  |  |
| --- | --- |
| **CR/TP number** | **Comments collection** |
| R4-2212031  OPPO | Moderator: This CR clarifies the limitation in current Rel-17 MG enh WI (e.g., no cross-feature requirements). Companies are encouraged to provide view on whether and how to introduce the limitation in spec. |
| Apple: we are fine to clarify this. Comments on wording can be provided once RAN4 agrees to add this clarification. |
| Ericsson: Fine to clarify no cross-feature requirements. We need to further check how to introduce the limitation since RAN4 will introduce the cross-feature in R18 soon. |

## Summary for 1st round

### Open issues

Moderator: No open issue in this AI.

### CRs/TPs

*Moderator tries to summarize discussion status for 1st round and provides recommendation on CRs/TPs Status update*

*Note: The tdoc decisions shall be provided in Section 3 and this table is optional in case moderators would like to provide additional information.*

|  |  |
| --- | --- |
| **CR/TP number** | **CRs/TPs Status update recommendation** |
| R4-2212031  OPPO | *Based on 1st round of comments collection, moderator can recommend the next steps such as “agreeable”, “to be revised”* |

## Discussion on 2nd round (if applicable)

# Topic #2: Core requirement maintenance (AI 9.9.1.2)

*Main technical topic overview. The structure can be done based on sub-agenda basis.*

## Companies’ contributions summary

|  |  |  |
| --- | --- | --- |
| **T-doc number** | **Company** | **Proposals / Observations** |
| R4-2211895 | Apple | Proposal 1: proximity condition for overlapping in FR2-2 is 4ms.  Proposal 2: introduce the following concurrent gaps configuration restriction:  Option 1: When concurrent MGs are configured, the MGRP for each MG cannot be smaller than 40ms.  Option 2: When concurrent MGs are configured, up to one MGP can be configured with MGRP=20ms.  Proposal 3: introduce a new capability for concurrent gaps capable UE to indicate whether above concurrent gaps configuration restriction apply. |
| R4-2211942 | CMCC | *Proposal 1: it is not necessary to define an overhead cap for concurrent gaps. In order to exclude the combination of 20ms MGRP+ 20ms MGRP, clarification in the spec can be considred.*  Proposal 2: *In order to exclude the combination of 20ms MGRP+ 20ms MGRP, no need to extend the dropping rule, just add clarification that when concurrent MGs are configured, the MGRP for each MG cannot be smaller than 40ms.* |
| R4-2211955 | Xiaomi | Proposal 1: The minimum distance between two gap instances is 4ms for FR2-2.  Proposal 2: Option 3 is adopt to define the overhead capability, e.g. When concurrent MGs are configured, the MGRP for each MG cannot be smaller than 40ms. |
| R4-2212078 | MediaTek inc. | Proposal 1: When network configures concurrent gaps to UE, network can configure at most 1 MG with MGRP=20ms in an FR. |
| R4-2212079 | MediaTek inc. | CR: Maintenance CR on TS38.133 for concurrent gaps core part |
| R4-2212130 | Intel Corporation | *Proposal 1: Prefer to define the additional dropping rules in [2] to avoid the issue of concurrent MG overhead cap.* |
| R4-2212204 | Qualcomm Incorporated | Proposal 1: Reuse X = 4 for the proximity condition for colliding measurement gaps in FR2-2.  Proposal 2: Introduce an optional UE capability to signal the maximum overhead for concurrent MGs supported by the UE.   * The set of candidate values include {30%, 40%, 50%}. * The overhead cap applies per FR. * If the UE does not signal the capability, no overhead cap applies.   Proposal 3: Support the UE reporting its preferred maximum overhead for concurrent MG via UE Assistance Information. Request RAN2 to add new signalling for this purpose. |
| R4-2212760 | Ericsson | *Proposal 1: The dropping rule can be extended to handle the overhead cap.*  *Proposal 2: To move forward, RAN4 to extend the overlapping rule when two MGs configuring with MGRP=20ms.*   * *the lower priority gap can be cancelled regardless of proximity rule* * *Data scheduling is resumed on the dropped gap occasions* |
| R4-2212871 | Nokia, Nokia Shanghai Bell | 1. RAN4 need to resolve the remaining details related to legacy MG and concurrent MG. 2. Send LS to RAN2 asking RAN2 to introduce priority for legacy gaps. 3. Define the overhead cap: Option 3 (Introduce UE capability) 4. Definition of overhead cap: Option 3 (MGRP for each MG cannot be smaller than 40ms) |
| R4-2212872 | Nokia, Nokia Shanghai Bell | CR: CR for concurrent measurement gaps |
| R4-2212873 | Nokia, Nokia Shanghai Bell | LS: LS on priority for legacy gaps |
| R4-2213291 | ZTE Corporation | Not avialable |
| R4-2213508 | Huawei, HiSilicon | Proposal 1: Define X = 4ms for FR2-2.  Proposal 2: Update the requirement applicability as follows.   * RAN4 requirements do not apply when a gap without assigned priority is configured simultaneously with any other gap(s) that affect serving carriers in the same FR, if the gaps are colliding with each other.   Proposal 3: Introduce the following applicability condition on overhead cap for concurrent MG:   * When concurrent MGs are configured, the requirements apply provided that at most one gap in each FR (including per-UE gaps) is configured with MGRP < 40 ms |
| R4-2213509 | Huawei, HiSilicon | CR: CR on concurrent MG related requirements |
| R4-2213874 | ZTE Corporation | Proposal 1: The value of X for FR2-2 can be smaller or equals to 4 ms.  Proposal 2: RAN4 can wait for the signalling structure finally identified in RAN 2, and then further check the correlation between classic MG and concurrent MG.  Proposal 3: To move forward, we can compromise to Option 5, i.e. handling this issue by extending the dropping rule, instead of defining an overhead cap.  Proposal 4: Referring to the definition of additional dropping rule, we agree that when two MGs configuring with both MGRP = 20 ms, the lower priority can be canceled regardless of proximity rule. |

## Open issues summary

*Before e-Meeting, moderators shall summarize list of open issues, candidate options and possible WF (if applicable) based on companies’ contributions.*

### Sub-topic 2-1: Overlapping

#### **Issue 2-1: Proximity condition for overlapping in FR2-2**

* Proposals
  + Option 1: Apple, Xiaomi, Qualcomm, Huawei
    - X = 4ms
* Recommended WF
  + Agree on Option 1 to close the issue

|  |  |
| --- | --- |
| **Company** | **Comments** |
| Apple | Support option 1. |
| Xiaomi | Support option 1 |
| Intel | Recommended WF can be agreed. |
| ZTE | Agree with recommended WF |
| Ericsson | Fine with option 1 |

#### **Issue 2-2: Relation between legacy (classic) MG and concurrent MG**

* Proposals
  + Option 1: Nokia
    - Send LS to RAN2 asking RAN2 to introduce priority for legacy gaps
  + Option 2: Huawei
    - Update the requirement applicability as follows
      * RAN4 requirements do not apply when a gap without assigned priority is configured simultaneously with any other gap(s) that affect serving carriers in the same FR, if the gaps are colliding with each other
* Recommended WF
  + Companies are encouraged to provide views in the 1st round. A draft LS can be arranged in the 2nd round if Option 1

|  |  |
| --- | --- |
| **Company** | **Comments** |
| Apple | No strong view. Option 2 can resolve this in RAN4 without RAN2 impact. To proponent of option 1: can network configure legacy gap in GapConfig-r17? E.g. not setting ncsgInd, preConfigInd and so on, just add gapPriority-r17 |
| Xiaomi | Option 2, according to RAN2 signaling design, the measurement gap is configured with priority, and in my understanding, the legacy gap without priority and concurrent MGs cannot be configured simultaneously. |
| Intel | Option 1 is NOT preferable.  Introducing of the priority for legacy gaps seems not Rel17 WI scope, which has significant impacts on the legacy measurement gap configuration. |
| ZTE | Option 1 and Option 2 are both fine to us.  Option 2 comes from the perspective of RAN4. Considering signalling structure is involved in, so sending LS to RAN2 to achieve alignment between RAN2 and RAN4 is fine. |
| Ericsson | We have some different views.  To avoid further effort in RAN2 and scenario limitation in RAN4, we suggest defining a default priority for legacy MG. If legacy MG colliding with ConMG, the legacy MG should be dropped. |

### Sub-topic 2-2: Overhead cap

Moerator: Affter checking all contributions, it seems all comapnies are fine to introduce the cap. But the controversial part is on how to define it (UE capability, NW configuration limitation, extending dropping rules). Therefore, Moderator suggest to directly focus on the detail.

#### **Issue 2-3: How to define the overhead cap when concurrent MGs are configured**

* Proposals
  + Option 1: Introduce UE capability to indicate whether configuration restriction apply
    - Option 1a: Apple, Xiaomi, Nokia
      * The MGRP for each MG cannot be smaller than 40ms
    - Option 1b: Apple
      * Up to one MGP can be configured with MGRP=20ms
    - Option 1c: Qualcomm
      * A set of candidate values of per FR maximum overhead includes {30%, 40%, 50%}
  + Option 2: Directly add NW configuration limitation in spec
    - Option 2a: CMCC
      * The MGRP for each MG cannot be smaller than 40ms
    - Option 2b: MTK, Huawei
      * Up to one MGP can be configured with MGRP=20ms
  + Option 3: Extending dropping rules
    - Option 3a: Intel, E///
      * when two MGs configuring with MGRP=20ms, the lower priority gap can be cancelled regardless of proximity rule and data scheduling is resumed on the dropped gap occasions
  + Option 4: Qualcomm
    - Signal the preferred maximum overhead via UE Assistance Information. Request RAN2 to add new signalling for this purpose.
* Recommended WF
  + Companies are encouraged to provide views in the 1st round.

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| **Company** | **Comments** |
| Apple | We are fine with all options on the table. Prefer option 1a/2a. Question to proponent of option 3a, since the lower priority gap will always be cancelled, is there any motivation for network to configure the gap with lower priority? If not, is it identical to option 2b? |
| Xiaomi | Option 1a, regarding option 1b, if one of the MGRP is configured as 20ms, and its gap priority is higher than the other one, considering the proximity of gap collision, the gap with larger MGRP (e.g.40ms) will not have the chance to be measured, as show in following figure: |
| Intel | We prefer Option 3 because in comparison with other options, it is most simple and straightforward way. For an example, Option 2 need more extra works beside RAN4.  We can also compromise to Option 2. But how RAN4 will specify such NW restriction in TS38.133 shall be considered. |
| ZTE | We share similar view as Intel, Option 3 is more simple and straightforward way than others. Option 3 can be seen as the extension of overlapping rule. But in fact the effect of Option 3 is same as Option 2b. |
| Ericsson | Option 3.  From our understanding, network can manage this cap and tradeoff between the throughput loss and measurement gaps’ configuration. Thus, we think it’s unnecessary to define an overhead. To mover forward, we made a compromise solution to extend the dropping rule. Based on this solution, the scenario of one gap with MGRP=20ms and another gap with MGRP>20ms can be valid. |

## Companies views’ collection for 1st round

### Open issues

Moderator: Company views are collected in previous section

### CRs/TPs comments collection

*Major close to finalize WIs and Rel-15 maintenance, comments collections can be arranged for TPs and CRs. For Rel-16 on-going WIs, suggest to focus on open issues discussion on 1st round.*

|  |  |
| --- | --- |
| **CR/TP number** | **Comments collection** |
| R4-2212079  MTK | Apple: fine with the CR. |
| Xiaomi: fine with change |
| Ericsson: fine with the CR. |
| R4-2212872  Nokia | Apple: fine with the CR but it still depends on outcome of issue 2-3. |
| Xiaomi: depends on the conclusion on issue 2-3 |
| Ericsson: Depends on the discussion |
| R4-2213509  Huawei | Apple: fine with the CR but it still depends on outcome of issue 2-3. |
| Xiaomi: depends on the conclusion on issue 2-3 |
| Ericsson: Depends on the discussion |

## Summary for 1st round

### Open issues

*Moderator tries to summarize discussion status for 1st round, list all the identified open issues and tentative agreements or candidate options and suggestion for 2nd round i.e. WF assignment.*

|  |
| --- |
| **Status summary** |
| **Issue 2-1: Proximity condition for overlapping in FR2-2**  *Status*:  *Tentative agreements*:  *Candidate options*:  *Recommendations for 2nd round*: |
| **Issue 2-2: Relation between legacy (classic) MG and concurrent MG**  *Status*:  *Tentative agreements*:  *Candidate options*:  *Recommendations for 2nd round*: |
| **Issue 2-3: How to define the overhead cap when concurrent MGs are configured**  *Status*:  *Tentative agreements*:  *Candidate options*:  *Recommendations for 2nd round*: |

### CRs/TPs

*Moderator tries to summarize discussion status for 1st round and provided recommendation on CRs/TPs Status update suggestion*

|  |  |
| --- | --- |
| **CR/TP number** | **CRs/TPs Status update recommendation** |
| R4-2212079  MTK | *Based on 1st round of comments collection, moderator can recommend the next steps such as “agreeable”, “to be revised”* |
| R4-2212872  Nokia |  |
| R4-2213509  Huawei |  |

## Discussion on 2nd round (if applicable)

*Moderator can provide summary of 2nd round here. Note that recommended decisions on tdocs should be provided in the section titled ”Recommendations for Tdocs”.*

# Topic #3: Performance requirement (AI 9.9.2.2)

*Main technical topic overview. The structure can be done based on sub-agenda basis.*

## Companies’ contributions summary

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| --- | --- | --- |
| **T-doc number** | **Company** | **Proposals / Observations** |
| R4-2211896 | Apple | CR: draftCR on concurrent gaps test case for FR2 SA with SSB and PRS |
| R4-2212083 | MediaTek inc. | CR:CR on TS38.133 for concurrent MG test case No 2 |
| R4-2212134 | Intel Corporation | CR: [draftCR] CR for concurrent MG test case No 4 |
| R4-2212761 | Ericsson | CR:Test case for Con-MGs TC1 |
| R4-2212875 | Nokia, Nokia Shanghai Bell | CR:DraftCR TC#3 on Concurrent Measurement Gaps |
| R4-2213298 | ZTE Corporation | Not available |
| R4-2213514 | Huawei, HiSilicon | Proposal 1: Define TC #3, 4 and 7 in [1] for verifying performance of PRS and LTE measurement with concurrent MGs.  Proposal 2: Pick 1 TC (e.g. TC#1) for SBI reporting.  Proposal 3: Use simultaneous per-UE gap and per-FR gap in TC #4 and 7**.** |
| R4-2213515 | Huawei, HiSilicon | CR:CR to introduce TC#5 for concurrent MGs |
| R4-2213881 | ZTE Corporation | CR:Draft CR on test case for Concurrent MG for FR2 PPO in TS38.133 A.7.6.2.x |

## Open issues summary

*Before e-Meeting, moderators shall summarize list of open issues, candidate options and possible WF (if applicable) based on companies’ contributions.*

### Sub-topic 3-1 High-level principles

#### **Issue 3-1: Whether to introduce test cases for PRS measurement**

* Proposals
  + Option 1: Huawei
    - Yes
* Recommended WF
  + Collect views in 1st round

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| --- | --- |
| **Company** | **Comments** |
| Apple | Fine with option 1. |
| Intel | We also prefer to define TC for PRS measurement together with other measurements (e.g. PRS + SSB). |
| ZTE | Fine with Option 1. |
| Ericsson | Fine with option 1. |
|  |  |

#### **Issue 3-2: Whether to introduce test cases for EUTRAN measurement**

* Proposals
  + Option 1: Huawei
    - Yes
* Recommended WF
  + Collect views in 1st round

|  |  |
| --- | --- |
| **Company** | **Comments** |
| Apple | Fine with option 1. |
| Intel | No strong opinion |
| ZTE | Fine with Option 1. |
| Ericsson | Fine with Option 1. |
|  |  |

#### **Issue 3-3: Which test case to add SBI reporting**

* Background: Agreement in last meeting
  + **< Agreement>** Define test case without SBI reporting. FFS whether and how to pick 1 test case for SBI reporting
* Proposals
  + Option 1: Huawei
    - TC#1
* Recommended WF
  + Collect views in 1st round

|  |  |
| --- | --- |
| **Company** | **Comments** |
| Apple | We fail to understand the necessity of adding SBI reporting, which has nothing to do with the functionality to be verified. |
| Intel | No strong opinion. But seems SBI detection is common function which can be verified by the existing TC already. |
| ZTE | Similar view as Intel. |
| Ericsson | No strong view. Could Huawei further explain the reason to introduce the SBI reporting? |
|  |  |

## Companies views’ collection for 1st round

### Open issues

Moderator: Company views are collected in previous section

### CRs/TPs comments collection

*Major close to finalize WIs and Rel-15 maintenance, comments collections can be arranged for TPs and CRs. For Rel-16 on-going WIs, suggest to focus on open issues discussion on 1st round.*

|  |  |
| --- | --- |
| **CR/TP number** | **Comments collection** |
| R4-2211896  Apple | Intel: It is up to issue 3-1.  And for types of PRS measurement, in TC4 from Intel, RSTD measurement is used, whether the same PRS measurements (RSRP, RSTD) shall be used for TC4 and TC7 can be discussed. |
| Company B |
|  |
| R4-2212083  MTK | Intel: is the additional SMTC configuration necessary? |
| Company B |
|  |
| R4-2212134  Intel | Intel: It is up to issue 3-1. We will also update part of them to aligned with other TCs |
| Company B |
|  |
| R4-2212761  Ericsson | Company A |
| Company B |
|  |
| R4-2212875  Nokia | Company A |
| Company B |
|  |
| R4-2213515  Huawei | Company A |
| Company B |
|  |
| R4-2213881  ZTE | Company A |
| Company B |
|  |

## Summary for 1st round

### Open issues

*Moderator tries to summarize discussion status for 1st round, list all the identified open issues and tentative agreements or candidate options and suggestion for 2nd round i.e. WF assignment.*

|  |
| --- |
| **Status summary** |
| **Issue 3-1: Whether to introduce test cases for PRS measurement**  *Status*:  *Tentative agreements*:  *Candidate options*:  *Recommendations for 2nd round*: |
| **Issue 3-2: Whether to introduce test cases for EUTRAN measurement**  *Status*:  *Tentative agreements*:  *Candidate options*:  *Recommendations for 2nd round*: |
| **Issue 3-3: Which test case to add SBI reporting**  *Status*:  *Tentative agreements*:  *Candidate options*:  *Recommendations for 2nd round*: |

### CRs/TPs

*Moderator tries to summarize discussion status for 1st round and provided recommendation on CRs/TPs Status update suggestion*

|  |  |
| --- | --- |
| **CR/TP number** | **CRs/TPs Status update recommendation** |
| R4-2211896  Apple | *Based on 1st round of comments collection, moderator can recommend the next steps such as “agreeable”, “to be revised”* |
| R4-2212083  MTK |  |
| R4-2212134  Intel |  |
| R4-2212761  Ericsson |  |
| R4-2212875  Nokia |  |
| R4-2213515  Huawei |  |
| R4-2213881  ZTE |  |

## Discussion on 2nd round (if applicable)

*Moderator can provide summary of 2nd round here. Note that recommended decisions on tdocs should be provided in the section titled ”Recommendations for Tdocs”.*

# Recommendations for Tdocs

## 1st round

**New tdocs**

|  |  |  |  |
| --- | --- | --- | --- |
| **New Tdoc number** | **Title** | **Source** | **Comments** |
|  | WF on … | YYY |  |
|  | LS on … | ZZZ | To: RAN\_X; Cc: RAN\_Y |
|  |  |  |  |

**Existing tdocs**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Tdoc number** | **Revised to** | **Title** | **Source** | **Recommendation** | **Comments** |
| R4-22xxxxx |  | CR on … | XXX | Agreeable, Revised, Merged, Postponed, Not Pursued |  |
|  |  |  |  |  |  |
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Notes:

1. Please include the summary of recommendations for all tdocs across all sub-topics incl. existing and new tdocs.
2. For the Recommendation column please include one of the following:
   1. CRs/TPs: Agreeable, Revised, Merged, Postponed, Not Pursued
   2. Other documents: Agreeable, Revised, Noted
3. For new LS documents, please include information on To/Cc WGs in the comments column
4. Do not include hyper-links in the documents

## 2nd round

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Tdoc number** | **Revised to** | **Title** | **Source** | **Recommendation** | **Comments** |
| R4-22xxxxx |  | CR on … | XXX | Agreeable, Revised, Merged, Postponed, Not Pursued |  |
| R4-22xxxxx |  | WF on … | YYY | Agreeable, Revised, Noted |  |
| R4-22xxxxx |  | LS on … | ZZZ | Agreeable, Revised, Noted |  |
|  |  |  |  |  |  |

Notes:

1. Please include the summary of recommendations for all tdocs across all sub-topics.
2. For the Recommendation column please include one of the following:
   1. CRs/TPs: Agreeable, Revised, Merged, Postponed, Not Pursued
   2. Other documents: Agreeable, Revised, Noted
3. Do not include hyper-links in the documents