**3GPP TSG-RAN WG4 Meeting # 102-e R4-22XXXX**

**Electronic Meeting, 21 Feb. – 03 March, 2022**

**Agenda item:** 10.26

**Source:** Moderator (vivo)

**Title:** Email discussion summary for [236] LTE\_NR\_MUSIM

**Document for:** Information

# Introduction

This email discussion is for R17 MUSIM WI and the scope covers the following agenda items:

* AI 10.26.1 General and work plan
* AI 10.26.2 RRM core requirements

At RAN 94 meeting, the revised WI for MUSIM [RP-213679] was approved. In the objectives of the WI, the following objective is added:

* Specify that existing gap patterns in TS 38.133 can be applicable for MUSIM and also define new gap patterns for MUSIM [RAN4]:

During email discussion companies are encourages to:

* Provide comments on all interested topics/sub-topics at one time
* Ensure that comments are based on the latest version of the document by checking the folder before uploading
* Use “Track changes” to help identify added comments/changes
* Based on meeting guidance from RAN4 chair when changing the file name, adding your company name

# Topic #1: Rel-17 RRM for MUSIM

## Companies’ contributions summary

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| **Tdoc number** | **Company** | **Proposals / Observations** |
| R4-2203748 | Apple | **Proposal 1: longer MGL such 40ms and 80ms can be considered for aperiodic gap pattern.**  **Proposal 2: it is unnecessary to introduce the mandatory MGPs for MU-SIM once UE reporting to support MUSIM capability.**  **Proposal 3: It’s feasible to use multiple short aperiodic gaps for Msg1, Msg2, (Msg3, Msg4) transmission/reception or their combinations and multiple trials for On-demand SI request** |
| R4-2204161 | ZTE | **Observation 1: No need to define MGL larger than 20ms and MGRP larger than 5120ms for new periodic gap patterns for MUSIM.**  **Observation 2: No need to define MGL larger than 20ms for aperiodic gap pattern for MUSIM.**  **Proposal 1: One additional periodic gap may impact NW A performance.** |
| R4-2204307 | OPPO | **Proposal 1: MGL longer than 20ms is not considered for either periodic or aperiodic gap patterns.**  **Proposal 2: Not define mandatory new gap patterns for MUSIM.**  **Proposal 3: It is feasible to configure 3 periodic gaps without sacrificing NW-A performance, if the overhead cap of gap combination does not exceed X%.**   * **X=30 could be considered as baseline.** |
| R4-2204318 | vivo | **Proposal 1: For issue 1-2-1, use the MGL value in endorsed CR [7].**  **Proposal 2: For issue 1-2-2, conclude whether to introduce [5120ms MGRP and 20ms MGL]or not at RAN4 102e meeting.**  **Proposal 3: For issue 1-2-3, suggest that other candidate MGLs for aperiodic gap, especially longer MGL could be considered at later release instead of Rel-17.**  **Proposal 4: After NE allows UE’s request on MUSIM gap for MUSIM measurement, further constraints are not needed. Suggest to use the above proposal for study in future release.**  **Proposal 5: How a UE requests MUSIM gap for MUSIM measurement including OSI acquisition and On-demand SI acquisition is a pure UE implementation issue and no further enhancements/optimizations at Rel-17 time scale.**  **Proposal 6: A new UE capability for MUSIM gap should be introduced. Detailed design on signaling is up to RAN2 decision.**  **Proposal 7: Reply LS to RAN2 on MGL and MGRP should be based on RAN4’s endorsed CR.**  **Proposal 8: Regarding 3 at RAN2’s LS, the scenario for 3 periodic gaps could be one periodic gap for serving cell measurement, one periodic for neighbour cell measurement and the other periodic gap for paging reception. Whether extra sacrificing on NW A compared with 2 periodic gap method needs more investigation.** |
| R4-2204422 | Intel | **CR** |
| R4-2205394 | Huawei, HiSilicon | **Proposal 1: No new MGL is considered for periodic MUSIM gaps.**  **Proposal 2: No other MGL value is considered for aperiodic MUSIM gaps.**  **Proposal 3: All new GPs for MUSIM are optional.**  **Proposal 4: No more discussion on applicability of MUSIM GPs.**  **Proposal 5: RAN4 not to introduce support for multiple aperiodic gaps or multiple occasions for one aperiodic gap.**  **Proposal 6: RAN4 not to introduce one additional periodic gap for MUSIM** |
| R4-2205513 | Ericsson | **Observation 1: Additional periodic gap will impact the NW A’s performance, especially when UE can finish the related processing with less trials.**  **Observation 2: Current 2 periodic gaps and 1 aperiodic gap for MUSIM can handle the UE’s behaviour in Idle mode for NW B.**  **Proposal 1: To efficient utilize the gap, UE shall inform NW with the additional assistant information when UE requests the gap for MIB/SIB1 decoding.**  **Proposal 2: UE can acquire the OSIs based on multiple aperiodic gaps or a periodic gap by monitoring multiple PDCCH occasions for SI message associated with the strongest SSBs.**  **Proposal 3: When UE requests the gap for OSI acquisition, UE shall request the gap with the assistant information, including potential M PDCCH monitoring occasions for SI message associated with the strongest M SSBs.**  **Proposal 4: For On-demand SI request, UE shall request one aperiodic gap(20ms) for Msgs processing when the proximity of adjacent Msgs is shorter than a threshold. Otherwise, UE shall request multiple aperiodic gaps(10ms) to handle each Msg processing.**  **Proposal 5: UE can request aperiodic gap with the assistant information to avoid missing the following signal reception/transmission windows. The information shall include the potential occasions to handle the subsequent Msgs’ processing.**  **Proposal 6: RAN4 had already agreed the following MUSIM gap patterns with MGL and MGRP in TS38.133.**   * **MGL: 3ms, 4ms, 6ms, 10ms, 20ms** * **MGRP: 20ms, 40ms, 80ms, 160ms, 320ms, 640ms, 1280ms, 2560ms, 5120**   **Proposal 7: An additional periodic gap with UE assist information or multiple aperiodic gaps requesting once a time can be believed as the optimization for MU-SIM gap and defined in next release.** |
| R4-2205514 | Ericsson | **Observation 1: Current MGPs defined in RAN4 can meet the NW B’s UE behaviour in Idle mode.**  **Observation 2: Aperiodic MGP with MGL 10ms is enough for SIB acquisition.**  **Observation 3: Aperiodic MGP with MGL 10ms can be used for on-demand SI.**  **Proposal 1: RAN4 not to introduce further long MGL for optimization in Rel-17 MUSIM.**  **Proposal 2: RAN4 to introduce the new aperiodic MGP with MGL 10ms.**  **Proposal 3: RAN4 to clarify the applicability that sharing the gap between network A’s mobility measurements and the MUSIM measurements is precluded.**  **Proposal 4: Define a separate MUSIM gap pattern table to report the supported MUSIM gap patterns by UE.**  **Proposal 5: UE needs to at least support MUSIM gap pattern with MGL=6MS, MGRP=1280ms once UE reporting to support MUSIM capability.** |
| R4-2205515 | Ericsson | **CR** |
| R4-2206094 | Qualcomm Incorporated | **Proposal 1: Legacy measurements gap patterns 12-23 in TS 38.133, clause 9.1.2 are applicable to MUSIM when the UE is configured in NR SA with a FR2 serving cell in network A.**  **Proposal 2: RAN4 should add new periodic gap patterns for MUSIM with MGL = 40 ms.**  **Proposal 3: The proposed LS reply to RAN2 can be found in the Appendix.** |

## Open issues summary

### Sub-topic 1-1 New gap patterns for MUSIM

**Issue 1-1-1: MGL for new periodic gap patterns for MUSIM**

* Proposals:
  + Option 1: No need to define MGL larger than 20ms (ZTE oppo Huawei)
    - Option 1a: no need to define longer MGL at Rel-17 (Ericsson)
  + Option 2: Add new periodic gap patterns for MUSIM with MGL = 40 ms (Qualcomm)
  + Option 3: use the MGL value in endorsed CR R4-2202760 (vivo)
* Recommended WF
  + Suggest to use option 1 base on majority view

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| **Company** | **Comments** |
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**Issue 1-1-2: MGRP for new periodic gap patterns for MUSIM**

* Proposals:
  + Option 1: No need to define MGRP larger than 5120ms (ZTE)
  + Option 2: Define gap pattern with MGL 20ms and MGRP with 5120ms (Intel Ericsson)

Moderator Note: option 1 and option 2 are not exclusive each other. Support or oppose both options are possible.

* Recommended WF
  + Could company check whether both option 1 and option 2 are agreeable?

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**Issue 1-1-3: Aperiodic gap pattern for MUSIM**

* Proposals:
  + Option 1: Introduce MGL longer than 20ms
    - [40ms 80ms] (Apple)
  + Option 2: Do not introduce MGL longer than 20ms (ZTE oppo Huawei)
    - Option 2a: Do not introduce MGL longer than 20ms at Rel-17 (vivo, Ericsson)
  + Option 3: Introduce MGL 10ms for aperiodic gap (Ericsson)
* Recommended WF
  + Between option 1 and 2, suggest to use option 2 based on majority view? Could company further check whether option 3 is agreeable?

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**Issue 1-1-4: Legacy gap pattern for MUSIM**

* Proposals:
  + Option 1: Legacy measurements gap patterns 12-23 in TS 38.133, clause 9.1.2 are applicable to MUSIM when the UE is configured in NR SA with a FR2 serving cell in network A (Qualcomm)
* Recommended WF
  + TBA

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### Sub-topic 1-2 Reply for LS R2-2201717

**Issue 1-2-1: One additional periodic gap on top of the three gaps agreement (i.e., 2 periodic gaps and 1 aperiodic gap) RAN2 keeps without sacrificing NW A performance**

* + Option 1: Do not introduce one additional periodic gap for MUSIM (Huawei)
  + Option 2: May impact NW A performance (ZTE)
  + Option 3: Feasible to configure 3 periodic gaps without sacrificing NW-A performance, if the overhead cap of gap combination does not exceed X%. (oppo)
  + Option 4: Discuss additional/expanded gap configurations for MUSIM and its impact on performance at Rel-18 (Ericsson Qualcomm)
    - Option 4a: From a signaling perspective, it is up to RAN2 to introduce signaling to support configurations with more than two periodic gaps for MUSIM in Rel-17 (Qualcomm)
  + Option 5: The scenario for 3 periodic gaps could be one periodic gap for serving cell measurement, one periodic for neighbour cell measurement and the other periodic gap for paging reception. Whether extra sacrificing on NW A compared with 2 periodic gap method needs more investigation. (vivo)
* Recommended WF
  + TBA

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**Issue 1-2-2: Draft reply LS**

**For information only: Draft reply LSs are available at: R4-2204307; R4-2205513; R4-2206094; R4-2204318**

### Sub-topic 1-3 Application issue for MUSIM

**Issue 1-3-1: Application considerations**

* Proposals
  + Option 1: Applicability of MUSIM GPs are already specified in the endorsed CR, no more discussion (Huawei)
    - Option 1a: RAN4 to clarify the applicability that sharing the gap between network A’s mobility measurements and the MUSIM measurements is precluded. (Ericsson)
    - Option 1b: UE will require MUSIM gaps for MUSIM purpose. After NW allows UE’s request on MUSIM gap for MUSIM measurement, further constraints are not needed since the purpose is clear (vivo)
* Recommended WF: Suggest to agree option 1 and directly work on corresponding CR, if necessary

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**Issue 1-3-2: MIB/SIB1 acquisition**

* Proposals
  + Option 1: Option 1: Do not introduce support for multiple aperiodic gaps or multiple occasions for one aperiodic gap (Huawei)
  + Option 2: To efficient utilize the gap, UE shall inform NW with the additional assistant information when UE requests the gap for MIB/SIB1 decoding (Ericsson)
* Recommended WF
  + TBA

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**Issue 1-3-3: OSI acquisition**

* Proposals
  + Option 1: Do not introduce support for multiple aperiodic gaps or multiple occasions for one aperiodic gap (Huawei)
  + Option 2: UE can use multiple aperiodic gaps or a periodic gap by monitoring multiple PDCCH occasions for SI message associated with the strongest SSBs; UE shall request the gap with the assistant information, including potential M PDCCH monitoring occasions for SI message associated with the strongest M SSBs (Ericsson)
  + Option 3: How a UE requests MUSIM gap for MUSIM measurement including OSI acquisition and On-demand SI acquisition is up to UE implementation issue and no further enhancements/optimizations at Rel-17 time scale (vivo)
* Recommended WF
  + TBA

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**Issue 1-3-4: On-demand SI**

* Proposals
  + Option 1: Do not introduce support for multiple aperiodic gaps or multiple occasions for one aperiodic gap (Huawei)
  + Option 2: It’s feasible to use multiple short aperiodic gaps for Msg1, Msg2, (Msg3, Msg4) transmission/reception or their combinations and multiple trials for On-demand SI request. (Apple)
    - Option 2a: For On-demand SI request, UE shall request one aperiodic gap(20ms) for Msgs processing when the proximity of adjacent Msgs is shorter than a threshold. Otherwise, UE shall request multiple aperiodic gaps(10ms) to handle each Msg processing. UE can request aperiodic gap with the assistant information to avoid missing the following signal reception/transmission windows. The information shall include the potential occasions to handle the subsequent Msgs’ processing. (Ericsson)
  + Option 3: How a UE requests MUSIM gap for MUSIM measurement including OSI acquisition and On-demand SI acquisition is up to UE implementation issue and no further enhancements/optimizations at Rel-17 time scale (vivo)
* Recommended WF
  + TBA

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**Issue 1-3-5: Multiple aperiodic gaps**

* Proposals
  + Option 1: Do not introduce support for multiple aperiodic gaps or multiple occasions for one aperiodic gap (Huawei)
  + Option 2: Multiple aperiodic gaps requesting once a time can be believed as the optimization for MU-SIM gap and defined in next release. (Ericsson)
* Recommended WF
  + TBA

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### Sub-topic 1-4 UE feature issue

**Issue 1-4-1: Mandatory new gap pattern for MUSIM**

* Proposals:
  + Option 1: UE needs to at least support MUSIM gap pattern with MGL=6MS, MGRP=1280ms once UE reporting to support MUSIM capability. (Ericsson)
  + Option 2: Not necessary to introduce mandatory MGPs for MUSIM (Apple oppo Huawei)
* Recommended WF
  + TBA

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**Issue 1-4-2 UE capability for MUSIM**

* + Option 1: Define a separate MUSIM gap pattern table to report the supported MUSIM gap patterns by UE(Ericsson vivo)
    - Option 1a: Detailed design on signalling is up to RAN2 decision (vivo)
* Recommended WF: Suggest to agree option 1.

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## Companies views’ collection for 1st round

### Open issues

*One of the two formats, i.e. either example 1 or 2 can be used by moderators.*

### 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.*

|  |  |
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| **CR/TP number** | **Comments collection** |
| **R4-2204422** |  |
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| **R4-2205515** |  |
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## 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.*

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|  | **Status summary** |
| **Sub-topic #1-1** |  |

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|  | **Status summary** |
| **Sub-topic #1-2** |  |

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|  | **Status summary** |
| **Sub-topic #1-3** |  |

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|  | **Status summary** |
| **Sub-topic #1-4** |  |

### 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.*

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| **CR/TP number** | **CRs/TPs Status update recommendation** |
| XXX | *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)

# Recommendations for Tdocs

## 1st round

**New tdocs**

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| **Title** | **Source** | **Comments** |
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**Existing tdocs**

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| **Tdoc number** | **Title** | **Source** | **Recommendation** | **Comments** |
| [**R4-2203748**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_102-e/Docs/R4-2203748.zip) | On R17 MUSIM | Apple |  |  |
| [**R4-2204161**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_102-e/Docs/R4-2204161.zip) | Discussion on MUSIM requirements | ZTE Corporation |  |  |
| [**R4-2204307**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_102-e/Docs/R4-2204307.zip) | Discussion on RRM core requirements for Multi-SIM devices | OPPO |  |  |
| [**R4-2204318**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_102-e/Docs/R4-2204318.zip) | On remaining issues for Rel-17 MUSIM requirements | vivo |  |  |
| [**R4-2204422**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_102-e/Docs/R4-2204422.zip) | Removing square brackets for MUSIM gap patterns | Intel Corporation |  |  |
| [**R4-2205394**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_102-e/Docs/R4-2205394.zip) | Discussion on remaining issues for MUSIM | Huawei, HiSilicon |  |  |
| [**R4-2205513**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_102-e/Docs/R4-2205513.zip) | LS response on gap handling for MUSIM | Ericsson |  |  |
| [**R4-2205514**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_102-e/Docs/R4-2205514.zip) | New gap pattern for MUSIM | Ericsson |  |  |
| [**R4-2205515**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_102-e/Docs/R4-2205515.zip) | draftCR on New gap pattern for MUSIM | Ericsson |  |  |
| [**R4-2206094**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_102-e/Docs/R4-2206094.zip) | Second reply LS on gaps for MUSIM | Qualcomm Incorporated |  |  |
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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** | **Title** | **Source** | **Recommendation** | **Comments** |
| R4-210xxxx | CR on … | XXX | Agreeable, Revised, Merged, Postponed, Not Pursued |  |
| R4-210xxxx | WF on … | YYY | Agreeable, Revised, Noted |  |
| R4-210xxxx | LS on … | ZZZ | Agreeable, Revised, Noted |  |
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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

# Annex

Contact information

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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)