3GPP TSG-RAN WG2 Meeting #113bis Electronic R2-210xxxx

Elbonia, 12 – 20 April 2021

**Agenda item: 8.1**

**Source: Rapporteur (Nokia)**

**Title: [AT113bis-e][031][MBS17] MBS session activation (Nokia)**

**WID/SID: NR\_MBS-Core - Release 17**

**Document for: Discussion and Decision**

# 1 Introduction

This is report for the email discussion initiated from the discussion on online meeting on 12th of April 2021::

[R2-2103278](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_113bis-e/Docs/R2-2103278.zip) MBS session activation and group paging Nokia, Nokia Shanghai Bell discussion Rel-17 NR\_MBS-Core

DISCUSSION

- NEC support.

- QC support and think it should be restricted to cells supporting MBS. Nokia agrees. QC think that for cells not supporting MBS legacy paging shall be used. LG agrees.

- Ericsson agrees with P1 but think that also non-supporting nodes need to be supported with group paging, where CN allocates a specific group TMSI (transparent to RAN non supporting MBS).

- CATT think MCCH can be used, and think this may have less impact. Vivo agrees with CATT. MTK agrees as well. Vivo think that otherwise the UE need to wake up at more occasions.

- Oppo think MSB session ID can be used in the paging message and think inmpact to legacy UEs shall be considered.

- Xiaomi think that MCCH is not always best.

- Samsung think that gropu paging can only notify for on one service, and think that power consumption may be an issue.

- CMCC think we should first discuss what ID we would use.

* There is Support to have group notification for multicast for MBS supporting nodes (e.g. paging)

Go offline to attempt to progress slightly more (Nokia).

* [AT113bis-e][031][MBS17] MBS session activation (Nokia)

Scope: Based on the agreement, on-line comments and submitted papers, Progress the topic of session activation and group paging/notification to reach agreements if possible, FFS points otherwise. Can also collect comments on notification for non-supporting nodes.

 Intended outcome: Report, Agreements

 Deadline: Report/Agreements Friday April 16

In addition to above paper following papers were provided to the meeting on this topic:

[R2-2103905](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_113bis-e/Docs/R2-2103905.zip) Discussion on group notification for multicast session activation Huawei, HiSilicon discussion Rel-17 NR\_MBS-Core

[R2-2103728](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_113bis-e/Docs/R2-2103728.zip) Discussion on SA2 Reply LS on 5G MBS CMCC discussion Rel-17 NR\_MBS-Core

[R2-2103179](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_113bis-e/Docs/R2-2103179.zip) NR Multicast group paging aspects Qualcomm Inc discussion Rel-17 NR\_MBS-Core

[R2-2103118](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_113bis-e/Docs/R2-2103118.zip) Considerations on the SA2 questions about session activation vivo discussion

[R2-2103729](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_113bis-e/Docs/R2-2103729.zip) Draft reply LS on Group Paging CMCC LS out Rel-17 NR\_MBS-Core To:SA2 Cc:RAN3

[R2-2103906](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_113bis-e/Docs/R2-2103906.zip) Reply LS on 5MBS progress and issues to address Huawei, HiSilicon LS out Rel-17 NR\_MBS-Core To:SA2, RAN3

Additionally on supporting notification for non-MBS node was treated in this paper:

[R2-2103776](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_113bis-e/Docs/R2-2103776.zip) Open issues for UEs in idle or inactive mode Ericsson discussion Rel-17 NR\_MBS-Core

# 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 |
| Nokia (Rapporteur) | Jarkko Koskela | Jarkko.t.koskela@nokia.com |
| Huawei | Dawid Koziol | dawid.koziol@huawei.com |
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# 3 Group Session Activation

So in the online session RAN2 agreed

* There is Support to have group notification for multicast for MBS supporting nodes (e.g. paging)

As this is not firm agreement yet we would need to first consider can we agree to support some sort of group notification for multicast for MBS supporting nodes. Independently to which channel (e.g. MCCH or PCCH) is used for group notification we could consider what are benefits compared to unicast paging.

In general alternative to support group notification one could use regular unicast paging i.e. NW would need to include UEs sharing same paging occasion a different *pagingRecords* thus causing size increase of paging message. Possible even that one cannot accommodate all the required paging records in a message which can add also latency as pagings need to be distributed in time.

**Observation 1:** Using unicast paging would increase the overhead on PCCH (need to include multiple paging records in single paging message to signal paging to all UEs)

**Question 3.1**: Do you agree with above observation 1 and do you consider that we need some type fo group notification mechanism?

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| Answers to Question 3.1 |
| Company | Yes/No | Technical Arguments |
| Nokia | Yes |  Capacity of PCCH and, if UEs ought to connect to the network, also PRACH would be issue with unicast paging which may result in longer latency with which a notification is delivered to UEs.  |
| Huawei, HiSilicon | Yes | Group notification can improve signalling efficiency, especially that a very large number of UEs can be Paged at the same time in an area where the service is provided. |
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For unicast paging minimum paging DRX currently is 320ms (*defaultPagingCycle* = 32rf). Thus the delay for providing unicast paging can be up to 320ms even with shortest paging drx cycle.

**Question 3.2**: Should the notification for multicast services have shorter latency than it is possible with regular unicast paging?

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| Answers to Question 3.2 |
| Company | Yes/No | Technical Arguments |
| Nokia | No | Some services could require much shorted delays but alternatively for services requiring very short delays it could be possible to keep UEs in RRC\_CONNECTED state as the network would need to do if the services are provided using unicast. Probably one would need to consider why would one require shorter delay for multicast session notification than for unicast session.Thus we do not see strong need to go for much shorter session notification period than for unicast services.  |
| Huawei, HiSilicon | No | We agree with the comments from Nokia, i.e. DRX cycle lengths already supported for unciast are sufficient as multicast services do not have higher requirements in this respect than unicast services. |
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**Question 3.3**: Do you see any other possible issues with using unicast paging for multicast session indications?

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| Answers to Question 3.3 |
| Company | Yes/No | Technical Arguments |
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*PROPOSAL TO BE ADDED Based on Q1/Q2/Q3 responses if we can live with unicast paging. Following questions are more valid if RAN2 sees need for group notification mechanism*

From UE point of view it would be desirable to have paging occasions simultaneously with unicast paging but naturally this does not work with group notification as there is no way to ensure that all the UEs listening to same group notification occasions would be also listening at the same time to unicast paging.

**Observation 2:** Group paging mechanism cannot be ensured to have same paging occasions as unicast paging.

Additionally if one tries to have group notification occasions collocated with unicast paging occasions there would be need to accommodate both regular unicast paging and group notification in the same occasion. This may have some impact what is capacity available for unicast paging and/or group notification.

**Question 3.4**: Should a special effort be taken in the design of group notification mechanism so that simultaneous group notification and unicast paging could be avoided?

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| Answers to Question 3.4 |
| Company | Yes/No | Technical Arguments |
| Nokia | Maybe | It seems unlikely that there would be need to page many multicast session activation in same occasions thus e.g. if one uses paging approach for group notification one would need only to add a paging record to paging message. But of course if there is desire in the group to avoid simultaneous occasions this would be OK for us. This could be achieved e.g. with new channel (e.g. MCCH / another PCCH) or modified paging formula |
| Huawei, HiSilicon | No | Contrary, we think that collocating unicast paging with multicast paging is beneficial for UE power consumption. However, there is no additional effort needed to align the paging occasions, i.e. the network may reuse UE’s unicast Paging Occasions. If different UEs that need to receive multicast paging are monitoring different POs, then multicast paging should be included in each of them. This still decreases signalling overhead with a very small specifications impact compared to other group paging schemes and without a negative impact on UE’s power consumption. |
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Generally in this email we are considering how to notify group of UEs about multicast session activation in IDLE/INACTIVE states. But it would impact RAN2 discussion whether one expects a UE to monitor group notification channel (e.g. PCCH/MCCH) in RRC\_CONNECTED state e.g. should CONNECTED mode UE to check regularly to group notification channel about multicast session indications or is it signalled in dedicated signaling to the UE or by other means.

**Question 3.5**: Is UE expected to monitor Group notification channel in RRC\_CONNECTED?

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| Answers to Question 3.5 |
| Company | Yes/No | Technical Arguments |
| Nokia | No | We see no need for UE to monitor another channel for multicast session indications in RRC\_CONNECTED but, if the UE configuration needs changes depending on the UEs configuration at the time of multicast session activation, NW could signal it in dedicated signaling e.g. RRC reconfiguration or PTM leg activation as NW is aware which UE is registered to which MBS session.  |
| Huawei, HiSilicon | No | We already made the following agreement during the previous meeting:**If the UE which joined the multicast session is in RR CONNECTED state when the session is started, the gNB sends RRC Reconfiguration message with relevant MBS configuration to the UE and there is no need for separate session start notification for this UE. FFS for session activation.**Now that it is clear that only session activation is applicable to multicast, we think this agreement should be applied to session activation, not session start (which is only for broadcast session). |
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In [R2-2103278](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_113bis-e/Docs/R2-2103278.zip) it was noted that with group notication it could be that many UEs would start PRACH procedure simultaneously.

**Question 3.6**: Are you concerned about possible PRACH capacity due to group notification?

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| Answers to Question 3.6 |
| Company | Yes/No | Technical Arguments |
| Nokia | Yes | The PRACH resources configured in SIB1 are configured for a typical unicast load in a cell when PRACH transmissions are distributed over time evenly. If there are too few PRACH resources, then random-access procedures are likely to fail due to collisions. We think RAN2 should study if possible issue with PRACH capacity needs to be solved.  |
| Huawei, HiSilicon | No | It depends on the detailed notification mechanism. In case UE’s unicast POs are reused as we described above in Q3.4, then the notification for different UEs would already be distributed over time and RACH impact could be avoided. |
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And if you have any other aspects you would like to be discussed regarding group notification principles

**Question 3.7**: Please list here any other aspects you think are important to solve to make group notification design efficient

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| Answers to Question 3.7 |
| Company | Topic | Details of the topic |
| Huawei, HiSilicon | Group ID in the paging message | RAN2 should confirm that the group identifier in the group paging message is MBS session ID as agreed by SA2, at least for the MBS supporting node. |
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# 4 Support for non-MBS node

In few papers e.g. [R2-2103179](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_113bis-e/Docs/R2-2103179.zip), [R2-2103278](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_113bis-e/Docs/R2-2103278.zip) and [R2-2103118](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_113bis-e/Docs/R2-2103118.zip) it was noted that paging with MBS session ID in non-MBS supporting node would cause quite a bit of changes to such a node.

In [R2-2103776](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_113bis-e/Docs/R2-2103776.zip) a it was proposed to use 5G-S-TMSI instead of MBS session ID. In this solution a 5G S-TMSI is assigned to the UE by upper layers when the UE joins the multicast group. This would be different 5G-S-TMSI opposed to one used for unicast paging.

When the UE is in Idle or Inactive mode, the UE will monitor the group 5G S-TMSI for session activation as well as unicast paging

When the non-supporting gNB receives a Paging message from the CN including a group 5G S-TMSI, the gNB handles the Paging as with any other 5G S-TMSI, i.e. this solution is transparent to the gNB.

**Question 4.1:** Should it be possible to support group notification in non MBS node by paging UEs with 5G-S-TMSI that is different from unicast 5G-S-TMSI?

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| Answers to Question 3.6 |
| Company | Yes/No | Technical Arguments |
| Nokia | No | SA2 already indicated paging is performed with MBS session ID/TMGI. In non supporting node to avoid changes to the node we cannot add new identity to the paging message. Therefore, there must be a mapping between 5G-S-TMSI and MBS session ID/TMGI. Additionally if we considering mapping of TMGI to 5G-S-TMSI it does not seem to have sufficient amount of space to do it without reserving some space from AMF Set ID and AMF Pointer. In 5G-TMSI (the part of 5G-S-TMSI that is allocatable) we have 32 bits but TMGI is 44 bits. As said SA2 has not agreed to use 5G-S-TMSI for paging and we should not open this discussion in RAN2. Also if we have group notification mechanism in the non supporting node it would need to to assign extra capacity for the PRACH to take into account group of UEs accessing system simultaneously. |
| Huawei, HiSilicon | Can be 2nd priority | We think the support of group notification for non MBS node can be the 2nd priority and we can first focus on MBS nodes. In the non-MBS node, the MBS traffic needs to be delivered in the unicast manner, so it may not be so necessary to enhance paging channel only. |
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# 5 Conclusion

**TO BE UPDATED**