**3GPP T****SG-RAN WG2 Meeting #115-e R2-210xxxx**

**E-meeting, 9th – 27th August 2021**

**Agenda item:**8.1.3.3

**Source:** Huawei, HiSilicon

**Title:** Report of offline: [AT115-e][049][MBS] L3 Other (Huawei)

**Document for:** Discussion and Decision

# 1 Introduction

In [19], the following contributions submitted to AI 8.1.3.3 (miscellaneous L3 centric aspects of MBS) for RAN2#115-e were summarized:

1. R2-2107014, Discussion on beam sweeping transmission for delivery mode 2, OPPO
2. R2-2107038, Discussion on MCCH Contents and General RRC Aspects, CATT, CBN
3. R2-2107052, MCCH Configuration, MediaTek Inc.
4. R2-2107236, MCCH Contents and RRC Aspects for MBS, Samsung
5. R2-2107341, MCCH contents for NR MBS, ZTE, Sanechips
6. R2-2107366, RRC issues of multicast session, Spreadtrum Communications
7. R2-2107529, Configurations for MRB and scheduling via MCCH in DM2, Futurewei
8. R2-2107531, Handling MBS during conditional handover, Futurewei
9. R2-2107546, NR MBS control signalling aspects for UEs in different RRC states, Qualcomm Inc
10. R2-2107579, MBS reception in CONNECTED state, Apple
11. R2-2107691, Miscellaneous Aspects of MBS Provisioning, Nokia, Nokia Shanghai Bell
12. R2-2108036, MBS related configuration for delivery mode 2, CHENGDU TD TECH LTD.
13. R2-2108049, MBS BWP UE capability and MBS resources, Sony
14. R2-2108084, Other aspects for MBS, Ericsson
15. R2-2108203, MCCH acquisition in RRC\_CONNECTED state, Huawei, HiSilicon
16. R2-2108456, Details for MCCH design, Intel Corporation

Based on the summary, the following proposals were made in [19]:

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| --- |
| **Proposal 1. RAN2 should discuss whether:**  **• TMGI is sufficient to identify MBS session or session ID parameter is required in addition (LS to SA2 should be considered)**  **• Whether/which SDAP, PDCP, RLC parameters need to be included in broadcast radio bearer configuration**  **Proposal 2. If RAN1 agrees MTCH can be provided within a BWP not overlapping with BWP where MCCH is provided, MCCH configuration via dedicated signalling will be supported.**  **Proposal 3. RAN2 discusses whether area specific MCCH is supported once MCCH contents are clarified.**  **Proposal 4. On-demand MCCH is not supported in Rel-17.**  **Proposal 5. There is a single configuration of modification/repetition period for MCCH.**  **Proposal 6. RAN2 to discuss whether MBS specific Access Categories and/or establishment cause(s) need to be specified.** |

This document aims at gathering companies views on these proposals.

# 2 Discussion

## 2.1 MBS bearer configuration

Contributions [2][3][5][7][12] proposed to add additional information for MRB configuration in the MCCH information, but the opinions on detailed parameters are diverse. For example, in the aspect of SDAP configuration, contribution [2] proposed not to include SDAP configuration in MCCH information, since for MBS (including broadcast session), SDAP layer is not needed at UE side. However, contribution [3][7] proposed to add MBS SDAP configuration in MCCH control information, since in NR the MBS SDAP and PDCP are configured in RAN. Contribution [4] proposed that RLC and PDCP configuration are preferably default due to the MCCH message size issue. There is also other MCCH information discussed in the above contributions, which are summarized as follows

* TMGI is used independently [2] or together with session ID [7] to identify a broadcast session
* Whether to include RB ID [5]
* Whether SDAP/PDCP/RLC configuration is needed in the *brb-list-r17* [3][7][12] or not [2][4]
* Add MBS SPS configuration [3]
* Add CFR related parameters [3]

Based on the above summary, in [19] it was suggested to further discuss two aspects:

* + - 1. **Whether TMGI is sufficient to identify MBS session or session ID parameter is required in addition (LS to SA2 should be considered)**

1. **Whether/which SDAP, PDCP, RLC parameters need to be included in broadcast radio bearer configuration**

With respect to the second issue, the running CR, as endorsed in [20], contains also the following editor’s note:

|  |
| --- |
| -- Editor’s note: FFS which PDCP and RLC parameters are configurable and which are specified in section 9.1.1. |

Based on this, the companies are requested to answer the following questions.

**Question 1: Do you think TMGI is sufficient to identify MBS session or session ID parameter is required in addition to that? Should LS to SA2 be sent on this issue?**

|  |  |
| --- | --- |
| **Company** | **Reply** |
| **MediaTek** | We may send the LS to SA2 check the identification of MBS service |
| Ericsson | 23.247 says:  MBS Session ID may have the following types:  - TMGI (for MBS broadcast and MBS multicast Session);  - source specific IP multicast address (for MBS multicast Session).  That means TMGI is a \*type\* of MBS session ID. It is not possible to have a session ID and a TMGI. For broadcast TMGI is the only type of MBS Session ID also. We can ask SA2 for clarification. |
| CATT | Agree with Ericsson. TMGI is used independently to identify a MBS session, according to SA2 spec. LS to SA2 for clarification is fine. |
| Kyocera | We assume TMGI is sufficient from RAN point of view but think an LS can be sent to SA2 for their confirmation. |
| Qualcomm | For RAN, MBS session can be identified by TMGI within a given PLMN. For NPN, TMGI + NID is needed. We can send LS to SA2 if needed for clarification. |
| Futurewei | It could be a working assumption that TMGI is sufficient in NR. It is prudent to send a LS to SA2 to confirm. |
| Samsung | Agree with earlier comments and we should send a LS to SA2 for clarification |
| TD Tech, Chengdu TD Tech | From the RAN point of view, it seems the session ID of an MBS session is not needed over Uu to identify the MBS session. But we think the related LS can be sent to SA2 to confirm such understanding. |
| Sony | Agree with above and we should send the LS to SA2 |
| CMCC | Agree with Ericsson. TMGI is used for MBs session identification as specified in SA2 spec. |
| Lenovo, Motorola Mobility | Agree with Ericsson. We can send LS to SA2 for clarification. |
| Apple | We should send LS to SA2 for clarification. |

When it comes to SDAP, it was agreed that no SDAP header is needed for MBS. Current running RRC CR in [20] assumes that no SDAP configuration is provided to the UE for neither broadcast nor multicast MRBs.

**Question 2: Do you agree that SDAP configuration is not needed at the UE for neither broadcast nor multicast? If not, then which parameters do you think are needed and why?**

|  |  |  |
| --- | --- | --- |
| **Company** | **Yes/no** | **Comments** |
| **MediaTek** | **Yes** |  |
| Ericsson | Yes | There is no need for SDAP configuration. |
| CATT | Yes | For MBS,There is no any SDAP function involved at UE side. |
| Kyocera | Yes | However, we think MBS session ID (e.g., TMGI) is needed to be configured (instead of *pdu-Session* in S*DAP-Config*), which is already captured in the endorsed RRC running CR. |
| Qualcomm | Yes |  |
| Futurewei | Yes | Agreed with above observation. |
| Samsung | Yes |  |
| TD Tech, Chengdu TD Tech | Yes but see our comments | If different QOS flows of an MBS session are mapped onto different RBs, no SDAP configuration needs to be sent to UE for the MBS session reception.  But if another mapping of the QOS flows is taken, whether or not the SDAP configuration is needed shall be studied. |
| Sony | Yes |  |
| CMCC | Yes |  |
| Lenovo, Motorola Mobility | Yes |  |
| Apple | Yes |  |

PDCP and RLC configuration for multicast is believed to follow the PDCP configuration for a DRB mostly. In the following question, it is proposed to focus on the required PDCP/RLC configuration for broadcast only. With that respect, in addition to deciding which parameters are needed, RAN2 needs to agree which of the parameters are configurable via MCCH and which parameters can use pre-defined values. In the below table the rapporteur gathered the parameters which seem relevant for broadcast MRB configuration. For each parameter, companies are requested to indicate whether they think the parameter should be configurable or pre-defined.

**Question 3: Companies are requested to provide their views by filling in the table below.**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | RLC | | PDCP | | | Any missing parameters? |
| Sn-FieldLength | t-Reassembly | pdcp-SN-SizeDL | headerCompression | t-Reordering |
| Company1 (example) | Predefined | Configurable | Configurable | Predefined | Configurable | No |
| MediaTek | Configurable | Configurable | Configurable | Configurable | Configurable |  |
| Ericsson | - | - | - | - | - | We can wait with this. |
| CATT | Predefined or cofigurable | Predefined or cofigurable | - | No need | No need | No |
| Kyocera | Configurable | Configurable | Configurable | Configurable | Configurable |  |
| Qualcomm | Configurable | Configurable | Configurable | Configurable | Configurable | We can wait. |
| Futurewei | Predefined | Not needed or left to UE implementation | Predefined | Configurable | No need |  |
| Samsung | Predefined | Predefined | Predefined | Predefined | Predefined | Broadcast should be in best-effort manner for Rel-17. Service differentiation by different configuration should be minimized. Also, we are considering predefined PDCP/RLC parameters to support MCCH message size constraints for NR MBS. |
| TD Tech, Chengdu TD Tech | Configurable or predefined | Configurable or predefined | Configurable or predefined | Configurable or predefined | Configurable or predefined | Other parameters: discuss later, for example the security related parameters |
| Sony | Predefined | Predefined | Predefined | Predefined | Predefined | We are ok to start with this list and preconfigured. |
| CMCC | Configurable | Configurable | - | - | - |  |
| Lenovo, Motorola Mobility | - | - | - | - | - | No strong view, we can probably wait |
| Apple | Configurable | Configurable | Configurable | No need | Configurable |  |

## 2.2 Dedicated signalling for MCCH configuration

As discussed in the email discussion “[AT114-e][039][MBS] MCCH and MCCH change notification”, UE might be configured with a dedicated BWP not overlapping with MCCH while the UE is in RRC CONNECTED state. Since there was no agreement on this issue achieved in the email discussion, there was the following decision in RAN2#114-e meeting: “Postpone the discussion on whether dedicated MCCH configuration is required until RAN1 makes progress on BWP/CFR for MCCH.”

As agreed in RAN1#105-e meeting, for broadcast reception, RRC\_IDLE/RRC\_INACTIVE UEs can use a configured/defined CFR with the same size as the initial BWP, where the initial BWP has the same frequency resources as CORESET0 (i.e., Case A), to receive GC-PDCCH/PDSCH carrying MCCH.

Contribution [15][16] have made proposals on the dedicated signalling for MCCH configuration. In contribution [16], it is assumed that there is no motivation to configure a UE receiving MBS a dedicated BWP not overlapping with MCCH as currently RAN1 assumes that both MCCH and MTCH are in the initial BWP. However, in contribution [15], the authors think the situation with the MCCH is equivalent to SIB/Paging reception in RRC\_CONNECTED state where the network can either configure the UE with a common search space to monitor SI/Paging on the dedicated BWP or provide system information through dedicated signalling using the RRCReconfiguration message. Furthermore, [15] indicates that having a possibility to provide MCCH in dedicated signalling is useful for service continuity during handover.

Based on the summary above, the rapporteur concluded in [19] that the usefulness of introducing MCCH provisioning with dedicated signalling depends on whether MCCH can be provided in a BWP different than MTCH, and proposed that: “If RAN1 agrees MTCH can be provided within a BWP not overlapping with BWP where MCCH is provided, MCCH configuration via dedicated signalling will be supported”.

**Question 4: Do you agree that it should be possible to provide MCCH configuration via dedicated signalling, under the condition that RAN1 agrees MTCH can be provided within a BWP not overlapping with BWP where MCCH is provided.**

|  |  |  |
| --- | --- | --- |
| **Company** | **Yes/no** | **Reasoning / comments** |
| **MediaTek** | **Yes** | This may help to avoid BWP switch for the UE to acquire MCCH configuration in such case |
| Ericsson | Yes |  |
| CATT | NA | It seems no necessary to agree something more on this for now. We can just keep the previous agreement “Postpone the discussion on whether dedicated MCCH configuration is required until RAN1 makes progress on BWP/CFR for MCCH.”,  We do not see RAN1 is motivated to use different BWP for MTCH and for MCCH, even though it has not been excluded. |
| Kyocera | Yes | We assume the MCCH configuration via dedicated signalling can allow the flexibility for the network and the better service continuity for the UE. |
| Qualcomm | Yes |  |
| Futurewei | Yes | It allows more BWP configuration flexibility for connected Ues under DM2. Subject to RAN1 final decision. |
| Samsung | - | We need not agree anything on this now. Agree with CATT and we can keep earlier agreement “Postpone the discussion on whether dedicated MCCH configuration is required until RAN1 makes progress on BWP/CFR for MCCH.” |
| TD Tech, Chengdu TD Tech | FFS | The scenario where MTCH is provided on a CFR not overlapped with the CFR for MCCH needs to be discussed. If the scenario can be confirmed by the majority companies, the further discussion can be made. |
| Sony | - | We agree with CATT and wait for the progress from RAN1 |
| CMCC | Yes | We think it’s ok to use dedicated signalling, and we can wait for RAN1’s progress. |
| Lenovo, Motorola Mobility | Yes |  |
| Apple | - | Agree with CATT that we should wait for RAN1 discussion. |

## 2.3 Area specific MCCH

As discussed in previous meetings, one issue is whether MCCH can be area specific, similar to area specific SIB introduced in Rel-15. Contributions [2][9][16] have provided proposals on the area specific MCCH. Specifically, contribution [2] proposed to support the area specific PTM configuration (e.g. in MCCH), considering the use of area specific PTM configuration can help to ensure better service continuity during mobility. However, contribution [16] proposed to not consider area specific MCCH, since there is increased overhead, unclear benefit, and potential issues, e.g. having to update MBS SIB frequently due MCCH version change or limiting how fast MCCH contents can be changed. On the other hand, in contribution [9] both area specific and cell specific NR MCCH configuration is supported as configuration choice. The benefits that are mentioned include signalling overhead reduction and UE power consumption gains.

In [19] it was proposed to wait with the decision on whether area-specific MCCH is supported until the MCCH contents are clarified. However, the companies are invited to express their views by answering the below question and in case their view depends on the exact contents of MCCH, this can be clarified in the answer.

**Question 5: Do you think area specific MCCH is required and why/why not?**

|  |  |  |
| --- | --- | --- |
| **Company** | **Yes/no** | **Reasoning / comments** |
| **MediaTek** | **No** | We assume the information carried by MCCH should be cell specific. For example if neighbour cell information is agreed for MCCH, neighbour cell information for MBS should be different for different cell |
| Ericsson | No | Strictly speaking, it is not *required*. However, it could be a useful optimization if time permits. |
| CATT | Yes | 1. It helpful for a better service continuity during mobility, i.e latency can be reduced.  2. It allows the flexibility of deployment, area specific PTM configuration can be supported. whether to use it is up to deployment. |
| Kyocera | Yes | We think it could be configuration choice whether the area specific or cell specific MCCH, depending on MBS services to be provided in an area. For same MBS service(s), we assume the MTCH information may be the same in an area. If it’s the case, we assume the area-specific MCCH can be helpful for the service continuity from the UE point of view. |
| Qualcomm | Yes | With area specific, every time UE moves from one cell to another cell, as long as UE is within MCCH Area there is no need for UE to acquire MCCH. MCCH Area can be same as SIB Area or Group of cell or TA level etc. It is optional for NW whether to configure as Area based or Cell level. |
| Futurewei |  | No strong opinion. Per cell configuration should be the baseline. Consider area specific is a non-essential optimization. |
| Samsung | No | In general MBS services support, scheduling and other MCCH contents (e.g. neighbour cell information) can differ across cells. |
| TD Tech, Chengdu TD Tech | May be | If the same MBS sessions are provided with delivery mode 2 in a group of cells, the area specific MCCH may exist.  Otherwise, it’s hard to have an area specific MCCH. But the MCCH specific SIB can be area specific which means the same MCCH configuration information is applied in each cell within the cell group. |
| Sony | Yes | It should be network decision to configure either cell specific or area specific MCCH. Area specific MCCH could be like the SIB area and has the benefit of UE power saving. |
| CMCC | Yes | Area specific MCCH may help for UE service continuity during mobility, with which UE may not need to acquire MCCH unless it moves out of the MCCH area, and the latency may be reduced. |
| Lenovo, Motorola Mobility | No | We agreed to support single MCCH in this release. Thus, information of different broadcast services will be contained in the same MCCH message. It’s not likely that the same MCCH content related to many broadcast services will be the same in a large area. |
| Apple | No | Cell specific MCCH configuration can be the baseline and supported in this release. |

## 2.4 On demand MCCH

Contributions [2][9][16] discuss whether to support on-demand MCCH. Contribution [9] think on-demand MCCH is important to reduce network overhead, and it can be network configuration choice to transmit MCCH either by using broadcast mode or on demand. However, contribution [2] indicates the overhead savings will be limited compared to UP resource consumption while there are disadvantages in terms of extra latency for service setup time, extra interruption during cell reselection, extra interaction with network for broadcast session. [16] also proposes not to support on-demand MCCH due to similar reasons.

In [19], the rapporteur proposed not to support on-demand MCCH due to numerous issues that were identified, i.e. latency for service setup time, extra service interruption and network interaction. The companies are invited to express their on the need to have on-demand MCCH by replying to the below question.

**Question 6: Do you think on-demand MCCH is required and why/why not?**

|  |  |  |
| --- | --- | --- |
| **Company** | **Yes/no** | **Reasoning / comments** |
| **MediaTek** | **No** | If MCCH is on-demand, it will put unnecessary restriction for the idle/inactive mode UEs, since they are required to access the network before its reception of broadcast services. |
| Ericsson | No | Agree with Mediatek |
| CATT | No | A cell in the broadcast service area will transmit the MBS user data anyway. So it does not make much sense to reduce the CP resource consumption when the UP radio resource is using.  And the disadvantages of on demand MCCH is obvious, like introducing extra latency for service setup time, extra interruption during cell reselection, extra interaction with network for broadcast session. |
| Kyocera | Yes | We think it’s up to network implementation whether MCCH is provided periodically or on-demand. We see the issues summarized by the rapporteur, while we assume these are mainly related to QoS requirement of MBS services to be provided and/or number of UEs receiving MBS services, e.g., these may not be any issue for a delay-tolerant services. |
| Qualcomm | Yes | Similar to On-demand SIB, it is key to reduce NW overhead as much as possible. Latency and CP resource argumenets are applicable for SIBs as well. Note that all MBS applications are not delay sensitive and different networks may operate different type of applications.  On demand MCCH can be optional and is upto network whether to configure as On demand or not. |
| Futurewei | No | Broadcast is to efficiently deliver same data to multiple UEs including idle/inactive and connected UEs. So should be the MCCH. On demand MCCH is not suitable for idle/inactive UEs. Even for connected UEs is not efficient. In addition, MII also addressed the service demand issue. |
| Samsung | No | We have only single MCCH commonly defined to cater all types of MBS broadcast services (delay-sensitive or delay insensitive), we do not see any advantage with on-demand MCCH. Issues mentioned for extra latency for service setup time, extra interruption during cell reselection, extra interaction with network for broadcast session would be drastic. |
| TD Tech, Chengdu TD Tech |  | No strong view |
| Sony | Yes | Agree with Qualcomm and Kyocera. In addition, we think that network may link MCCH broadcast and on-demand MBS SIB providing MCCH config. |
| CMCC | Yes | Share similar view with Qualcomm. |
| Lenovo, Motorola Mobility | No | Agree with MediaTek, and the motivation of letting UE to request MCCH on-demand is not very clear to us.  There might be latency problem too if UE needs to explicitly request first. |
| Apple | No | Agree with MediaTek |

## 2.5 Single MCCH with multiple modification/Repetition eriod

In RAN2#114-e meeting, it was agreed that only a single MCCH is supported in this release and multiple MCCH support was excluded. However, contribution [5] proposes that a single MCCH channel can be configured with multiple modification/repetition. In this approach, the mapping between MBS session and related modification/repetition should be signalled in SIB. According to [5], this can help in reducing the overhead and UE power consumption On the hand, contribution [16] proposes not to support such scheme, because of the requirement to signal the mapping between MBS session and related modification/repetition in SIB. According the contribution, this results in large latency for MBS session start and impacts power consumption of Ues not receiving MBS service.

In [19] the rapporteur proposed that single MCCH channel with multiple modification/repetition periods is not supported. Companies are requested to express their view on this aspect.

**Question 7: Do you agree that a single MCCH channel with multiple modification/repetition periods is NOT supported, i.e. there is a single configuration of modification/repetition for MCCH.**

|  |  |  |
| --- | --- | --- |
| **Company** | **Yes/no** | **Reasoning / comments** |
| **MediaTek** | Agree | We think this is an optimization, which is an alternative way of multiple of MCCHs (postponed by RAN2) |
| Ericsson | Agree | We agree with the rapporteur. No support for this. |
| CATT | Agree | It is just another form of multiple MCCHs and multiple MCCHs is not supported in Rel-17. |
| Kyocera | Yes | In our understanding, this scheme may change the MCCH content depending on when it’s transmitted, i.e., associated with modification/repetition periods. If so, it could be seen as the multiple MCCH scheme, which RAN2 already agreed not to introduce in this release. |
| Qualcomm | Yes |  |
| Futurewei | Yes |  |
| Samsung | Yes |  |
| TD Tech, Chengdu TD Tech | Low priority and left for the later discussion | We support a single MCCH with several modification/repetition periods. But we think this method has low priority and can be left for the later discussion if there’s time to do so. |
| Sony | Yes |  |
| CMCC | Yes |  |
| Lenovo, Motorola Mobility | Agree |  |
| Apple | Yes |  |







# 3 Summary

TBD

# References

1. R2-2107014, Discussion on beam sweeping transmission for delivery mode 2, OPPO
2. R2-2107038, Discussion on MCCH Contents and General RRC Aspects, CATT, CBN
3. R2-2107052, MCCH Configuration, MediaTek Inc.
4. R2-2107236, MCCH Contents and RRC Aspects for MBS, Samsung
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13. R2-2108049, MBS BWP UE capability and MBS resources, Sony
14. R2-2108084, Other aspects for MBS, Ericsson
15. R2-2108203, MCCH acquisition in RRC\_CONNECTED state, Huawei, HiSilicon
16. R2-2108456, Details for MCCH design, Intel Corporation
17. R2-2108204, Summary of e-mail discussion “[Post114-e][074][MBS] RRC running CR” and RRC open issues list, Huawei, HiSilicon
18. R2-2108799, Summary of [Post114-e][073][MBS] Service continuity for Delivery Mode 2 (Xiaomi), Xiaomi Communications
19. R2-2109035, Pre115-e][004][MBS] Summary 8.1.3.3 L3 Centric Other, Huawei, HiSilicon
20. [R2-2108205](file:///D:\Documents\3GPP\tsg_ran\WG2\TSGR2_115-e\Docs\R2-2108205.zip), 38.331 running CR for NR MBS Huawei, HiSilicon