**3GPP T****SG-RAN WG2 Meeting #115-e DRAFT\_R2-2109104**

**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. Single MCCH channel with multiple modification/repetition periods is not supported, i.e. there is a single configuration of modification/repetition 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:

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| -- 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?**

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| **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. |
| OPPO | Agree to send the LS to SA2 for clarification. |
| Xiaomi | Agee with others that we should send an LS to SA2. |
| Spreadtrum | TMGI is sufficient to identify MBS session. Sending LS to SA2 is fine for clarification, if needed. |
| Sharp | We assume TMGI is sufficient to identify MBS session but fine to send the LS to SA2 to confirm. |
| ZTE | TMGI shall be sufficient at least for Broadcast. For multicast, an LS is good. |
| **TCL** | Agree on TMGI and consult SA2 regarding session ID need |
| Huawei, HiSilicon | We think it is safest to consult SA2 about this. |
| LGE | The TMGI is sufficient to identify MBS session, but it is OK to send an LS to SA2 for clarification. |
| Intel | Our view is that TMGI is sufficient from RAN point of view as SA2 TS 23.247 indicates “*For MBS multicast sessions that the UE joined with a source specific IP multicast address, a TMGI is also allocated by 5GC and is sent to the UE and used in other signalling messages between RAN, CN and UE*”. We are also OK to send LS to SA2 for clarification. |
| vivo | It is fine to send LS to SA2 for clarification. |
| Nokia | It is better to send an LS to SA2 to verify if indeed only TMGI is used in NR. |
| Convida | In our view the TMGI is sufficient, but we agree with that it is probably prudent to send an LS to SA2 for clarification. |

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| **Summary of question 1:**  Most companies believe TMGI should be sufficient to identify the MBS session, but everybody agrees to consult with SA2 on whether session ID parameter is needed or not.  **Proposal 1: Send and LS to SA2 to consult on whether TMGI is sufficient for MBS session identification or some additional parameter is required (such as sessionID in LTE).** |

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?**

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| --- | --- | --- |
| **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 |  |
| OPPO | Yes |  |
| Xiaomi | Yes |  |
| Spreadtrum | Yes |  |
| Sharp | Yes |  |
| ZTE | Yes | Agreed with above observation. |
| TCL | Yes |  |
| Huawei, HiSilicon | Yes | Since there is no uplink transmission over MRBs, SDAP configuration is not needed. |
| LGE | Yes |  |
| Intel | Yes |  |
| vivo | Yes |  |
| Nokia | Yes |  |
| Convida | Yes |  |

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| **Summary of question 2:**  All companies agree that SDAP configuration is not needed at the UE for neither broadcast nor multicast.  **Proposal 2: There is no SDAP configuration provided to the UE for neither broadcast nor multicast.** |

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 |  |
| OPPO | - | - | - | - | - | No strong view and we can wait. |
| Xiaomi | Configurable | Configurable | Configurable | Configurable | Configurable |  |
| Spreadtrum | Configurable | Configurable | Configurable | Configurable | Configurable |  |
| Sharp | Configurable | Configurable | Configurable | Configurable | Configurable |  |
| ZTE |  |  |  |  |  | Fine to wait.  Can FFS within L2 centric issues. |
| TCL | - | - | - | - | - | We can wait |
| Huawei, HiSilicon | Configurable  We can leave flexibility to network since support of both ***um-WithLongSN*** and ***um-WithShortSN*** arerequired for the UE | Predefined (0ms)  There is no HARQ feedback and thus no out of sequence reception is expected | Predefined (18 bit)  Support of shorts (12 bit) depends on the report of *shortSN* capability, thus it is safest to always use 18bit SN for PDCP | Configurable | Predefined (0ms)  There is no HARQ feedback and thus no out of sequence reception is expected | No |
| LGE | Pre-defined | Pre-defined | No need | No need | No need | No |
| Intel | - | - | - | - | - | No strong view and we can postpone the discussion. |
| vivo | Configurable or predefined | No need | predefined | No need | No need |  |
| Nokia | Configurable | Configurable | Configurable | Configurable | Configurable | Predefined values could be considered for delivery mode 2 |
| Convida | Configurable | Configurable | Configurable | Configurable | Configurable |  |
| **SUMMARY** | Sn-FieldLength  Configurable: 11  Pre-defined: 4  No strong view/postpone: 8 | t-Reassembly  Configurable: 10  Pre-defined: 6  No strong view/postpone: 7 | pdcp-SN-SizeDL  Configurable: 9  Pre-defined: 6  No strong view/postpone: 9 | headerCompression  Configurable: 10  Pre-defined: 2  No need: 4  No strong view/postpone: 8 | t-Reordering  Configurable: 9  Pre-defined: 7  No strong view/postpone: 8 |  |
| “Configured or pre-defined” is counted as “no strong view”. “Not needed” is counted as “pre-defined”, except for ROHC where it can actually have a different meaning. In case of ROHC configuration, it was a bit unclear whether by “not needed” companies actually thought ROHC should not be used for broadcast, but is rapporteur’s understanding that this has been already agreed and should not be re-discussed unless there are some blocking points.  Since many companies would like to have more time to check this topic, the following is proposed:  **Proposal 3: For broadcast, it is FFS whether sn-FieldLength (for RLC) and pdcp-SN-SizeDL parameters are configurable or predefined in specifications (related UE capabilities should be considered).**  **Proposal 4: For broadcast, it is FFS whether t-Reassembly (in RLC configuration) and t-Reordering (in PDCP configuration) are needed, e.g. considering whether out of sequence reception can happen as there is no HARQ feedback for broadcast.**  For ROHC, based on an understanding that it is supported as per previous agreements and that it can be enabled/disabled by the network per RB, the following is proposed:  **Proposal 5: For broadcast, it is FFS whether ROHC, when enabled by the network, has a predefined configuration or ROHC parameters are configurable by the network.** | | | | | | |

## 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.**

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| **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. |
| OPPO | Yes |  |
| Xiaomi | Yes |  |
| Spreadtrum | - | Share views of CATT that we should wait for RAN1 discussion. |
| Sharp | Yes |  |
| ZTE | Yes but | - it only covers RRC\_CONNECTED UEs.  - this might have impact how UE monitors MCCH change (in various RRC states) |
| TCL | Yes | Wait for RAN1 discussion. |
| Huawei, HiSilicon | Yes | This proposal originates from our Tdoc in [15] and as explained there, the situation 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. |
| LGE | Yes, | but we also think there is no motivation to use different BWP for MTCH and MCCH. |
| Intel | - | Agree with CATT that we can wait for RAN1 conclusion. |
| vivo | Comments | We should wait for more RAN1 input. |
| Nokia | Yes, if RAN1 agrees MCCH can be provided in different BWP than MTCH | We would think that dedicated signalling is needed if RAN1 agrees that MCCH can be provided on different BWP than MTCH. Thus, better to wait for RAN1. |
| Convida | Yes |  |

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| **Summary of question 3:**  It seems to be a common understanding that dedicated signalling of MCCH will be required in case RAN1 agrees MTCH can be provided within a BWP not overlapping with BWP where MCCH is provided. However, many companies indicate RAN2 can wait for further progress in RAN1 on this issue and there is no need to agree anything at this time. Thus, no proposal is made. |

## 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?**

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| --- | --- | --- |
| **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. |
| OPPO | Yes | Reduce the service interruption and data loss during cell reselection. |
| Xiaomi | No in Rel-17 | Considering the very limited time in Rel-17, the are-specific MCCH can be supported in the later release. |
| Spreadtrum | No | Agree with Samsung, MCCH contents should be cell specific. |
| ZTE | No | MCCH is per cell as agreed, therefore no area specific MCCH.  But for per MBS service, the config can be per area to reduce service interruption. |
| TCL | Yes | It has some benefits in terms of service continuity and UE power saving , better to not exclude it in this release but it can be up to NW configuration |
| Huawei, HiSilicon | No | Since MBS in NR is based on SC-PTM, i.e. single cell multicast transmission, it is unlikely that the same PTM configuration can be used in multiple cells. This would require coordination between the nodes, which would require significant additional specification work and would be anyway complex to implement in the real networks. |
| LGE | No | If multiple MCCHs are supported, the area specific MCCH would be beneficial. However, it would be rare that neighbour cell provide the exactly same broadcast sessions with the same configurations. Besides, the latency is not an important consideration in broadcast service continuity, since the broadcast session supports only low QoS. |
| Intel | No | In typical cases, MCCH is cell specific regarding ongoing MBS sessions, therefore it is unlikely that neighboring cells share the same MCCH content. Introduction of area specific MCCH requires that the version of the MCCH (similar to *valueTag*) as well as area ID (similar to *systemInformationAreaID*) are signaled in MBS SIB. The reason not to reuse *systemInformationAreaID* in SIB1 is that the area for SIB and MCCH can be different. Given that version of MCCH is signalled in MBS SIB, the MBS SIB should be updated with the new MCCH version information whenever MCCH content changes. This makes two-step MBS configuration approach not useful at all. In addition, this approach cannot work if MCCH should be changed faster than 640 ms (minimum BCCH modification period).  Given the increased overhead, unclear benefit, and potential issues discussed above, it is proposed to not consider area specific MCCH. |
| vivo | Yes | Area specific MCCH benefits for latency reduction in mobility scenario. |
| Nokia | No | MCCH is likely to provide cell specific information. |
| Convida | Yes | We would prefer not to rule this out. It clearly has some benefits for service continuity. The size of the area is fully under network control and can be as small as a cell. If multiple cells provide an MBS service, and the MCCH configuration in these cells is the same, the network should be allowed to configure an area specific MCCH. |

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| **Summary of question 5:**  Yes (area specific MCCH is needed): 9 companies  No (area specific MCCH is NOT needed): 12 companies  Maybe/no strong view: 2 companies  The views are split with respect to area-specific MCCH and it seems not possible to have an agreement without further discussion. Hence, no proposal is made. |

## 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 |
| OPPO | No |  |
| Xiaomi | No |  |
| Spreadtrum | Yes | We think it is up to gNB implementation. The gNB can set the MCCH broadcast status based on the UE request or some other information (e.g., it can always broadcast MCCH in the busy time while on-demand in the free time) which will decrease the impact to QoS of the first MBS UE entering this cell. |
| Sharp | No | We think the identified issues on UP caused by on-demand MCCH is more serious than the signalling overhead on CP. |
| ZTE | No | Agree with other companies who object this. |
| TCL | No | Agree with MediaTek |
| Huawei, HiSilicon | No | As explained above, this approach introduces several issue. Furthermore, on-demand MCCH can be achieved by implementation when having MBS SIB configured to be on-demand (in this situation, after receiving a request for MBS SIB, the network may also start providing MCCH). |
| LGE |  | Basically, we do not prefer to specify a new UE behaviour, e.g. MCCH request, to support the on-demand MCCH.  If the SIB providing MCCH configuration is always cell-specific SIB, the on-demand MCCH can be achieved by NW implementation without new UE behaviour. Network can transmit the MCCH message only when the SIB providing MCCH configuration is requested by UE.  However, if the SIB providing MCCH configuration can be area specific SIB, UE may not request the SIB after cell reselection, and then the gNB may not transmit the MCCH message. So in this case, the MCCH should be periodically transmitted. |
| Intel | No | Agree with MediaTek. In addition, on-demand MCCH increases latency especially in consideration of service continuity. |
| vivo | No | On-demand MCCH causes latency for service setup time, extra service interruption and network interaction. |
| Nokia | No | Not critical for WI completion to have this. And like MTK indicated this would put unnecessary limitation for IDLE UEs (and makes it more difficult to support standalone MBS cells in future although not part of the WI) |
| Convida | Yes | We agree with Kyocera, Qualcomm and others |

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| **Summary of question 6:**  Yes (on-demand MCCH is required): 6  No (on-demand MCCH is NOT required): 17 (including LGE)  No strong view: 1  There is a clear majority of companies who believes that this mechanisms will cause more issues than benefits, e.g. due to impact to idle/inactive mode UEs, extra latency and service interruption during cell reselection etc. It is also indicated that a similar goal can be achieved by implementation with existing on-demand SIB mechanism. Hence, the following is proposed:  **Proposal 6: On-demand MCCH mechanism is not introduced.** |

## 2.5 Single MCCH with multiple modification/Repetition

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.**

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| **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 |  |
| OPPO | Yes | It is baseline in R17. |
| Xiaomi | Yes |  |
| Spreadtrum | Yes |  |
| Sharp | Yes |  |
| ZTE | No | Thanks to moderator bringing this up to open discussion.  It is a “multiple MCCH scheme” depending how one sees it:  - From UE perspective, it is **only one MCCH** which does not violate our previous agreements that only one MCCH applies.  We appreciate Intel’s analysis in [16] (thanks again) in which it assumes UE has to monitor SIB first to be aware of the mapping between time-divisioned MCCH and MBS services. Based on such “assumption”, there are some negative impacts which we agree.  **However, monitoring SIB is not really needed:**  - UE can just monitor the MCCH repeatedly based on a common modification period, until it gets the interested MBS configuration.  - Afterwards, UE monitors MCCH based on the MBS specific change period.  We are fine to agree with thorough discussion/debating. But simply saying no is not really convincing. |
| TCL | Can be left for later discussion | Same view with Chengdu TD Tech |
| Huawei, HiSilicon | Yes | This approach introduces the same complexities as multiple MCCH, e.g. how different services are mapped to different MCCH periodicities and how the UE is informed of this mapping. Single MCCH with single repetition/modification period is sufficient for broadcast services. |
| LGE | Agree |  |
| Intel | Agree | Agree with the rapporteur. No need to support this. |
| vivo | Yes |  |
| Nokia | Agree (no multiple periods) | It would be way easier to just have multiple MCCH instead of having this kind of handling for “single” MCCH. |
| Convida | See Comments | We do see a benefit of having either multiple MCCH (which we have agreed not to support for R17) or a single MCCH with multiple modification/repetition periods. However, this may be down-prioritized for now. |

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| **Summary of question 7:**  A vast majority of companies (20/24) agree a single MCCH channel with multiple modification/repetition periods is NOT supported, i.e. there is a single configuration of modification/repetition for MCCH. Out of the remaining four companies, two companies indicate that single MCCH with multiple repetition/modification periods is low priority and could only be treated if time allows. Some companies also indicated this is similar to multiple MCCH approach and if this mechanism was to be discussed, it should be done together with multiple MCCH discussion, which was already ruled out for this release. Therefore, it is proposed:  **Proposal 7: A single MCCH channel with multiple modification/repetition periods is not supported, i.e. there is a single configuration of modification/repetition for MCCH (in Rel-17).** |

# 3 Summary

Based on the discussion in section 2, the following is proposed:

**Proposal 1: Send and LS to SA2 to consult on whether TMGI is sufficient for MBS session identification or some additional parameter is required (such as sessionID in LTE).**

**Proposal 2: There is no SDAP configuration provided to the UE for neither broadcast nor multicast.**

**Proposal 3: For broadcast, it is FFS whether sn-FieldLength (for RLC) and pdcp-SN-SizeDL parameters are configurable or predefined in specifications (related UE capabilities should be considered).**

**Proposal 4: For broadcast, it is FFS whether t-Reassembly (in RLC configuration) and t-Reordering (in PDCP configuration) are needed, e.g. considering whether out of sequence reception can happen as there is no HARQ feedback for broadcast.**

**Proposal 5: For broadcast, it is FFS whether ROHC, when enabled by the network, has a predefined configuration or ROHC parameters are configurable by the network.**

**Proposal 6: On-demand MCCH mechanism is not introduced.**

**Proposal 7: A single MCCH channel with multiple modification/repetition periods is not supported, i.e. there is a single configuration of modification/repetition for MCCH (in Rel-17).**

# 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
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
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