**3GPP TSG-RAN WG2 Meeting #118-e R2-220xxxx**

**Online, May 9th – May 20th, 2022**

**Agenda item:** **6.1.3.1**

**Source: CATT**

**Title: Report of [AT118-e][030][MBS] CP other**

**WI code: NR\_MBS-Core**

**Document for:** **Discussion and Decision**

# Introduction

This document aims at gathering and summarizing companies’ views for the following offline discussion:

* [AT118-e][030][MBS] CP other (CATT)

Scope: Treat R2-2204669, R2-2204827, R2-2205749, R2-2204670, R2-2204828, R2-2205249, R2-2205632, R2-2206123, R2-2205626, R2-2206124, R2-2204830, R2-2205627, R2-2204668, R2-2205745

Collect one round of comments, pave the way for on-line agreement (identify agreeable points, discussion points),

Intended outcome: Report

Deadline: For online CB W1 Thursday

# Contact details

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# Discussion

## Group paging Handling

### [C006] Correction to UE Behavior on Group Paging Handling

In R2-2204669, it is proposed to specify that when UE receiving group paging that does not contain CN paging, UE should not forward TMGI to upper layers.

In this case, RRC inactive UE directly triggers RRC resume procedure, and thus from this point of view RRC does not expect any trigger from NAS. In this case if TMGI is forwarded to NAS, unexpected procedure (e.g. NAS requests the lower layer to establish an RRC connection) may be triggered by NAS. It is unnecessary and may conflict with ongoing RRC resume procedure.

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| TDoc | Proposals |
| CATT  R2-2204669 | 5.3.2.3 Reception of the *Paging* *message* by the UE  ……  1> if in RRC\_IDLE, for each *TMGI* included in *pagingGroupList*, if any, included in the *Paging* message:  2> if the UE has joined an MBS session indicated by the *TMGI* included in the *pagingGroupList*:  3> forward the *TMGI* to the upper layers;  1> if in RRC\_INACTIVE and the UE has joined one or more MBS session(s) indicated by the *TMGI* included in the *pagingGroupList:*  2> if none of the *ue-Identity* included in any of the *PagingRecord*, if included in the *Paging* message, matches the UE identity allocated by upper layers:  3> initiate the RRC connection resumption procedure according to 5.3.13 with *resumeCause* set as below:  4> if the UE is configured by upper layers with Access Identity 1:  5> *resumeCause* is set to *mps-PriorityAccess*;  4> else if the UE is configured by upper layers with Access Identity 2:  5> *resumeCause* is set to *mcs-PriorityAccess*;  4> else if the UE is configured by upper layers with one or more Access Identities equal to 11-15:  5> *resumeCause* is set to *highPriorityAccess*;  4> else:  5> *resumeCause* is set to *mt-Access*.  2> else:  3> forward the *TMGI* to the upper layers;  3> perform the actions upon going to RRC\_IDLE as specified in 5.3.11; |

Companies are then requested to answer the following question.

**Question 1: Do you agree the change proposed in R2-2204669?**

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| --- | --- | --- |
| **Company** | **Yes/No** | **Comments / justification** |
| CATT | Yes | According to the spec, RRC inactive UE directly triggers RRC resume procedure if there is only TMGIs in paging message, and thus from this point of view RRC does not expect any trigger from NAS. To avoid unexpected procedure (e.g. NAS requests the lower layer to establish an RRC connection) triggered by NAS, this change makes sense. |
| Lenovo | Yes |  |
| Huawei, HiSilicon | No | This was discussed before and the conclusion was that it makes no harm to provide TMGIs and NAS layer can do whatever it wants with this.  It would be safest to check this with CT1, together with other cases where AS interacts with NAS for MBS. We proposed an LS in R2-2206124. |
| Qualcomm | No | In R17 NAS spec, when TMGI is received from RRC, it may or may not trigger Service Request procedure. We should not assume that NAS always triggering SR procedure. In RRC\_INACTIVE state, NAS knows RRC state of UE and if TMGI is received from NAS then NAS layer may decide to respond to the page based on TMGI or not. |
| Samsung | No | Purpose of forwarding TMGI to upper layers can be multi-fold e.g. NAS gets early informed about session activation, upper layer/service layer/display can get update. There may be no trigger from NAS to AS in response, that is fine. We think sending LS is okay. |
| Nokia | No but first change is OK | From NAS point of view UE is in CM\_CONNECTED state when in RRC\_INACTIVE state. Thus any forwarding of TMGI should not trigger any actions from NAS. Thus we do not really see any issue.  First change “if in RRC\_IDLE” addition seems to be fine though |
| OPPO | Yes | We also think it is different for RRC\_IDLE mode and RRC\_INACTIVE mode UE. |
| MediaTek | Yes | It makes sense not to send TMGI to NAS if UE can trigger RRC resume, otherwise it may lead to misunderstanding to NAS and then trigger SR procedure.  Ok to send a LS to check this behaviour. |
| Spreadtrum | No | The NAS may need to be aware of the TMGI in paging, and maybe we need to check with CT1. |
| Apple | No | Before this clarification/correction, it’s better to check the NAS operation when receiving TMGI in the RRC\_INACTIVE state. |
| TD Tech, Chengdu TD Tech | Yes |  |
| Kyocera | Yes | We share CATT’s view. |
| Xiaomi | No | Agree with Huawei and Qualcomm. |
| LGE | Yes | Though there is no harm in forwarding the TMGI to the upper layer, it would be better to delete the unnecessary behaviour. |
| Ericsson | No | We think that when the UE resumes the UE should not forward a TMGI to NAS. In 24.501 it says ("shall"):  *If TMGI is used as paging identity and the TMGI matches with MBS multicast session which the has UE joined, the UE shall respond to the paging. Otherwise, the UE shall not respond to the paging.*  It is ok to ask CT1.  It seems we read the existing procedure text differently from other companies, i.e. we think that the current says that when the UE in Inactive receives a Paging message with full-iRNTI or a Paging message without full-iRNTI, that the UE initiates the resume procedure. |
| Sharp | Yes |  |
| Futurewei | No | Let’s check CT1 and get their feedback first. |
| ZTE | Yes | also OK to check with CT1. |

### [V500] Clarification on Group Paging for INACTIVE UE

In R2-2204827, it is proposed to clarify that UE in RRC\_INACTIVE only monitor RAN paging using TMGI as CN paging using TMGI is only used to page CM-IDLE UEs.

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| TDoc | Proposals |
| VIVO  R2-2204827 | **Proposal 1: Update the description in TS 38.331 clause 4.2.8 that “If configured by upper layers for MBS multicast reception, monitors Paging channel for paging using TMGI” to “If configured by upper layers for MBS multicast reception, monitors Paging channel for RAN paging using TMGI”.**  Annex: Proposed TP to TS 38.331  4.2.1 UE states and state transitions including inter RAT  A UE is either in RRC\_CONNECTED state or in RRC\_INACTIVE state when an RRC connection has been established. If this is not the case, i.e. no RRC connection is established, the UE is in RRC\_IDLE state. The RRC states can further be characterised as follows:  ……  **- RRC\_INACTIVE**:  - A UE specific DRX may be configured by upper layers or by RRC layer;  - UE controlled mobility based on network configuration;  - The UE stores the UE Inactive AS context;  - A RAN-based notification area is configured by RRC layer;  - Transfer of unicast data and/or signalling to/from UE over radio bearers configured for SDT;  The UE:  - Monitors Short Messages transmitted with P-RNTI over DCI (see clause 6.5);  - During SDT procedure, monitors control channels associated with the shared data channel to determine if data is scheduled for it;  - While SDT procedure is not ongoing, monitors a Paging channel for CN paging using 5G-S-TMSI and RAN paging using fullI-RNTI;  - If configured by upper layers for MBS multicast reception, monitors Paging channel for RAN paging using TMGI; |

Companies are then requested to answer the following question.

**Question 2: Do you agree the change proposed in R2-2204827?**

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| **Company** | **Yes/No** | **Comments / justification** |
| CATT | No | For inactive UE, it is still possible to receive a CN paging using TMGI. |
| Lenovo | No | Both CN paging and RAN paging using TMGI should be supported. We prefer to change it as:  …for both CN and RAN paging using TMG |
| Huawei, HiSilicon | No | Agree with CATT. It is not appropriate to call it RAN paging. |
| Qualcomm | No | Statement in 4.2.1 is generic and is ok. As long as specific subclause clarify what to do, this section can remain generic. That, we don’t think Lenovo’s suggestion is needed either.  Rapporteur had also indicated to reject this RIL and we agree with rapp. |
| Samsung | No | INACTIVE state UE can receive CN paging with TMGI and transits to IDLE state. Based on upper layer initiation, UE can setup a RRC connection and receive multicast service. |
| Nokia | No | Shouldn’t UE be able to receive which ever identity in which ever state?  And terminology RAN paging / CN paging is very confusing. We would need to talk about paging with some specific identity instead e.g. Paging with I-RNTI or paging with S-TMSI etc… |
| OPPO | No |  |
| MediaTek | No |  |
| Spreadtrum | No |  |
| Apple | No | The RRC\_INACTIVE UE is required to monitor both RAN paging and CN paging. |
| TD Tech, Chengdu TD Tech | No |  |
| Kyocera | No | We share CATT’s view. |
| Xiaomi | No |  |
| LGE | No | From UE perspective, whether the paging is RAN paging or CN paging is determined by the UE ID type in Paging. When the TMGI is transmitted without UE ID, the UE cannot determine it, and it cannot be called RAN paging. |
| Ericsson | No | We cannot talk about RAN or CN paging, in case the Paging message only includes a list of TMGIs. |
| Sharp | No |  |
| Futurewei | No |  |
| ZTE | No | OK to make it more general. |

### Multicast session start and Paging

In R2-2205749, it is proposed to change the Need code for pagingGroupList and add field description for serviceID, and it is also proposed that UE should report TMGI to upper layers when the when the multicast MRB is established.

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| TDoc | Proposals |
| Ericsson R2-2205749 | **Proposal 1**: Need code N is used for *pagingGroupList*  **Proposal 2**: The following field description is used for the *serviceID* (similar as in LTE):  ***serviceId***  Uniquely identifies the identity of an MBS service within a PLMN. The field contains octet 3- 5 of the IE Temporary Mobile Group Identity (TMGI) as defined in TS 24.008 [49]. The first octet contains the third octet of the TMGI, the second octet contains the fourth octet of the TMGI and so on.  **Proposal 3**: When the multicast MRB is established the TMGI is reported to the upper layers. |

Companies are then requested to answer the following question.

**Question 3: Do you agree the P1 in R2-2205749?**

***Proposal 1****: Need code N is used for pagingGroupList*

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| **Company** | **Yes/No** | **Comments / justification** |
| CATT | Yes |  |
| Lenovo | Yes |  |
| Huawei, HiSilicon | Yes | This is already captured in the rapporteur CR in R2-2205938. |
| Qualcomm | ok |  |
| Samsung | Yes |  |
| Nokia | Yes |  |
| OPPO | Yes |  |
| MediaTek | Yes |  |
| Spreadtrum | Yes |  |
| Apple | Yes |  |
| TD Tech, Chengdu TD Tech | Yes |  |
| Kyocera | Yes |  |
| Xiaomi | Yes |  |
| LGE | Yes |  |
| Ericsson | Yes (proponent) |  |
| Sharp | Yes |  |
| Futurewei | Yes |  |
| ZTE | Yes |  |

**Question 4: Do you agree the P2 in R2-2205749?**

*Proposal 2: The following field description is used for the serviceID (similar as in LTE):*

***serviceId***

*Uniquely identifies the identity of an MBS service within a PLMN. The field contains octet 3- 5 of the IE Temporary Mobile Group Identity (TMGI) as defined in TS 24.008 [49]. The first octet contains the third octet of the TMGI, the second octet contains the fourth octet of the TMGI and so on.*

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| **Company** | **Yes/No** | **Comments / justification** |
| CATT | Yes |  |
| Lenovo | Yes |  |
| Huawei, HiSilicon | Yes | This is already captured in the rapporteur CR in R2-2205938. |
| Qualcomm | Ok | Minor editorial:  …contains octet 3- 5 of the … -> octet should be octets and extra space after hyphen can be removed in 3- 5. |
| Samsung | Yes |  |
| Nokia | Yes |  |
| OPPO | Yes |  |
| MediaTek | Yes |  |
| Spreadtrum | Yes |  |
| Apple | Yes |  |
| TD Tech, Chengdu TD Tech | Yes |  |
| Kyocera | Yes |  |
| Xiaomi | Yes |  |
| LGE | Yes |  |
| Ericsson | Yes (proponent) |  |
| Sharp | Yes |  |
| Futurewei | Yes |  |
| ZTE | Yes |  |

**Question 5: Do you agree the P3 in R2-2205749?**

*Proposal 3: When the multicast MRB is established the TMGI is reported to the upper layers.*

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| **Company** | **Yes/No** | **Comments / justification** |
| CATT | No | Not necessary. There is no such requirement” for display purposes” from CT1/SA2. |
| Lenovo | Yes |  |
| Huawei, HiSilicon | Yes | But this is already captured in the specifications like this. We can check this with CT1, if needed, as proposed in the draft LS in R2-2206124. |
| Qualcomm | Yes |  |
| Samsung | Yes | Multicast session activation/deactivation is linked with MRB setup/release in CONNECTED state. It is good to check with LS. |
| Nokia | No | We do not see really a motivation for this? Maybe we do not really understand the intention of this proposal though. Why would AS forward this information to upper layers – anyway if needed by NAS they can always use it as this is UE internal business. |
| OPPO | Yes |  |
| MediaTek |  | Ok to check with LS first |
| Spreadtrum | Yes |  |
| Apple |  | We can check with CT1 on the requirement. |
| TD Tech, Chengdu TD Tech | Yes |  |
| Kyocera |  | We’re wondering if P3 is already covered in the specification, since the current TS38.331 (section 5.3.5.6.7) specifies TMGI is indicated to upper layers, although it does not say which upper layer it’s indicated (i.e., to NAS or to other upper layer “for display purposes”). |
| Xiaomi | Yes |  |
| LGE | Yes |  |
| Martin | Yes, but… (proponent) | Apologies, I thought that this use case was missing, but I overlooked something, and HW is correct that it is already captured like that. But there seems to be a general discussion whether TMGI reporting to upper layers is needed when the MRB is setup/released. We think we should keep this, i.e. this is already done in LTE, and in our understanding this information can be used by upper layer, not NAS, but e.g. application for display/notification purposes. This information is not used by NAS, and we should not ask CT1 whether we should keep it. I checked with SA2 and SA6 colleagues, but this information does not seem to be used explicitly in their specifications.  **38.331**  2>  indicate the release of the multicast MRB and the *tmgi* of the released multicast MRB to upper layers.  3>  indicate the establishment of the multicast MRB(s) and the *tmgi* of the established multicast MRB(s) to upper layers;  3>  indicate the release of the user plane resources for the *tmgi* to upper layers after successful reconfiguration with sync;  3>  indicate the release of the user plane resources for the *tmgi* to upper layers immediately.   1. inform upper layers about the establishment of the broadcast MRB by indicating the corresponding *tmgi;*   1>  inform upper layers about the release of the broadcast MRB by indicating the corresponding *tmgi*;  **36.331:** 5.8.3.3 MRB establishment Upon MRB establishment, the UE shall:  …  1> inform upper layers about the establishment of the MRB by indicating the corresponding *tmgi* and *sessionId*; 5.8.3.4 MRB release Upon MRB release, the UE shall:  …  1> inform upper layers about the release of the MRB by indicating the corresponding *tmgi* and *sessionId*; 5.8a.3.3 SC-MRB establishment Upon SC-MRB establishment, the UE shall:  …  1> inform upper layers about the establishment of the SC-MRB by indicating the corresponding *tmgi* and *sessionId*; 5.8a.3.4 SC-MRB release Upon SC-MRB release, the UE shall:  …  1> inform upper layers about the release of the SC-MRB by indicating the corresponding *tmgi* and *sessionId*; |
| Sharp | Yes |  |
| Futurewei | Yes |  |
| ZTE | Yes | slightly prefer to notify upper layer.  also ok to check with CT1 |

## Multicast MRB ID change handling

In RAN2#117e meeting, the following agreement is made,

* **MRB ID can be changed without releasing/adding MRB (delta config)**

The agreement is captured in the 38.331 CR as below. However, it seems that the current procedure does not reflect the agreement correctly.

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| 5.3.5.6.7 Multicast MRB addition/modification  The UE shall:  1> for each *mrb-Identity* value included in the *mrb-ToAddModList* for which *mrb-IdentityNew* is included (multicast MRB ID change):  2> update the *mrb-Identity* to the value *mrb-IdentityNew*;  1> for each *mrb-Identity* value included in the *mrb-ToAddModList* that is not part of the current UE configuration (multicast MRB establishment including the case when full configuration option is used):  2> establish a PDCP entity and configure it in accordance with the received *pdcp-Config*;  ……  <omitted>  1> for each *mrb-Identity* value included in the *mrb-ToAddModList* that is part of the current UE configuration (prior treating this *mrb-ToAddModList)*:  2> if the *reestablishPDCP* is set:  3> if *drb-ContinueROHC* is included in *pdcp-Config*:  4> indicate to lower layer that *drb-ContinueROHC* is configured;  3> if *drb-ContinueEHC-DL* is included in *pdcp-Config*:  4> indicate to lower layer that *drb-ContinueEHC-DL* is configured;  3> re-establish the PDCP entity of this multicast MRB as specified in TS 38.323 [5], clause 5.1.2;  2> else, if the *recoverPDCP* is set:  3> trigger the PDCP entity of this MRB to perform data recovery as specified in TS 38.323 [5];  2> if the *pdcp-Config* is included:  3> reconfigure the PDCP entity in accordance with the received *pdcp-Config*. |

During R17 asn.1 review, [C001] [V503][V504][V508] [H002] are raised on this issue. The below papers are also submitted by companies to address this issue.

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| TDoc | Proposals/TP |
| CATT  R2-2204670 | 5.3.5.6.7 Multicast MRB addition/modification  The UE shall:  1> for each *mrb-Identity* value included in the *mrb-ToAddModList* that is not part of the current UE configuration (multicast MRB establishment including the case when full configuration option is used):  2> establish a PDCP entity and configure it in accordance with the received *pdcp-Config*;  ……  <omitted>  1> for each *mrb-Identity* value included in the *mrb-ToAddModList* that is part of the current UE configuration (prior treating this *mrb-ToAddModList)*:  2> if the *mrb-IdentityNew* is included (multicast MRB ID change):  3> update the MRB Identity in current UE configurationto the value *mrb-IdentityNew*;  2> if the *reestablishPDCP* is set:  3> if *drb-ContinueROHC* is included in *pdcp-Config*:  4> indicate to lower layer that *drb-ContinueROHC* is configured;  3> if *drb-ContinueEHC-DL* is included in *pdcp-Config*:  4> indicate to lower layer that *drb-ContinueEHC-DL* is configured;  3> re-establish the PDCP entity of this multicast MRB as specified in TS 38.323 [5], clause 5.1.2;  2> else, if the *recoverPDCP* is set:  3> trigger the PDCP entity of this MRB to perform data recovery as specified in TS 38.323 [5];  2> if the *pdcp-Config* is included:  3> reconfigure the PDCP entity in accordance with the received *pdcp-Config*. |
| VIVO  R2-2204828 | **Proposal 1: Remove the first bullet 1 in TS 38.331 clause 5.3.5.6.7, and add the operation of updating the mrb-Identity to the value *mrb-IdentityNew* in the loop of “for each *mrb-Identity* value included in the *mrb-ToAddModList* that is part of the current UE configuration”.**  **Proposal 2: Add a note in TS 38.331 clause 5.3.5.6.7 that “UE is not expected to receive the *mrb-ToAddModList* in which an entry carrying *mrb-IdentityNew* is put behind an entry carrying only *mrb-Identity*”.**  5.3.5.6.7 Multicast MRB addition/modification  The UE shall:  1> for each *mrb-Identity* value included in the *mrb-ToAddModList* that is part of the current UE configuration (prior treating this *mrb-ToAddModList)*:  2> update the *mrb-Identity* to the value *mrb-IdentityNew* if included;  2> if the *reestablishPDCP* is set:  3> if *drb-ContinueROHC* is included in *pdcp-Config*:  4> indicate to lower layer that *drb-ContinueROHC* is configured;  3> if *drb-ContinueEHC-DL* is included in *pdcp-Config*:  4> indicate to lower layer that *drb-ContinueEHC-DL* is configured;  3> re-establish the PDCP entity of this multicast MRB as specified in TS 38.323 [5], clause 5.1.2;  2> else, if the *recoverPDCP* is set:  3> trigger the PDCP entity of this MRB to perform data recovery as specified in TS 38.323 [5];  2> if the *pdcp-Config* is included:  3> reconfigure the PDCP entity in accordance with the received *pdcp-Config*.  1> for each *mrb-Identity* value included in the *mrb-ToAddModList* that is not part of the current UE configuration (multicast MRB establishment including the case when full configuration option is used):  2> establish a PDCP entity and configure it in accordance with the received pdcp-Config;  2> if an SDAP entity with the received tmgi does not exist:  3> establish an SDAP entity as specified in TS 37.324 [24] clause 5.1.1;  3> if an SDAP entity with the received *tmgi* did not exist prior to receiving this reconfiguration:  4> indicate the establishment of the user plane resources for the *tmgi* to upper layers;  NOTE 1: When setting the *reestablishPDCP* flag for a radio bearer, the network ensures that the RLC receiver entities do not deliver old PDCP PDUs to the re-established PDCP entity. It does that e.g. by triggering a reconfiguration with sync of the cell group hosting the old RLC entity or by releasing the old RLC entity.  NOTE 2: In this specification, UE configuration refers to the parameters configured by NR RRC unless otherwise stated.  NOTE 3: In this specification, UE is not expected to receive the *mrb-ToAddModList* in which an entry carrying *mrb-IdentityNew* is put behind an entry carrying only *mrb-Identity*. |
| Nokia,Huawei  R2-2205249 | Annex A: TP of modified procedural text for handling each element of mrb add mod list separately  5.3.5.6.7 Multicast MRB addition/modification  The UE shall for each element in the order of entry in the list the *mrb-ToAddModList*:  1> if *mrb-Identity* value included in the *mrb-ToAddModList* that is part of the UE configuration:  2> if *mrb-Identity* value included in the *mrb-ToAddModList* for which *mrb-IdentityNew* is included (multicast MRB ID change):  3> update the *mrb-Identity* to the value *mrb-IdentityNew*;  2> if the *reestablishPDCP* is set:  3> if *drb-ContinueROHC* is included in *pdcp-Config*:  4> indicate to lower layer that *drb-ContinueROHC* is configured;  3> if *drb-ContinueEHC-DL* is included in *pdcp-Config*:  4> indicate to lower layer that *drb-ContinueEHC-DL* is configured;  3> re-establish the PDCP entity of this multicast MRB as specified in TS 38.323 [5], clause 5.1.2;  2> else, if the *recoverPDCP* is set:  3> trigger the PDCP entity of this MRB to perform data recovery as specified in TS 38.323 [5];  2> if the *pdcp-Config* is included:  3> reconfigure the PDCP entity in accordance with the received *pdcp-Config*.  1> else if *mrb-Identity* value included in the *mrb-ToAddModList* that is not part of the UE configuration (multicast MRB establishment including the case when full configuration option is used):  2> establish a PDCP entity and configure it in accordance with the received *pdcp-Config*;  2> if the multicast MRB was configured with the same *tmgi* prior to receiving this reconfiguration message:  3> associate the established multicast MRB with the corresponding *tmgi*;  2> else:  3> indicate the establishment of the multicast MRB(s) and the *tmgi* of the established multicast MRB(s) to upper layers;  2> if an SDAP entity with the received *tmgi* does not exist:  3> establish an SDAP entity as specified in TS 37.324 [24] clause 5.1.1;  NOTE 1: When setting the *reestablishPDCP* flag for a radio bearer, the network ensures that the RLC receiver entities do not deliver old PDCP PDUs to the re-established PDCP entity. It does that e.g. by triggering a reconfiguration with sync of the cell group hosting the old RLC entity or by releasing the old RLC entity.  NOTE 2: In this specification, UE configuration refers to the parameters configured by NR RRC unless otherwise stated.    Annex B: TP for retaining existing style with required modifications  5.3.5.6.7 Multicast MRB addition/modification  The UE shall:  1> for each *mrb-Identity* value included in the *mrb-ToAddModList* for which *mrb-IdentityNew* is included (multicast MRB ID change):  2> update the *mrb-Identity* in the current UE configurationandthe *mrb-Identity* in the *mrb-ToAddModList* to the value *mrb-IdentityNew*;  1> for each *mrb-Identity* value included in the *mrb-ToAddModList* that is part of the current UE configuration:  2> if the *reestablishPDCP* is set:  3> if *drb-ContinueROHC* is included in *pdcp-Config*:  4> indicate to lower layer that *drb-ContinueROHC* is configured;  3> if *drb-ContinueEHC-DL* is included in *pdcp-Config*:  4> indicate to lower layer that *drb-ContinueEHC-DL* is configured;  3> re-establish the PDCP entity of this multicast MRB as specified in TS 38.323 [5], clause 5.1.2;  2> else, if the *recoverPDCP* is set:  3> trigger the PDCP entity of this MRB to perform data recovery as specified in TS 38.323 [5];  2> if the *pdcp-Config* is included:  3> reconfigure the PDCP entity in accordance with the received *pdcp-Config*.  1> for each *mrb-Identity* value included in the *mrb-ToAddModList* that is not part of the current UE configuration (multicast MRB establishment including the case when full configuration option is used):  2> establish a PDCP entity and configure it in accordance with the received *pdcp-Config*;  2> if the multicast MRB was configured with the same *tmgi* prior to receiving this reconfiguration message:  3> associate the established multicast MRB with the corresponding *tmgi*;  2> else:  3> indicate the establishment of the multicast MRB(s) and the *tmgi* of the established multicast MRB(s) to upper layers;  2> if an SDAP entity with the received *tmgi* does not exist:  3> establish an SDAP entity as specified in TS 37.324 [24] clause 5.1.1;  NOTE 1: When setting the *reestablishPDCP* flag for a radio bearer, the network ensures that the RLC receiver entities do not deliver old PDCP PDUs to the re-established PDCP entity. It does that e.g. by triggering a reconfiguration with sync of the cell group hosting the old RLC entity or by releasing the old RLC entity.  NOTE 2: In this specification, UE configuration refers to the parameters configured by NR RRC unless otherwise stated. |
| ZTE  R2-2205632 | 1. **For the deployment scenarios of PDCP SN sync based on SN on NG-U, the MRB ID and PDCP SN length are synced by means of network implementation.** 2. **MRB ID is of the same length of DRB, i.e., no need to extend MRB ID length.** 3. **One multicast MRB is uniquely identified by MRD ID and the MBS session ID (i.e., TMGI).** 4. Do not support the MRB ID modification on the fly, i.e., MRB ID modification without release/add MRB explicitly. |

Companies (CATT,VIVO,Nokia/Huawei) propose different solutions to correctly capture the agreement in the 38.331 spec. On the other hand, it seems that ZTE proposes to override the RAN2 agreement (i.e. MRB ID can be changed without releasing/adding MRB (delta config)).

Therefore, there are following options to address the MRB ID change issue,

Option 1: TP from CATT (as in R2-2204670)

Option 2: TP from VIVO (as in R2-2204828)

Option 3: TP (Annex A) from Noika, Huawei(as in R2-2205249)

Option 4: TP (Annex B) from Noika, Huawei(as in R2-2205249)

Option 5: Do not support the MRB ID modification on the fly (as in R2-2205632),which means to override the previous agreement(i.e. MRB ID can be changed without releasing/adding MRB (delta config)), i.e.

Companies are then requested to answer the following question,

**Question 6: Which option do you prefer to address the MRB ID change issue?**

|  |  |  |
| --- | --- | --- |
| **Company** | **Preferred option**  **(option1,2,3,4,5)** | **Comments / justification** |
| CATT | Option 1 | Option 1 is simplest and can address the MRB ID change issue well. |
| Lenovo | Option 3 | Not sure the note in option 2 is needed. |
| Huawei, HiSilicon | Option 4 (preferred), option 2 or option 3 | Option 1 will still not work in some cases, e.g. if a new MRB is added with an MRB ID which is already used, but will be changed to another one.  Out of options 2-4, we prefer option 4 as it does not require MRBs to be provided in a specific order by the network (as in Option 3) and it does not repeat the specifications text unnecessarily (as Option 2).  Option 5 is against the agreement and it should not be pursued at this stage. |
| Qualcomm | Either Option 2 or option 3 with edits, further checking needed | For Option 1 will not work in case new MRB is added with and already used MRB ID.  For Option 2: NOTE 3 can be moved right after the first new text bullet 2> as that is more relevant there.  Appreciate Nokia’s comprehensive paper, however: Option 3: can be confusing on what the "UE configuration" means -- does this mean before starting to process the list, or at any given instant including already processed entries?  Option 4: does not seem to work, because the first bullet already updates MRB ID, then how/what does UE compare whether the MRB config existed or not? E.g. taking example 1, after this step old 29 would be 30 and old 30 would be 29. Then how to process second step?  Option 5: We disagree to reverting the agreements reached after long discussions. Better to fix the procedural text as needed to achieve the intended behaviour. |
| Samsung | Option 4 | But seems further checking needed |
| Nokia | Option 2,3 or 4 (we are not sure if option 1 works) | Any of the options 2, 3 or 4 is fine for us. |
| OPPO | Option 5 | What is the scenario of changing the MRB ID value? |
| MediaTek | Option1 or 3 |  |
| Spreadtrum | Option 2,3 or 4 |  |
| TD Tech, Chengdu TD Tech | Option 4 |  |
| Kyocera | Option 1 | We have similar view as CATT. |
| Xiaomi | Option 2,3 or 4 |  |
| LGE | Option 2 or Option 4 | We slightly prefer Option 2. |
| Ericsson | Option 2, 3 or 4 | RAN2 should try to correct the procedure and not change agreements, i.e Option 5 is not preferred.  We would still like to review the detailed procedure text for the option selected as it is lifted into the CR. |
| Sharp | Option 2,3 or 4 |  |
| Futurewei | Option 2, 3 or 4 |  |
| ZTE | Option 5 (proponent) | we might have packets in the lower layer yet to be processed at UE side when the MRB ID change is happening. it would force UE to maintain two sets of LCID to RB ID mappings, temporarily but controversial, otherwise this part of data will have to be discarded.  also, we prefer following how we dealt with DRB in unicast, not making exception here and there.  an agreement with unsolved issue deserves a re-consideration, especially when we have a simpler and working solution: leave the MRB ID alignment by network implementation. |

In R2-2204828, it is also proposed that only when UE establishes an SDAP for a TMGI, UE informs the establishment of user plane resources for the TMGI.

|  |  |
| --- | --- |
| TDoc | Proposals/TP |
| VIVO  R2-2204828 | **Proposal 3: Only when UE establishes an SDAP for a TMGI, UE informs the establishment of user plane resources for the TMGI.** Annex: Proposed TP to TS 38.331 ……  5.9.3.3 Broadcast MRB establishment  Upon a broadcast MRB establishment, the UE shall:   1. establish a PDCP entity and an RLC entity in accordance with *MRB-InfoBroadcast* for this broadcast MRB included in the *MBSBroadcastConfiguration* message and the configuration specified in 9.1.1.7; 2. receive DL-SCH on the cell where the *MBSBroadcastConfiguration* message was received for the MBS broadcast service for which the broadcast MRB is established and using *g-RNTI* and *mtch-SchedulingInfo* (if included) in this message for this MBS broadcast service; 3. configure the physical layer in accordance with the *mbs-SessionInfoList*, *searchSpaceMTCH,* *pdsch-ConfigMTCH*, applicable for the broadcast MRB, as included in the *MBSBroadcastConfiguration* message; 4. if an SDAP entity with the received *tmgi* does not exist:   2> establish an SDAP entity as specified in TS 37.324 [24] clause 5.1.1.  2> if an SDAP entity with the received *tmgi* did not exist prior to receiving this reconfiguration:  3> indicate the establishment of the user plane resources for the *tmgi* to upper layers; |

Companies are then requested to answer the following question,

**Question 7: Do you agree P3 and corresponding TP in R2-2204828?**

|  |  |  |
| --- | --- | --- |
| **Company** | **Yes/No** | **Comments / justification** |
| CATT | Yes |  |
| Lenovo | Yes | It depends on whether SDAP entity is needed for multicast session. |
| Huawei, HiSilicon | Perhaps yes | This would be more aligned with the handling for DRBs/PDU sessions. |
| Qualcomm | ok |  |
| Samsung | Yes |  |
| Nokia | Maybe | No strong view from us. This seems to be correct although difficult to see how UE would behave wrongly with old text either. Note that there’s also a discussion on SDAP handling (Q12 of #034). |
| OPPO | Yes |  |
| MediaTek | Yes |  |
| Spreadtrum | Yes |  |
| Apple | Yes |  |
| TD Tech, Chengdu TD Tech | Yes |  |
| Kyocera | No | We think nothing broken with the current specification. Also, we wonder what “this reconfiguration” on the first additional condition 2> means, since section 5.9.3.3 is for Broadcast MRB establishment. In addition, we’re wondering why the SDAP entity is related here, i.e., the sentences in section 5.3.5.6.7 for Multicast MRB addition/modification may be reused. |
| Xiaomi | Yes |  |
| LGE | Yes |  |
| Ericsson | Maybe | It seems a bit like over-specifying |
| Sharp | Yes |  |
| Futurewei | Yes |  |
| ZTE | Yes |  |

## Other topics

### [H091]Corrections for GroupConfig structure

Currently in the *Group-Config* type specified for MBS within *MAC-CellGroupConfig* IE, two different types of identifiers are used to denote the identity of the particular group config. The type of identifier that is used depends on whether G-RNTI or G-CS-RNTI is configured within Group-Config IE (which in turn depends on whether the Group-Config is within *g-RNTI-ConfigToAddModList-r17* or within *g-CS-RNTI-ConfigToAddModList-r17*).

In R2-2206123, company thinks that this results in using a CHOICE structure for choosing the identifier which is then used for managing the lists of G-RNTI and G-CS-RNTI configurations. This is rather an unusual practice and it also is not required to have two different identifiers for these two listst as a single identifier will equally serve the purpose.so it is proposed that:

1. The Group-Config structure is modified so that it relies on a single identifier for list management.
2. Group-Config type is renamed as MBS-RNTI-SpecificConfig to better express its purpose.

The text proposals are as below,

|  |  |
| --- | --- |
| TDoc | Proposals |
| Huawei R2-2206123 | -MAC-CellGroupConfig  The IE *MAC-CellGroupConfig* is used to configure MAC parameters for a cell group, including DRX.  *MAC-CellGroupConfig* information element  -- ASN1START  -- TAG-MAC-CELLGROUPCONFIG-START  MAC-CellGroupConfig ::= SEQUENCE {  drx-Config SetupRelease { DRX-Config } OPTIONAL, -- Need M  schedulingRequestConfig SchedulingRequestConfig OPTIONAL, -- Need M  bsr-Config BSR-Config OPTIONAL, -- Need M  tag-Config TAG-Config OPTIONAL, -- Need M  phr-Config SetupRelease { PHR-Config } OPTIONAL, -- Need M  skipUplinkTxDynamic BOOLEAN,  ...,  [[  csi-Mask BOOLEAN OPTIONAL, -- Need M  dataInactivityTimer SetupRelease { DataInactivityTimer } OPTIONAL -- Cond MCG-Only  ]],  [[  usePreBSR-r16 ENUMERATED {true} OPTIONAL, -- Need R  schedulingRequestID-LBT-SCell-r16 SchedulingRequestId OPTIONAL, -- Need R  lch-BasedPrioritization-r16 ENUMERATED {enabled} OPTIONAL, -- Need R  schedulingRequestID-BFR-SCell-r16 SchedulingRequestId OPTIONAL, -- Need R  drx-ConfigSecondaryGroup-r16 SetupRelease { DRX-ConfigSecondaryGroup } OPTIONAL -- Need M  ]],  [[  enhancedSkipUplinkTxDynamic-r16 ENUMERATED {true} OPTIONAL, -- Need R  enhancedSkipUplinkTxConfigured-r16 ENUMERATED {true} OPTIONAL -- Need R  ]],  [[  intraCG-Prioritization-r17 ENUMERATED {enabled} OPTIONAL, -- Cond LCH-PrioWithReTxTimer  drx-ConfigSL-r17 SetupRelease { DRX-ConfigSL } OPTIONAL, -- Cond Mode1AndDRX-Only  drx-ConfigExt-v1700 SetupRelease { DRX-ConfigExt-v1700 } OPTIONAL, -- Cond DRX  schedulingRequestID-BFR-r17 SchedulingRequestId OPTIONAL, -- Need R  schedulingRequestID-BFR2-r17 SchedulingRequestId OPTIONAL, -- Need R  schedulingRequestConfig-v1700 SchedulingRequestConfig-v1700 OPTIONAL, -- Need M  --Editor’s note: extension done according to A4.3.5    offsetThresholdTA ENUMERATED{ms05, ms1, ms2, ms3, ms4, ms5, ms6 ,ms7, ms8, ms9, ms10, ms11, ms12,  ms13, ms14, ms15} OPTIONAL, -- Need R  --Editor’s note: may need to add here parameter TimingAdvanceSR  g-RNTI-ConfigToAddModList-r17 SEQUENCE (SIZE (1..maxG-RNTI-r17)) OF MBS-RNTI-SpecificConfig-r17 OPTIONAL, -- Need N  g-RNTI-ConfigToReleaseList-r17 SEQUENCE (SIZE (1..maxG-RNTI-r17)) OF MBS-GroupConfigId-r17 OPTIONAL, -- Need N  g-CS-RNTI-ConfigToAddModList-r17 SEQUENCE (SIZE (1..maxG-CS-RNTI-r17)) OF MBS-RNTI-SpecificConfig-r17 OPTIONAL, -- Need N  g-CS-RNTI-ConfigToReleaseList-r17 SEQUENCE (SIZE (1..maxG-CS-RNTI-r17)) OF MBS-GroupConfigId-r17 OPTIONAL, -- Need N  allowCSI-SRS-Tx-MulticastDRX-Active-r17 BOOLEAN  ]]  }  DataInactivityTimer ::= ENUMERATED {s1, s2, s3, s5, s7, s10, s15, s20, s40, s50, s60, s80, s100, s120, s150, s180}  MBS-RNTI-SpecificConfig-r17 ::= SEQUENCE {  mbs-RNTI-SpecificConfigId-r17 MBS-RNTI-SpecificConfigId-r17;  groupCommon-RNTI CHOICE {  g-RNTI RNTI-Value,  g-CS-RNTI RNTI-Value  },  drx-ConfigPTM-r17 SetupRelease { DRX-ConfigPTM-r17 } OPTIONAL, -- Need M  harq-FeedbackEnablerMulticast-r17 ENUMERATED {dci-enabler, enabled} OPTIONAL, -- Need S  harq-FeedbackOptionMulticast-r17 ENUMERATED {ack-nack, nack-only} OPTIONAL, -- CondHARQFeedback  pdsch-AggregationFactorMulticast-r17 ENUMERATED {n2, n4, n8} OPTIONAL -- Cond G-RNTI  }  MBS-RNTI-SpecificConfigId ::= INTEGER (0..maxG-RNTI-1-r17)  -- TAG-MAC-CELLGROUPCONFIG-STOP  -- ASN1STOP  ***mbs-RNTI-SpecificConfigId***  An identifier of the RNTI specific configuration for MBS multicast. |

Companies are then requested to answer the following question,

**Question 8: Do you agree the change proposed in R2-2206123?**

|  |  |  |
| --- | --- | --- |
| **Company** | **Yes/No** | **Comments / justification** |
| CATT | Yes |  |
| Lenovo | Yes |  |
| Huawei, HiSilicon | Yes (proponent) |  |
| Qualcomm | Ok with intent. See comments | Intent of using a single IE for the list elements is ok, but the TP has several issues that needs to be fixed. E.g. what is the need of the following CHOICE?  groupCommon-RNTI CHOICE {  g-RNTI RNTI-Value,  g-CS-RNTI RNTI-Value  },  Where is MBS-GroupConfigId-r17 defined? Etc. |
| Samsung | Yes with correction | Replace *MBS-GroupConfigId-r17* by *MBS-RNTI-SpecificConfigId*  Also note that maxG-CS-RNTI-r17 is 8 and maxG-RNTI-r17 is 16 |
| OPPO | Yes |  |
| MediaTek | Yes | But we should wait for RAN1’s conclusion on the final value of maxG-RNTI-r17/ maxG-CS-RNTI-r17 |
| Spreadtrum | Yes |  |
| Apple | Yes |  |
| TD Tech, Chengdu TD Tech | Yes |  |
| Kyocera | Yes |  |
| Xiaomi | Yes |  |
| Ericsson | Agree with intend, details TBD | Similar comments as QC and SS.  As SS mentions the G-RNTI and G-CS-RNTI have different max value, i.e. replacing *MBS-GroupConfigId-r17* by *MBS-RNTI-SpecificConfigId* does not work? |
| Sharp | Yes |  |
| Futurewei | Yes |  |
| ZTE | OK |  |

### [H001, H005, Z608, C005] Discussion on multicast MRB and DRB in RRC

In R2-2205626, several proposals are proposed on how to treat multicast MRB in

- connection management

- priority of multicast MRB in MII.

|  |  |
| --- | --- |
| TDoc | Proposals |
| ZTE  R2-2205626 | **Observation 1 Based on the resource model defined by SA2, there will always be a DRB if there is MRB configured by network.**  **Proposal 1 The *conditionalReconfiguration* for CHO or CPA is configured regardless of the existence of multicast MRB.**  **Proposal 2 RRC Connection suspension can be issued regardless of the existence of multicast MRB.**  **Proposal 3 The prioritization over unicast bearer applies to multicast MRB too, that is, if indicated by UE, the reception of broadcast services is prioritized compared to unicast bearer and also multicast MRB.** |

For P1 in R2-2205626, regarding the co-existence of CHO and MRB it has been agreed in RAN2#116bis meeting as following,

* RAN2 will not do additional work to support CHO for UEs for which MRB is configured in R17.

In rapporteur’s understanding, whether there are spec impacts is not clear if P1 is agreed.

Companies are then requested to answer the following question,

**Question 9: Do you agree P1 in R2-2205626?**

*Proposal 1 The conditionalReconfiguration for CHO or CPA is configured regardless of the existence of multicast MRB.*

|  |  |  |
| --- | --- | --- |
| **Company** | **Yes/No** | **Comments / justification** |
| CATT | No | RAN2 has agreed that RAN2 will no specify anything to support CHO for UEs for which MRB is configured in R17 |
| Lenovo | Yes | DRB will be always present |
| Huawei, HiSilicon | Yes | Agree with the proposal, but the intention in the Tdoc seemed to be the opposite. In any case, RAN2 agreed not to modify CHO for the sake of MBS, but there is no reason to forbid it artificially. The change is already captured in the rapporteur CR. |
| Qualcomm | Yes | Even if UE is configured with Muticast MRB, NW can still configure CHO, but no specific enhancement needed for Multicast MRB handling during CHO. |
| Samsung | No | There seems no spec impact |
| Nokia | No | Handling of this coordination is up to NW |
| OPPO | No | If CHO is configured with MRB, it means there will be no MRB in the target. But, the service continuity should be ensured also. |
| MediaTek | Probably No |  |
| Spreadtrum | Yes | The CHO can be configured at least for DRB. |
| Apple | Yes |  |
| Kyocera | Maybe yes | We don’t think the current specification prohibits P1, so we think CHO/CPA may be configured as long as any additional specification change is not required. |
| Xiaomi | Yes |  |
| LGE | Yes | Same view as QC. |
| Ericsson | No | The handling of this is as in many similar cases up to the NW to keep track of. |
| Sharp | Yes |  |
| Futurewei | Yes | That RAN2 agreed no additional work to support CHO under MBS in R17 does not mean CHO and MBS cannot co-exist. In certain scenarios an operator may still want to conduct CHO under MBS at the expense of some MBS data loss. Hopefully, the enhancement similar to normal HO can be extended to CHO in future release. |
| ZTE | Yes | As proponent we are here to confirm HW's understanding.  Our intention: only with DRB configured, regardless of the existence of MRB, conditionalReconfiguration for CHO or CPA can be issued. hope it clarifies. |

**Question 10: Do you agree P2 in R2-2205626?**

*Proposal 2 RRC Connection suspension can be issued regardless of the existence of multicast MRB.*

|  |  |  |
| --- | --- | --- |
| **Company** | **Yes/No** | **Comments / justification** |
| CATT | Yes |  |
| Lenovo | Yes | DRB will be always present |
| Huawei, HiSilicon | Yes | Agree with the proposal as such, but the intention in the Tdoc seemed the opposite. In any case, the current specs are OK. |
| Qualcomm | No | We note that Observation 1 in the paper is not correct. There can be MRB without any DRB. Then, if there is configured MRB and UE actively receiving Multicast data, gNB should not release UE into INACTIVE state. |
| Samsung | Yes |  |
| Nokia | No | We don’t see that anything needs to be captured on this one. This can be left up to NW implementation |
| OPPO | Yes |  |
| MediaTek | No | Agree with Qualcomm |
| Spreadtrum | Yes |  |
| Apple | Yes |  |
| TD Tech, Chengdu TD Tech | Yes |  |
| Kyocera | Yes |  |
| Xiaomi | Yes |  |
| LGE | Yes | RAN2 already agreed that the RRC connection can be suspended while the multicast session is suspended. |
| Ericsson | No | Similar to Nokia, we think this is up to NW implementation. |
| Sharp | Yes |  |
| Futurewei | Yes | The principle is fine. |
| ZTE | Yes (proponent) | DRB is always there. We dont think there will be cases where only MRB exists. |

In MBS interest indication message, priority between the reception of all listed MBMS frequencies and the reception of any unicast bearer can be included,according to the RAN2 agreement,

* The UE reports the following MBS interest information (as LTE SC-PTM):

MBS frequency list (20/24)

priority between the reception of all listed MBMS frequencies and the reception of any unicast bearer (23/24)

TMGI list (24/24)

For P3 in R2-2205626,it is proposed to extend the priority to cover multicast MRB too.

**Question 11: Do you agree P3 in R2-2205626?**

*Proposal 3 The prioritization over unicast bearer applies to multicast MRB too, that is, if indicated by UE, the reception of broadcast services is prioritized compared to unicast bearer and also multicast MRB.*

|  |  |  |
| --- | --- | --- |
| **Company** | **Yes/No** | **Comments / justification** |
| CATT | No | UE preference on the priority of multicast reception may be different from unicast, we think it is not suitable to treat multicast reception same as unicast reception. |
| Lenovo | Yes |  |
| Huawei, HiSilicon | Yes | We agree with the proposal and it is already captured like this in the specifications in some places, but this addition is missing from some places so the rapp CR will have to be updated to consider this. |
| Samsung | No | Multicast is targeted for critical/low latency services. UE may have interest in broadcast and express priority over unicast, but it does not mean priority over multicast. |
| Nokia | Yes | Otherwise we see no way for NW to know if UE prefers to receive multicast over broadcast. |
| OPPO | Yes |  |
| MediaTek | Yes |  |
| Spreadtrum | Yes |  |
| Apple | Yes |  |
| TD Tech, Chengdu TD Tech | Yes |  |
| Kyocera | No | We wonder if RAN2 needs further discussion on this issue, e.g., for what use case it’s useful, whether to specify additional priority information between broadcast and multicast, etc. |
| Xiaomi | No strong view |  |
| LGE | Yes | It is already captured in spec:  2> include *mbs-Priority* if the UE prioritises reception of all indicated MBS frequencies above reception of any of the unicast bearers and multicast MRBs; |
| Ericsson | Yes | It is logical to also have this distinction as not only the bearer type but also the service itself may impact the prioritization between BC and Multicast similar to MC vs Unicast |
| Sharp | Yes |  |
| Futruewei | Yes |  |
| ZTE | Yes |  |

### LS to CT1 on AS-NAS layer interactions for MBS

In R2-2206124, it is proposed to send LS to CT1 to confirm whether the AS to NAS layer indications as mentioned below are needed and/or whether there are any other events concerning MBS at AS layer which the NAS layer should be informed about.

|  |  |
| --- | --- |
| TDoc | Proposals |
| Huawei R2-2206124 | RAN2 is currently reviewing the procedures in RAN2 specifications related to MBS and one of the doubts that arose during the process was related to whether some of the information should be passed to NAS layers or not. Currently, according to RAN2 specifications, AS layer will indicate the following events related to MBS session:   1. When the UE receives a Paging message including a TMGI for a multicast MBS sessions which the UE has previously joined, the UE will forward the TMGI to upper layers (for both UE in RRC\_IDLE and RRC\_INACTIVE states). 2. When MRB(s) is/are established for either MBS broadcast or MBS multicast, the UE will notify upper layers about this (and include TMGI to identify the session the notification concerns). 3. When MRB(s) is/are released for either MBS broadcast or MBS multicast, the UE will notify upper layers about this (and include TMGI to identify the session the notification concerns).   RAN2 respectfully asks CT1 to confirm whether the AS to NAS layer indications as mentioned above are needed and/or whether there are any other events concerning MBS at AS layer which the NAS layer should be informed about. |

Companies are then requested to answer the following questions,

**Question 12: Do you agree to send LS to CT1 to confirm the AS-NAS layer interactions for MBS?**

|  |  |  |
| --- | --- | --- |
| **Company** | **Yes/No** | **Comments / justification** |
| CATT | Yes | It is beneficial to confirm with CT1 |
| Lenovo |  | We are fine for sending a LS to CT1.  MRB v.s. MBS session needs to be clarified, e.g. the first MRB of a MBS session is established, the AS will notify the upper layer with TMGI. It also depends on the discussion with SDAP issue. |
| Huawei, HiSilicon | Yes (proponent) | It would be good to clarify with CT1 if there are doubts. Also OK to include the question suggested by Lenovo. |
| Qualcomm |  | We thought it was clear in RAN2, but ok to confirm with CT1 if majority prefers. |
| Samsung | Yes | Ok to check with a LS |
| Nokia | No | We see no need. There is no limit of handling any information from AS in NAS regardless if it is forwarded in procedural text. |
| OPPO | Yes |  |
| MediaTek | Yes | Fine to check with CT1 |
| Spreadtrum | Yes | It is ok to send an LS to CT1. |
| Apple | Yes |  |
| TD Tech, Chengdu TD Tech | Yes |  |
| Kyocera | Yes |  |
| Xiaomi | Yes |  |
| Ericsson | Yes, but | We are fine to send an LS to CT1 for bullet 1, concerning paging, because in 24.501 it says:  *If TMGI is used as paging identity and the TMGI matches with MBS multicast session which the has UE joined, the UE shall respond to the paging. Otherwise, the UE shall not respond to the paging.*  But in our understanding NAS is not using the TMGI when MRB is setup/released, and this may confuse CT1, and if they reply negatively we are not sure if we should remove these parts, which are also present in 36.331. See also our reply to Q1. |
| Sharp | Yes |  |
| Futurewei | Yes |  |
| ZTE | Yes |  |

### [V533] Correction on Logical Channel Setup for PTM Transmission

In R2-2204830, company thinks that logicalChannelIdentityExt is only applied to PTM according to RAN2 agreement. So it is proposed to update the field description of logicalChannelIdentityExt as below,

|  |  |
| --- | --- |
| TDoc | Proposals |
| vivo  R2-2204830 | **Proposal 1: Update the field description of *logicalChannelIdentityExt* to “Extended logical channel ID used commonly for the MAC logical channel and for the RLC bearer for PTM reception. If this field is configured, the UE shall ignore *logicalChannelIdentity*”.**  **Proposal 2: If proposal 1 is agreed, RAN2 adopts the TP in the Annex.** |

Companies are then requested to answer the following question,

**Question 13: Do you agree the change proposed in R2-2204830?**

|  |  |  |
| --- | --- | --- |
| **Company** | **Yes/No** | **Comments / justification** |
| CATT | Yes |  |
| Lenovo | Yes |  |
| Huawei, HiSilicon | Yes | The intention was misunderstood by the RRC CR rapporteur when replying to this RIL in R2-2206120. We agree with this clarification. |
| Qualcomm | ok |  |
| Samsung | Yes |  |
| OPPO | Yes |  |
| MediaTek | Yes |  |
| Spreadtrum | Yes |  |
| Apple | Yes |  |
| TD Tech, Chengdu TD Tech | Yes |  |
| Kyocera | Yes |  |
| Xiaomi | Yes |  |
| LGE | Yes |  |
| Ericsson | Yes | The Field description could be improved somewhat, can be handled with CR update. |
| Sharp | Yes |  |
| Futurewei | Yes |  |
| ZTE | Yes |  |

### Miscellaneous correction to TS 38331

In R2-2205627, miscellaneous corrections to TS 38331 are proposed,

|  |  |
| --- | --- |
| TDoc | Proposals |
| ZTE  R2-2205627 | Change 1: In 5.3.5.2, and 5.3.8.1, the initiation of RRC reconfiguration and release can be done regardless of configured multicast MRB.  Change 2: In 5.3.5.6.7, 5.9.3.3, 5.9.3.4 SDAP related procedure was deleted.  Change 3: In 5.9.4, the priority between broadcast and unicast/multicast was clarified. The prioritization is applied to both unicast and multicast.  change 4: In 6.3.2, to achieve better power efficiency and scheduling flexibility, put the parameter allowCSI-SRS-Tx-MulticastDRX-Active in Group-Config instead of per UE config.  change 5: in the MRB-Identity, the length of MRB ID is changed to 5bits, in the RadioBearerConfig, TMGI is indicated in the the MRB release; in the RLC-BearerConfig, TMGI is added in the served MRB. |

Companies are then requested to answer the following questions,

**Question 14: Do you agree the corrections proposed in R2-2205627?**

|  |  |  |
| --- | --- | --- |
| **Company** | **Yes/No** | **Comments / justification** |
| CATT | Chang 1:No  Chang 2:No  Chang 3:No  Chang 4:No  Chang 5:No | Change 1: Disagree. We think the current text is correct.  Change 2: Disagree. SDAP entity is needed to handle MBS data according to 37.324  Change 3: Disagree, same comments as Q11.  change 4: Disagree, we think it is not motivated to make parameter allowCSI-SRS-Tx-MulticastDRX-Active on a per multicast DRX basis.  change 5: Disagree.it overrides the RAN2 agreement(“Extend MRB ID space beyond current 32 limit and up to 512.”) |
| Huawei, HiSilicon | See next column | Change 1: Disagree. The current specifications is OK. It is true that in most of the cases DRB will be configured, but MRB-only configuration is also valid, e.g. during congestion.  Change 2: Disagree, SDAP entity is needed for MBS.  Change 3: Agree as commented in Q11.  Change 4: Disagree, we think it is OK the way it is currently captured.  Change 5: Disagree, it contradicts the agreement from the previous meeting. |
| Qualcomm | No | The CR has several issues, but mostly covered by other papers in any case. Also related to answers in Q9/Q11. In general, agree with CATT comments. |
| Samsung | No | Disagree with changes 1 to 5 |
| Nokia | No to all | Similar comments to CATT |
| OPPO | **No** |  |
| MediaTek |  | Agree with change 3 as comment to Q11  Disagree with change 1 2 4 5 |
| Spreadtrum | No to all |  |
| TD Tech, Chengdu TD Tech |  | We are ok with change 3 |
| Kyocera | No | We think the current specification can work. For Change 3, it depends on Q11. |
| Xiaomi | See comment | Open for Change 3.  Disagree with other changes. |
| LGE |  | Agree with the change 3 only. |
| Ericsson | No | Several issues with this CR and for those relevant we can handle those with other updates in the MBS CR.  (agree with change 3, see also Q11) |
| Futurewei |  | No to all except 3 per Q11. |
| ZTE | (proponent) | just to clarify:  - change 2 is also discussed in MBS 034. we are ok if majority think this is not an issue.  - change 4 is also discussed in MBS MAC, we are OK if majority think such flexibility is not needed. |

## 38.304 corrections

### Scenario on setting frequencies to be of the lowest priority

In RAN2#115e meeting, the following agreement was reached,

* The UE may consider cell reselection candidate frequencies at which it cannot receive the MBS service to be of the lowest priority during the MBS session, as LTE SC-PTM. (25/25)

And the agreement is captured in 38.304 CR as below,

|  |
| --- |
| 5.2.4 Cell Reselection evaluation process  5.2.4.1 Reselection priorities handling  ……  <omitted>  If the MBS broadcast capable UE is receiving or interested to receive an MBS broadcast service(s), the UE may consider cell reselection candidate frequencies at which it can not receive the MBS broadcast service to be of the lowest priority during the MBS broadcast session as specified in TS 38.300 [2], as long as the SIB20 is provided by the cell on the MBS frequency which the UE monitors and as long as the condition 2) above is fulfilled for the serving cell. |

During previous CR update discussions, some companies mentioned that it is still not clear on what scenarios UE should consider frequencies to be of the lowest priority during the MBS session.

Since this function mainly reuses the LTE mechanism, so we can take the corresponding text in 36.304 as a reference,

|  |
| --- |
| //TS 36.304  5.2.4 Cell Reselection evaluation process  5.2.4.1 Reselection priorities handling  ……  If the UE is capable either of MBMS Service Continuity or of SC-PTM reception and is receiving or interested to receive an MBMS service provided on a downlink only MBMS frequency, on a frequency used by dedicated MBMS cells, on a frequency used by FeMBMS/Unicast-mixed cells as defined in TS 36.300 [2], or on a frequency belonging to PLMN different from its registered PLMN, the UE may consider cell reselection candidate frequencies at which it can not receive the MBMS service to be of the lowest priority during the MBMS session TS 36.300 [2], as long as the above mentioned condition 1) is fulfilled for the cell on the MBMS frequency which the UE monitors or this cell broadcasts SIB1-MBMS and as long as the above mentioned condition 2) is fulfilled for the serving cell.  NOTE 2: Example scenarios in which the previous down-prioritisation may be needed concerns the cases where camping is not possible, while the UE can only receive this MBMS frequency when camping on a subset of cell reselection candidate frequencies, e.g. the MBMS frequency is a downlink only carrier, the MBMS frequency is used by dedicated MBMS cells, the MBMS frequency is used by FeMBMS/Unicast-mixed cells TS 36.300 [2], or the MBMS frequency belongs to a PLMN different from UE's registered PLMN. |

It seems also necessary to add similar clarification in 38.304. Therefore, in R2-2204668, it is proposed to add NOTE to clarify the scenarios on setting frequencies to be of the lowest priority during the MBS session,

|  |  |
| --- | --- |
| TDoc | Proposals |
| CATT,CBN R2-2204668 | 5.2.4 Cell Reselection evaluation process  5.2.4.1 Reselection priorities handling  ……  If the MBS broadcast capable UE is receiving or interested to receive an MBS broadcast service(s), the UE may consider cell reselection candidate frequencies at which it can not receive the MBS broadcast service to be of the lowest priority during the MBS broadcast session as specified in TS 38.300 [2], as long as the SIB20 is provided by the cell on the MBS frequency which the UE monitors and as long as the condition 2) above is fulfilled for the serving cell.  NOTE: Example scenarios in which the previous down-prioritisation may be needed concerns the cases where camping is not possible, while the UE can only receive the MBS broadcast service when camping on a subset of the cell reselection candidate frequencies, e.g. the MBS broadcast frequency is a downlink only carrier, or the MBS broadcast frequency belongs to a PLMN different from UE's registered PLMN. |

Companies are then requested to answer the following question,

**Question 15: Do you agree the change proposed in R2-2204668?**

|  |  |  |
| --- | --- | --- |
| **Company** | **Yes/No** | **Comments / justification** |
| CATT | Yes | We think it is essential to clarify it, or for the intended scenario on setting frequencies to be of the lowest priority during the MBS session, it may not implemented correctly at UE side. |
| Lenovo | Yes |  |
| Huawei, HiSilicon | Yes | We think such clarification is useful, similarly as currently captured in 36.304. |
| Qualcomm | No | In our view, this detailed note is not needed. |
| Samsung | No strong view |  |
| Nokia | No | Note does not really bring any clarity and actually we do not see really any added value to existing text with the note. Additionally note uses some odd terminology e.g. “down prioritizing” etc… |
| OPPO | Yes |  |
| MediaTek | Yes | To align with LTE |
| Spreadtrum | Yes | We think the clarification is helpful. |
| Apple |  | We are not sure whether the DL only frequency for MBS broadcast service is supported in this release. |
| TD Tech, Chengdu TD Tech | Yes |  |
| Kyocera | Yes | We think the additional NOTE is useful. |
| Xiaomi | Yes |  |
| Ericsson | No | The No is mainly because we do not understand what we are trying to do here.  We still have the very basic question why there is a need to specify frequencies of the lowest priority where UE cannot receive MBS, in addition to the frequency of the highest priority where the UE can receive MBS? The UE would re-select to the highest priority frequency, if possible, and that is the wanted behavior.  PS: If the highest priority frequency provides not good coverage it is our understanding that the UE may **not** consider that frequency the highest priority because it says "may".  Then we also have some problems to read the NOTE correctly:   * The NOTE tries to clarifies frequencies where the UE can or cannot receive MBS? * Why does the NOTE talk about a subset of frequencies, i.e. the UE only camps on a single frequency? * A DL only carrier refer to ROM device which is out of scope for Rel-17? * In our understanding MBS frequency prioritization does not impact PLMN selection. |
| Futurewei | Yes |  |
| ZTE | No | same view with Ericsson. |

### Correction to frequency prioritization

|  |  |
| --- | --- |
| TDoc | Proposals |
| Ericsson R2-2205745 | **Proposal 1**: Clarify (e.g. in a NOTE) that the UE no longer considers the frequency of the highest priority when the MCCH does not include the MBS broadcast service the UE is interested in.  **Proposal 2**: Clarify in NOTE 7 what is up to UE implementation concerning frequency prioritization.  **Observation 1**: Stop prioritizing the MBS frequency does not resolve the possible congregation on the MBS frequency.  **Proposal 3**: Clarify in a NOTE that when the UE stops prioritizing the MBS frequency, the UE triggers inter-frequency measurements for cell reselection to another frequency. |

For P1 and P3 in [R2-2205745](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2//TSGR2_118-e/Docs/R2-2205745.zip), they are enhancements on stopping frequency prioritization. The rapporteur understands that spec impact on stopping frequency prioritization has been extensively discussed during the WI phase, and there is no additional spec impact identified according to below agreements,

* When the conditions for frequency prioritization are no longer met, the UE should stop prioritizing the frequency of this cell (e.g. when the cell reselected by the UE due to frequency prioritization for MBS stops providing SIBx etc.). FFS whether there is additional TS impact.
* There is no additional TS impact on stopping frequency prioritization.

Companies are then requested to answer the following question,

**Question 16: Do you agree that P1 in R2-2205745?**

*Proposal 1: Clarify (e.g. in a NOTE) that the UE no longer considers the frequency of the highest priority when the MCCH does not include the MBS broadcast service the UE is interested in.*

|  |  |  |
| --- | --- | --- |
| **Company** | **Yes/No** | **Comments / justification** |
| CATT | No | We think there is no additional spec impact on stopping frequency prioritization according to previous discussions and RAN2 agreements |
| Lenovo | No | Agree with rapporteur’s view that there is no spec impact identified. |
| Huawei, HiSilicon | No | The proposal is incorrect. Even when the session is currently not provided (i.e. not included in MCCH), the UE should still camp on the frequency and monitor for session start notification. |
| Qualcomm | Yes |  |
| Samsung | No |  |
| Nokia | No | same view with CATT |
| OPPO | Yes | Agree with Huawei. |
| MediaTek | No |  |
| Spreadtrum | No | same view with CATT |
| Apple | No |  |
| TD Tech, Chengdu TD Tech | No |  |
| Kyocera | No | We think the current specification already covers P1, i.e., “*If the MBS broadcast capable UE is receiving or interested to receive an MBS broadcast service(s) and can only receive this MBS broadcast service(s) by camping on a frequency on which it is provided,*” |
| Xiaomi | No |  |
| LGE | No | Not needed. 304 says ‘UE may consider that frequency to be the highest priority during the MBS broadcast session’. During the MBS broadcast session, the interested session is included in MCCH. |
| Ericsson | See comments (proponent) | We were thinking about the use case where neighbouring cells on the MBS frequency do not support the same set of sessions ([R2-2205745](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2//TSGR2_118-e/Docs/R2-2205745.zip)). Perhaps not a typical case, but a possible case?  The comment from HW is valid, that we need to consider the case when the session has not started yet. But in our understanding there is not that much wating time, i.e. the UE only prioritizes the frequency according to the start/stop times in the USD, and should not be waiting on the frequency a long time for the session to start.  But perhaps some further discussion is needed whether this use case is supported, and what the expected UE behavior is. |
| Futurewei | No |  |
|  |  |  |

**Question 17: Do you agree that P3 in R2-2205745?**

*Proposal 3: Clarify in a NOTE that when the UE stops prioritizing the MBS frequency, the UE triggers inter-frequency measurements for cell reselection to another frequency.*

|  |  |  |
| --- | --- | --- |
| **Company** | **Yes/No** | **Comments / justification** |
| CATT | No | Same comments as Q16 |
| Lenovo | No | Agree with rapporteur’s view that there is no spec impact identified. |
| Huawei, HiSilicon | No | It is unnecessary in our opinion. Higher priority frequencies will be measured anyway. |
| Qualcomm | No | It is natural UE behaviour. |
| Samsung | No |  |
| Nokia | No | We should not have unnecessary notes. There will be requirements defined in RAN4 which will dictate UE requirements – how UE achieves those is up to UE implementation. |
| OPPO | No |  |
| MediaTek | No |  |
| Spreadtrum | No |  |
| Apple | No |  |
| TD Tech, Chengdu TD Tech | No |  |
| Kyocera | No | We have the same view as CATT. |
| Xiaomi | No |  |
| LGE | No | It is natural UE behaviour. |
| Ericsson | Yes (proponent) | So this was captured for SC-PTM in LTE 36.304:  NOTE: UE should search for a higher ranked cell on another frequency for cell reselection as soon as possible after the UE stops using QoffsetSCPTM.  When relaxed RRM measurements are configured in the cell, and e.g. the UE is stationary, then the UE may refrain from inter-frequency measurements up to an hour. It is the measurements not the frequency down-prioritization, that triggers the UEs to disperse.  It is nice to hear that some UE vendors think this is natural, but RAN4 will not cover this case, and we think this should be covered in 38.304, similar as in 36.304. |
| Futurewei | No |  |

For P2 in R2-2205745, it is proposed to clarify the NOTE 7 in 38.304 further,

|  |
| --- |
| 5.2.4 Cell Reselection evaluation process  5.2.4.1 Reselection priorities handling  ……  If the MBS broadcast capable UE is receiving or interested to receive an MBS broadcast service(s) and can only receive this MBS broadcast service(s) by camping on a frequency on which it is provided, the UE may consider that frequency to be the highest priority during the MBS broadcast session as specified in TS 38.300 [2] as long as the two following conditions are fulfilled:  1) The cell reselected by the UE due to frequency prioritization for MBS is providing SIB20;  2) Either:  - One or more MBS FSAI(s) of that frequency is indicated in SIB21 of the serving cell and the same MBS FSAI(s) is also indicated for this MBS broadcast service in MBS User Service Description (USD) as specified in TS 26.346 [20], or  - SIB21 is not provided in the serving cell and that frequency is included in the USD of this service, or  - SIB21 is provided in the serving cell but does not provide the frequency mapping for the concerned service, and that frequency is included in the USD of this service.  NOTE 7: It is up to UE implementation how to use information in USD to determine whether/how to do the frequency prioritization for specific frequency/frequencies included in USD. |

NOTE 7 was added according to the RAN2#116bis-e agreement as below,

* UE can prioritize the frequency indicated in USD when SIBy is provided in the cell but does not provide the frequency mapping for the concerned service.
* It is up to UE implementation how to use information in USD (e.g. with other explicit knowledge) to determine whether to (or how to) do the frequency prioritization for specific frequency/frequencies in USD.

The rapporteur understands that NOTE 7 is aligned well with the agreement already.

Companies are then requested to answer the following question,

**Question 18: Do you agree to clarify NOTE 7 further, as proposed in P2 of R2-2205745?**

*Proposal 2: Clarify in NOTE 7 what is up to UE implementation concerning frequency prioritization.*

|  |  |  |
| --- | --- | --- |
| **Company** | **Yes/No** | **Comments / justification** |
| CATT | No strong view | We are not sure if there is something to clarify further, but we follow the majority view. |
| Lenovo | No | Agree with rapporteur’s view that the existing NOTE 7 is aligned well with the agreement already |
| Huawei, HiSilicon | Yes | We agree the current text is rather unclear. We should clarify that it is up to UE implementation to decide which frequency to prioritize in case USD provides more than one frequency. |
| Qualcomm | No |  |
| Samsung | No |  |
| Nokia | No | We did not see actual TP in the paper. What is proposed? As long as there is no clear proposal we cannot support. |
| OPPO | No |  |
| MediaTek | No |  |
| Spreadtrum | No |  |
| Apple | No |  |
| TD Tech, Chengdu TD Tech | No |  |
| Kyocera | Yes | We think the additional NOTE, clarifying the background from RAN2 agreements, is useful. |
| Xiaomi | No strong view |  |
| LGE | No | The prioritization is up to UE implementation so the further clarification is not needed. |
| Ericsson | Yes (proponent) | We find the current NOTE difficult to understand what it exactly is trying to say. We did not come up with a TP because we did not understand what the intention of the NOTE was.  We find the answer from HW more clear, and would propose to consider such clarification:  NOTE 7: It is up to UE implementation which frequency to select, when the USD provides multiple frequencies for the service the UE is interested in. |
| Futurewei | No strong view |  |

## Other issues

**Question 19: Any other CP open issues?**

|  |  |
| --- | --- |
| **Company** | **Comments / justification** |
| TD Tech, Chengdu TD Tech | The broadcast session reception interruption problem during the cell reselection in LTE needs considering. It’s a serious problem. It’s not an optimization problem. We hope such problem in LTE shall be solved in the first NR MBS version. The simplest solution is to make the source cell and target cell have the same PTM configuration. We suggest an extra bit is added in the neighbour cell information to show the source cell and the target cell have the same/different PTM configuration. |
|  |  |
|  |  |

# Summary

Based on the discussion above, we propose:

# Reference

[1] R2-2204669 [C006] Correction to UE Behavior on Group Paging Handling CATT CR Rel-17 38.331 17.0.0 2991 - F NR\_MBS-Core

[2] R2-2204827 [V500] Clarification on Group Paging for INACTIVE UE vivo discussion Rel-17 NR\_MBS-Core

[3] R2-2205749 Multicast session start and Paging Ericsson discussion Rel-17 NR\_MBS-Core

[4] R2-2204670 [C001] Modificaitons towards the MRB ID Change Procedure CATT CR Rel-17 38.331 17.0.0 2992 - F NR\_MBS-Core

[5] R2-2204828 [V503][V504][V508] Correction on MRB Handling vivo discussion Rel-17 NR\_MBS-Core

[6] R2-2205249 [V503][H002] MRB identity change procedural text issue Nokia, Nokia Shanghai Bell discussion Rel-17 NR\_MBS-Core Late

[7] R2-2205632 [C001, H002, v503, Z609] MRB ID scope and its modification on the fly ZTE, Sanechips discussion Rel-17 NR\_MBS-Core

[8] R2-2206123 Corrections for GroupConfig structure (RIL: H091) Huawei, HiSilicon draftCR Rel-17 38.331 17.0.0 F NR\_MBS-Core

[9] [R2-2205626](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2//TSGR2_118-e/Docs/R2-2205626.zip) [H001, H005, Z608, C005] Discussion on multicast MRB and DRB in RRC ZTE, Sanechips discussion Rel-17 NR\_MBS-Core

[10] R2-2206124 Draft LS on AS-NAS layer interactions for MBS Huawei, HiSilicon LS out Rel-17 NR\_MBS-Core

[11] R2-2204830 [V533] Correction on Logical Channel Setup for PTM Transmission vivo discussion Rel-17 NR\_MBS-Core

[12] R2-2205627 Miscellaneous correction to TS 38331 ZTE, Sanechips CR Rel-17 38.331 17.0.0 3106 - F NR\_MBS-Core

[13] R2-2204668 Correction to 38.304 for MBS CATT, CBN CR Rel-17 38.304 17.0.0 0237 - F NR\_MBS-Core

[14] R2-2205745 Frequency prioritization Ericsson discussion Rel-17 NR\_MBS-Core