3GPP TSG-RAN WG2 Meeting #127 R2-240xxxx

Maastricht, Netherlands, 19 - 23 August 2024

**Source: Huawei, HiSilicon**

**Title:** **Report of [POST127][505][MBS] RRC CR (Huawei)**

**Agenda Item:** **7.11.1**

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

# Introduction

This document is the report of the following email discussion.

* [POST127][505][MBS] RRC CR (Huawei)

 Scope: Update the RRC CR with the agreements from the meeting, discuss the related FFSes.

 Intended outcome: Agreeable RRC CR in R2-2407736

 Deadline: Short

Please provide your input before August 29, 02:00 UTC. After that, an updated RRC CR will be provided based on the conclusions in this document.

# Contact information

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# Discussion on the spec impact of RAN2#127 agreements

## **3.1 Agreement 1**

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| * When the UE which was configured to receive MBS multicast in INACTIVE reselects to a new cell where there is no SIB24, it should trigger RRC resume. Include the change in the post-meeting e-mail discussion for RRC.
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This agreement is discussed first in this offline, because it may impact the discussion on other agreements.

During the online, some companies think UE may miss paging during the cell re-selection to an MCCH-less cell. So, to take pre-caution, the above agreement was made that UE always resume upon re-selecting an MCCH-less cell. The proposed TP for this agreement from Rapp is:

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| 5.2.2.4.2 Actions upon reception of the *SIB1*……4> if in RRC\_INACTIVE and the forwarded information does not trigger message transmission by upper layers:5> if the serving cell does not belong to the configured *ran-NotificationAreaInfo*:6> initiate an RNA update as specified in 5.3.13.8;5> if configured to receive MBS multicast in RRC\_INACTIVE:6> if SIB24 is not scheduled in SIB1 in the new cell (i.e., different from the cell where the UE received multicast in RRC\_CONNECTED) after cell selection or in the cell after cell reselection:7> initiate RRC connection resume procedure for multicast reception as specified in 5.3.13.1d; |

**Question 1: Do you think the above spec change is agreeable?**

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| **Company** | **Yes/No** | **Comments if any** |
| CATT | See comment | The agreement is only on the reselection case.But UE behavior in the cell selection is impacted by the change as well.  |
| Nokia  | Yes | To our understanding also cell selection should be covered – it has exactly same issue. |
| Samsung | Yes | Issue is also applicable for cell selection to a different cell |
| Ericsson  | Yes, with comments | The session status (active/inactive) is cell dependent and if the UE does not know the activation status in the new cell (either after cell selection or reselection to a cell different from connected) then the UE needs to resume to not miss data. But we are a bit confused whether this only applies to MCCH-less cell. The MCCH provides the PTM configuration and indicates when the UE can stop monitoring:  mbs-SessionId-r18 TMGI-r17,… stopMonitoringRNTI-r18 ENUMERATED {true} OPTIONAL, -- Cond G-RNTIThe field is optionally present, Need R, if *g-RNTI* is included. Otherwise, it is absent.***stopMonitoringRNTI***Indicates the UE to stop monitoring the G-RNTI for the corresponding multicast session.But does the MCCH indicate at any time the “session status”? The session TMGI is present between start and stop time in USD? The UE detects the session status based on the presence of “stop” indicator? When the gNB triggers group paging based on new data activity in RAN, then the gNB also has to remove “stop” from MCCH?We also do not have procedure text to cover this case?In the context of MCCH(-less), what exactly does this sentence mean?If absent, UE considers that all joined multicast sessions can be received in RRC\_INACTIVE.In case of reselection/selection to an MCCH-less cell other than connected, then the UE should resume, similar as for the case we discuss here. This sentence can be read that UE does not resume. Why was the following wording not used?:If absent, UE considers itself to be configured to receive multicast sessions in RRC\_INACTIVE |
| Sharp | Yes | For Ericsson’s comments: ***stopMonitoringRNTI*** can only be set to TRUE. So, for each multicast session, only two status can be indicated by gNB.I think the sentence “If absent, UE considers that all joined multicast sessions can be received in RRC\_INACTIVE.” is clear even for MCCH-less cell. The reason is that ***multicastConfigInactive*** is used to indicate **whether** the UE is configured to receive MBS multicast in RRC\_INACTIVE and inactivePTM-Config is used to indicate which multicast session(s) can be received in RRC\_INACTIVE.  |

**Rapp’s Summary:**

We focus on the spec change related to the agreements in this offline. Since re-selection case is agreed and cell selection case is similar, to avoid further complexity of specifying different behavior for these two cases, we should make this change for both cases:

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| 5.2.2.4.2 Actions upon reception of the *SIB1*……4> if in RRC\_INACTIVE and the forwarded information does not trigger message transmission by upper layers:5> if the serving cell does not belong to the configured *ran-NotificationAreaInfo*:6> initiate an RNA update as specified in 5.3.13.8;5> if configured to receive MBS multicast in RRC\_INACTIVE:6> if SIB24 is not scheduled in SIB1 in the new cell (i.e., different from the cell where the UE received multicast in RRC\_CONNECTED) after cell selection or in the cell after cell reselection:7> initiate RRC connection resume procedure for multicast reception as specified in 5.3.13.1d; |

## **3.2 Agreement 2 and 3**

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| * Upon receiving group paging which indicates to allow the inactive multicast reception, if multicast MCCH is not present, UE initiates RRC resume if it was not configured to receive multicast in RRC\_CONNECTED. FFS the exact change.
* Upon receiving group paging which indicates to allow inactive multicast reception when UE is receiving multicast in RRC\_INACTIVE, UE checks whether the selected or reselected cell is multicast MCCH-less cell before reading multicast MCCH. FFS whether this is already covered by the current specs.
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Rapporteur’s understanding:

According to Agreement 1, if UE moved to an MCCH-less cell, UE would have resumed. So, by the time UE receives the paging in RRC\_INACTIVE, there is no case that this is an MCCH-less cell. On the other hand, if UE didn’t move, and this is an MCCH-less cell, NW shouldn’t have told the UE to stay in INACTIVE for multicast reception if no PTM configuration was provided. So for both cases mentioned in Agreement 2 and 3, MCCH is always present and the UE doesn’t need to check MCCH presence.

Based on the above understanding, the following change is proposed:

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| 3> else:4> start monitoring the G-RNTI(s), if configured, corresponding to the *TMGI(s)*;4> if the UE was notified to stop monitoring the G-RNTI(s) for all the joined multicast sessions that are configured for reception in RRC\_INACTIVE:5> start monitoring the Multicast MCCH-RNTI;5> acquire the *MBSMulticastConfiguration* message on multicast MCCH; |

**Question 2: Do you think the above spec change is agreeable?**

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| **Company** | **Yes/No** | **Comments if any** |
| CATT | OK |  |
| Nokia | Partly | We agree on deletion of “”Not so sure that we should delete “5> if multicast MCCH is present” as then UE would start monitoring MCCH-RNTI even in cell not sending MCCH (paging was received in same cell where UE was released to INACTIVE), right?But we think also change from CATT R2-2406333 should be includedResulting in If we don’t have purple change above then UE wouldn’t resume connection if MCCH is not present (in case paging was received in same cell where UE was released)? |
| Samsung | See comment | The case is different than agreement 1 as UE may be on the same cell where UE was released. If this is MCCH less cell and UE has not received received PTM configuration, then UE would resume the RRC connection. So agree with Nokia’s purple text addition. Also, aligned with view from Nokia to retain the first instance as well of “5> if multicast MCCH is present”” |
| Ericsson | See comment | Agree with Nokia. |
| Sharp | See comment | The following scenario should also be considered: UE camps on the MCCH-less cell where the multicast session was received in RRC\_CONNECTED and the PTM configuration was provided in RRCRelease. |

**Rapp’s Summary:**

Let’s take a look at the cases mentioned by Nokia and Sharp:

1. UE received multicast in Cell A and was released by Cell A without PTM configuration for an inactive session. UE stays in Cell A which is MCCH-less. When the session is active, why would NW include “*inactiveReceptionAllowed*” indication for this session, knowing that this is an MCCH-less cell and this UE doesn’t have PTM configuration? In this sense, there is no resume case in this branch (i.e., this cell should be a cell with MCCH). On the contrary if this cell is MCCH-less, NW should use paging to invoke the UE to RRC\_CONNECTED (i.e., UE should execute resume in the other branch).
2. UE received multicast in Cell A and was released by Cell A with PTM configuration for an inactive session. When the session is active, and the NW include “*inactiveReceptionAllowed*” indication for this session, the UE shouldn’t resume and can use the PTM configuration in RRCRelease. Under this case, there may be two sub-cases: Cell A with or without MCCH. For with MCCH case, UE applies PTM in RRCRelease and monitor MCCH-RNTI; For MCCH-less case, UE just use the PTM configuration in RRCRelease.

Based on above, we can try the following updated TP:

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| 3> else:4> start monitoring the G-RNTI(s), if configured, corresponding to the *TMGI(s)*;4> if the UE was notified to stop monitoring the G-RNTI(s) for all the joined multicast sessions that are configured for reception in RRC\_INACTIVE:5> apply the multicast PTM configuration provided in *RRCRelease*;5> if multicast MCCH is present:6> start monitoring the Multicast MCCH-RNTI;6> acquire the *MBSMulticastConfiguration* message on multicast MCCH;4> else if the UE was notified to stop monitoring the G-RNTI for at least one multicast session for which the PTM configuration was not included in *RRCRelease* message:5> acquire the *MBSMulticastConfiguration* message on multicast MCCH; |

## **3.2 Agreement 4**

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| * When UE initiates RRC resume procedure with resumeCause set to mt-SDT, it should start monitoring G-RNTI(s) of joined MBS session(s) indicated by the TMGI(s) included in the paging message. FFS if there is spec impact (discuss in post-meeting e-mail discussion).
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Rapporteur’s understanding:

There was a history discussion in the main session about the collision between mt-sdt paging and group paging. It was about the following case 1:

Case1: When UE receives both mt-sdt paging and group paging that wants UE to go to CONNECTED in the same paging message, UE will use mt-access instead of mt-sdt as the resume cause to make sure NW doesn’t send UE back into RRC\_INACTIVE.

The Agreement 4 here refers to the following case 2:

Case2: When UE receives both mt-sdt paging and group paging that wants UE to stay in INACTIVE in the same paging message, UE should use mt-sdt and NW may send UE back into RRC\_INACTIVE. **But according to the current condition, UE will not start monitoring G-RNTI in INACTIVE (see the red text in Option 2)**.

During the discussion at the meeting, there were two options to solve this case 2:

Option 1: Add a note for this case to say UE should start monitoring G-RNTI in INACTIVE to avoid big spec impact. Potential change (based on the TP proposed toAgreement 2 and 3):

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| 3> else:4> start monitoring the G-RNTI(s), if configured, corresponding to the *TMGI(s)*;4> if the UE was notified to stop monitoring the G-RNTI(s) for all the joined multicast sessions that are configured for reception in RRC\_INACTIVE:5> start monitoring the Multicast MCCH-RNTI;5> acquire the *MBSMulticastConfiguration* message on multicast MCCH;NOTE X: In case UE initiates the RRC connection resumption procedure with *resumeCause* set to *mt-SDT* and NW sends UE back to RRC\_INACTIVE, UE configured to receive MBS multicast in RRC\_INACTIVE should start receiving multicast in RRC\_INACTIVE if *pagingGroupList* was included in the same paging message with *mt-SDT* indication telling the UE to stay in RRC\_INACTIVE for multicast reception.  |

Option 2: Change the procedural text to make sure UE starts monitoring G-RNTI in INACTIVE. Potential change (based on the TP proposed toAgreement 2 and 3):

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| 1> if in RRC\_INACTIVE and the UE has joined one or more MBS session(s) indicated by the *TMGI(s)* included in the *pagingGroupList*:2> if *PagingRecordList* is not included in the *Paging* message; or2> if none of the *ue-Identity* included in any of the *PagingRecord* matches the UE identity allocated by upper layers or the UE's stored *fullI-RNTI*:3> if the UE is not configured to receive multicast in RRC\_INACTIVE for at least one of the MBS sessions indicated by the *TMGI(s)* that the UE has joined; or3> if *inactiveReceptionAllowed* is not included for at least one of the MBS sessions indicated by the *TMGI(s)* that the UE has joined:4> initiate the RRC connection resumption procedure according to 5.3.13 with *resumeCause* set as below:5> if the UE is configured by upper layers with Access Identity 1:6> set *resumeCause* to *mps-PriorityAccess*;5> else if the UE is configured by upper layers with Access Identity 2:6> set *resumeCause* to *mcs-PriorityAccess*;5> else if the UE is configured by upper layers with one or more Access Identities equal to 11-15:6> set *resumeCause* to *highPriorityAcces*s;5> else:6> set *resumeCause* to *mt-Access*;3> else:4> start monitoring the G-RNTI(s), if configured, corresponding to the *TMGI(s)*;4> if the UE was notified to stop monitoring the G-RNTI(s) for all the joined multicast sessions that are configured for reception in RRC\_INACTIVE:5> start monitoring the Multicast MCCH-RNTI;5> acquire the *MBSMulticastConfiguration* message on multicast MCCH;4> else if the UE was notified to stop monitoring the G-RNTI for at least one multicast session for which the PTM configuration was not included in *RRCRelease* message:5> acquire the *MBSMulticastConfiguration* message on multicast MCCH;2> else if the *ue-Identity* included in any of the *PagingRecord* matches the UE identity allocated by upper layers:3> forward the *TMGI(s)* to the upper layers;3> if UE initiated the RRC connection resumption procedure with *resumeCause* set to *mt-SDT* and was released to RRC\_INACTIVE:4> start monitoring the G-RNTI(s), if configured, corresponding to the *TMGI(s)*;4> if the UE was notified to stop monitoring the G-RNTI(s) for all the joined multicast sessions that are configured for reception in RRC\_INACTIVE:5> start monitoring the Multicast MCCH-RNTI;5> acquire the *MBSMulticastConfiguration* message on multicast MCCH; |

Option 3: Change the procedural text to make sure UE starts monitoring G-RNTI in INACTIVE

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| 3> else if *mt-SDT* indication was included in the *Paging* message and if the conditions for initiating SDT for a resume procedure initiated in response to RAN paging according to 5.3.13.1b are fulfilled:4> if *pagingGroupList* was not included in the *Paging* message; or:4> if *pagingGroupList* was included in the *Paging* message but the UE has not joined any MBS session(s) indicated by the *TMGI(s)* included in the *pagingGroupList* or:4> if *pagingGroupList* was included in the *Paging* message, the UE is configured to receive MBS multicast in RRC\_INACTIVE, and *inactiveReceptionAllowed* was included for all the MBS session(s) indicated by the TMGI(s) that the UE has joined:5> initiate the RRC connection resumption procedure according to 5.3.13 with *resumeCause* set to *mt-SDT*:3> else:4> initiate the RRC connection resumption procedure according to 5.3.13 with *resumeCause* set to *mt-Access*;NOTE 2: If both conditions for initiating MT-SDT and MO-SDT according to 5.3.13.1b are fulfilled, UE may initiate RRC connection resumption procedure for MT-SDT or MO-SDT based on implementation.NOTE 3: A MUSIM UE may not initiate the RRC connection resumption procedure, e.g. when it decides not to respond to the *Paging* message due to UE implementation constraints as specified in TS 24.501 [23].2> else if the *ue-Identity* included in the *PagingRecord* matches the UE identity allocated by upper layers:3> if upper layers indicate the support of paging cause:4> forward the *ue-Identity*, *accessType* (if present) and paging cause (if determined) to the upper layers;3> else:4> forward the *ue-Identity* and *accessType* (if present) to the upper layers;3> perform the actions upon going to RRC\_IDLE as specified in 5.3.11 with release cause 'other';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(s)* included in the *pagingGroupList*:2> if *PagingRecordList* is not included in the *Paging* message; or2> if none of the *ue-Identity* included in any of the *PagingRecord* matches the UE identity allocated by upper layers or the UE's stored *fullI-RNTI(*except when *mt-SDT* indication is included in the paging message*)*:3> if the UE is not configured to receive multicast in RRC\_INACTIVE for at least one of the MBS sessions indicated by the *TMGI(s)* that the UE has joined; or3> if *inactiveReceptionAllowed* is not included for at least one of the MBS sessions indicated by the *TMGI(s)* that the UE has joined:4> initiate the RRC connection resumption procedure according to 5.3.13 with *resumeCause* set as below:5> if the UE is configured by upper layers with Access Identity 1:6> set *resumeCause* to *mps-PriorityAccess*;5> else if the UE is configured by upper layers with Access Identity 2:6> set *resumeCause* to *mcs-PriorityAccess*;5> else if the UE is configured by upper layers with one or more Access Identities equal to 11-15:6> set *resumeCause* to *highPriorityAcces*s;5> else:6> set *resumeCause* to *mt-Access*;3> else:4> start monitoring the G-RNTI(s), if configured, corresponding to the *TMGI(s)*;4> if the UE was notified to stop monitoring the G-RNTI(s) for all the joined multicast sessions that are configured for reception in RRC\_INACTIVE:5> if multicast MCCH is present:6> start monitoring the Multicast MCCH-RNTI;6> acquire the *MBSMulticastConfiguration* message on multicast MCCH;5> else if the UE selected or re-selected to a cell which is different from the cell where the multicast service(s) was received in RRC\_CONNECTED:6> initiate RRC connection resume procedure for multicast reception as specified in 5.3.13.1d;4> else if the UE was notified to stop monitoring the G-RNTI for at least one multicast session for which the PTM configuration was not included in *RRCRelease* message:5> acquire the *MBSMulticastConfiguration* message on multicast MCCH;2> else if the *ue-Identity* included in any of the *PagingRecord* matches the UE identity allocated by upper layers:3> forward the *TMGI(s)* to the upper layers; |

**Question 3: Which option do you prefer?**

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| **Company** | **Which option is preferred?** | **Comments/suggestions if any** |
| CATT | Option 1 |  |
| Nokia | Option 1 | Option 2 could also work, but the current wording seems misleading. We believe that this is anyway a corner case. |
| Samsung | Option 3 | Option 3 can be simple changeOption 2 TP is incorrect as mt-SDT cannot come under the yellow highlighted condition as mt-SDT should be related to RAN paging.2> else if the *ue-Identity* included in any of the *PagingRecord* matches the UE identity allocated by upper layers:3> forward the *TMGI(s)* to the upper layers;3> if UE initiated the RRC connection resumption procedure with *resumeCause* set to *mt-SDT* and was released to RRC\_INACTIVE:Option 1 is a complex NOTE. |
| Ericsson | Option 2 | Similar view a Samsung that the NOTE is complex/unclear: “should start receiving multicast in RRC\_INACTIVE”“telling the UE to stay in RRC\_INACTIVE”Did not follow the logic for option 3.Another wording for a NOTE: NOTE X: If the received a Paging message including *mt-SDT* indication and *inactiveReceptionAllowed* indication for the multicast session(s) the UE has joined and the UE resumes the connection and the UE is released to RRC\_INACTIVE, then the UE starts monitoring the Multicast MCCH-RNTI and acquires the *MBSMulticastConfiguration* message on multicast MCCH. |
| Sharp | Option 2 or Option 3 | Similar view as Samsung that NOTEs (NOTEs from Rapporteur and Ericsson) is complex/unclear.In addition, the agreement does not restrict that UE should only start monitoring G-RNTI(s) when stays in RRC\_INACTIVE after initiating RRC Resume for SDT.For mt-SDT, *ue-Identity* included in the *PagingRecord* matches the UE's stored *fullI-RNTI*. So, the text in option 2 should be:2> else if the *ue-Identity* included in any of the *PagingRecord* matches the UE identity allocated by upper layers:3> forward the *TMGI(s)* to the upper layers;2> else if UE initiated the RRC connection resumption procedure with *resumeCause* set to *mt-SDT*:3> start monitoring the G-RNTI(s), if configured, corresponding to the *TMGI(s)*;3> …… |

**Rapp’s Summary:**

For option 1, it is indeed a complex NOTE which tries to include everything. Even in the current shape, it doesn’t include the behavior of monitoring Multicast MCCH-RNTI and so on.

For option 3, we should avoid using Double Negation in the condition, which may lead to confusion.

For option 2, considering Samsung’s comments, we can revise it as following:

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| 2> else if the *ue-Identity* included in any of the *PagingRecord* matches the UE identity allocated by upper layers:3> forward the *TMGI(s)* to the upper layers;2> else if UE initiated the RRC connection resumption procedure with *resumeCause* set to *mt-SDT*:3> start monitoring the G-RNTI(s), if configured, corresponding to the *TMGI(s)*;3> if the UE was notified to stop monitoring the G-RNTI(s) for all the joined multicast sessions that are configured for reception in RRC\_INACTIVE:4> apply the multicast PTM configuration provided in *RRCRelease*;4> if multicast MCCH is present:5> start monitoring the Multicast MCCH-RNTI;5> acquire the *MBSMulticastConfiguration* message on multicast MCCH;4> else if the UE was notified to stop monitoring the G-RNTI for at least one multicast session for which the PTM configuration was not included in *RRCRelease* message:5> acquire the *MBSMulticastConfiguration* message on multicast MCCH; |

# Summary

Proposal: Agree the RRC CR in R2-2407736.

# Reference

[1] R2-2407575 Report from session on R18 MBS, R18 QoE and R19 XR