3GPP TSG-RAN WG2 #119-bis-e R2-221xxxx

Electronic meeting, 10th – 19th October 2022

Agenda Item: 8.11.2

Source: CATT

Title: Report of [AT119bis-e][605][eMBS] PTM configuration for INACTIVE (CATT)

Document for: Discussion, Decision

# 1 Introduction

This document is the report of the following email discussion,

* [AT119bis-e][605][eMBS] PTM configuration for INACTIVE (CATT)

      Scope: Treat the remaining proposals from R2-2210068:

-       Gather comments on the current proposals and refine them accordingly

-       Identify a (hopefully big) set of easy proposals for offline agreement, capture controversial parts as FFS, if needed

-       Identify a (very small) set of proposals for online discussion

      Outcome: Report

      Deadline: Report available: Tuesday 2022-10-18 1200 UTC

Two phases are planned for the discussions, i.e.,

* Ph1: companies’ comments collected before Friday Oct. 14th 23:00 UTC
* Ph2: proposals/summary checked before Tuesday Oct. 18th 10:00 UTC

# 2 Contact information

Participants are encouraged to leave their contact information in the following table.

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| Company | Delegate name (email address) |
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# 3 Ph1 discussions

## 3.1 Whether and how to notify the session state change to UEs in INACTIVE

### 3.1.1 Session activation

Whether UE is informed about session activation

In [1], almost all the companies agree that Rel-18 UE in INACTIVE should be informed when the session is activated (Details FFS). So the Proposal 6 in [1] is renamed as proposal 1 and copied below.

**Proposal 1 Rel-18 UE in INACTIVE can be be informed when the session is activated (Details FFS).**

**Question 1 Do you have any concern on Proposal 1?**

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How to inform UE about session activation

Firstly, note that we already agreed that “For both option 1 and option 2, as a baseline, group paging can be used to switch UEs receiving multicast from RRC\_INACTIVE to RRC\_CONNECTED, and UEs continue the multicast reception in CONNECTED.

Then, although not explicitly proposed in [1], Rapporteur understands that based on Proposal 1, it is possible to form a baseline regarding how to inform UE about the session activation. Therefore the following proposal and question are added.

**Proposal 2 As a baseline, group paing can be used to inform UE(s) about the session activation. (Details FFS).**

**Question 2 Do you agree with Proposal 2?**

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Upon session activation, how does UE determine whether it can receive the multicast session in RRC\_INACTIVE or not?

Upon session activation, UEs should know whether it can receive the multicast session in INACTIVE. In [1], this issue was discussed extensively in Question 9, i.e., “Q9: Do you agree Rel-18 UE in INACTIVE should be informed whether the multicast session can be received in INACTIVE when the session is activated (Details FFS)?”. Some alternatives have been mentioned therein.

**Proposal 7 Further discuss the following alternatives regarding how UE is indicated whether it can receive the multicast session in RRC\_INACTIVE or not when the multicast session is activated:**

**Alt. 1 When the multicast session is activated, UE can receive the multicast session in RRC\_INACTIVE if the PTM configuration used in RRC\_INACTIVE for the session is available to the UE (e.g., configuration provided to UE via dedicated RRC signaling or via MCCH), otherwise it goes back to RRC\_CONNECTED to receive the multicast session.**

**Alt. 2 When the multicast session is activated, UE is indicated by group paging whether it can receive the multicast session in RRC\_INACTIVE or not (detail signaling FFS).**

**Other possible alternative(s) if any.**

Basically, Alt. 1 does not require changes to the group paging, i.e., UE determines whether it can receive the session in INACTIVE based on whether the related PTM configurations are available to the UE, while Alt. 2 requires changes to the group paging as it needs explicit indication in the group paging.

For the sake of progress the Proposal 7 in [1] is reformulated to the following question.

**Question 3 If Proposal 1 and Proposal 2 are agreed, which alternative do you prefer regarding how UE determines whether it can receive the multicast session in RRC\_INACTIVE or not when the session is activated?**

**Alt. 1 When the multicast session is activated, UE can receive the multicast session in RRC\_INACTIVE if the PTM configuration used in RRC\_INACTIVE for the session is available to the UE (e.g., configuration provided to UE via dedicated RRC signaling or via MCCH), otherwise it goes back to RRC\_CONNECTED to receive the multicast session.**

**Alt. 2 When the multicast session is activated, UE is indicated by group paging whether it can receive the multicast session in RRC\_INACTIVE or not (detail signaling FFS).**

**Other possible alternative(s) if any.**

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| Company | Alt. 1, 2 or others | Comment if any, e.g., please specify them if you prefer other alternatives. |
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Note: A Proposal 3 may be added based on output in ph1.

### 3.1.2 Session deactivation

The following were concluded from [1].

**Observation 1 Majority of the companies see a need to inform UEs in RRC\_INACTIVE when a multicast session is deactivated.**

**Proposal 8 Further discuss whether UEs in INACTIVE should be informed when the multicast session is deactivated, and if yes what is the solution.**

Rapporteur understands that most of the companies think that UE may be aware when a multicast session is deactivated, but there may be different views regarding how this is achieved, e.g., some thinks group paging can be used, some think MCCH can be used, etc.

Therefore to progress, the Proposal 8 in [1] is updated to the following and companies can further comment on it.

**Proposal 4 UE may be aware when a multicast session is deactivated. FFS how this is achieved (e.g., informed via group paging, MCCH, or other ways).**

**Question 4 Do you agree with Proposal 4?**

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### 3.1.3 Session release

The following were concluded from [1].

**Proposal 9 Rel-17 mechanism (NAS-based indication) is applicable for multicast session release, if Rel-18 UEs move from RRC\_INACTIVE to RRC\_CONNECTED. FFS if any enhancement is needed.**

Basically this confirms that Rel-17 mechanis applies and it is open whether any enhancements are needed.

The Proposal 9 in [1] is renamed as Proposal 5 and comments if any can be provided in the following.

**Proposal 5 Rel-17 mechanism (NAS-based indication) is applicable for multicast session release, if Rel-18 UEs move from RRC\_INACTIVE to RRC\_CONNECTED. FFS if any enhancement is needed.**

**Question 5 Do you agree with Proposal 5?**

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## 3.2 Further analysis of Option 1

The following were concluded from [1].

**Proposal 10 If option 1 is supported for PTM configuration, group paging may be used to inform the UE when network changes the PTM configurations, and UE upon reception triggers RRC connection resume procedure to obtain the updated configurations (details of group paging can be FFS).**

**Observation 2 For Option 1, majority of the companies think there is issue in signalling/system load when a large number of UEs in the cell need PTM configuration update. Several companies observed that the likelihood of such problem is rare and suggested existing solutions may be applicable.**

**Proposal 11 If Option 1 is supported, further discuss how to solve the issue in signalling/system load when a large number of UEs in the cell need PTM configuration update.**

Proposal 10 and 11 in [1] are renamed and merged below and comments if any can be provided to them.

**Proposal 6 If option 1 is supported for PTM configuration**

* **group paging may be used to inform the UE when network changes the PTM configurations, and UE upon reception triggers RRC connection resume procedure to obtain the updated configurations (details of group paging can be FFS).**
* **FFS how to solve the issue in signalling/system load when a large number of UEs in the cell need PTM configuration update.**

**Question 6 Do you agree with Proposal 6?**

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## 3.3 Further analysis of Option 2

The following were concluded from [1].

**Proposal 12 FFS if there is an issue that a UE can obtain all the PTM configurations for a multicast service via Option 2 without/before joining the multicast session, and if yes, what is the security issue on the condition that security is enabled by service layer.**

Proposal 12 in [1] is renamed below and comments if any can be provided to them.

**Proposal 7 FFS if there is an issue that a UE can obtain all the PTM configurations for a multicast service via Option 2 without/before joining the multicast session, and if yes, what is the security issue on the condition that security is enabled by service layer.**

**Question 7 Do you agree with Proposal 7?**

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# 4 Ph2 discussions

Review the summary/proposals based on ph1, TBD

# 5 Conclusions

TBD

# 7 Reference

[1] R2-2210068 Report of [Post119-e][610][eMBS] PTM configuration for INACTIVE (CATT)

# Appendix - Previous agreements on Multicast reception in RRC\_INACTIVE

## RAN2 #119-e

**Multicast reception in RRC\_INACTIVE**

In Rel-18, multicast reception for UEs in INACTIVE supports at least the following scenarios, with the assumption that the UE already has a valid PTM configuration:

- Scenario 1: a UE has been receiving multicast in CONNECTED, and it enters INACTIVE and continues the multicast reception.

- Scenario 2: a UE has joined a multicast session and has been directed to INACTIVE, the UE starts to receive the multicast session

FFS for state changes, e.g. due to service being not provided in INACTIVE anymore etc.

It is up to gNB to decide whether a multicast session may be received by UE(s) in INACTIVE. FFS what information gNB may be provided to form such decision (related to SA2 discussion).

It is supported that gNB transmit one multicast session to both UEs in CONNECTED and INACTIVE in the same cell. FFS how the gNB configures this.

It is assumed the network can choose which UEs receive in RRC INACTIVE and which in RRC Connected and can move UEs between the states for Multicast service reception.

The following is taken as baseline: we assume the same PDCCH/PDSCH resources (e.g. resources used for MTCH) can be used for all UEs (including UEs in CONNECTED and/or INACTIVE states) for receiving the same multicast session. Different configuration/resources are not precluded as well. FFS what exactly can be common and what not (e.g. HARQ, SPS etc.) and what is needed in addition (to legacy PTM config).

For PTM configuration delivery, RAN2 further investigates the following solutions:

Option 1: Dedicated signalling

Option 2: Solution based on SIB+MCCH

We do not preclude some “mix” of the options

HARQ feedback and PTP are not supported for multicast reception in RRC\_INACTIVE.

Multicast service continuity after cell reselection in RRC\_INACTIVE state (i.e. without resuming RRC connection) will be supported (if the configuration of the new cell is available for the UE). FFS whether there are cases where the UE needs to resume the connection. FFS RAN3 impacts due to inter-gNB mobility.

Upon cell reselection to neighbour cells during active multicast session, if the configuration of the session is not available for the new cell for UEs in INACTIVE, then the UE is required to resume RRC connection to get the Multicast MRB configuration.

## RAN#119-bis-e

* The following general description is taken as baseline for PTM configuration delivery Option 1:

(1-a) PTM configuration(s) (i.e., configurations used for multicast reception in RRC\_INACTIVE) of one or more multicast sessions for at least one cell are provided via dedicated RRC signaling to a UE.

(1-b) The RRC message for this includes RRCReconfiguration and/or RRCRelease and/or RRCResume (details FFS)

(1-c) UE stores the received configurations while it is in RRC\_INACTIVE, and if there is a need to update some or all the configurations, the UE is notified of such changes and may trigger RRC connection resume to obtain the updated configurations. In case of mobility in RRC\_INACTIVE, the UE triggers RRC connection resume if the configuration of the session is not available for the new cell.

* The following general description is taken as baseline for PTM configuration delivery Option 2:

(2-a) PTM configurations (i.e., configurations used for multicast reception in RRC\_INACTIVE) are provided via an MCCH-like channel (same or different as used for MBS broadcast), and information regarding MCCH scheduling is provided via SIB, FFS dedicated signalling

(2-b) UE can receive such configurations when it is in RRC\_INACTIVE, FFS whether it is allowed/needed to also receive when UE is in RRC\_CONNECTED

(2-c) If there is a need to update some or all the received configurations, UE does not need to resume RRC connection but is notified of such changes (e.g. via MCCH DCI) and obtains the updated configurations via MCCH.

* Dedicated RRC signalling (i.e. RRC release message with suspendConfig) is used for switching a multicast receiving UE from RRC\_CONNECTED to RRC\_INACTIVE and continue multicast reception (details FFS).
* For both option 1 and option 2, as a baseline, group paging can be used to switch UEs receiving multicast from RRC\_INACTIVE to RRC\_CONNECTED, and UEs continue the multicast reception in CONNECTED. FFS if there is any potential issue if Rel-17 group paging is reused. FFS if there are other cases when UE triggers resume. FFS if MCCH can also be used in case of option 2.
* FFS whether to introduce PTM configuration applicable area, i.e., the mechanism that the PTM configurations, once acquired by a UE, may apply to a certain area (i.e., a set of cells instead of a single cell).