**3GPP T****SG-RAN WG2 Meeting #123bis R2-230xxxx**

**Xiamen, China, 9th-13th October 2023**

**Agenda item: 7.11.1**

**Source: vivo**

**Title: Open Issues for eMBS UE Capability**

**Document for: Discussion and Decision**

# 1 Introduction

This contribution is aimed at collecting companies’ views on the open issues for eMBS UE capability, which is associated with the following post-email discussion:

* [Post123bis][614][eMBS] UE capabilities CRs update and open issues (vivo)

Scope: Running CRs update and open issues

Intended outcome:

* Endorsed running CRs
* List of open issues for UE capabilities (separate document)

Deadline: Long

# 2 Participants

To facilitate this offline discussion amongst the delegates, would you please fill in your name and email address in the table below?

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| --- | --- |
| Delegate name | E-mail address |
| Yitao Mo (Stephen) | yitao.mo@vivo.com |
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# 3 Discussion

In R2-2309567, the capability CR rapporteur recommends companies further consider and discuss whether and how to define some minimum capability requirements for eMBS regarding RLC and PDCP-related capability, similar to the Rel-17 broadcast feature (the corresponding features are highlighted below).

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| 25-2 | Broadcast reception | It is optional for UE to support broadcast reception (RAN1 FG 33-1) as specified in TS 38.331 [2]. A UE that supports the feature shall also support:  - 4 broadcast MRBs as the minimum number;  - PDCP 12 bits SN;  - ROHC with profiles 0x0000, 0x0001 and 0x0002;  - 4 ROHC context sessions;  - RLC UM with 6 bits SN;  - RLC UM with 12 bits SN;  - DRX with long DRX cycle for MBS broadcast as specified in TS 38.321 [10]. |

In the rapporteur's understanding, some minimum RLC and PDCP-related capability requirements are needed for multicast reception in the RRC\_INACTIVE state, considering the mobility case (where the network cannot know the radio capability of a UE reselected to the current serving cell). Based on this assumption, the NW can configure a more appropriate (e.g. configuring ROCH profiles of 0x0002 for UDP/IP) PTM configuration to facilitate multicast reception. The following components are assumed for eMBS (Note that the maximum supported number (i.e. 16 for non-RedCap UEs and 8 for RedCap UE) of DRBs are shared for multicast MRB and unicast DRB. Thus it is assumed that there is no need to define a minimum number for multicast MRB in RRC\_INACTIVE state. From UE point of view, the UE capability constraint for the DRB number is not changed after going into the RRC\_INACTIVE state),

- Support 12-bit length of PDCP sequence number;

- Support of ROHC profiles 0x0000, 0x0001, and 0x0002;

- Support 4 ROHC header compression context sessions as the minimum number;

- Support UM MRB with 12-bit length of RLC sequence number;

- Support UM MRB with 6-bit length of RLC sequence number;

Further, views and comments from companies are warmly welcome.

**Q1: Do companies agree that the above-mentioned RLC and PDCP-related capability components can be considered as the minimum capability requirements for eMBS?**

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| **Company** | **Yes/No/Comments** | **Detailed comments** |
| Nokia | Maybe | If it would be fine to have this still as open issue so that we can have little more time to check – As baseline this is perfectly fine though |
| Samsung | Yes | Broadcast can be a baseline for the minimum capability. We think at least eMBS multicast shall support what Rel-17 Broadcast supports. |
| vivo | Yes |  |
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**Summary:**

Based on the comments received, it seems agreeable that a UE supporting multicast reception in RRC\_INACTIVE state also supports the following components:

- 12-bit length of PDCP sequence number;

- ROHC profiles 0x0000, 0x0001, and 0x0002;

- 4 ROHC header compression context sessions as the minimum number;

- UM MRB with 12-bit length of RLC sequence number;

- UM MRB with 6-bit length of RLC sequence number.

Thus, the following proposal is given,

**Proposal 1: As a baseline, a UE supporting multicast reception in RRC\_INACTIVE state also supports the following components:**

**- 12-bit length of PDCP sequence number;**

**- ROHC profiles 0x0000, 0x0001, and 0x0002;**

**- 4 ROHC header compression context sessions as the minimum number;**

**- UM MRB with 12-bit length of RLC sequence number;**

**- UM MRB with 6-bit length of RLC sequence number.**

Last but not least, companies are invited to provide other open issues regarding the eMBS UE capability, which are not covered, if any.

**Q2: Are there any additional open issues for eMBS UE capability?**

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| **Company** | **Yes/No** | **Detailed comments** |
| Qualcomm | Yes | It should be made clear that the existing rel17 mcast capabilities are ONLY for CONNECTED mode and do not automatically apply in rel18 INACTIVE mcast. E.g. if a UE indicates support of ***maxModulationOrderForMulticast-r17,* that should not mean it supports those for INACTIVE mcast. Same applies for all other -r17 mcast capabilities. Then the question is should we clarify each -r17 or capture somewhere common the above principle? E.g.** 38.306: ***sps-Multicast-r17, s***hould we add a NOTE in rel18 spec that SPS is not supported for multicast reception in INACTIVE state?  Further discussion is needed on which of the rel-17 parameters like ***dynamicSlotRepetitionMulticastNTN-SharedSpectrumChAccess-r17, dynamicSlotRepetitionMulticastTN-NonSharedSpectrumChAccess-r17, maxModulationOrderForMulticast-r17, etc.*** apply as it is in CONN, and which one need new capabilities for INACTIVE compared to CONNECTED.  [RAPP] Based on the comment, the rapporteur assumes that the following 2 questions are raised by Qualcomm:  **1. Whether and how to clarify the R17 MBS multicast related capabilities are intended for multicast reception in RRC\_CONNECTED state (i.e. not supported for multicast reception in RRC\_INACTIVE state).**  **2. Whether some R17 MBS multicast related capability components are also applicable for multicast reception in RRC\_IANCTIVE (with new capability).**  For the first question, clarifications on SPS and HARQ feedback and PTP retransmission are captured in stage-2 spec. It is the rapporteur’s understanding that no further clarification is needed for stage-3 spec. Anyway, we can further discuss this based on contribution input.  An analysis on the second question can be found in R2-2309567. It is the rapporteur’s understanding that the current running CR is sufficient (p.s. we have also discussed whether to support FDMed multicast and unicast in INACTIVE or support Intra-slot multicast and unicast in INACTIVE during offline AT123bis-604, where most companies agree to not support those features). |
| Nokia | Yes | Maybe we should still list as open issue whether DCI 4\_2 is strictly not supported? This is not really not decided yet, right?  [RAPP] Based on the reply LS from RAN1, it is the rapporteur’s understanding that DCI 4\_2 (i.e. non fallback-DCI) cannot be supported in Rel-18 eMBS. Additionally, as per the running RRC CR, DCI 4\_2 related configuration cannot be indicated via RRC Release and multicast MCCH message. As a result, the UE cannot know the exact size of DCI 4\_2, thus not able to detect the DCI 4\_2. (NOTE: the size of DCI 4\_0/4\_1 is predefined and fixed). In this sense, the rapporteur would like to conclude that DCI 4\_2 is definitely not supported for eMBS. |
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**Summary:**

No proposal is made. Companies can consider the above comments and further discuss the potential issue in the upcoming meeting based on contribution input.