3GPP TSG-RAN WG3 #111e R3-211030

Online, 26 Jan- 5 Feb 2021

Agenda Item: 22.2.5

Source: Lenovo, Motorola Mobility (moderator)

Title: Summary of Offline Discussion on MBS Transmission Area

Document for: Approval

# Introduction

This paper provides summary of offline discussion on MBS transmission area.

**CB: # 74\_MBS\_TXarea**

**CATT**

**On NG-C interface, MBS service area info (e.g. a list of cell ID) should be indicated in the NGAP MBS session resource signaling for local multicast session.**

**On F1 interface, which cells to provide MBS service (e.g. a list of cell IDs) should also be indicated in the F1AP MBS session resource signaling for Multicast session.**

**introduce a concept of MBS Transmission Area.**

**introduce a concept of Multicast Transmission Area, to distinguish from the Multicast sevice area from SA2.**

**introduce a concept of Broadcast Transmission Area, and it is determined by MBS service area provided by 5GC.**

**Len,Moto**

**Within a gNB-DU, the gNB-DU can schedule the multicast traffic among multiple cells using a same G-RNTI and radio resources among these cells (i.e. called MC-PTM mode).**

**It is up to the gNB-CU makes the decision on which modes is configured to the UE i.e. PTP mode only, SC-PTM mode only, MC-PTM mode only, or both PTP and SC-PTM/MC-PTM modes.**

**It is up to the gNB-CU makes the decision on the MBS data transmission area of a MBS session.**

**MBS data transmission mode and MBS transmission area management are achieved by MBS Bearer Setup or MBS Bearer Modification procedure:**

**- The data transmission area (which is a cell or a cell list) is included in MBS BEARER SETUP REQUEST message.**

**\*\*\*\*\***

**- continue discussion on whether to introduce MBS transmission area; try to converge on general principles (maintain alignment with CB on architecture)**

**- avoid unnecessary details**

(Len - moderator)

Summary of offline disc [R3-211030](file:///C%3A%5CUsers%5Cpgodin%5CDesktop%5CphilipDocuments%5Ca_ran3new2%5Cran3111%5Cmeeting%5CCB%20%23%2074_MBS_TXarea%5CInbox%5CR3-211030.zip)

# For the Chairman’s Notes

1. **The following proposal which can be agreeable:**
* ***Proposal: On NG-C interface, multicast service area info (e.g. a list of cell IDs) is provided by 5GC at least for local multicast session.***
1. **A new issue for further confirmation:**
* ***It is FFS that a gNB-DU can schedule the multicast traffic among multiple cells using a same G-RNTI and radio resources among these cells.***
1. **There is no consensus on the FFSs identified in previous meetings:**
* ***FFS: whether to introduce the concept of "MBS transmission area" in RAN;***
* ***FFS whether CU or DU determines the MBS transmission area.***

# Discussion

The agreements in RAN3#110e:

* Broadcast session is associated with Broadcast service area which is provided by 5GC.
* On NG-C interface, Broadcast service area info (e.g. a list of cell IDs) is indicated in the NGAP MBS session resource signaling, for broadcast sessions. FFS for multicast session

The agreements in RAN3#109e:

* An MBS session is denoted by an MBS session identifier unique within the PLMN
* For multicast, the gNB determines the area in which MBS user data needs to be provided by knowledge of the UEs that have joined the MBS Session
* For multicast, the area in which MBS user data needs to be provided may be further limited by the multicast service area; input from SA2 expected
* For multicast, the area in which the MBS user data needs to be provided is deduced from UE Context data

## MBS service area for multicast session over NG interface

As discussed in RAN3#110e, it is still FFS on whether service area is needed for multicast session on the NG interface. As discussed in [1], according to the SA2 discussion, in order to support local MBS service, application function needs to be able to provide the local service area to 5GC and NG-RAN to ensure the local MB service can be delivered within some certain areas. Therefore, on NG-C interface, MBS service area info (e.g. a list of cell ID) also should be indicated in the NGAP MBS session resource signaling for local multicast session.

 **Question 1: Do you agree that MBS service area info (e.g. a list of cell ID) should be indicated in the NGAP MBS session resource signaling for local multicast session on NG interface?**

|  |  |  |
| --- | --- | --- |
| Company | Yes/No | Comment |
| Nokia | Yes | The multicast service area as defined by SA2 should be indicated. However the NGAP MBS session resource signaling is up to decision/definition in CB# 71. |
| Samsung | Yes |  |
| Huawei | Partially  | Only needed for local MBS service, for non-local MBS service, the MBS context is provided in the UE level PDU session context, thus no cell list is needed. |
| CATT | Yes |  |
| Ericsson |  | I see this topic being scattered around a couple of Agenda Items. This is a bit confusing. SA2 has some open items on the local MBS service discussions and I suggest to wait for their decisions. I do not expect too many surprises and enormous protocol impact on NG. |
| ZTE | Yes | Based on the definition of Multicast service, the area information is optional.Also, area info can be cell ID list, and SAI list as well. |
| Qualcomm | Yes |  |
| Lenovo, Motorola Mobility | Yes |  |

**Summary: 7 companies -> Yes at least for local MBS service; 1 company would like to wait for SA2’s decision.**

**Proposal: On NG-C interface, multicast service area info (e.g. a list of cell IDs) is provided by 5GC at least for local multicast sessions.**

## MBS transmission area for multicast session in RAN

As discussed in [2], for PTM, there may be two modes SC-PTM and MC-PTM. In SC-PTM mode, the gNB schedules the multicast traffic in a single cell via a cell specific G-RNTI. In the MC-PTM mode, the gNB schedules the multicast traffic among multiple cells using a same G-RNTI and radio resources among these cells. To improve the system performance, both SC-PTM and MC-PTM should be allowed. And the MC-PTM is network implementation and transparent to UEs.

**Question 2: Do you agree that the gNB-DU can schedule the multicast traffic among multiple cells using a same G-RNTI and radio resources among these cells (i.e. called MC-PTM mode)?**

|  |  |  |
| --- | --- | --- |
| Company | Yes/No | Comment |
| Nokia | - | Looks a RAN2 decision. |
| Samsung |  | Agree with Nokia |
| Huawei | yes | It is network implementation  |
| CATT |  | It is pending RAN2 whether / how to support MC-PTM. |
| Ericsson |  | Always had difficulties to understand the RAN3 part in this discussion. I suggest to remove the topic from the Agenda. |
| ZTE | - | Agree with Nokia, there are related discussion in RAN2 whether there will be area specific PTM configuration. Let's wait for RAN2's update. |
| Qualcomm | Yes |  |
| Lenovo, Motorola Mobility | Yes |  |

**Summary: There is no consensus on that gNB-DU can schedule the multicast traffic among multiple cells using a same G-RNTI and radio resources among these cells.**

In the [2], it is further proposed that because the he gNB-CU have full information (e.g. the UE distributions), for a single UE, the gNB-CU makes the decision on which modes is configured to the UE i.e. PTP mode only, SC-PTM mode only, MC-PTM mode only, or both PTP and SC-PTM/MC-PTM modes.

**Question 3: if the answer is yes to Q2, do you agree that it is up to the gNB-CU makes the decision on which modes is configured to the UE i.e. PTP mode only, SC-PTM mode only, MC-PTM mode only, or both PTP and SC-PTM/MC-PTM modes.**

|  |  |  |
| --- | --- | --- |
| Company | Yes/No | Comment |
| Nokia | No. | As explained in CB#72, which entity decides the mode switch between CU and DU should wait for RAN1/RAN2 progress on the definition of which measurements will be used. To make an educated decision, it is needed to consider all criteria when known. |
| Samsung | Yes | We agree gNB-CU at least need to make decision when configure the UE.  |
| Huawei | No | As agreed in the WID, the support of SFN is not explicitly discussed and specified. The mode switch entity can be discussed and concluded without considering SFN and any adaption to SFN is network implementation issue. |
| CATT |  | This should be discussed after there is definite conclusion about whether / how to support MC-PTM. |
| Ericsson |  | Wasn’t the same question posed in another CB already? we should avoid overlapping discussions. This is very much depending on RAN2 discussions. |
| ZTE |  | Not sure if Q3 and Q2 are related (we don't think so), but mode switch discussion will be in CB#72.  |
| Qualcomm | Yes | But, up to RAN2 |
| Lenovo, Motorola Mobility | Yes |  |

**Summary: There is no consensus on that it is up to the gNB-CU makes the decision on which modes is configured to the UE i.e. PTP mode only, SC-PTM mode only, MC-PTM mode only, or both PTP and SC-PTM/MC-PTM modes**

As discussed in [1], for F1 interface, given that multicast session support dynamic join/leave mechanism, and when an UE wants to join a session, it initiates RRC connection establishment procedure, so that the NG-RAN can knows the MBS context for the UE. Furthermore, the gNB-CU is the terminating point for RRC protocol and NG signaling connection. Therefore, the gNB-CU can know the real transmission area for multicast sessions, then it needs to notify gNB-DU over the F1 interface which cells to provide the MBS services. [2] also proposed that for SC-PTM and MC-PTM, the multicast area should also be selected. It could be better the gNB-CU makes the decision on the multicast area.

**Question 3: Do you agree to introduce the concept of multicast transmission area in RAN? Please companies provide your views.**

|  |  |  |
| --- | --- | --- |
| Company | Yes/No | Comment |
| Nokia | No. | We don’t see the need for introducing this additional concept in RAN3 specifications. |
| Samsung |  | Seems no usage |
| Huawei | NO | Agree with Nokia and Samsung |
| CATT | Yes | In any case, the actual transmission area for mulicast in RAN side, is different from the service area of 5GC. Since SA2 has such a concept, it seems reasonable for RAN to have a similar concept as MBS service area. |
| Ericsson |  | Always had difficulties to understand the RAN3 part in this discussion. I suggest to remove the topic from the Agenda. |
| ZTE | No | Agree with Nokia. |
| Qualcomm | No |  |
| Lenovo, Motorola Mobility | Yes |  |

**Summary: There is no consensus to introduce the concept of multicast transmission area in RAN.**

**Question 4: Do you agree that the Gnb-CU decides the multicast transmission area and sends it to Gnb-DU in F1-AP Signaling?**

|  |  |  |
| --- | --- | --- |
| Company | Yes/No | Comment |
| Nokia | No. | The model needs to be discussed in the CB#73. The DU could also consider all the cells involved through the MBS UE Contexts. |
| Samsung |  | DU can know the UE interested MBS information and the UE serving cell Id. Seems no need to indicate the transmission area.  |
| Huawei | NO |  |
| CATT | Yes | Agree with Nokia, it is related the discussion of the CB#73. In our understanding, a non UE associated procedure may be used for the establishment of corresponding shared F1-U tunnel, and cell id list may be indicated. |
| Ericsson |  | There is overlap with another CB, please avoid that. |
| ZTE |  | No strong view, for Multicast, the transmission follows where the UEs are, DU to decide in some cases is better (e.g., swifter response to UE's intra-CU mobility, better resource allocation by coordinating the load among cells) |
| Qualcomm | No |  |
| Lenovo, Motorola Mobility | Yes |  |

**Summary: There is no consensus on the gNB-CU decides the multicast transmission area and sends it to gNB-DU in F1-AP Signaling.**

More specifically, a definition of multicast transmission area is provided in [1] as the MBS transmission area for multicast session.

* Multicast transmission area: The area within which data of one or multiple Multicast session(s) are actually provided in RAN. The NG-RAN determines the area by knowledge of the UEs that have joined the MBS Session and deduction from UE Context data.

**Question 5: Do you agree the above definition of multicast transmission area for multicast sessions?**

|  |  |  |
| --- | --- | --- |
| Company | Yes/No | Comment |
| Nokia | No. | As said above we don’t see the need for introducing this additional concept in RAN3 specifications. |
| Samsung |  | Not ready for it. |
| Huawei | NO |  |
| CATT |  | Rely on the above discussion. |
| Ericsson |  | There is overlap with another CB, please avoid that. |
| ZTE | No | If this concept has anything to do with area specific PTM config, let's wait for RAN2 update. Otherwise, it seems not necessary. |
| Qualcomm | No |  |
| Lenovo, Motorola Mobility | No |  |

**Summary: the majority does not agree that new definition of the multicast transmission area in RAN for multicast sessions.**

## MBS transmission area in RAN for broadcast session

[1] proposes to introduce a broadcast transmission area in RAN for broadcast session and the definition of broadcast transmission area is provided as:

* Broadcast transmission area: The area within which data of one or multiple Broadcast session(s) are actually provided in NG-RAN. And it is determined by MBS service area provided by 5GC.

**Question 6: Do you agree to introduce the concept of broadcast transmission area in RAN? Please companies provide your views.**

|  |  |  |
| --- | --- | --- |
| Company | Yes/No | Comment |
| Nokia | No. | As explained in the proposed definition, we don’t see the difference with the broadcast area. |
| Samsung | No | We can first us service area, and avoid to introduce new concept until the usage is clear.  |
| Huawei | NO | What is additional function comparing with broadcast area(cells list)?  |
| CATT | Yes | From a standard point of view, the introduction of a RAN side concept would make the actual MBS transmission area for broadcast service clearer. |
| Ericsson |  | no need |
| ZTE | No. | Agree with Nokia. |
| Qualcomm | No |  |
| Lenovo, Motorola Mobility | No |  |

**Question 7: if the answer to Q6 is Yes, do you agree the above definition of broadcast transmission area?**

|  |  |  |
| --- | --- | --- |
| Company | Yes/No | Comment |
| Nokia | No. |  |
| Samsung | No |  |
| CATT |  | Rely on the above discussion. |
| Ericsson |  | no need |
| ZTE | No |  |
| Lenovo, Motorola Mobility | No |  |

**Summary: the majority does not agree to introduce the new concept of the broadcast transmission area for broadcast sessions in RAN.**

# References

1. R3-210462 Further Consideration on MBS Transmission Area (CATT)
2. R3-210621 (TP for BL CR 38.401) MBS Transmission Area Control between gNB-CU and gNB-DU (Lenovo, Motorola Mobility)