3GPP TSG-RAN WG3 Meeting #115-e R3-222473

Online, 21st February – 3rd March 2022

Agenda Item: 22.2.6

Source: Lenovo, Motorola Mobility (moderator)

Title: Summary of Offline Discussion on MBS Local Area

Document for: Approval

# Introduction

This contribution provides the summary of offline discussion on:

**CB: # MBS4\_Others**

**- For location dependent MBS and limited area MBS:**

**- How to provide the MBS Service Area?Information in?NGAP?Distribution Setup Response, XnAP Handover Request, NGAP Handover Request,?NGAP Handover Required,?NGAP Path Switch Request ACK.**

**- Whether and how to add the MBSSAI to the MBS Service Area Information.**

**- Capture agreements and provides TPs and LS if agreeable.**

(Lenovo - moderator)

Summary of offline disc [R3-222473](file:///C:\Users\EALEVES\OneDrive%20-%20Ericsson%20AB\Documents\3GPP\TSG_RAN\WG3\TSGR3_115-e\Inbox\Drafts\CB%20%23%20MBS4_Others\Inbox\R3-222473.zip)

Phase I：Please provide your inputs before UTC time 8:00am Thursday 24th Feb.

Phase II: Stage 2&3 TPs [TBD].

# For the Chairman’s Notes

The following proposals can be agreed:

Propose the following:

R3-20xxxa, R3-20xxxc merged

R3-20xxxc rev [in xxxg] – agreed

R3-20xxxd rev [in xxxh] – agreed

R3-20xxxe rev [in xxxi] – agreed

R3-20xxxf rev [in xxxj] – endorsed

Propose to capture the following:

**Agreement text…**

**Agreement text…**

**WA: carefully crafted text…**

**Issue 1: no consensus**

**Issue 2: issue is acknowledged; need to further check the impact on xxx. May be possible to address with a pure st2 change. To be continued…**

# Discussion

### New MBS Service Area Concept (MBS SAI)

[2] thinks that in some cases the flexibility and or granularity of the TAI is not sufficient, and the Cell List information may be updated due to network configuration/energy saving and the cell information should be agnostic and transparent to CN. It is proposed that to include a new MBS Service Area concept (MBS SAI) in the MBS Service Area Information:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **IE/Group Name** | **Presence** | **Range** | **IE type and reference** | **Semantics description** |
| **MBS Service Area Cell List** |  | *0..<maxnoofCellsforMBS>* |  |  |
| *>*NR CGI [FFS] | M |  | 9.3.1.7 |  |
| **MBS Service Area TAI List** |  | *0..<maxnoofTAIforMBS>* |  |  |
| *>*TAI | M |  | 9.3.3.11 |  |
| **Supported MBS SAI List** |  | *0..<maxnoofMBSSAIs>* |  | FFS: PLMN / NID dependancy of MBS SAI. also whether the *Broadcast PLMN Identity Info List* needs that input. |
| *>MBS Service Area Identity* | M |  | OCTET STRING(2) |  |

In In the previous meetings, RAN3 has agreed to introduce an MBS xxx ID/SAI for broadcast session in the section 22.4:

*RAN3#114bis-e:*

MBS xxx ID/SAI is used to identify a preconfigured MBS area and it could be provided to RAN node via OAM.

Name the MBS xxx ID/SAI as SAI in the interim before SA2 gives final name. As to the length of SAI, it depends on the decision of SA2.RAN3 send LS to SA2 on the conclusion in RAN3

Exchange the list of SAI that neighbor cells supported via Xn interface. In case of CU/DU split, SAIs of each cell should be configured in DU by OAM and be provided from DU to CU.

Check the view of SA2 on the necessity of indication of session start success or failure with cell accuracy.

From moderator point view, the following issues need to be clarified:

- whether the new MBS Service Area concept (MBS SAI) is the same with MBS xxx ID/SAI which was agreed for broadcast session in section 22.4; and

- whether the new MBS Service Area concept (MBS SAI) is also applied to multicast session.

- whether the new MBS Service Area concept (MBS SAI) is the same with the LTE MBMS Service Area as defined in TS 36.443:

9.2.3.6 MBMS Service Area

The MBMS Service Area IE consists of a list of one or several MBMS Service Area Identities where each MBMS Service Area Identity is frequency agnostic and can be mapped onto one or more cells.

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| --- | --- | --- | --- | --- |
| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
| MBMS Service Area | M |  | OCTET STRING | Value part coded per MBMS Service Area AVP as defined in TS 29.061 [9]. |

**Q1: Do you think that it is agreeable to introduce a new MBS Service Area concept (MBS SAI) in the MBS Service Area Information. If the new MBS Service Area concept (MBS SAI) is agreeable, do you agree to add the new MBS Service Area concept (MBS SAI) to the NG Setup and NG RAN Configuration update procedures?**

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| --- | --- | --- |
| **Company** | **Yes/No** | **Comments** |
| Ericsson |  | the main aim of our persistence in that topic is to decouple cell configuration (i.e. RAN internal matters) from MBS service area indications. The best would be to indicate the MBS service area by (whatever sort of) geographical indication. The best to achieve that would be to introduce a kind of “abstraction”, where an identifier, dissociated with TAI/cell denotes a geographical meaning. |
| Nokia | No | We should stick to the model designed by SA2 TS 23.247. This option was discussed by SA2 last year during stage 2 and ruled out. It is too late to re-discuss it now and to add yet another option and should be brought again to SA2 anyway. |
| Huawei | NO | Agree with Nokia. We should respect the conclusion of SA2. |
| ZTE | No | We do not think it is necessary to introduce a new definition which is not described in SA2 spec. In addition, SA2 has sent LS(R3-222504) on the MBS Service Area concept. We prefer to use the FSI instead of the legacy SAI. |
| Lenovo | No | It should be discussed in SA2 firstly. As pointed by Nokia, SA2 did not agree it. |

**Q2: If the new MBS Service Area concept (MBS SAI) is agreeable, companies are invited to provide their views on the following issues to be clarified:**

**- Issue 1: whether the new MBS Service Area concept (MBS SAI) is the same with MBS xxx ID/SAI which was agreed for broadcast session in section 22.4?**

**- Issue 2: whether the new MBS Service Area concept (MBS SAI) is also applied to multicast session?**

**- Issue 3: whether the new MBS Service Area concept (MBS SAI) is the same with the LTE MBMS Service Area as defined in TS 36.443. If not, how to define the format of the new MBS SAI？**

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| **Company** | **Yes/No for each issue** | **Comments on the issues** |
| Ericsson |  | This we cannot say. It seems that there is an agreement outside RAN3 that rather talks of an area ID used for BC frequency selection only. As long as our main aim as clarified in Q1 is achieved, we are fine. |
| Nokia | Not agreeable | See answer above.  There is no link with the MBS xxx ID/SAI which has been introduced last time for frequency layer prioritization and the new Ericsson proposal. Reusing similar name just brings additional confusion.  In our understanding, this new Ericsson proposal was discussed by SA2 last year during stage 2 and ruled out. It is too late to re-discuss it now and add yet another option, and should be brought again to SA2 anyway. |
| Huawei | NO | Agree with Nokia. |
| ZTE |  | Please check our comments in Q1. |
| Lenovo |  | See comments to Q1. |

### MBS Service Area Information for local multicast session

In RAN3#114bis-e, it was agreed that:

***Do not provide the full list of (MBS Are Session ID + MBS Service Area) information for the MBS Session in PDU Session Resource Setup/Modify Request message.***

And the following FFSes were identified:

***Whether to provide a list of {MBS Are Session ID + MBS Service Area} in Session Activation Request message and Distribution setup Response message.***

***Whether to provide a single {MBS Service Area + (optional) MBS Area Session ID} in the Session Activation Request message and Distribution setup Response message, and PDU Session Resource Setup/Modify Request message.***

For location dependent MBS service, the full list of {MBS Area Session ID + MBS Service Area} are useful for handover propose, e.g. for admission control in the target gNB to decide whether the location dependent service is still valid or not. Then the full list of {MBS Area Session ID + MBS Service Area} should be provided from MB-SMF to the gNB in Distribution Setup Response message as specified in TS 23.247. Including in Activation Request is redundant and not always received by NG-RAN nodes.

**Q3: Do you agree that for delivery of location dependent contents of a multicast session, the full list of** **{MBS Area Session ID + MBS Service Area Information} should be provided from MB-SMF to the gNB in Distribution Setup Response message?**

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| --- | --- | --- |
| **Company** | **Yes/No** | **Comments** |
| Ericsson | No | In principle, MBS Service Area information needs to be provided to the gNB, in which message is debated also in MBS#2 CB. Whether this is the “full” information or only “partial”, whatever that means, it should enable the gNB to determine handling of intra- and inter-node mobility. Which amount of information is necessary for that is probably a configuration/implementation/deployment matter and requires at most stage 2 specification. |
| Nokia | Yes but partly | This is covered in the CB MBS\_2\_Sess on Session Management.  A list should be provided in the Distribution Setup Response, but as explained by Ericsson whether this is full or partial needs not be specified in stage 3. This list should at least cover the receiving gNB for the mobility but may not necessarily be the full full list. |
| Huawei | Yes | The SA2 has clarified that a list should be contained in the DISTRIBUTION SETUP RESPONSE message.  Regard to “full” or “just the gNB related”, we agree that this should be stage 2 specification said by Ericsson. Based on the progress of the discussion, there is no mechanism to allow MB-SMF filter out the information for the related RAN node, it is better to provide the full list. |
| ZTE | Yes | We are fine for this proposal, but this part is discussing in the CB MBS2. Shall we wait for the outcome of MBS2? |
| Lenovo | Yes | We tend to agree that ‘full’ may not be needed. But a list of {MBS Area Session ID + MBS Service Area Information} should be provided.  We also agree that the detailed message is pending to CB#MBS2. |

### Handover procedure for multicast service available within a limited area

In RAN3#114e, it was agreed that:

* To support provision of multicast content within a limited area during handover, for each active MBS multicast Session, Service Area Information may be provided to the target gNB within handover related signalling. FFS on the impact on handover related signaling.

The basic procedure is specified in section 7.2.4.3.3 of TS 23.247:

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| 7.2.4.3.3 Handover procedure with limited area MBS session  The Handover procedure for the UE is performed as defined in clause 7.2.3 with the following additions:  - If the UE is camping at the Source RAN node and receiving multicast data corresponding to the MBS Session ID via the 5GC Shared MBS traffic delivery before the Handover, for Xn based handover in clause 7.2.3.2, the Source RAN node includes MBS Session ID and MBS service area to the Target RAN node during Handover Preparation phase. For N2 based handover in clause 7.2.3.3, this step corresponds to Handover Request and Handover Required message, respectively.  NOTE: During the Xn or N2 handover procedures, if the target RAN node does not support MBS, the associated QoS flow is established at the Target RAN side regardless whether the UE is still in the MBS service area.  - If the UE is camping at the Source RAN node and receiving multicast data corresponding to the MBS Session ID via the 5GC individual MBS traffic delivery before the Handover, for the N2 Handover in clause 7.2.3.4, the SMF includes MBS session area information (MBS Session ID and MBS service area) in N2 SM information to the Target RAN node in Handover request.  - If the Target RAN node support MBS, it determines whether to establish the resources for multicast distribution for MBS Session ID, based on the received MBS Session ID provided by the source RAN (if source RAN support MBS) or SMF (if source RAN not support MBS), and location of the UE. If UE is not in the in the MBS service area provided by the source RAN (if source RAN support MBS) or SMF (if source RAN not support MBS), the Target RAN does not allocate RAN resources for the multicast MBS Session to the UE.  - If the target RAN node support MBS, when it determines that the UE is in the location area and that the shared delivery is not established for the multicast session ID, the target NG-RAN initiates the shared delivery establishment as specified in clause 7.2.1.4. |

According to the above specification, the impact on Xn based handover related signalling is Xn-AP: MBS Service Area Information per MBS Session ID is included in the HANDOVER REQUEST message. There are two options to implement the detailed IEs:

- Option 1: the MBS Service Area Information per MBS Session ID is included in the *PDU Session Resources To Be Setup List* IE.

- Option 2: the MBS Service Area Information per MBS Session ID of each active multicast session is provided by separate IE from the *PDU Session Resources To Be Setup List* IE.

Since the MBS session information including the associated unicast QoS flow info has to be provided in the *PDU Session Resources To Be Setup List* IE, it is easy to include the MBS Service Area (Cell List and/or TA List) per MBS Session ID is included in the *PDU Session Resources To Be Setup List* IE.

**Q4: Do you agree that to support Xn based handover for the multicast service available within a limited area,**

* **Xn-AP: the MBS Service Area Information per MBS Session ID of each active multicast session is included in the *PDU Session Resources To Be Setup Lis*t IE in the HANDOVER REQUEST message?**

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| **Company** | **Yes/No** | **Comments** |
| Ericsson |  | But in principle, Xn HO should enable the transfer of sufficient MBS Session context information to allow establishment of MBS resources at the target in case the UE is the first to enter the target node, whereas fulfillment of “sufficient information” is a matter of configuration/deployment/implementation.  But the place is wrong, MBS Session context information to be provided outside PDU Session related IEs, and only if an active session is ongoing. |
| Nokia | Yes. |  |
| Huawei | Yes. | It is unnecessary to provide MBS session information in different places, which have no additional gain. |
| ZTE | YES | We prefer to follow SA2’s spec. |
| Lenovo | Yes | In handover procedure only UE associated signalling can be used. In this case, it is natural to include the MBS service area information in the *PDU Session Resources To Be Setup Lis*t IE. |

Regarding the NG based handover of the limited area multicast service, the following impacts are observed:

* If the source gNB does not support MBS, the MBS Service Area (Cell List and/or TA List) per MBS Session ID should be included in the *Handover Request Transfer* IE in the HANDOVER REQUEST message.
* If the source gNB supports MBS, the MBS Session ID and MBS Service Area information should be provided in the *Source NG-RAN Node to Target NG-RAN Node Transparent Container* IE, to be carried via the HANDOVER REQUEST and HANDOVER REQUIRED messages.

**Q5: Do you agree that to support NG based handover for the multicast service available within a limited area,**

* **NG-AP: the MBS Service Area Information per MBS Session ID of each active multicast session is included in the *Handover Request Transfer* IE in the HANDOVER REQUEST message and in the *Source NG-RAN Node to Target NG-RAN Node Transparent Container* IE?**

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| --- | --- | --- |
| **Company** | **Yes/No** | **Comments** |
| Ericsson | No | no Service Area information necessary anywhere in the NG HO messages. |
| Nokia | Yes. |  |
| Huawei | Yes. |  |
| ZTE | Yes |  |
| Lenovo | Yes | Cannot understand Ericsson’s comments why service area information is not needed. It is also possible the MBS service information is not available of the MBS session in the target during the NG handover procedure. In this case, the MBS service information is needed for handover admission control. |

### Handover procedure for local multicast service with the location-dependent content

In RAN3#114bis-e, there is an FFS:

* To support provision of local multicast service with the location-dependent content during handover, for each active MBS multicast Session, Service Area Information per Area Session ID may be provided to the target gNB within handover related signalling. FFS on the detailed impact on handover signalling.

As specified in the section 7.2.4.2.3, the impact on Xn and NG based handover related signalling can be observed.

|  |
| --- |
| - If the UE is camping at Source RAN and receiving multicast data corresponding to the MBS Session ID and Area Session ID via the 5GC Shared MBS traffic delivery before the handover, for the Xn Handover (comparing with the clause 7.2.3.2), the following applies:  - The Source RAN node includes MBS Session ID, Area Session ID and MBS service area where the UE resides to the Target RAN node.  - If the UE is camping at Source RAN and receiving multicast data corresponding to the MBS Session ID and Area Session ID via the 5GC Shared MBS traffic delivery before the handover, for the N2 Handover (comparing with the clause 7.2.3.2), the following applies:  - The source RAN node includes MBS session area information (MBS Session ID, Area Session ID and MBS service area where the UE resides) to the Target RAN node in Handover Required message.  - The SMF forwards the RAN container information and may also include MBS session area information (MBS Session ID, Area Session ID and MBS service area) to the Target RAN in Handover request.  If the UE has moved to another MBS service area of the MBS session:  - If the target NG-RAN node support MBS and RAN resource has not been allocated, the SMF provides the MBS session information related to the new Area session ID to NG-RAN. For Xn handover, the SMF uses the Path Switch reply message. For N2 handover, the SMF updates the PDU session after the completion of the handover procedure. Per the received the MBS session information, the 5GC shared delivery is established. |

According to the above specification, the impact on Xn based handover related signalling is:

* Xn-AP: a list of {MBS Area Session ID + MBS Service Area Information} per MBS Session ID for each active multicast session is included in the *PDU Session Resources To Be Setup List* IE in the HANDOVER REQUEST message;
* NGAP: a list of {MBS Area Session ID + MBS Service Area Information} per MBS Session ID of each active multicast session is included in the *Path Switch Request Acknowledge Transfer* IE in the PATH SWITCH REQUEST ACKNOWLEDGE message.

**Q6: Do you agree that to support Xn based handover for the multicast service available within a location dependent content:**

* **Xn-AP: a list of {MBS Area Session ID + MBS Service Area Information} per MBS Session ID for each active multicast session is included in the *PDU Session Resources To Be Setup List* IE in the HANDOVER REQUEST message; and**
* **NGAP: a list of {MBS Area Session ID + MBS Service Area Information} per MBS Session ID of each active multicast session is included in the *Path Switch Request Acknowledge Transfer* IE in the PATH SWITCH REQUEST ACKNOWLEDGE message?**

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| --- | --- | --- |
| **Company** | **Yes/No** | **Comments** |
| Ericsson | No | no no! no (common) MBS Session information in (per UE) PDU Session information, but MBS Session context information outside from PDU Session information.  Therefore, no impact on the path switch procedure of that sort. |
| Nokia | Yes | This is aligned with SA2 TS 23.247. |
| Huawei | Yes | Please RAN3 respect the agreement of SA2.  Path Switch procedure is used for Xn handover to another MBS service area. If the UE has moved to another MBS service area of the MBS session, the CN should indicate the new Area Session ID anyway. |
| ZTE | Yes |  |
| Lenovo | Yes | Firstly, a list of {MBS Area Session ID + MBS Service Area Information} per MBS Session ID for each active multicast session should be included in the *PDU Session Resources To Be Setup List* IE in the HANDOVER REQUEST message.  Regarding Path Switch, we can check further if Ericsson is not convinced. |

And the impact on NG based handover related signalling is:

* NG-AP: a list of {MBS Area Session ID + MBS Service Area Information} per MBS Session ID of each active multicast session is included in the *Handover Request Transfe*r IE in the HANDOVER REQUEST message; andin the *Source NG-RAN Node to Target NG-RAN Node Transparent Container* IE.

**Q7: Do you agree that to support NG based handover for the multicast service available within a location dependent content:**

* **NG-AP: a list of {MBS Area Session ID + MBS Service Area Information} per MBS Session ID of each active multicast session is included in the *Handover Request Transfe*r IE in the HANDOVER REQUEST message; andin the *Source NG-RAN Node to Target NG-RAN Node Transparent Container* IE?**

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| **Company** | **Yes/No** | **Comments** |
| Ericsson | ? | This is probably not entirely related to that CB.  But in principle, Xn HO should enable the transfer of sufficient MBS Session context information to allow establishment of MBS resources at the target in case the UE is the first to enter the target node, whereas fulfillment of “sufficient information” is a matter of configuration/deployment/implementation.  For NG based HO this approach is not necessary.  But: is the question now for Xn or NG based HO? a bit confusing, to be honest. |
| Nokia | Yes. | This is aligned with SA2 TS 23.247. |
| Huawei | Yes. | This is used for NG handover to provide the MBS service area information. |
| ZTE | Yes |  |
| Lenovo | Yes | @Ericsson, sorry for the typo, it is for NG based handover.  Cannot understand Ericsson’s comments why service area information is not needed. It is also possible the MBS service information is not available of the MBS session in the target during the NG handover procedure. In this case, the MBS service information is needed for handover admission control. |

# References

1. R3-221993 Handover Signalling for Local Multicast Session (Lenovo, Motorola Mobility, Nokia, Nokia Shanghai Bell, Qualcomm Incorporated, ZTE)
2. R3-222065 Discussion on MBS service areas (Ericsson)
3. R3-222166 (TP to TS 38.300 BL CR) Support of Local MBS (Huawei, CBN, China Unicom)
4. R3-222182 TP for 38300 on local MBS (ZTE Corporation)