**3GPP TSG-RAN2 Meeting #119-e** **R2-2208884**

**Online, 17 - 29 August, 2022**

**Agenda Item:** 6.1.1

**Release:** Rel-17

**Work Item:** NR\_MBS-Core

**Source:** Qualcomm Incorporated

**Title:** [Offline 605] discussion report: Reply LS to SA4

**Document for:**Discussion/Decision

# Introduction

As part of Rel-17 MBS, RAN2 had sent an LS on the MBS broadcast service continuity and MBS session identification to SA4/RAN3/SA2 in [R2-2108914](http://www.3gpp.org/ftp//tsg_ran/WG2_RL2/TSGR2_115-e/Docs//R2-2108914.zip).

Following questions were asked to SA4/RAN3/SA2:

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| To support the MBS service continuity, RAN2 would like to ask SA2, RAN3 and SA4 the following question:  **Question 1: Can an “MBS ID” (e.g. SAI) be defined for NR MBS for use in SIB and the upper layer signalling (e.g. USD), to avoid too many TMGIs from being broadcast in System Information?**  **Question 2: Can the mapping between frequency and MBS service/session be provided in the upper layer signalling (e.g. USD), as in LTE SC-PTM?** |

RAN2#119e received LS reply from SA4 where SA4 indicated the following feedback for Q2:

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| *Question 2: Can the mapping between frequency and MBS service/session be provided in the upper layer signalling (e.g. USD), as in LTE SC-PTM?*  Feedback: Similar to the parameters as defined for the MBMS User services in TS 26.346, such as frequency (coded as EARFCN), subcarrier-spacing or bandwidth may be added to the MBS Distribution Session data entity inside the MBSF. |

SA4 also indicated the following action for RAN2:

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| **ACTION:** Please provide details of radio parameters needed to be added (if any) to the MBS Distribution Session data entity. |

Note that SA4 reply didn’t include any direct response to Q1. This was discussed online. Relevant chairs note is also captured for quick reference.

[R2-2206977](http://www.3gpp.org/ftp//tsg_ran/WG2_RL2/TSGR2_119-e/Docs//R2-2206977.zip) Reply LS on the MBS broadcast service continuity and MBS session identification ([S4-220827](http://www.3gpp.org/ftp//tsg_sa/WG4_CODEC/TSGS4_119-e/Docs//S4-220827.zip); contact: Qualcomm) SA4 LS in Rel-17 NR\_MBS-Core, 5MBP3 To:RAN2 Cc:RAN3, SA2

* CATT thinks SA4 did not confirm the question that RAN2 actually asked (Q1 in RAN2 LS). Xiaomi thinks SA4 specs already captures what RAN2 asked for. Samsung indicates SA4 refers to parameters which are not relevant for NR, so we can indicate this to them. Ericsson thinks some signalling can help. ZTE agrees with intention from SA4 to include additional parameters, but agree with Samsung that this may not be relevant in NR any more. ZTE suggests to leave this for R18 MBS. Huawei shares view with ZTE. QCM thinks we need to add at least frequency.
* Noted
* Discuss offline the reply to SA4 LS, i.e. what is needed in Rel-17, clarify what is not relevant in NR, can mention that we might consider additional info for Rel-18.
* We will reply to this LS. [offline QCM]
* [AT119-e][605][MBS-R17] Reply LS to SA4 (Qualcomm)

Scope: Discuss the reply to SA4 LS in [R2-2206977](http://www.3gpp.org/ftp//tsg_ran/WG2_RL2/TSGR2_119-e/Docs//R2-2206977.zip), i.e. what is needed in Rel-17, clarify what is not relevant in NR, can mention that we might consider additional info for Rel-18.

Outcome: Reply LS

Deadline: Agreeable LS available EOM

This offline is for the Rely LS to SA4. The plan is to first collect initial feedback before discussing the exact wording of the draft LS reply based on the feedback. So, the deadline for initial phase is proposed as follows:

**Deadline for initial feedback (answer to questions below): 23:59 UTC Monday August 22.**

# Contact information

|  |  |  |
| --- | --- | --- |
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# History

During RAN2#116e, following reply was received from SA2. Corresponding discussion and RAN2 agreements are copied below:

[R2-2111244](http://www.3gpp.org/ftp//tsg_ran/WG2_RL2/TSGR2_116-e/Docs//R2-2111244.zip) Reply LS on MBS broadcast service continuity and MBS session identification ([S2-2108175](http://www.3gpp.org/ftp//tsg_sa/WG2_Arch/TSGS2_147E_Electronic_2021-10/Docs//S2-2108175.zip); contact: Huawei) SA2 LS in Rel-17 NR\_MBS-Core, 5MBS To:RAN2, RAN3 Cc:SA4, SA6

- Huawei think SA2 will not continue the discussion on frequency info in higher layer unless R2 replies with a motivation why we want that. Nokia agrees. Xiaomi as well. CATT as well. Ericsson think indeed this could be useful (for some use cases). QC agree this is useful.

- ZTE think we don't really want it, we just wanted feedback from SA2. Don't agree with Huawei.

* Noted
* RAN2 think frequency info in USD is useful (at least for some use cases)
* We will reply giving some motivations for freq info in USD.

The above LS reply from SA2 included the following answer related to Q1:

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| SA2 answer: SA2 agrees to introduce an additional MBS identifier for reducing the volume broadcasted in SIB. The identifier can be associated with several TMGIs to avoid that those TMGIs need to be broadcasted in the System Information.SA2 did not yet conclude whether this additional identifier will denote service areas. SA2 intends to agree related CRs that detail the concept and related procedures in the next meeting. The additional MBS identifier can be used in SIB and the service announcement for Broadcast. |

Subsequently, following was sent to SA2 with CC: SA4, SA6, RAN3:

[R2-2111511](http://www.3gpp.org/ftp//tsg_ran/WG2_RL2/TSGR2_116-e/Docs//R2-2111511.zip) Further reply on MBS broadcast service continuity RAN2 LS out

* [052] Approved

This LS from RAN2 included the following text:

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| RAN2 would like to thank SA2 for their LS in [S2-2108175](http://www.3gpp.org/ftp//tsg_sa/WG2_Arch/TSGS2_147E_Electronic_2021-10/Docs//S2-2108175.zip) and for agreeing to introduce additional MBS identifier in upper layer signalling to allow for reducing the volume broadcasted in SIB. |

SA2 replied with the following:

[R2-2200142](http://www.3gpp.org/ftp//tsg_ran/WG2_RL2/TSGR2_116bis-e/Docs//R2-2200142.zip) LS on MBS broadcast service continuity and MBS session identification ([S2-2109187](http://www.3gpp.org/ftp//tsg_sa/WG2_Arch/TSGS2_148E_Electronic_2021-11/Docs//S2-2109187.zip); contact: Huawei) SA2 LS in Rel-17 NR\_MBS-Core, 5MBS To:RAN2 Cc:RAN3

|  |
| --- |
| SA2 is working on finalization of the works for MBS SAI.  SA2 gets the consensus that the frequency can be provided in the upper layer signalling. SA2 has agreed the attached CR and kindly requests RAN2 and RAN3 for feedback on SA2's agreements, if any. |

Later, another LS was initiated by RAN3, which was replied by SA2 and sent to RAN2:

[R2-2203727](http://www.3gpp.org/ftp//tsg_ran/WG2_RL2/TSGR2_117-e/Docs//R2-2203727.zip) Reply LS on MBS Service Area Identity and start procedure for broadcast service ([S2-2201517](http://www.3gpp.org/ftp//tsg_sa/WG2_Arch/TSGS2_149E_Electronic_2022-02/Docs//S2-2201517.zip); contact: CATT) SA2 LS in Rel-17 5MBS, NR\_MBS-Core To:RAN3, RAN2, SA6 Cc:SA4, SA5

- R2 to decide length of ID

- Huawei are ok w 3 bytes. LGE also think we can follow SA2 suggestion of 3 bytes

- Lenovo think 2 bytes is sufficient.

- CATT are ok with 2 or 3 bytes.

* MBS FSA ID is 3 bytes

RAN2 replied to: SA2, Cc: RAN3, SA4 with the following:

[R2-2203902](http://www.3gpp.org/ftp//tsg_ran/WG2_RL2/TSGR2_117-e/Docs//R2-2203902.zip) Reply LS on the Length of MBS Service Area Identity RAN2 LS out Rel-17 5MBS To:SA2 Cc:RAN3,SA4

* [066] Approved

Now, regarding the Q1 in RAN2’s LS, as contact company for the LS from SA4, rapporteur checked with SA4 contact on why Q1 was not included in the reply. Because all the above LSes also went to SA4 (either as To or CC), it is our understanding that SA4 didn’t see a need to further respond to Q1 because it was already agreed by SA2, communicated to RAN2 and SA4, and SA4 already captured in their specification. The following text can be found in TS 26.517.

|  |
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| - The serviceArea element declares the one or more service areas in which the MBS Session corresponding to this MBS Distribution Session is currently available. |

This is further clear from the SA4 meeting minutes shown below (from [S4-220745](http://www.3gpp.org/ftp//tsg_sa/WG4_CODEC/TSGS4_119-e/Docs//S4-220745.zip)):

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| |  |  |  |  | | --- | --- | --- | --- | | [S4-220705](http://www.3gpp.org/ftp//tsg_sa/WG4_CODEC/TSGS4_119-e/Docs//S4-220705.zip) | LS on the MBS broadcast service continuity and MBS session identification | RAN2 | Jayeeta Saha |     **Online Discussion:**   * Was presented by Frederic. * Richard: They are worried about allocating too much space to TMGIs. But for the majority of sessions there will be only one TMGI. * Thomas: On question 2, we can say we are reusing something from MBMS. * Qi: I have found an answer from SA2 ([S2-2108175](http://www.3gpp.org/ftp//tsg_sa/WG2_Arch/TSGS2_147E_Electronic_2021-10/Docs//S2-2108175.zip)). * Frederic: Are we fine with the SA2 answer? Do we want to add anything?   **Decision:**   * Will be responded to in 815 by Thomas. |

**Observation 1: No further answer is expected from SA4 on Q1 as SA2 have already replied to RAN2 and SA4.**

**Question 1: Any comments on the above observations?**

|  |  |
| --- | --- |
| **Company** | **Comment** |
| ZTE | Yes. Both RAN and SA WGs have already passed stage 3, the naming/feature is already a fait accompli. |
| Kyocera | We agree with the rapporteur’s observation. |
| vivo | We agree with the rapporteur’s observation. |
| LGE | We agree with the rapporteur’s observation. |
| CATT | According to the spec 38.304,We expect there are mapping between MBS FSAI and MBS broadcast service in the USD.it is not clear whether there is such mapping info in USD.  In SA2 spec,it states that the the mapping info between MBS FSAI and broadcast session are communicated in the service announcement towards the UE. It is not clear whether “service announcement” mentioned by SA2 equal to USD.if it can be confirmed on this point,then we are OK with Observation 1.  //TS 38.304  If the MBS broadcast capable UE is receiving or interested to receive an MBS broadcast service(s) and can only receive this MBS broadcast service(s) by camping on a frequency on which it is provided, the UE may consider that frequency to be the highest priority during the MBS broadcast session as specified in TS 38.300 [2] as long as the two following conditions are fulfilled:  1) The cell reselected by the UE due to frequency prioritization for MBS is providing SIB20;  2) Either:  - One or more MBS FSAI(s) of that frequency is indicated in SIB21 of the serving cell and the same MBS FSAI(s) is also indicated for this MBS broadcast service in MBS User Service Description (USD) as specified in TS 26.346 [20], or  It has been captured in SA2 spec that the the mapping info between  //23.247  The MBS FSA ID(s) of a broadcast MBS session are communicated in the service announcement towards the UE. The UE compares those MBS FSA IDs(s) with the MBS FSA ID(s) in SIBs for frequency selection.  [QC] our understanding is the service announcement is in the USD, so USD can have mapping between MBS FSAI and MBS broadcast service. |
| OPPO | We agree with the rapporteur’s observation. |
| Ericsson | We agree that no further LSs are needed, i.e. RAN2 can assume that Frequency and FSAI are included in the service announcement and USD. We have the understanding that SA4 only has to complete their stage 3 details, e.g. clarify the encoding for serviceArea and radioFrequencyelement.  FYI: in 26.346 it says:  The semantics of *r12:serviceArea* shall comply to the *MBMS Service Area Identity* as defined in TS 23.003 [4] and TS 36.443 [104].  The *radioFrequency* element indicates the one or more RF frequencies in the E-UTRAN downlink which transmit this MBMS User Service over the service area(s) identified by the *serviceArea* element. The frequency parameter is coded as EARFCN in 3GPP TS 36.101 [105]. |
| Sharp | We agree with the rapporteur’s observation. |
| Samsung | We agree with the rapporteur’s observation. |
| Intel | Agree with rapporteur’s observation. |
| Futurewei | Agree with rapporteur’s observation. |
| Nokia | Agree with rapporteur. We have relevant FSAI information in specs. |
| MediaTek | Agree with rapporteur’s observation. |
| Xiaomi | Agree with rapporteur’s observation. |

**Summary:** Companies have common understanding on observation 1. No further answer is expected from SA4 on Q1 as SA2 have already replied to RAN2 and SA4.

# Discussion: Reply LS to SA4

## What is needed for Rel-17

### Frequency Information

In the context of Rel-17 discussion, going back to RAN2#116e, it was already discussed and agreed that frequency info in USD is useful, as shown in the agreements above. This has been further confirmed by SA2 and captured in SA4 specifications.

**Observation 2: For Rel-17 MBS, RAN2#116e already agreed that frequency info in USD is useful (at least for some use cases) and communicated to other groups. SA2 already confirmed and SA4 already added it in their specifications.**

**The main discussion point now for Rel-17 is whether something is missing and whether anything more is needed?**

For LTE, TS 26.346 (which SA4 also referred in their reply LS) captured the following:

|  |
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| The *availabilityInfo* element shall include one or more *infoBinding* elements. The *infoBinding* element shall contain the child elements *serviceArea* and *radiofrequency*. A UE shall be capable of processing an *infoBinding* element that does not contain the child element *serviceArea*. Note that for backwards compatibility reasons, *serviceArea* needs to be indicated as optional in the USD schema (i.e. ‘minOccurs="0"’). The *serviceArea* element declares the one or more service areas over which this MBMS User Service is provided. This element is designated by the *MBMS Service Area Identity* (SAI) as defined in 3GPP TS 36.443 [104] and 3GPP TS 23.003 [77]. According to 3GPP TS 36.443 [104], *MBMS Service Area Identity* is frequency agnostic and can be mapped onto one or more cells. The specific usage of the *MBMS Service Area Identity*, or its correlation to other network identification information,is not defined in this specification. The *radioFrequency* element indicates the one or more RF frequencies in the E-UTRAN downlink which transmit this MBMS User Service over the service area(s) identified by the *serviceArea* element. The frequency parameter is coded as EARFCN in 3GPP TS 36.101 [105]. The MBMS client shall forward the service area and radio frequency information received in the USD to the lower layers, and the UE is expected to make use of such information in accordance with TS 36.300 [96] clause 15.4 as well as TS 36.304 [108] and TS 36.331 [97]. |

In current TS 26.517 v17.0.0, SA4 has already added the following in 5.2.4 for NR MBS:

|  |
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| The userServiceDescription element may include an availabilityInfo child element providing additional information pertaining to the availability of the MBS Distribution Session within the 5G Network. If present, the availabilityInfo element shall include one or more infoBinding child elements. The infoBinding element shall contain the child elements serviceArea and radiofrequency:  - The serviceArea element declares the one or more service areas in which the MBS Session corresponding to this MBS Distribution Session is currently available.  - The radioFrequencyelement indicates the one or more radio frequencies in the NG-RAN downlink which transmit the MBS Session corresponding to this MBS Distribution Session in the service area(s) identified by the serviceArea element. |

As we can see above, the radioFrequency element is already captured by SA4 in Rel-17 specs, however exact reference on how it is encoded is missing (corresponding to yellow text for LTE).

**Observation 3: The** radioFrequency **element is already captured by SA4 in Rel-17 specifications, however exact reference on how it is encoded is missing.**

On a quick look it may look like we can simply refer to ARFCN-ValueNR. However, there is some difference between how the LTE and NR indicate frequency/band information. EARFCN in LTE can uniquely identify a particular frequency belonging to a particular band. However, in NR, ARFCN-ValueNR only indicates an absolute frequency without saying anything about the corresponding NR band that the UE may or may not support. And such frequency can belong to more than one bands indicated by FreqBandIndicatorNR. Therefore, for NR, USD should include FreqBandIndicatorNR along with ARFCN-ValueNR so that UE can correctly identify whether the USD includes a frequency of interest. Without knowledge of NR band, the UE cannot decide whether to include a given frequency in the frequency of interest, e.g. when that frequency may be supported in one band and not other if it is not clear to UE whether the service is being provided in the supported band.

**Observation 4: In NR, FreqBandIndicatorNR+ ARFCN-ValueNR identifies a frequency in a band.**

**Draft Proposal 1: In reply LS to SA4, indicate**

**Option 1: “In NR, frequency parameter is coded as combination of FreqBandIndicatorNR and ARFCN-ValueNR as defined in 3GPP TS 38.331 and TS 38.101.”**

**Option 2: “In NR, frequency parameter is coded as ARFCN-ValueNR as defined in 3GPP TS 38.331 and TS 38.101.”**

**Question 2: Which option from Draft Proposal 1?**

|  |  |  |
| --- | --- | --- |
| **Company** | **Option** | **Comment** |
| ZTE | Option 1 | an easy one based on observation 4. |
| Kyocera | Option 1 | We think Option 1 can be applicable for all cases, according to the rapporteur’s analysis. |
| vivo | Option 1 | In some cases, there might be an overlapping part between two different bands. In this sense, Option 1 is preferable. |
| LGE | Option 1 |  |
| CATT | Option 1 |  |
| OPPO | Option 1 |  |
| Ericsson | Option 1 |  |
| Sharp | Option 1 |  |
| Samsung | Option 1 |  |
| Intel | Option 1 |  |
| Futurewei | Option 1 |  |
| Nokia | Option 1 |  |
| MediaTek | Option 1 |  |
| Xiaomi | Option 1 |  |

**Summary:** All companies agree to indicate in reply LS to SA4 that in NR, the frequency parameter is coded as combination of FreqBandIndicatorNR and ARFCN-ValueNR as defined in 3GPP TS 38.331 and TS 38.101.

### Other Information for Rel-17

SA4 LS briefly touched upon subcarrier-spacing or bandwidth that may be added to the MBS Distribution Session data entity inside the MBSF.

**Question 3: Should RAN2 indicate in the reply anything else (e.g. SCS, bandwidth, something else) needs to be added for Rel-17?**

|  |  |  |
| --- | --- | --- |
| **Company** | **Anything else needed in USD (Yes/No)?** | **Comment** |
| ZTE | No | We may simply say for Rel-17 freq info is sufficient in the LS.  For other access layer info it depends on the Rel-18 study result. If needed, RAN2 can always trigger such LS to SA4 in later stage. |
| Kyocera | No | RAN2 only agreed the frequency info. In USD, which is sufficient for Rel-17. |
| Vivo | No | Nothing more for Rel-17 MBS. |
| LGE | No |  |
| CATT | No |  |
| OPPO | No |  |
| Ericsson | See comment | Agree that for a normal broandband UE nothing more is needed. But in offline #602 ([[Offline-602][MBS-R17] CP other corrections (Mediatek)](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_119-e/Inbox/Drafts/%5BOffline-602%5D%5BMBS-R17%5D%20CP%20other%20corrections%20(Mediatek))) there is a discussion whether something is needed for a RedCap UE supporting MBS. We agree thought that BS is not needed ☺.  [QC]: thanks for catching the typo in the question and correcting it 😊 |
| Sharp | No |  |
| Samsung | No |  |
| Intel | No | Only frequency information is needed for Rel-17. |
| Futurewei | No |  |
| Nokia | No |  |
| MediaTek | No |  |
| Xiaomi | No |  |

**Summary:** All companies share the view that SCS, BW or other paratmers are not needed in USD for Rel-17.

**Observation 5:** **No other parameters, such as SCS or BW, are to be added in USD for Rel-17.**

## Additional info for Rel-18

The discussion scope includes “can mention that we might consider additional info for Rel-18”. From rapporteur point of view, it is premature to discuss what we might consider as additional info for Rel-18 and in any case details of such is out of scope of this discussion.

**Question 4: Any comments about additional info for Rel-18?**

|  |  |
| --- | --- |
| **Company** | **Comment** |
| ZTE | Agree with rapporteur, for now it can be a bit premature. |
| Kyocera | We agree with the rapporteur’s view. We don’t think RAN2 needs to include any information for Rel-18 at this point. |
| vivo | Agree with the rapporteur’s view. |
| CATT | Agree with the rapporteur’s view. |
| OPPO | Agree with the rapporteur’s view. |
| Ericsson | Similar reply as for question 3. |
| Sharp | Agree with the rapporteur’s view. |
| Samsung | Agree with the rapporteur’s view. |
| Intel | Agree with rapporteur that it is premature to discuss Rel-18 in current email discussion. |
| Futurewei | Agree with the rapporteur’s view. |
| Nokia | It is premature to discuss R18 additional info and we should wait. |
| MediaTek | Agree with the rapporteur |
| Xiaomi | Agree with the rapporteur’s view. |

**Summary:** All companies share the view that it is premature to discuss about potential new parameters in USD for Rel-18. In any case, if something new is needed for Rel-18, that can be communicated to SA4 later. But as also discussed online, in rapporteur’s view it may be a good idea to indicate to SA4 that something more for USD in Rel-18 is not precluded, so that they make sure the USD schema is extensible.

**Observation 6: New parameters for Rel-18 is not precluded but it is premature to discuss about new parameters in USD for Rel-18. If something new is needed for Rel-18, that can be communicated to SA4 later.**

# Summary

Observation 1: No further answer is expected from SA4 on Q1 as SA2 have already replied to RAN2 and SA4.

Observation 2: For Rel-17 MBS, RAN2#116e already agreed that frequency info in USD is useful (at least for some use cases) and communicated to other groups. SA2 already confirmed and SA4 already added it in their specifications.

Observation 3: The radioFrequency element is already captured by SA4 in Rel-17 specifications, however exact reference on how it is encoded is missing.

Observation 4: In NR, FreqBandIndicatorNR+ ARFCN-ValueNR identifies a frequency in a band.

**Proposal 1: In reply LS to SA4, indicate the following: In NR, the frequency parameter is coded as combination of FreqBandIndicatorNR and ARFCN-ValueNR as defined in 3GPP TS 38.331 and TS 38.101.**

Observation 5: No other parameters, such as SCS or BW, are to be added in USD for Rel-17.

Observation 6: New parameters for Rel-18 is not precluded but it is premature to discuss about new parameters in USD for Rel-18. If something new is needed for Rel-18, that can be communicated to SA4 later.

**Proposal 2: In reply LS to SA4, indicate the following: RAN2 didn’t agree on adding other parameters, such as SCS or BW, in USD for Rel-17. Please note, this does not preclude whether RAN2 might request to add something for Rel-18 or later release.**