**SA WG2 Meeting #S2-156E S2-2304873r06**

**17 - 21 April 2023, Electronic, Elbonia (revision of S2-230xxxx)**

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| *CR-Form-v12.2* | | | | | | | | |
| **CHANGE REQUEST** | | | | | | | | |
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|  | **23.247** | **CR** | **0232** | **rev** | **-** | **Current version:** | **18.1.0** |  |
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| *For* [***HE******LP***](http://www.3gpp.org/3G_Specs/CRs.htm#_blank)*on using this form: comprehensive instructions can be found at* [*http://www.3gpp.org/Change-Requests*](http://www.3gpp.org/Change-Requests)*.* | | | | | | | | |
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| ***Proposed change affects:*** | UICC apps |  | ME |  | Radio Access Network |  | Core Network | **x** |

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| ***Title:*** | Resolving the EN on TMGI index and TMGI update for the configuration mechanism in the MOCN enhancement | | | | | | | | | |
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| ***Source to WG:*** | ZTE | | | | | | | | | |
| ***Source to TSG:*** | SA WG2 | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Work item code:*** | 5MBS\_Ph2 | | | | |  | ***Date:*** | | | 2023-04-05 |
|  |  | | | |  | |  | | |  |
| ***Category:*** | **F** |  | | | | | ***Release:*** | | | Rel-18 |
|  | *Use one of the following categories:* ***F*** *(correction)* ***A*** *(mirror corresponding to a change in an earlier release)* ***B*** *(addition of feature),* ***C*** *(functional modification of feature)* ***D*** *(editorial modification)*  Detailed explanations of the above categories can be found in 3GPP [TR 21.900](http://www.3gpp.org/ftp/Specs/html-info/21900.htm). | | | | | | | | *Use one of the following releases: Rel-8 (Release 8) Rel-9 (Release 9) Rel-10 (Release 10) Rel-11 (Release 11) … Rel-16 (Release 16) Rel-17 (Release 17) Rel-18 (Release 18) Rel-19 (Release 19)* | |
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| ***Reason for change:*** | | For the MOCN enhancement in the R18, there is an EN on the TMGI index for the configuration mechanism.  Editor's note: For the association of MBS session identifiers (i.e. TMGIs) configured in NG-RAN, it is FFS whether AFs can provide additional information (e.g. TMGI index) to request the allocation of a TMGI from a range of TMGIs for shared MBS services in an MB-SMF.  Editor's note: Updates to TMGI allocation for resource sharing across multiple broadcast MBS Sessions during network sharing based on configured TMGI mapping in NG-RAN (see clause 6.17) are FFS.  It proposes to remove this EN according to the meeting discussion. | | | | | | | | |
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| ***Summary of change:*** | | Removing the EN on the wherther the AF provides the additional information (e.g. TMGI index). Removing the EN on the Updates to TMGI allocation | | | | | | | | |
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| ***Consequences if not approved:*** | | The EN on the wherther the AF provides the additional information (e.g. TMGI index) and on the update to TMGI allocation are not resolved | | | | | | | | |
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| ***Clauses affected:*** | | 6.18, 7.1.1.2, 7.3.4 | | | | | | | | |
|  | |  | | | | | | | | |
|  | | **Y** | **N** |  | | | |  | | |
| ***Other specs*** | |  | **x** | Other core specifications | | | | TS/TR ... CR ... | | |
| ***affected:*** | |  | **x** | Test specifications | | | | TS/TR ... CR ... | | |
| ***(show related CRs)*** | |  | **x** | O&M Specifications | | | | TS/TR ... CR ... | | |
|  | |  | | | | | | | | |
| ***Other comments:*** | |  | | | | | | | | |
|  | |  | | | | | | | | |
| ***This CR's revision history:*** | |  | | | | | | | | |

*FIRST CHANGE*

6.18 Resource sharing across broadcast MBS Sessions during network sharing

In network sharing scenario as specified in clause 5.18 of TS 23.501 [2], the same MBS broadcast service may be delivered via multiple operators' CN participating in the network sharing to a shared NG-RAN, and the shared NG-RAN nodes may broadcast the MBS data only once for resource efficiency.

When the AF creates multiple broadcast MBS sessions via multiple CNs to deliver the same content, the shared NG-RAN allocates radio resource for one of broadcast MBS Sessions instead of allocating radio resource for all the broadcast MBS Sessions.

NOTE 1: The same QoS requirements are assumed to be provided by the AF for the broadcast MBS Sessions via multiple CNs delivering the same content.

The NG-RAN determines the broadcast MBS sessions delivering the same content in one of the following ways:

- Based on the Associated Session ID (see clause 6.5.X) provided by the AF to the NG-RAN via 5GCs when creating broadcast MBS sessions. or

- Based on the association of MBS session identifiers (i.e. TMGIs) configured in NG-RAN, the shared NG-RAN nodes can determine that the multiple broadcast MBS sessions are transmitting the same content for the same MBS service. For the location dependent MBS session, the existing MBS session identifiers are used to identify multiple broadcast MBS Sessions via different CNs delivering the same content.

NOTE 2: One possibility for configuring the association between TMGIs is configuring a range of TMGIs for each PLMN participating in network sharing, and associating TMGIs with the same offset in the ranges. Example for TMGI range mapping: If the PLMN 1 TMGI range x1 to xn is configured to be mapped to TMGI range y1 to yn in PLMN 2, x1 is mapped to y1, x2 is mapped to y2, and so forth.

NOTE 3: When the association of MBS session identifiers is configured in NG-RAN, there is no requirement on the AF to provide an Associated Session ID..

Editor's note: How to support multiple broadcast MBS Sessions via different CNs to deliver the same content for location-dependent MBS sessions is FFS.

Illustrated in Figure 6.18-1 is an example that the AF creates broadcast MBS Sessions via 5GC Operators A, B and C respectively to deliver the same content and N3mb unicast transport is used from 5GC to the NG-RAN. Based on operator policy in the NG-RAN node, the N3mb tunnel may be established from the 5GC of only one operator (i.e., Operator A in Figure 6.18-1) to the shared NG-RAN, or the N3mb tunnels may be established from the 5GCs of all the operators to the shared NG-RAN. Over the Uu interface, the NG-RAN allocates radio resource for only one of the established broadcast MBS Sessions regardless of the number of N3mb tunnels established to deliver the MBS packets.

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**Figure 6.18-1: Example of Resource sharing across multiple broadcast MBS Sessions via different CNs to deliver the same content during network sharing**

*Next CHANGE*

7.1.1.2 MBS Session Creation without PCC

This procedure is used by the AF to start the MBS Session towards 5GC and consist of TMGI allocation, and MBS session creation, and they apply to both multicast and broadcast communications unless otherwise stated.

For multicast, MBS session establishment procedure triggered by UE join requests may follow the MBS session creation procedure to reserve resources towards NG-RAN. For broadcast, the MBS session start procedure to reserve resources towards NG-RAN is triggered by the MBS session creation procedure.

For both broadcast and multicast communication, the TMGI allocation may be separated from the MBS Session creation request.

For multicast communication, TMGI allocation procedure is applicable if TMGI is used as MBS Session ID.

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**Figure 7.1.1.2-1: MBS Session Creation without PCC**

Steps 1 to 6 are optional and only applicable if TMGI is used as MBS Session ID and required to be pre-allocated.

1. AF sends Nnef\_MBSTMGI\_Allocate Request (TMGI number, [MBS service area]) message to NEF/MBSF to request allocation of a TMGI(s) to identify new MBS session(s). The MBS service area indicates the possible service area for those TMGI(s) to be allocated, which may be needed for local MBS.

NOTE 1: Depending on the network deployment and use case, MB-SMF may receive requests from AF directly, or via NEF, or via MBSF, or via NEF and MBSF.

2. NEF/MBSF checks authorization of AF. If geographical area information or civic address information was provided by the AF as MBS service area, NEF/MBSF performs the translation.

NOTE 2: NEF is not required if AF is in trusted domain.

3. NEF/MBSF discovers and selects an MB-SMF using NRF or based on local configuration, possibly based on MBS service area.

4. NEF/MBSF sends an Nmbsmf\_TMGI\_Allocate Request (TMGI number) message to the MB-SMF.

5. MB-SMF allocates TMGI(s) and returns the TMGI(s) to the NEF/MBSF via the Nmbsmf\_TMGI\_Allocate response (TMGI(s), expiration time).

6. The NEF or MBSF responds to the AF by sending an Nnef\_MBSTMGI\_Allocate Response (TMGI(s), expiration time).

7. The AF may perform a Service Announcement towards UEs. The AF informs UEs about MBS Session information with MBS Session ID, e.g. TMGI, SSM, and possibly other information e.g. MBS service area, session description information, etc.

The MBS service area information can be Cell ID list, TAI list, geographical area information or civic address information. Amongst them, Cell ID list and TAI list shall only be used by AFs who reside in trust domain, and when the AFs are aware of such information.

The UE needs to be aware if the service is broadcast or multicast to decide if JOIN is to be performed.

8. AF of content provider may provide description for an MBS session (possibly providing information for a previously allocated TMGI to NEF via a Nnef\_MBSSession\_Create request ([MBS Session ID], MBS service type, MBS Service Information, [TMGI allocation request], [MBS service area], [Any UE indication], [start and end time of the MBS session], [MBS session state], [ingress transport address request indication], [Request for location-dependent session], [FSA ID(s)], [Associated Session Identifier]). If step 1-6 has not been executed before, the AF may provide an MBS Session ID containing an SSM or it may request that the network allocates an MBS Session ID (i.e., TMGI). The AF provides the MBS service type (i.e. either multicast service or broadcast service) and MBS Service Information (as defined in clause 6.14). The AF may provide the "Any UE indication" (indicating whether a multicast MBS session is "open to any UEs"), MBS service area, start and end time of the MBS session and MBS session state (active/inactive). In addition, the AF request may also indicate that the allocation of an ingress transport address is requested and that the AF request is for a location dependent MBS service.

If geographical area information or civic address information was provided by the AF as MBS service area, NEF/MBSF translates the MBS service area to Cell ID list or TAI list.

For broadcast communication, the AF may determine MBS FSA ID(s) for the Broadcast MBS session based on business agreements and include them in the description of the MBS session.

For broadcast communication, to support resource sharing across MBS Sessions during network sharing (see clause 6.17), the AF may include Associated Session Identifier in this step to enable NG-RAN to identify the broadcast MBS sessions from multiple CNs delivering the same content.

NOTE 3: The same QoS requirements are assumed to be provided by the AF for the broadcast MBS Sessions via multiple CNs delivering the same content.

NOTE 4: MBS session state is applicable for multicast MBS Session.

9. NEF/MBSF checks authorization of content provider.

10. NEF/MBSF discovers MB-SMF candidates and selects MB-SMF as ingress control node, possibly based on MBS service area. If a TMGI is included in step 8, NEF/MBSF finds MB-SMF based on that TMGI.

11. NEF/MBSF sends Nmbsmf\_MBSSession\_Create Request ([MBS Session ID], MBS service type, [TMGI allocation request], MBS Service Information (as defined in clause 6.14), [MBS service area], [Any UE indication], [start and end time of the MBS session], [MBS session state], [ingress transport address request indication], [FSA ID(s)], [Associated Session Identifier], [multicast session security context]) to MB-SMF, to request MB-SMF to reserve ingress resources for a MBS distribution session. The NEF/MBSF forwards all parameters it has received from the AF in step 8. If the MBSF decides to insert an MBSTF into the user plane for the MBS session, it also indicates that the allocation of an ingress transport address is requested even if this was not requested in step 8. The request also includes the Any UE indication if provided in step 8. If the MBSF acts as the MBS security function for multicast as defined in TS 33.501 [20], it provides a multicast session security context for the MBS session.

If requested to do so, or if a source specific multicast is provided as MBS Session ID in step 11, the MB-SMF allocates a TMGI.

For broadcast communication, if no MBS FSA ID(s) have been received, the MB-SMF selects MBS FSA ID(s) for the Broadcast MBS session based on local configuration.

12. Void.

13. The MB-SMF derives the required QoS parameters locally based on the MBS Service Information.

14. MB-SMF selects the MB-UPF. If the allocation of an ingress transport address was requested in step 11, the MB-SMF requests the MB-UPF to reserve user plane ingress resources. If multicast transport of the MBS data towards RAN nodes is to be used, the MB-SMF also request the MB-UPF to reserve for the outgoing data a tunnel endpoint and the related identifiers (source IP address, SSM and GTP Tunnel ID) and to forward data received at the user plane ingress resource using that tunnel endpoint.

If the allocation of an ingress transport address was not requested in step 11, the MB-SMF provides the SSM received as MBS Session ID to the MB-UPF and requests the MB-UPF to join the corresponding multicast tree from the content provider. The MB-SMF may also defer the configuration to join the corresponding multicast tree e.g. based on information that the session is inactive, service requirements and MBS start/end time until receiving the first query for the MBS session as part of the establishment procedure in clause 7.2.1.3, or until receiving a request to activate the MBS session via the MBS Session Update procedure in clause 7.1.1.6.

15. If requested, MB-UPF selects an ingress address (IP address and port) and a tunnel endpoint for the outgoing data and provides it to MB-SMF.

16. MB-SMF indicates the possibly allocated ingress address to the NEF/MBSF. MB-SMF may include TMGI if it is allocated in step 11. For broadcast communication, the MB-SMF includes any MBS FSA ID(s) selected in step 11. It also indicates the success or failure of reserving transmission resources.

16a. If a source specific multicast address is provided as MBS Session ID in step 11, the MB-SMF updates its NF profile at the NRF with the serving MBS Session ID. If an MBS service area was received in step 11, the MB-SMF updates its NF profile at the NRF with that information.

NOTE 5: If TMGI is used to represent an MBS Session, MB-SMF does not need to update NRF if the TMGI range(s) supported by an MB-SMF is already included in the MB-SMF profile when MB-SMF register itself into NRF.

17. For broadcast communication, the MB-SMF continues the procedure towards the AMF and NG-RAN as specified in clause 7.3.1 to request the allocation of resources to for the transmission of the broadcast session.

18. [Optional] If the MBSF decides to use an MBSTF, the NEF/MBSF provides the ingress address received in step 16 towards the MBSTF as DL destination. If the allocation of an ingress transport address was requested in step 8, the MBSF requests the MBSTF to allocate the user plane ingress resources. If the allocation of an ingress transport address was not requested in step 8, the MBSF provides the SSM received as Multicast session ID in step 8 and requests the MBSTF to join the corresponding multicast tree from the content provider.

19. [Conditional on step 19] If requested, the MBSTF selects an ingress address (IP address and port) and provides it to NEF/MBSF.

20. The NEF/MBSF-C indicates the possibly allocated ingress address and other parameters (e.g. TMGI) to the AF via an Nnef\_MBSSession\_Create response ([TMGI], [Allocated ingress address])). If MBS Session ID is not provided in step 8, or the MBS Session ID is SSM, the NEF/MBSF provides the allocated TMGI. If AF requested the allocation of an ingress transport address, the message also includes the allocated ingress address. For broadcast communication, the message also includes any MBS FSA ID(s) received in step 17.

21. Same as step 7. The AF may also perform a service announcement at this stage.

22. For multicast communication, depending on configuration UEs can join the MBS Session as specified in clause 7.2.1.

*Next CHANGE*

### 7.3.4 Support for Location dependent Broadcast Service

The clause describes procedures to support the Location dependent broadcast service as described in clause 6.2.

The MBS session creation procedure is performed as defined in clause 7.1.1.2 with the following additions:

- Multiple AFs may start the same Broadcast MBS session with different content in different MBS service areas. The NEF selects MB-SMF as ingress control node(s) for different MBS service areas.

- If presented, the NEF maps possible external identifiers for MBS service areas to network-internal identifiers (e.g. list of cells, TAIs).

- For Location dependent Broadcast Service, MB-SMF allocates Area Session ID, and updates its NF profile towards the NRF with the TMGI and Area Session ID.

- The MB-SMF may select the MB-UPF based on the MBS service area.

- The MBS service area(s) are indicated to the UE in the Service Announcement as defined in clause 6.11.

The MBS session establishment procedure is performed as defined in clauses 7.3.1 and 7.3.1a with the following additions:

- MB-SMF requests the AMF to transfer an N2 message (i.e. MBS Session Resource Setup Request) to the NG-RAN nodes of the MBS service area with Broadcast MBS session information which additionally includes the Area Session IDs and MBS service areas.

- The NG-RAN uses the received MBS Session ID and Area Session IDs to determine the local Broadcast MBS session contexts.

- The NG-RAN responds for service areas it handles with the Area Session ID(s) and DL tunnel endpoint(s) for the DL tunnel(s) from MB-SMF if unicast transport applies over N3mb between MB-UPF and NG-RAN.

- According to the Area Session ID(s) and DL tunnel endpoint(s) provided by NG-RAN, the MB-SMF instructs the MB-UPF to send location dependent content.

*END OF CHANGES*