**3GPP TSG-SA WG6 Meeting #45-bis-e S6-212385**

**e-meeting, 11th – 19th October 2021 (revision of S6-212305)**

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| *CR-Form-v12.1* |
| **CHANGE REQUEST** |
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|  |  | **CR** | **1** | **rev** | 1 | **Current version:** |  |  |
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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 | **X** | Radio Access Network |  | Core Network |  |

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| ***Title:***  | MCGWUE\_MBMS support for MC clients residing on non-3GPP devices |
|  |  |
| ***Source to WG:*** | Samsung, Nokia, Nokia Shanghai Bell, FirstNet, BDBOS |
| ***Source to TSG:*** | S6 |
|  |  |
| ***Work item code:*** | MCGWUE |  | ***Date:*** | 2021-10-06 |
|  |  |  |  |  |
| ***Category:*** | **B** |  | ***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 canbe 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-15 (Release 15)Rel-16 (Release 16)Rel-17 (Release 17)Rel-18 (Release 18)* |
|  |  |
| ***Reason for change:*** | 3GPP TR 23.700-79 studied the key issue of supporting MBMS for the MC clients residing on non-3GPP devices via MC gateway UE and proposed solution. Refer subclause 7.8 of 3GPP TR 23.700-79 for more details. This contribution brings the solution specified in Subclause 7.8 of 3GPP TR 23.700-79 to TS 23.280 for normative work. |
|  |  |
| ***Summary of change:*** | Section 11.5.3 is updated to capture the information flows and procedures for supporting MBMS functionality for MC clients residing on non 3GPP devices. |
|  |  |
| ***Consequences if not approved:*** | Incomplete specification. |
|  |  |
| ***Clauses affected:*** | 11.5.3(new) |
|  |  |
|  | **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 should be implemented to the spec after implementing S6-212384\_Introduction of subclauses to capture MC gateway UE function details |
|  |  |
| ***This CR's revision history:*** |  |

\* \* \* \* \* \* \* FIRST CHANGE \* \* \* \* \* \* \*

### 11.5.3 MBMS support for MC clients residing on non-3GPP devices

#### 11.5.3.1 General

This subclause addresses the MBMS support for the MC clients residing on the non-3GPP devices associated with an MC gateway UE. The MC clients instruct the MC gateway UE about the corresponding MBMS bearer details to enable MC gateway listening on them. On demand, MC gateway UE forwards the traffic received over MBMS bearer to the MC clients residing on non‑3GPP devices. With the procedure defined in this subclause MBMS bearer can be supported for the MC clients residing on non-3GPP devices. Changes required are confined to the reference point between MC gateway UE and the MC clients residing on non‑3GPP devices. MC service server may consider the location of the corresponding MC clients as defined in subclause 11.5.2 while deciding to establish MBMS bearer.

#### 11.5.3.2 Information flows

##### 11.5.3.2.1 MC GW MBMS bearer announcement

Table 11.5.3.2.1-1 describes the information flow from the MC client which resides on a non‑3GPP device to the MC gateway UE for sharing the details of MBMS bearer announcement received by the MC Client from the MC Service server.

Table 11.5.3.2.1-1: MC GW MBMS bearer announcement

|  |  |  |
| --- | --- | --- |
| Information element | Status | Description |
| MC GW service ID | M | The MC GW service ID of the requesting MC client. |
| TMGI | M | TMGI information |
| List of service area identifier | M | A list of service area identifier for the applicable MBMS broadcast area. |
| Frequency | O | Identification of frequency if multi carrier support is provided |
| SDP information | M | SDP with media and floor control information applicable to groups that can use this bearer (e.g. codec, protocol id, FEC information) |
| Monitoring state | O | The monitoring state is used to control if the client is actively monitoring the MBMS bearer quality or not. |
| ROHC information | O | Indicate the usage of ROHC and provide the parameters of the ROHC channel to signal to the ROHC decoder. |

##### 11.5.3.2.2 MC GW MBMS listening status report

Table 11.5.3.2.2-1 describes the information flow from the MC gateway UE to the MC client which resides on a non‑3GPP device for the MC GW MBMS listening status report.

Table 11.5.3.2.2-1: MC GW MBMS listening status report

|  |  |  |
| --- | --- | --- |
| Information element | Status | Description |
| TMGI(s) | M | TMGI(s) information. |
| MBMS listening status(s) | M | The MBMS listening status per TMGI. |
| MBMS reception quality level | O | The reception quality level per TMGI |
| Non 3GPP transport resources establishment parameters (See NOTE) | O | This element contains the details of the non‑3GPP transport resources establishment parameters (IP address, Port etc.) which are used by the MC gateway UE to forward the MC service communication traffic received over 3GPP MBMS bearer to the MC client. |
| NOTE: These parameters are implementation specific and are dependent on the non 3GPP transport mechanism used between the MC client and MC gateway UE. This parameter can be present mandatorily if the MBMS bearer listening status is success. |

##### 11.5.3.2.3 MC GW MapGroupToBearer request

Table 11.5.3.2.3-1 describes the information flow from the MC client which resides on a non‑3GPP device to the MC gateway UE for sharing the details of MapGroupToBearer message received from the MC service server.

Table 11.5.3.2.3-1: MC GW MapGroupToBearer request

|  |  |  |
| --- | --- | --- |
| Information element | Status | Description |
| MC GW service ID | M | The GW MC service ID of the MC service user. |
| MCPTT group ID | M | This element identifies the MCPTT group, in which the call is started. |
| Media stream identifier  | M | This element identifies the media stream of the SDP used for the group call (e.g. MBMS subchannel). |
| TMGI | M | The MBMS bearer identifier. |

##### 11.5.3.2.4 MC GW MapGroupToBearer response

Table 11.5.3.2.4-1 describes the information flow from the MC gateway UE to the MC client which resides on a non‑3GPP device for the MC GW MapGroupToBearer response.

Table 11.5.3.2.4-1: MC GW MapGroupToBearer response

|  |  |  |
| --- | --- | --- |
| Information element | Status | Description |
| MapGroupToBearer Status | M | Success or failure response |
| Non 3GPP transport resources establishment parameters (See NOTE) | M | This element contain the details of the non 3GPP transport resources establishment parameters(IP address, Port etc.,) which are used by the MC gateway UE to forward the MC service Group communication traffic received over 3GPP MBMS bearer to the MC client. |
| NOTE: These parameters are implementation specific and are dependent on the non-3GPP transport mechanism used between the MC client and MC gateway UE |

##### 11.5.3.2.5 MC GW MBMS bearer quality report

Table 11.5.3.2.5-1 describes the information flow from the MC gateway UE to the MC client which resides on a non‑3GPP device for the MC GW MBMS bearer quality report.

Table 11.5.3.2.5-1: MC GW MapGroupToBearer response

|  |  |  |
| --- | --- | --- |
| Information element | Status | Description |
| TMGI(s) | M | TMGI(s) information. |
| MBMS listening status(s) | M | The MBMS listening status per TMGI. |
| MBMS reception quality level | O | The reception quality level per TMGI |

##### 11.5.3.2.6 MC GW MBMS bearer suspension indication

Table 11.5.3.2.6-1 describes the information flow from the MC gateway UE to the MC client which resides on a non‑3GPP device for the MC GW MBMS bearer suspension indication.

Table 11.5.3.2.6-1: MC GW MBMS bearer suspension indication

|  |  |  |
| --- | --- | --- |
| Information element | Status | Description |
| TMGI(s) | M | TMGI(s) information. |
| MBMS suspension status(s) | M | The MBMS suspension status per TMGI. |

#### 11.5.3.3 Procedures

##### 11.5.3.3.1 Procedure for handling MBMS bearer announcement

Whenever MC clients residing on non-3GPP devices receive MBMS bearer announcements from the MC system, MC clients share the details of the MBMS bearer received in MBMS bearer announcement to the MC gateway UE. This enables the MC gateway UE to start monitoring the corresponding MBMS bearer.

Figure 11.5.3.3.1-1 illustrates the procedure for handling the MBMS bearer announcement by the MC client and the MC gateway UE.

Pre-conditions:

1. The MC client has been configured with the necessary parameters to enable the use of theMC gateway UE.

2. The MC client successfully completed service authorization via MC gateway UE.



Figure 11.5.3.3.1-1: Handling of MBMS bearer announcement

1. The MC service server establishes the MBMS bearer(s) according to the procedures defined in 3GPP TS 23.468 [18]. Service description associated with the MBMS bearer(s) is returned from the BM-SC.

2. The MC service server provides service description information associated with the MBMS bearer to the MC client residing on non‑3GPP devices via MC gateway UE.

3. The MC client sends the MC GW MBMS bearer announcement to the MC Gateway UE containing the MBMS bearer related information received from the MC service server.

4. The MC gateway UE stores the information associated with the TMGI(s). The MC gateway UE uses the TMGI and other MBMS bearer related information to activate the monitoring of the MBMS bearer.

5. The MC gateway UE that enters or is in the service area of at least one announced TMGI notifies to the MC client that it can receive data over MBMS by sending the MC GW MBMS listening status report. The MC GW MBMS listening status report also contains the details of the non‑3GPP transport resources related parameters. The MC gateway UE may choose to send the details of existing transport resources information as part of non-3GPP transport resources establishment parameters IE if existing communication channel can be reused.

6. The MC client establishes the transport resources with the MC gateway UE based on the parameters received in step 5 to receive the MC service data from the MC gateway UE, if these parameters are not referring to any of the already established transport resources. The MC Gateway UE forwards the MC service data it received over the MBMS bearer from the MC service server to the MC client over this transport resources.

7. The MC client sends the MBMS Listening Status Report to the MC service server indicating that it is able to receive the media over MBMS.

##### 11.5.3.3.2 Procedure for handling MapGroupToBearer message

Whenever the MC client detects that traffic received from MC service server is MapGroupToBearer message and if the MC client participates in the group session or communication identified by the MapGroupToBearer message then it should inform the details contained in the MapGroupToBearer message to MC gateway UE. When the association of group call, MBMS bearer and the MC GW service ID of the MC client is known to the MC gateway UE, it can forward the traffic received over MBMS bearer accordingly.

Figure 11.5.3.3.2-1 illustrates the procedure for handling the MapGroupToBearer message by the MC client and the MC gateway UE.

Pre-conditions:

1. The MC client has been configured with the necessary parameters needed for connectivity with the MC gateway UE.

2. The MC client successfully completed service authorization via MC gateway UE.



Figure 11.5.3.3.2-1: Handling of MapGroupToBearer message

1. The MC service server sends a MapGroupToBearer message over a previously activated MBMS bearer to all users that will receive the call over an MBMS bearer. The MapGroupToBearer message includes association information between the group call and MBMS bearer. The MapGroupToBearer message includes MC service group ID and information about the media stream identifier of the activated MBMS bearer and may include the identifier (i.e. the TMGI) of the MBMS bearer broadcasting the call.

2. If the MC client is participating in the MC group communication identified by the MapGroupToBearer message, it sends the details contained in the MapGroupToBearer message to the MC gateway UE through MC GW MapGroupToBearer request message.

3. The MC gateway UE on receiving the MC GW MapGroupToBearer Request message from the MC client it maintains the association between the GW MC Service ID and the corresponding MBMS sub channel.

4. The MC gateway UE sends the MC GW MapGroupToBearer response message to the MC client which contains the details of the non‑3GPP transport resources related parameters. The MC gateway UE may choose to send the details of existing communication channel information as part of non-3GPP transport resources establishment parameters IE if existing transport resources can be reused.

5. The MC client establishes the communication channel with the MC gateway UE based on the parameters received in step 4 to receive the MC service group communication data from the MC gateway UE, if these parameters are not referring to any of the already established transport resources. The MC Gateway UE forwards the MC service group communication data it received over the MBMS bearer from the MC service server to the MC client over this transport resources.

6. The MC service server sends the downlink media for the group communication session over the MBMS bearer.

7. The MC gateway UE checks which MC clients should receive the media of the MC group communication based on Step 3.

8. The MC gateway UE forwards the downlink media to the intended MC clients over the transport resources established as in step 5.

##### 11.5.3.3.3 Procedure for MBMS bearer suspension notification

The MC service server can choose to instruct some MC clients to send the MBMS bearer suspension report when notified by RAN. When the MC clients are residing on non 3GPP devices, MC gateway UE would be the one listening on the MBMS bearers. When RAN decides to suspend the MBMS bearer it indicates the MC gateway UE. MC gateway UE to notify the MC clients it is serving so that MC clients can report the same to the MC service server. This procedure is applicable only if the MC client is instructed to report the MBMS bearer suspension. Irrespective of whether the MC clients need to send the MBMS bearer suspension report to the MC service server, MC gateway can choose to notify the MC clients it is serving whenever RAN suspends the MBMS bearer. MC clients can then decide to send the MBMS bearer suspension report to the MC service server only if they are instructed by the MC service server.

Figure 11.5.3.3.3-1 illustrates the procedure for MC clients residing on non-3GPP devices reporting the MC service server about the MBMS bearer suspension.



Figure 11.5.3.3.3-1: MBMS bearer suspension notification

1. The MC service server sends an MBMS suspension reporting instruction to the MC client residing on non-3GPP device.

NOTE: This message may be included in the MBMS bearer announcement message and may be sent both on a unicast bearer and a multicast bearer.

2. RAN decides to suspend the MBMS bearer, according to existing procedures in 3GPP TS 36.300 [21].

3. An MBMS suspension indication is sent to the MC gateway UE in the MSI (MCH Scheduling Information), according to existing procedures in 3GPP TS 36.300 [21].

4. The MC gateway UE detect the MBMS suspension and sends an MC GW MBMS suspension indication to the MC Client residing on non-3GPP device.

5. The MC client MBMS suspension report to the MC Service server via MC gateway UE.

##### 11.5.3.3.4 Procedure for reporting MBMS bearer quality

The MC gateway UE listening on the MBMS bearer has to report the MBMS bearer quality to the MC clients so that MC clients can report the same to the MC service server. MC Gateway UE monitors an MBMS bearer to receive MC service media. Based on the received quality (e.g. radio level quality) the MC gateway UE needs to inform the MC Clients which requested the MC gateway UE to listen on MBMS bearer, whether it is able to receive the MC service media on the MBMS bearer with sufficient quality or not the MC Clients can inform the MC service server accordingly.

Figure 11.5.3.3.4-1 illustrates the procedure for MC clients residing on non‑3GPP devices reporting the MC service server about the MBMS bearer quality.

Pre-conditions:

1. There is an MBMS bearer activated and the MBMS bearer information is announced to the MC gateway UE.

2. The MC gateway UE is located in the MBMS broadcasting area

3. The MC gateway UE monitors SIB-13 (or SIB-20) and (SC-)MCCH to receive the modulation and coding scheme.

4. The MC gateway UE monitors the cell specific reference signal and when MBSFN transmission is used, the MBSFN specific reference signals.



Figure 11.5.3.3.4-1: Reporting MBMS bearer quality

1. The MC gateway UE follows the Step 1 of the procedure as described in clause 10.7.3.6.2 for the MC service UE. The corresponding MBMS bearer quality information is forwarded to all the MC clients which have asked the MC gateway UE to listen on the particular MBMS bearer.

2. If the MBMS bearer quality reaches a certain threshold, the MC gateway UE sends an MC GW MBMS bearer quality report to the MC client. The threshold is used to define the MBMS listening status, which indicates if the MBMS bearer quality has been acceptable or not to receive a specific MC service media. If the MBMS bearer quality is mapped to a different MBMS reception quality level, the MC gateway UE may send an MBMS Bearer Quality report including the MBMS reception quality level to the MC Client.

NOTE: The threshold used to indicate MBMS bearer quality depends on service type (i.e. MCPTT, MCVideo or MCData) and the metrics used. The metrics used and the associated thresholds are out of scope of this specification.

3. The MC Client sends the MBMS listening status report to the MC Service server via MC gateway UE containing the information received in the MC GW MBMS bearer quality report.

4. The MC service server may send additional proposal for measurements e.g. information about neighbouring MBMS bearers. This message may be an MBMS bearer announcement message.

\* \* \* \* \* \* \* END CHANGE \* \* \* \* \* \* \*