**3GPP TSG-SA WG6 Meeting #60 S6-242xxxx**

**Changsha, China 15th – 19th April 2024 (revision of S6-24xxxx)**

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| *CR-Form-v12.1* |
| **CHANGE REQUEST** |
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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 | **x** |

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| ***Title:***  | Clause 11 of Rel-19 |
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| ***Source to WG:*** | Ericsson |
| ***Source to TSG:*** | S6 |
|  |  |
| ***Work item code:*** | MCGWUE |  | ***Date:*** | 2024-02-20 |
|  |  |  |  |  |
| ***Category:*** | **A** |  | ***Release:*** | Rel-19 |
|  | *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-16 (Release 16)Rel-17 (Release 17)Rel-18 (Release 18)Rel-19 (Release 19)* |
|  |  |
| ***Reason for change:*** | This CR reflects the necessary updates to be done in 3GPP TS 23.280 related to MC gateway UE based on the LS reply from SA3 in S6-240551. Furthermore, it reflects the agreement to have MBMS and location reporting support as part of release 19. |
|  |  |
| ***Summary of change:*** | 1. voiding the (dis-) connection authorisation procedures in clause 11.5.1 and 11.5.42. adding an editor`s note in clause 11.5.1 as MBMS and location support are FFS within Rel-193. update the texts in the other clauses, e.g., the functionalities in clause 11.1 and 11.2, etc, to reflect the changes mentioned above2. update the functional model in clause 11.2 to reflect the LS reply mentioned earlier4. adding a new figure in clause 11.2 to describe the functional model to support non-3GPP devices that cannot host an MC client. 5. remove the GW-core and GW-local reference points, and removing the MC gateway UE media forwarding function. 6. voiding the MC gateway UE initial configuration in clause A.77. voiding the GW MC service ID in clause 8.1.7 |
|  |  |
| ***Consequences if not approved:*** | Violating security mechanism described by SA3.  |
|  |  |
| ***Clauses affected:*** | 11.1, D.1, D.2, 3.1, 8.1.7, A.7, and 11.2, 11.3, 11.4, 11.5 and their subclauses.  |
|  |  |
|  | **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:*** |  |
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| ***This CR's revision history:*** |  |

\* \* \* \* First change \* \* \* \*

# 11 MC gateway UE

## 11.1 General

An MC gateway UE enables MC service access for a MC service user residing on non-3GPP capable devices and for devices which are unable to host MC service clients. In order to be able to participate in a MC service, the MC gateway UE provides the following necessary functions to enable the MC service access for such MC clients:

- **3GPP transport resources**: Sharing of MC gateway UE 3GPP transport resources among the associated MC service clients.

- **MC client identification**: Independent MC service client identification, MC service client authorisation and MC service profile association.

- **Location Management**: Providing location management support for the associated MC clients to handle the location information and triggers related to 3GPP access network.

- **MC client communication integrity**: Ensure that signalling, media content and traffic attributes, e.g. priority and QoS, of communications between the MC system and MC service client remains unaltered.

NOTE 2: Further information about MC gateway UE selection are summarized in Annex D.

## 11.2 Functional Model

### 11.2.0 General

The MC gateway UE offers access to the MC server for several MC clients as shown in Figure 11.2.0-1. The MC clients can be either located in the MC gateway UE or in non-3GPP devices connected to the MC gateway UE via non-3GPP access.

For non-3GPP devices which can host an MC client, the MC gateway UE enables connectivity to the MC server. For non-3GPP devices which cannot host the MC client, the MC gateway UE hosts the instantiation of the MC client for the non-3GPP device.



Figure 11.2.0-1: Functional architecture

The MC gateway UE provides 3GPP access capabilities using 3GPP network credentials.

For non-3GPP devices which cannot host MC clients, the MC gateway UE instantiates an MC client, acting on behalf of the non-3GPP device, to provide the requested services (e.g. emergency call, group calls, short data messages services, etc.). The communication interworking and the definition of associated procedures between the MC client (initiated at the MC gateway UE) and the non-3GPP devices is out of scope of this document.

NOTE 1: MC clients residing on a non-3GPP device cannot use UICC credentials to perform authorisation with the 3GPP transport system.

For MC clients getting MC service access via the MC gateway UE, the MC gateway UE forwards (unmodified) signalling and media from the individual MC clients to the MC server and vice versa.

If the MC service user on the non-3GPP device utilizes multiple MC services simultaneously, the MC service access may also be provided by one or multiple MC gateway UEs as shown in figure 11.2.0-2 while restricting each MC service to one MC gateway UE (e.g. MCPTT via MC gateway UE1, MCData via MC gateway UE2).



Figure 11.2.0-2: Simultaneous multiple MC gateway UE use by a single non-3GPP device

NOTE 2: Even not shown in the above figure, the same principle of simultaneous use of multiple MC gateway UEs is applied for non-3GPP devices which cannot host an MC client.

### 11.2.1 Functional model

The authentication and authorisation of the MC clients via the MC gateway UE follows the procedures described in 3GPP TS 33.180 [25]. Upon successful authentication and authorisation the MC clients can access a MC server via an MC gateway UE.

The MC gateway UE is capable of supporting the authentication and authorisation of the MC client residing at the non-3GPP device by forwarding the unmodified application layer signalling between the MC client and the corresponding MC server. The authentication and authorisation of the MC client in the non-3GPP device follows the procedures described in 3GPP TS 33.180 [25].

NOTE: The authentication and authorisation between the MC gateway UE and the non-3GPP device is out of scope of 3GPP.

Figure 11.2.1-1 represents the functional model of utilizing MC gateway UE to enable MC services to non-3GPP devices that can host an MC client. Figure 11.2.1-2 represents the functional model for non-3GPP devices that cannot host an MC client.



Figure 11.2.1-1: Functional model of MC gateway UE signalling plane with MC client in the non- 3GPP device



Figure 11.2.1-2: Functional model of MC gateway UE signalling plane with MC client in the MC gateway UE

11.2.2 Reference points

#### 11.2.2.1 General

The reference points for the use of the MC gateway UE are described in the following subclauses.

#### 11.2.2.2 Void

#### 11.2.2.3 Void

#### 11.2.2.4 Reference points MCX-n, CSC-n, SIP-1 and HTTP-1

The reference points CSC-n belonging to the application plane and the reference points SIP-1 and HTTP-1 belonging to the signalling control plane are relayed by the MC gateway UE between MC client on the non-3GPP device towards the MC gateway UE and the corresponding MC service server.

CSC-n, SIP-1 and HTTP-1 reference points are specified in the present specification. The MCX-n reference points are specified in 3GPP TS 23.379 [16], 3GPP TS 23.281 [12] and 3GPP TS 23.282 [13].

11.2.3 Void

## 11.3 Using identities behind the MC gateway UE

### 11.3.1 General

The MC gateway UE enables access to the MC system for MC clients either hosted on the MC gateway UE or hosted on non-3GPP devices.. MC clients hosted in a non-3GPP device utilize unique identities that is transparently passing the MC gateway UE. This is further illustrated in subclause 11.3.2. MC clients hosted in MC gateway UE utilize unique MC service identities and share one common IMS subscription that is unique for the MC gateway UE. This is further illustrated in subclause 11.3.3.

The use of the various mission critical user identities is determined by clause 8 of the present document.

### 11.3.2 When using separate IMS subscriptions

If the MC clients are hosted by non-3GPP devices or the MC clients are hosted by the MC gateway UE, an MC service user corresponding to an MC client uses a dedicated IMS/SIP subscription without any relation to the MC gateway UE subscription.

Figure 11.3.2-1 depicts the use of the IMS Credential (IMC) application in accordance with 3GPP TS 23.228 [9].



Figure 11.3.2-1: IMC per MC service client

The MC service user profiles are independent of the MC gateway MC service user profile.

### 11.3.3 When sharing MC gateway UE's IMS subscription

The MC clients, instantiated at the MC gateway UE on behalf of the non-3GPP devices which cannot host an MC client, rely on the IMS subscription provided by the MC gateway UE. In this case, the MC clients instantiated at the MC gateway UE share the credentials from the IMS subscription of the MC gateway UE, as shown in Figure 11.3.3-1.



Figure 11.3.3-1: Sharing MC gateway UE's IMC for non-3GPP devices which cannot host a client

## 11.4 MC gateway UE routing capabilities

### 11.4.1 General

The use of the MC gateway UE requires the support of an IP network behind the MC gateway UE, that a range of IP addresses are reachable over a single MC gateway UE. That enables the forwarding of signalling information and media plane between non-3GPP devices and MC server by the MC gateway UE.

### 11.4.2 MC client IP address association

The use of a unique IP address by the MC clients shall be ensured for the period of association of the MC clients via the MC gateway UE with the IMS/SIP core and the MC server. Each MC gateway UE requires a unique IP address range for their MC client association which is known by the MC service environment and a correlation between the MC client's IP address and the MC gateway UE's IP address exists.

Whether and how the service continuity procedures are impacted

Whether and how the service continuity procedures are impacted

**Hosted by a non-3GPP device**

Whether and how the service continuity procedures are impacted

Whether and how the service continuity procedures are impacted

**MC gateway UE**

Whether and how the service continuity procedures are impacted

**MC servers**

MC client(s)

**Hosted by a MC gateway UE**

MC client(s)

Client IP

Client IP

MCX-n

CSC-n

SIP-n

MCX-n

CSC-n

SIP-n

MC gateway UE IP

Figure 11.4.2-1: MC client IP address relationship

Framed routing in accordance with IETF RFC 2865 [32], IETF RFC 3162 [33], 3GPP TS 23.501 [34] shall be used to enable the support of an IP network behind the MC gateway UE, such that a range of IP addresses is reachable over a single 3GPP transport session. It allows the routing of packets to IP addresses that do not belong to the PDN/PDU session of the MC gateway UE.

NOTE: The MC gateway UE can provide necessary IP address allocation to MC clients, e.g., as a DHCP relay agent in accordance with IETF RFC 1541 [35] and IETF RFC 8415 [36], or as a requesting router in accordance with IETF RFC 8415 [36] and 3GPP TS 23.401 [17] when using IPv6 prefix delegation.

11.4.3 IP address association using the MC gateway UE

If the MC client relies on IP address provided by the MC gateway UE, the MC gateway UE shall store the correlation between the non-3GPP device and the IP address (MC gateway UE IP and the local IP) used by the MC client . The procedures initiated by the MC client, i.e., SIP registration, user authentication and service authorisation use the MC gateway UE's IP address.

The MC gateway UE assigns the local IPs from address pool which it maintains to the individual MC clients. Managing the local IP addresses, re-using the local IP address, and how the traffic is routed between the MC clients and the network is left for implementation.

Whether and how the service continuity procedures are impacted

Whether and how the service continuity procedures are impacted

**Hosted by a non-3GPP device**

Whether and how the service continuity procedures are impacted

Whether and how the service continuity procedures are impacted

**MC gateway UE**

Whether and how the service continuity procedures are impacted

**MC servers**

MC client(s)

**Hosted by a MC gateway UE**

MC client(s)

Local IP

MC gateway UE IP

IP address mapping

MCX-n

CSC-n

SIP-n

MCX-n

CSC-n

SIP-n

Figure 11.4.3-1: non-3GPP device uses MC gateway UE's IP address

## 11.5 Procedures and information flows

### 11.5.0 General

This clause describes the procedures related to providing MC services, e.g., location reporting and MBMS support, to MC clients in the non-3GPP devices.

Editor`s note: The content of the following subclauses are FFS.

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### 11.5.2 3GPP access network related location information management

#### 11.5.2.1 General

The MC clients residing on the non-3GPP devices may receive the location reporting configuration from the location management server containing the trigger criteria related to 3GPP access network related location parameters and the requested location information may contain the 3GPP access network related location information. The procedures defined in this subclause enables the MC clients residing on the non-3GPP devices to request the MC gateway UE to handle these triggers on its behalf and to request the required location information (3GPP access network related) from MC gateway UE.

#### 11.5.2.2 Information flows

##### 11.5.2.2.1 MC GW location reporting configuration

Table 11.5.2.2.1-1 describes the information flow from the MC client, which resides on a non-3GPP device, to the MC gateway UE for the location reporting configuration.

Table 11.5.2.2.1-1: MC GW location reporting configuration

|  |  |  |
| --- | --- | --- |
| Information element | Status | Description |
| GW MC service ID | M | The GW MC service ID of the requesting MC service user |
| Requested location information | O (see NOTE 1) | Identifies what location information is requested |
| Triggering criteria | O (see NOTE 1) | Identifies when the location management client will send the location report (see NOTE 2) |
| Minimum time between consecutive reports | O (see NOTE 1) | Defaults to 0 if absent  |
| NOTE 1: If none of the information elements is present, this represents a cancellation for location reporting, if configured.NOTE 2: The triggering criteria contains only the events related to the 3GPP access network. |

##### 11.5.2.2.2 MC GW location information report

Table 11.5.2.2.2-1 describes the information flow from the MC gateway UE to the MC client residing on a non-3GPP device for the location information reporting.

Table 11.5.2.2.2-1: MC GW location information report

|  |  |  |
| --- | --- | --- |
| Information element | Status | Description |
| GW MC service ID | M | The GW MC service ID of the requesting MC service user |
| Triggering event | O | Identity of the event that triggered the sending of the report |
| Location information(see NOTE) | O | Location information of the MC gateway UE |
| NOTE: The following location information elements which are related to 3GPP access network shall be present (configurable): Serving and neighbouring ECGI, MBMS SAIs, MBMSfnArea, PLMN ID. |

##### 11.5.2.2.3 MC GW location information request

Table 11.5.2.2.3-1 describes the information flow from the MC client residing on a non-3GPP device to the MC gateway UE for requesting an immediate location information report.

Table 11.5.2.2.3-1: MC GW location information request

|  |  |  |
| --- | --- | --- |
| Information element | Status | Description |
| GW MC service ID | M | The GW MC service ID of the requesting MC service user |

#### 11.5.2.3 Procedures

##### 11.5.2.3.1 Event triggered location reporting procedure

The procedure for how the MC clients residing on non-3GPP devices handling the location reporting configuration containing the trigger criteria related to the 3GPP access network related location information is shown in the figure 11.5.2.3.1-1.

Pre-conditions

- The MC service user wishes to have access to MC services by using a non-3GPP device.

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



Figure 11.5.2.3.1-1: Event-triggered location reporting procedure

1. MC client receives the location reporting configuration request from LMS which contains the triggering criteria of 3GPP access network related location information changes.

2. MC client sends the MC GW location reporting configuration to the MC gateway UE containing the 3GPP access network related location information triggers and the requested location information. MC Gateway UE stores the location reporting configuration and starts monitoring for the triggers as received in the MC GW location reporting configuration.

3. A location reporting event occurs, triggering step 4.

4. MC gateway UE sends the MC GW Location information report containing the location information requested by the MC client.

5. MC client updates the locally available location information with the location information received from the MC gateway UE.

6. The MC client sends a location information report to the location management server, containing location information identified by the location management server and available to the MC client.

##### 11.5.2.3.2 On-demand location reporting procedure

The MC client may need to immediately send the location report to the location management sometimes and the requested location information may be related to the 3GPP access network. Under these circumstances the MC client can request the MC gateway UE to report its location information as described in the figure 11.5.2.3.2-1.

Pre-conditions

- The MC service user wishes to have access to MC services by using a non-3GPP device.

- The MC client successfully completed service authorization via MC Gateway UE.



Figure 11.5.2.3.2-1: On-demand location reporting procedure

1. MC client receives the location information request from LMS to send the location information immediately or any other events where it has to send the location report to the location management server immediately like initial login, group call etc. Requested location information includes the location information related to 3GPP access network.

2. MC service user is notified and asked for permission to share location information. MC service user can accept or deny the request.

3. MC client sends the MC GW Location information request to the MC gateway requesting for the location information related to the 3GPP access network of the MC gateway UE.

4. MC gateway UE sends the MC GW Location information report containing the location information requested by the MC client.

5. MC client updates the locally available location information with the location information received from the MC gateway UE.

6. The MC client sends a location information report to the location management server, containing location information identified by the location management server and available to the MC client.

##### 11.5.2.3.3 Location reporting cancel procedure

The location reporting cancel procedure reuses the information flow of location reporting configuration as defined in the subclause 11.5.2.3.1 as described in the figure 11.5.2.3.3-1

Pre-conditions

- The MC service user wishes to have access to MC services by using a non-3GPP device.

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

- The MC client no longer needs the location information report from MC gateway UE.



Figure 11.5.2.3.3-1: On-demand location reporting procedure

1. The location management client sends MC GW location reporting configuration without any information element to the MC gateway UE to stop location reporting from the MC gateway UE.

2. The MC gateway UE stops sending location information reports to the MC client.

### 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. |

##### 11.5.3.2.7 MC GW UnMapGroupToBearer request

Table 11.5.3.2.7-1 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 UnMapGroupToBearer message received from the MC service server.

Table 11.5.3.2.7-1: MC GW UnMapGroupToBearer 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 MC service group related to a group call to be dissociated over the MBS session. |
| Media stream identifier  | M | This element identifies the media stream of the SDP, which is no longer used for the group call within the MBMS session. |
| TMGI | M | The MBMS bearer identifier. |

##### 11.5.3.2.8 MC GW UnMapGroupToBearer response

Table 11.5.3.2.8-1 describes the information flow from the MC gateway UE to the MC client which resides on a non‑3GPP device for the MC GW UnMapGroupToBearer response.

Table 11.5.3.2.8-1: MC GW UnMapGroupToBearer response

|  |  |  |
| --- | --- | --- |
| Information element | Status | Description |
| UnMapGroupToBearer Status | M | Success or failure response |

#### 11.5.3.3 Procedures

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

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 the MC 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.

##### 11.5.3.3.2A Procedure for handling UnmapGroupFromBearer message

Whenever the MC client receives UnmapGroupFromBearer message and if the MC client participates in the group session or communication identified by the UnmapGroupFromBearer message then it should inform the details contained in the UnmapGroupFromBearer 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 remove the association and stop forwarding of the traffic received over MBMS bearer accordingly.

Figure 11.5.3.3.2A-1 illustrates the procedure for handling the UnmapGroupFromBearer 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 11.5.3.3.2A-1: Handling of UnmapGroupFromBearer message

1. An MCPTT group call is ongoing; the MC gateway UE forwards the downlink media to the intended MC client over the transport resources established.

2. MCPTT server has determined to disconnect the call over the MBMS bearer for the MC client.

3. An UnmapGroupFromBearer message is sent by the MCPTT server to MC client (if in MBMS coverage area) on MBMS bearer(s).

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

5. The MC gateway UE on receiving the MC GW UnMapGroupToBearer Request message from the MC client it removes the association maintained between the GW MC Service ID and the corresponding MBMS sub channel.

6. The MC gateway UE sends the MC GW MapGroupToBearer response message to the MC client.

##### 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 an additional proposal for measurements e.g. information about neighbouring MBMS bearers. This message may be an MBMS bearer announcement message.

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# A.7 Void

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### 8.1.7 Void

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# 3 Definitions, symbols and abbreviations

## 3.1 Definitions

For the purposes of the present document, the terms and definitions given in 3GPP TR 21.905 [1] and the following apply. A term defined in the present document takes precedence over the definition of the same term, if any, in 3GPP TR 21.905 [1]. Not all definitions are used in this document.

**Accuracy:** Reflects the uncertainty of the location at the moment of location measurement, e.g. see 3GPP TS 25.305 [30] and 3GPP TS 23.032 [31].

**ACM:** Administrative Configuration Management, which enables the exchange of administrative configuration data between interconnected MC systems.

**ACMC:** Administrative Configuration Management Client, client entity which initiates administrative configuration exchange request to an interconnected partner MC system and which could make decision on such request received from an ACMC of a partner MC system.

**ACMS:** Administrative Configuration Management Server, server entity which receives administrative configuration exchange requests from an ACMC belonging to the same primary MC system or via an ACMS of an interconnected partner MC system.

**Active MC service user profile:** The MC service user profile that is currently used by an MC service client of an MC service user while receiving MC service.

**Ad hoc Group Communication**: The combining of a multiplicity of MC service users into a group for the duration of a communication. When the communication is released, the group no longer exists. If the communication is associated with an alert, then the group continues to exist until the alert is also canceled.

**Ad hoc Group emergency alert**: The combining of a multiplicity of MC service users into a group for sending an emergency alert. When the alert is cancelled, the group no longer exists. If the alert is associated with a communication, then the group continues to exist until the communication is also canceled.

**Altitude:** Third dimension for the geographical coordinates at the moment of location measurement, e.g. see 3GPP TS 25.305 [30] and 3GPP TS 23.032 [31].

**Bearing:** Direction at the moment of location measurement, e.g. see 3GPP TS 25.305 [30].

**Chat group:** An MC service group that is pre-defined with MC service group ID and member list in the group management server. Group members must join the pre-estabslihed group call to participate.

**ECGI:** E-UTRAN Cell Global Identifier, which is used to identify cells globally, where the ECGI is constructed from the Mobile Country Code (MCC), Mobile Network Code (MNC) and the E-UTRAN Cell Identifier (ECI).

**Interconnection:** A means of communication between MC systems whereby MC service users obtaining MC service from one MC system can communicate with MC service users who are obtaining MC service from one or more other MC systems.

**Interconnection group:** An MC service group that is configured to allow inclusion of MC service group members who are MC service users from partner MC system(s).

**LCS network:** The 3GPP network that provides location service as defined in 3GPP TS 23.271 [29].

**Location:** The current physical location of the MC service UE.

**MBMS SAI:** Multimedia Broadcast Multicast Service Area Identity which is mapped to the MBMS service area.

**MC gateway server:** A server providing topology hiding for MC service interconnection with a partner MC system, where that partner MC system is in a different trust domain.

**MC service:** A generic name for any one of the three mission critical services: either MCPTT, or MCVideo, or MCData.

**MC service affiliated group member:** An MC service user who has indicated an interest in a particular MC service group and has been accepted to participate in MC service group communication for that MC service group.

**MC service client:** A generic name for the client application function of a specific MC service. MC service client could be replaced by MCPTT client, or MCVideo client, or MCData client depending on the context.

**MC service group:** A defined set of MC service users with associated communication dispositions (e.g. media restrictions, default priority and commencement directions) configured for the use with one or more MC services.

**MC service group affiliation:** A mechanism by which an MC service user's MC service(s) communication interest in one or more MC service groups is determined.

**MC service group call:** A mechanism by which an MC service user can make a one-to-many MC service(s) transmission to other users that are members of MC service group(s).

**MC service group de-affiliation:** A mechanism by which an MC service user's MC service(s) communication interest in one or more MC service groups is removed.

**MC service group home system:** The MC system where the MC service group is defined.

**MC service group host MC service server:** The MC service server within an MC system which provides centralised support for a particular MC service of an MC service group defined in a MC service group home system.

**MC service group member:** An MC service user, whose MC service ID is listed in a particular MC service group.

**MC service ID:** A generic name for the user ID of a mission critical user within a specific MC service. MC service ID could be replaced by MCPTT ID, or MCVideo ID, or MCData ID depending on the context.

**MC service server:** A generic name for the server application function of a specific MC service. MC service server could be replaced by MCPTT server, MCVideo server, or MCData server depending on the context.

**MC service user:** An authorized user, who can use an MC service UE to participate in one or more MC services.

**MC service user profile:** The set of information associated to an MC service user that allows that user to employ one or more MC services in a given role and from a given MC service UE.

**MC service UE:** A UE that can be used to participate in one or more MC services.

**MC service UE label:** A generic name for identification of a specific MC service UE.

**MC system:** The collection of applications, services, and enabling capabilities required to provide a single mission critical service or multiple mission critical services to one or more mission critical organizations.

**MC user:** A user, identified by an MC ID, who, after authorization, obtains mission critical service(s).

**Migration:** A means for an MC Service user to obtain MC service directly from a partner MC system.

**Partner MC system:** Allied MC system that provides MC services to an MC service user based on the MC service user profiles that are defined in the primary MC system of that MC service user.

**Preconfigured MC service group:** an MC service group used only for regrouping that has been configured in advance of a group or user regrouping operation to serve as the source of regroup group configuration.

**Pre-arranged group:** An MC service group that is pre-defined with MC service group ID and member list in the group management server. Affiliated group members are invited when the group communication is setup.

**Pre-selected MC service user profile:** The MC service user profile that is to be selected as the active MC service user profile through configuration, and applicable for an authenticated MC service user upon MC service authorization.

**Primary MC system:** MC system where the MC service user profiles of an MC service user are defined.

**Requested Priority:** A value for use in a MC service group or MC private communication that, if accepted, is used by the MCX service server to temporarily replace the priority level that is predefined in the MC service group or MC service user profile. This value is used in combination with other factors to determine the application priority for the requested communication.

**Selected MC service user profile:** The MC service user profile that is to be selected as the active MC service user profile for an MC service upon request by an MC service user.

**Serving MC service server:** The MC service server which is providing MC service to an MC service client.

NOTE 1: There is one serving MC service server for each MC service, which can be the primary MC service server of the MC service user of the MC service client, or can be a partner MC service server to which the MC service user has migrated.

**Serving MC system:** The MC system which is providing MC service to an MC user.

NOTE 2: The MC system can be the primary MC system of the MC service user, or can be a partner MC system to which the MC service user has migrated.

**Speed:** Movement at the moment of location measurement, e.g. see 3GPP TS 25.305 [30] and 3GPP TS 23.032 [31].

**Time of measurement:** Date and time expressed with a certain precision to reflect the moment of the location measurement.

For the purposes of the present document, the following terms given in 3GPP TS 22.280 [3] apply

**Mission Critical**

**Mission Critical Applications**

**Mission Critical Organization**

**Mission Critical Service**

**Functional alias**

For the purposes of the present document, the following terms given in 3GPP TS 22.179 [2] apply

**Multi-talker control**

**Group-broadcast group**

For the purposes of the present document, the following terms related to a MC gateway UE function apply

**MC gateway UE:** A functional entity that enables simultaneous access to the MC system for multiple MC clients.

**MC client:** Aggregates a set of clients (i.e. Group management client, Configuration management client, Identity management client, Key management client, Location management client and MC service client).

**MC server:** Aggregates a set of servers (i.e. Group management server, Configuration management server, Identity management server, Key management server, Location management server and MC service server) which serves the MC client accordingly.

**Non-3GPP device:** A device that enables connectivity towards an MC gateway UE using an access method not specified by 3GPP. A subset of these devices can host an MC client specified by 3GPP.

\* \* \* \* Fifth change \* \* \* \*

Annex D (informative):
Consideration MC gateway UE selection

# D.1 General

Operating conditions can influence the selection and the use of the MC gateway UE. Such status information can be considered by the non-3GPP device either to connect to another MC gateway UE (e.g. with better operating conditions for the requested service), or to re-connect to the same MC gateway UE (e.g. reattempt connection after a certain time).

# D.2 Potential Operating Conditions

Possible operating conditions information could belong to one of the following categories:

**MC gateway UE capacity limits**

The MC gateway UE might not be able to allow MC clients to connect when the limit of connected MC clients has been reached.

**3GPP access congestion**

The MC gateway UE can make use of to the special Categories/Access Identity, the preferential access applies based on its assigned Access Control Class/Access Identity during periods of congestion. The MC gateway UE subscription allows to obtain priority treatment for the required communication.

Nevertheless, the serving access network can indicate to the UEs (including MC gateway UE) that Access Class Barring applies and this can be passed by the MC gateway UE to the MC client.

**PLMN reselection and migration**

Depending on operator policy, roaming agreements, and on national/regional regulatory requirements, the MC gateway UE PLMN reselection is necessary (e.g. to handle the IP connectivity, QoS, etc.).

**Network status information**

If the network status information of an EPS/5GS capability available at MC gateway UE, it can be further propagated to the corresponding MC clients for further processing (e.g., if the requested QoS for service can be provided for MC client or not).

\* \* \* \* End of change \* \* \* \*