**3GPP TSG-CT WG3 Meeting #118e C3-215132**

**E-Meeting, 11th – 15th October 2021 (Revision of C3-21xxxx)**

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| --- |
| *CR-Form-v12.1* |
| **CHANGE REQUEST** |
|  |
|  | **29.468** | **CR** | **0058** | **rev** | **-** | **Current version:** | **17.0.0** |  |
|  |
| *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:***  | Notification Event enhancement in MB2 |
|  |  |
| ***Source to WG:*** | Ericsson |
| ***Source to TSG:*** | CT3 |
|  |  |
| ***Work item code:*** | TEI17, MBMS\_enh-CT |  | ***Date:*** | 2021-09-20 |
|  |  |  |  |  |
| ***Category:*** | **B** |  | ***Release:*** |  Rel-17 |
|  | *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:*** | Current TS 29.468 definition is lack of notification of bearer activation failure and diagnostic info in the notification event, the application server does not know the bearer related reason of the abnormal session terminated  |
|  |  |
| ***Summary of change:*** | Add the Bearer Activation Failure event for the BM-SC to notify the GCS AS of the failure status of an MBMS bearer and MBMS-Bearer-Event-Diagnostic-Info AVP to indicate the diagnostics of the event. The GCS AS may take the further actions based on the different status and diagnostic information. |
|  |  |
| ***Consequences if not approved:*** | GCS AS cannot get indication on detail information of the abnormal session terminated, does not know whether shall re-establish the session in the geo-redundant BM-SC system or switch the delivery to the unicast delivery, and potential dead loop between session established and session terminated. |
|  |  |
| ***Clauses affected:*** | 4.2.1, 4.2.2, 5.3.5, 6.4.1, 6.4.4, 6.4.5, 6.4.m(new), A.2.4 |
|  |  |
|  | **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:*** |  |

**Additional discussion(if needed):**

**Proposed changes:**

\*\*\* 1st Change \*\*\*

### 4.2.1 Group Communication Service Application Server (GCS AS)

The GCS AS is defined in TS 23.468 [4] and supports the following functionality:

- Exchanging GC1 signalling with the UE.

- Receiving unicast uplink data from the UE via the SGi reference point.

- Delivery of data to all the UEs belonging to a group using unicast delivery over the SGi reference point and/or MBMS delivery over the MB2 reference point.

- Support for service continuity procedures for a UE to switch between unicast delivery and MBMS delivery.

- For MBMS delivery:

- MB2‑C procedures defined in TS 23.468 [4], for requesting the BM‑SC to activate, deactivate, modify an MBMS bearer, allocate/deallocate TMGI.

- Forwarding of data to be delivered via an MBMS bearer to the BM‑SC via the MB2‑U reference point.

In addition to the functions defined in 3GPP TS 23.468 [4], an GCS AS which acts as a V2X Application Server may support the following functions:

- For the V2X Localized User Plane supported feature, MB2‑C procedures defined in 3GPP TS 23.285 [28] subclause 5.4.2.2 for requesting the BM-SC to activate an MBMS bearer for local MBMS based MBMS data delivery.

In addition to the functions defined in 3GPP TS 23.468 [4], an GCS AS may take further actions based on the MBMS bearer status and diagnostic information notified by the BM-SC in the MB2 reference point.

\*\*\* 2nd Change \*\*\*

### 4.2.2 Broadcast-Multicast Service Centre (BM‑SC)

The BM‑SC is defined in TS 23.246 [3], with additions related to the MB2 reference point in TS 23.468 [4], and supports the following functionality:

- MBMS Broadcast Mode procedures defined in TS 23.246 [3] (stage 2) and in TS 29.061 [6] (stage 3).

- MB2‑C procedures defined in TS 23.468 [4], for activating, deactivating, modifying an MBMS bearer, allocating/deallocating TMGI and notifying the TMGI expiry or the MBMS Bearer condition to GCS AS.

- SGmb procedures for controlling MBMS broadcast bearers defined in TS 29.061 [6].

- Reception of user data from the GCS AS via the MB2‑U reference point and forwarding those data via the SGi‑mb reference point as described in TS 29.061 [6].

In addition to the functions defined in 3GPP TS 23.468 [4], the BM-SC may support the following functions for V2X services:

- For the V2X Localized User Plane supported feature, MB2‑C procedures defined in 3GPP TS 23.285 [28] subclause 5.4.2.2 for receiving Local MBMS information defined in 3GPP TS 23.285 [28] from an GCS AS which acts as a V2X Application Server.

In addition to the functions defined in 3GPP TS 23.468 [4], the BM-SC may notify the MBMS bearer status and diagnostic information to the GCS AS.

\*\*\* 3rd Change \*\*\*

### 5.3.5 MBMS Bearer Status Indication Procedure

The BM‑SC may use the MBMS Bearer Status Indication Procedure to notify the GCS AS of conditions affecting the delivery of services that use MBMS Delivery, for instance the termination of an MBMS bearer e.g.due to TMGI expiry or MBMS-GW error, MBMS bearer activation failure due to no established MBMS-GW, MBMS-GW transient error or SGmb path failure.

To apply this procedure, the BM‑SC shall send a GCS-Notification-Request (GNR) command including one MBMS‑Bearer‑Event‑Notification AVP for each bearer with an event to be notified. Within the MBMS‑Bearer‑Event‑Notification AVP, the BM‑SC shall indicate the bearer event using the MBMS-Bearer-Event AVP and shall include and the TMGI AVP and the MBMS‑Flow‑Identifier AVP to designate the affected bearer, may also include the MBMS-Bearer-Event-Diagnostic-Info AVP to indicate the diagnostics reason of the event. If FEC and/or ROHC is applied the MBMS‑Bearer‑Event‑Notification AVP may also include Userplane-Protocol‑Result AVP(s) indicating the success or failure of the FEC and/or ROHC execution.

Upon reception of a GCS-Notification-Request (GNR), the GSC AS shall reply with a GCS-Notification-Answer (GNA) command and may take further actions for the affected bearer based on the notified different event and diagnostic information.

\*\*\* 4th Change \*\*\*

### 6.4.1 General

Table 6.4.1‑1 describes the Diameter AVPs defined for the MB2‑C reference point, their AVP Code values, types and possible flag values. The Vendor-Id header of all AVPs defined in the present document shall be set to 3GPP (10415).

Table 6.4.1‑1: MB2‑C specific Diameter AVPs

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  |  |  |  | AVP Flag rules (Note 1) | Applicability (Note 2) |
| Attribute Name | AVP Code | Clause defined | Value Type  | Must | May | Should not | Must not |
| BMSC‑Address | 3500 | 6.4.2 | Address | M,V | P |  |  |  |
| BMSC‑Port | 3501 | 6.4.3 | Unsigned32 | M,V | P |  |  |  |
| Common-Tunnel-Endpoint-Identifier | 3524 | 6.4.26 | OctetString | V | P |  | M | V2X Localized User Plane |
| FEC-Request | 3525 | 6.4.27 | OctetString | V | P |  | M | FEC |
| FEC‑Result | 3531 | 6.4.33 | Unsigned32 | V | P |  | M | FEC |
| Local-M1-Information | 3518 | 6.4.20 | Grouped | V | P |  | M | V2X Localized User Plane |
| Local-MB2-U-Information | 3519 | 6.4.21 | Grouped | V | P |  | M | V2X Localized User Plane |
| MB2U‑Security | 3517 | 6.4.19 | Unsigned32 | M,V | P |  |  |  |
| MBMS‑Bearer‑Event | 3502 | 6.4.4 | Unsigned32 | M,V | P |  |  |  |
| MBMS-Bearer-Event-Diagnostic-Info | 3533 | 6.4.m | Unsigned32 | V | P |  |  |  |
| MBMS‑Bearer‑Event‑Notification | 3503 | 6.4.5 | Grouped | M,V | P |  |  |  |
| MBMS‑Bearer‑Request | 3504 | 6.4.6 | Grouped | M,V | P |  |  |  |
| MBMS‑Bearer‑Response | 3505 | 6.4.7 | Grouped | M,V | P |  |  |  |
| MBMS‑Bearer‑Result | 3506 | 6.4.8 | Unsigned32 | M,V | P |  |  |  |
| MBMS-eNB-IP-Multicast-Address | 3520 | 6.4.22 | Address | V | P |  | M | V2X Localized User Plane |
| MBMS-eNB-IPv6-Multicast-Address | 3521 | 6.4.23 | Address | V | P |  | M | V2X Localized User Plane |
| MBMS-GW-SSM-IP-Address | 3522 | 6.4.24 | Address | V | P |  | M | V2X Localized User Plane |
| MBMS-GW-SSM-IPv6-Address | 3523 | 6.4.25 | Address | V | P |  | M | V2X Localized User Plane |
| MBMS‑Start‑Time | 3507 | 6.4.9 | Time | M,V | P |  |  |  |
| Radio‑Frequency | 3508 | 6.4.10 | Unsigned32 | M,V | P |  |  |  |
| ROHC-Full-Header-Periodicity | 3527 | 6.4.29 | Float32 | V | P |  | M | ROHC |
| ROHC-Max-CID | 3532 | 6.4.34 | Unsigned32 | V | P |  | M | ROHC |
| ROHC‑Profile | 3528 | 6.4.30 | Unsigned32 | V | P |  | M | ROHC |
| ROHC‑Request | 3526 | 6.4.28 | Grouped | V | P |  | M | ROHC |
| ROHC‑Result | 3530 | 6.4.32 | Unsigned32 | V | P |  | M | ROHC |
| TMGI‑Allocation‑Request | 3509 | 6.4.11 | Grouped | M,V | P |  |  |  |
| TMGI‑Allocation‑Response | 3510 | 6.4.12 | Grouped | M,V | P |  |  |  |
| TMGI‑Allocation‑Result | 3511 | 6.4.13 | Unsigned32 | M,V | P |  |  |  |
| TMGI‑Deallocation‑Request | 3512 | 6.4.14 | Grouped | M,V | P |  |  |  |
| TMGI‑Deallocation‑Response | 3513 | 6.4.15 | Grouped | M,V | P |  |  |  |
| TMGI‑Deallocation‑Result | 3514 | 6.4.16 | Unsigned32 | M,V | P |  |  |  |
| TMGI‑Expiry | 3515 | 6.4.17 | Grouped | M,V | P |  |  |  |
| TMGI‑Number | 3516 | 6.4.18 | Unsigned32 | M,V | P |  |  |  |
| Userplane-Protocol‑Result | 3529 | 6.4.31 | Grouped | V | P |  | M | ROHC, FEC |
| NOTE 1: The AVP header bit denoted as 'M', indicates whether support of the AVP is required. The AVP header bit denoted as 'V', indicates whether the optional Vendor-ID field is present in the AVP header. For further details, see IETF RFC 6733 [27].NOTE 2: AVPs marked with a supported feature are applicable as described in clause 6.5.2. |

For all AVPs which contain bit masks and are of the type Unsigned32 or Unsigned64, bit 0 shall be the least significant bit. For example, to get the value of bit 0, a bit mask of 0x0001 should be used.

Every AVP of type Grouped is defined by means of the ABNF syntax in IETF RFC 2234 [13] and according to the rules in IETF RFC 6733 [27].

\*\*\* 5th Change \*\*\*

### 6.4.4 MBMS‑Bearer‑Event AVP

The MBMS‑Bearer-Event AVP (AVP code 3502) is of type Unsigned32 and it shall contain a bit mask with values as defined table 6.4.4-1. Several bits may be set in combination except for bit 0 and bit 1.

Table 6.4.4-1: MBMS‑Bearer‑Event AVP

|  |  |  |
| --- | --- | --- |
| Bit | Name | Description |
| 0 | Bearer Terminated | The MBMS bearer was terminated. |
| 1 | Bearer Activated | The MBMS bearer was activated. |
| 2 | Userplane Event | The userplane event is reported, and the result is further indicated in the Userplane-Protocol‑Result AVP. |
| 3 | Bearer Activation Failure | The MBMS bearer is not activated successfully based on the MBMS-Start-Time, BM-SC may periodically retry the activation until the SGmb path is recovered. |

\*\*\* 6th Change \*\*\*

### 6.4.5 MBMS‑Bearer‑Event‑Notification AVP

The MBMS‑Bearer‑Event-Notification AVP (AVP code 3503) is of type Grouped. It is used by the BM‑SC to notify the GCS AS about an MBMS bearer event.

AVP Format:

MBMS-Bearer-Event-Notification::= < AVP Header: 3503 >

 { TMGI}

 { MBMS-Flow-Identifier }

 { MBMS-Bearer-Event }

 [ MBMS-Bearer-Event-Diagnostic-Info ]

 \*[ Userplane-Protocol‑Result ]

 \*[ AVP ]

\*\*\* 7th Change \*\*\*

### 6.4.m MBMS‑Bearer‑Event‑Diagnostic-Info AVP

The MBMS‑Bearer‑Event-Diagnostic-Info AVP (AVP code 3533) is of type Enumerated. It indicates the diagnostic reason of an event notified. The following values are supported:

TMGI-Expiry (0)

 The MBMS bearer was terminated due to the expiry of TMGI.

MBMS-GW-Not-Establishment (1)

 The MBMS bearer was activated failure due to MBMS-GW is not established.

SGmb-Transient-Path-Failure (2)

 The MBMS bearer was activated failure due to SGmb transient path failure.

SGmb-Non-Transient-Path-Failure (3)

 The MBMS bearer was terminated due to SGmb non-transient path failure.

MBMS-GW-User-Plane-Failure (4)

 The MBMS bearer was terminated due to User Plane Failure detected by the MBMS-GW.

MBMS-GW-Permanent-Error (5)

 The MBMS bearer was terminated due to MBMS-GW Permanent Error response.

MBMS-GW-Transient-Error (6)

 The MBMS bearer was activated failure due to MBMS-GW Transient Error response.

\*\*\* 8th Change \*\*\*

## A.2.4 MBMS Bearer Status Indication Procedure

Figure A.2.4‑1 provides the procedure used between the GCS AS and the BM‑SC to indicate the change of the MBMS bearer status, e.g. a release of the MBMS bearer.



Figure A.2.4‑1: MBMS Bearer Status Indication Procedure

1. If the BM‑SC receives a MBMS session termination request initiated by the MBMS GW, or if the BM-SC is configured to receive a delayed session start response from the MBMS GW, or if the BM-SC detects the SGmb path failure, the BM‑SC sends a Diameter GNR command to indicate the bearer status to the GCS AS including the parameters as defined in clause 5.3.5. Other actions which will trigger the MBMS bearer status indication procedure are not included in this specification.

2. The GCS AS responds to the BM‑SC with a Diameter GNA command. The Diameter session ends after the GNA command.

\*\*\* End of Changes \*\*\*