**3GPP TSG SA WG4#116e S4-211347**

**E-meeting, 10th – 19th November 2021**

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| *CR-Form-v12.0* | | | | | | | | |
| **DRAFT CHANGE REQUEST** | | | | | | | | |
|  | | | | | | | | |
|  | **26**.**501** | **CR** | draft | **rev** |  | **Current version:** | **16.8.0** |  |
|  | | | | | | | | |
| *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 | **X** | Radio Access Network |  | Core Network | **X** |

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| ***Title:*** | **[5MBUSA] 5GMS via eMBMS** | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Source to WG:*** | Qualcomm Incorporated | | | | | | | | | |
| ***Source to TSG:*** |  | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Work item code:*** | 5MBUSA | | | | |  | ***Date:*** | | | 03/11/2021 |
|  |  | | | |  | |  | | |  |
| ***Category:*** | **B** |  | | | | | ***Release:*** | | |  |
|  | *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-12 (Release 12)* *Rel-13 (Release 13) Rel-14 (Release 14) Rel-15 (Release 15) Rel-16 (Release 16)* | |
|  |  | | | | | | | | | |
| ***Reason for change:*** | | See work item | | | | | | | | |
|  | |  | | | | | | | | |
| ***Summary of change:*** | | Add 5GMS via eMBMS | | | | | | | | |
|  | |  | | | | | | | | |
| ***Consequences if not approved:*** | | Work Item objectives not complete | | | | | | | | |
|  | |  | | | | | | | | |
| ***Clauses affected:*** | | 2, 5.10 (new) | | | | | | | | |
|  | |  | | | | | | | | |
|  | | **Y** | **N** |  | | | |  | | |
| ***Other specs*** | | **X** |  | Other core specifications | | | | TS/TR ... CR | | |
| ***affected:*** | |  |  | Test specifications | | | | TS/TR ... CR ... | | |
| ***(show related CRs)*** | |  |  | O&M Specifications | | | | TS/TR ... CR ... | | |
|  | |  | | | | | | | | |
| ***Other comments:*** | |  | | | | | | | | |
|  | |  | | | | | | | | |
| ***This CR's revision history:*** | |  | | | | | | | | |

**===== CHANGE =====**

# 2 References

The following documents contain provisions which, through reference in this text, constitute provisions of the present document.

- References are either specific (identified by date of publication, edition number, version number, etc.) or non‑specific.

- For a specific reference, subsequent revisions do not apply.

- For a non-specific reference, the latest version applies. In the case of a reference to a 3GPP document (including a GSM document), a non-specific reference implicitly refers to the latest version of that document *in the same Release as the present document*.

[1] 3GPP TR 21.905: "Vocabulary for 3GPP Specifications".

[2] 3GPP TS 23.501: "System architecture for the 5G System (5GS)".

[3] 3GPP TS 23.502: "Procedures for the 5G System (5GS)".

[4] 3GPP TS 23.503: "Policy and charging control framework for the 5G System (5GS); Stage 2".

[5] 3GPP TS 26.238: "Uplink streaming".

[6] 3GPP TS 26.307: "Presentation layer for 3GPP services".

[7] 3GPP TS 26.247: "Transparent end-to-end Packet-switched Streaming Service (PSS); Progressive Download and Dynamic Adaptive Streaming over HTTP (3GP-DASH)".

[8] 3GPP TS 26.234: "Transparent end-to-end Packet-switched Streaming Service (PSS); Protocols and codecs".

[9] 3GPP TS 23.003: "Technical Specification Group Core Network and Terminals; Numbering, addressing and identification".

[10] 3GPP TS 28.530: "Management and orchestration; Concepts, use cases and requirements".

[11] 3GPP TS 28.531: "Management and orchestration; Provisioning".

[12] 3GPP TS 28.541: "Management and orchestration; 5G Network Resource Model (NRM); Stage 2 and stage 3".

[13] 3GPP TS 23.222: "Common API Framework for 3GPP Northbound APIs".

[14] IETF RFC 1034: "Domain names – concepts and facilities".

[15] 3GPP TS 23.246: "Multimedia Broadcast/Multicast Service (MBMS); Architecture and functional description".

[16] 3GPP TS 26.346: "Multimedia Broadcast/Multicast Service (MBMS); Protocols and codecs".

[17] 3GPP TS 26.347: "Multimedia Broadcast/Multicast Service (MBMS); Application Programming Interface and URL".

[18] 3GPP TS 26.348: "Northbound Application Programming Interface (API) for Multimedia Broadcast/Multicast Service (MBMS) at the xMB reference point".

**===== CHANGE =====**

## 5.10 5GMS via eMBMS

### 5.10.1 Introduction

The functionality to be supported is the ability for a network provider to deploy 5GMS-based media streaming as an MBMS-aware application on top of eMBMS as defined in TS 23.246 [15] and subsequent specifications including TS 26.346 [16], TS 26.347 [17] and TS 26.348 [18]. Different deployment scenarios may be considered such as

- A content provider operates a 5GMS headend including an 5GMS AF and AS and distributes the content via eMBMS as well as via 5G System. The eMBMS distribution may for example be a Receive-only Mode (ROM) service.

- A mobile network operator operates a 5GMS headend including an 5GMS AF and AS and receives content from an 5GMSd application provider. The content is distributed via the eMBMS system for devices that support eMBMS and via 5G Media streaming otherwise.

Other modes of operations may be considered. Detailed collaboration model examples are provided in Annex A.

### 5.10.2 Architecture

The architecture in Figure 5.10.1-1 below represents a harmonized architecture for 5G Media Streaming via eMBMS. In this case the 5GMSd AF is responsible to setup the delivery of 5GMSd formats to an MBMS client and expose the service and conent the 5GMSd client via well-defined APIs.



Figure 5.10.1-1 Harmonized architecture for 5G Media Streaming over eMBMS

Two deployment options are provided, as indicated also in Annex A:

- Consist of multiple (physical) servers, where different servers, or different groups of servers, may be addressed with different FQDNs. The client may be made aware of this via the manifest (i.e. listing multiple base URLs).

NOTE: In this case the servers may be managed by the same or different parties (e.g. MNO and/or 5GMSd Application Provider).

- Be addressed with a single FQDN. For example, the MNO AS is mostly transparent and acts as a proxy/cache.

The second case addresses the scenario for which the service is exclusively being provided through MBMS and no unicast for data delivery exists. The first case addresses the scenario, for which parts of the service are also available on unicast, i.e. the hybrid case.

In the architecture, no new functions or interfaces are defined. However, some of the reference points need extensions to fully support the two scenarios. For details refer to clause 5.10.4.

### 5.10.3 Call flows for 5GMS via eMBMS

#### 5.10.3.1 5GMS exclusively via eMBMS

The call flow in Figure addresses the delivery of 5GMS media data exclusively via eMBMS. For this, the call flow in clause 5.3.2 is extended accordingly.



**Figure 5.10.3-1: High Level Procedure for DASH content via eMBMS**

Prerequisites:

- The 5GMSd Application Provider has provisioned the 5G Media Streaming System and has setup content ingest.

- The content ingest is forwarded to the BMSC using the M1d parameters.

- The 5GMSd Aware Application has received the service announcement from the 5GMS Application Provider.

Steps:

1: The 5GMSd Aware Application triggers the Service Announcement and Service and Content Discovery procedure. The Service and Content Discovery procedure only involves the App and the external Application Server. The Service Announcement includes either the whole Service Access Information (i.e. details for Media Session Handling (M5d) and for Media Streaming access (M4d)) or a reference to the service access information.

2: The BMSC receives the content from the 5GMS AS.

3: The BMSC pushes content and broadcasts the Service Announcement.

4: A media content item is selected.

5: The 5GMSd-Aware Application triggers the 5GMSd Client to start media playback. The Media Player Entry is provided to the 5GMSd Client.

6: When the 5GMS-Aware Application has received only a reference to the Service Access Information (see step 1), the Media Session Handler interacts with the 5GMSd AF to acquire the whole Service Access Information.

7 - 12: The Media Session Handler acts as a MBMS-aware application and initiates the service acquisition. For details, see TS 26.347 [15]. This establishes transport session for MPD and Content.

13: In parallel, the Media Player is invoked to start media access and playback.

14: The Media Player requests the MPD.

15: The Media Player receives the MPD.

16: The Media Player processes the MPD. It determines for example the number of needed transport sessions for media acquisition. The Media Player should be able to use the MPD information to initialize the media pipelines for each media stream. The MPD should also contain information to initialize the DRM client, when DRM is used.

17: The Media Player notifies the Media Session Handler about the MPD. The notification may contain parameters from the MPD.

18: Optional: the Media Player acquires the necessary DRM information, for example a DRM License.

19: The Media Player configures the media playback pipeline.

20: The Media Player requests initialization information. The Media Player repeats this step for each required initialization segment.

21: The Media Player receives the initialization information.

22: The Media Player requests media segments according to the MPD.

23: The Media Player receives media segments and puts the information into the appropriate media rendering pipeline.

24: Previous steps are repeated according to the MPD information.

#### 5.10.3.2 Hybrid 5GMS delivery via 5G System and eMBMS

Tbd

#### 5.10.3.3 5GMS Consumption Reporting for eMBMS

tbd

#### 5.10.3.4 5GMS Metrics Reporting for eMBMS

### 5.10.4 Extensions for 5GMS Reference Points

On M1d:

* The permission of distributing the content via eMBMS

On M5d:

- The access information for the eMBMS service announcement is provided on M5d reference point to bootstrap the MBMS service

### 5.10.5 Extensions of MBMS Reference Points

No required extensions are identified for now.