**3GPP TSG SA WG4 #114e *S4-210805***

**E-meeting, 19th – 28th May 2021**

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| *CR-Form-v12.0* | | | | | | | | |
| **Pseudo CHANGE REQUEST** | | | | | | | | |
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|  | **26.802** | **CR** | **<CR#>** | **rev** | **9** | **Current version:** | **1.2.8** |  |
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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:*** | [FS\_5GMS\_Multicast] 5GMS via eMBMS | | | | | | | | | |
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| ***Source to WG:*** | Qualcomm Incorporated | | | | | | | | | |
| ***Source to TSG:*** | SA4 | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Work item code:*** | FS\_5GMS\_Multicast | | | | |  | ***Date:*** | | | 2021-05-11 |
|  |  | | | |  | |  | | |  |
| ***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 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)* | |
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| ***Reason for change:*** | |  | | | | | | | | |
|  | |  | | | | | | | | |
| ***Summary of change:*** | |  | | | | | | | | |
|  | |  | | | | | | | | |
| ***Consequences if not approved:*** | |  | | | | | | | | |
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| ***Clauses affected:*** | |  | | | | | | | | |
|  | |  | | | | | | | | |
|  | | **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:*** | |  | | | | | | | | |
| ***56*** | |  | | | | | | | | |
| ***This CR's revision history:*** | |  | | | | | | | | |

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

## 5.8 Key Issue #7: 5GMS via eMBMS

### 5.8.1 Description

This key issue proposes to study interworking of 5GMS with EPC and in particular with eMBMS and provide a solution such that the same service may be provided through EPC (unicast/broadcast) and 5GC (unicast/multicast).

In particular relevant is a 5GMS service with eMBMS and ROM-services as well as High-Power High Tower (HPHT) and Single Frequency Network (SFN) services, that are not supported in Rel-17 5MBS.



Figure 5.8.1-1 Interworking of 5GMS with EPC

The following aspects need to be considered

*-* The AF may be an “old” AF and only use 3GPP Release 16 xMB APIs

*-* The AF may be a “new” AF and may support both, 3GPP Rel 16 xMB APIs and new 3GPP Rel 17 M1 or MB-M1 APIs.

A similar topic referred to as Interworking is also studied TR 23.757 [7]. In particular, solution 46 addresses some aspects on this matter. However, this proposes a solution to maintain service continuity when a UE moves between an NG-RAN that supports MBS and an E-UTRAN that supports eMBMS. The solution is based on solution 10 and architecture A.2 and requires the deployment of N26. It is not considered further in the present document.

#### 5.8.2.1 Introduction

The key issue under consideration in this key topic is the ability for a network provider to deploy 5GMS-based media streaming, using eMBMS bearers as developed for TV-distribution in Rel-16 to address the 5G Broadcast requirements to distribute the entire service or parts of the service. The combination of the two technologies is expected to be done to support use cases similarly as documented in clause 5.7.2.3 on the Hybrid 5MBS/5GMS service.

The combination of 5GMSd-based distribution with 5MBS is not considered in this key issue, because it relates to the hybrid service in clause 5.7. The main identified issue is the combination of 5GMSd unicast and eMBMS.

The core issues under discussion are different architecture options.

#### 5.8.2.2 Option A: 5GMS uses MBMS User Service



Figure 5.8.2-1 Hybrid Services of 5GMS with eMBMS User Service (Option A)

In Option A, the 5GMSd Service provider acts as an eMBMS Content Provider. Figure 5.8.2-1 provides an architecture for which a 5GMSd Service provider uses xMB and MBMS user services for the distribution. Either of the following cases is expected to be of interest:

- The unicast option is unavailable, and the content is distributed via eMBMS only.

- The unicast option is available, and the hybrid functionalities as defined in clause 5.7.2 are supported.

#### 5.8.2.2 Option B: 5MBS uses MBMS Transport-only Mode



Figure 5.8.2-2 Hybrid Services of 5GMS with eMBMS Transport only mode (Option B)

In Option B, provides the case for which the 5G MBS Service provider uses the transport-only mode of eMBMS in order to deliver content generated in the MBSTF. Figure 5.8.2-2 provides an architecture for which a 5G MBS Service provider interfaces with the relevant BM‑SC functionalities into MBSTF and MBSF for the theMBMS distribution. Again, both use cases are of interest:

- The unicast option is unavailable, and the content is distributed via MBMS Bearer only.

- The unicast option is available, and the hybrid functionalities as defined in clause 5.7.2 are supported.

At the client side, the 5MBS client acts as a MBMS-aware application and translates the service announcement into an MBMS service.

#### 5.8.2.3 Option C: 5GC integration of MBMS

In a third option (Option C), support of physical layer distribution over enTV is supported in 5GC. This option is not considered as it would have impacts on 5GC outside of the control of SA4.

#### 5.8.2.4 Comparison of options

Table 5.8.2-1 provides an overview of benefits and drawbacks.

Table 6.3.2-1: Impacted Reference Points for different scenarios

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| --- | --- | --- |
| Options | Benefits | Drawbacks |
| Option A: 5GMS uses MBMS User Service | This has no impact on the 5MBS System; only 5GMS needs to be updated to provide content over eMBMS and the 5GMS client can find the MBMS service and connect to get access to the bearer.  It is a benefit that 5GMS can be combined quite easily with eMBMS for delivering 5GMS content over eMBMS as well as to provide hybrid services. | Someone deploying 5MBS and eMBMS needs to implement both, BMSC and MBSF/MBSTF functionalities on the server and the MBMS client and the 5MBS client need to be implement. |
| Option B: 5MBS uses MBMS transport-only mode | It is expected that the MBSTF will provide most of the delivery functions that are anyway needed from the BM‑SC. Based on this, adding the relevant MBMS Bearer service to the MBSTF should be trivial.  The delivery functions can re-used and harmonized in a single specification.  The benefits of extensions to the new interfaces and protocols defined in 5MBS are also available to the MBMS Bearer service. | The MBSTF needs a new interface to provide connection to BMSC for transport-only delivery. The same for the MBSF. Similar the 5MBS client needs these interfaces.  To deliver 5GMS content via eMBMS, 5MBS needs to be implemented. |
| Option C: 5MBS implements MBMS M1 interface | The equipment needed to support both 5G Broadcast enTV and and 5MBS is minimized as 5MBS includes the MBMS GW functionality. | MBMS GW functionality is simple, so no benefit for this. |

### 5.8.3 Conclusions

Based on the discussion, it is proposed to

1) focus on Option A as it is the simplest way to distribute 5GMS content via MBMS

2) further study option B to what extent this option is feasible based on the SA2 defined architecture

3) not pursue option C.

Based on the considerations in clause 5.8.2 and clause 6.2.4, the following aspects deserve normative documentation.

### 5.8.4 Recommended Next Steps

For Option A:

1. Architecture for 5GMS using MBMS User Services.

2. Call flows for:

a. 5GMS uses MBMS User Services without unicast support.

b. Hybrid 5GMS services using MBMS User Services and unicast.

3. M1d extensions to provision MBMS User Service delivery.

4. xMB extensions to identify content as 5GMSd Service.

5. M5d extensions provide the Service Access Information for MBMS.

6. 5GMSd extensions to support the MBMS-APIs.

7. Support for hybrid cases in combination with 7.3.4.

For option B, it is proposed to further study to what extent this option is feasible based on the SA2 defined architecture and address potential normative work at a later stage. Initially, it has been identified the following aspects need to be further studied

1. For stand-alone service without unicast:

a. Nmb2 extensions to provision for using xMB as ingest.

b. M5d extensions provide the service signaling for MBMS-based 5MBS.

c. Extensions to deliver 5GMS content through support MBMS transport-only mode using the MBSTF.

2. In addition, for a service that also leverages the use of 5GMSd unicast, the selected hybrid scenarios introduced in clause 6.2.3 may be provided.

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

6.2.4 5GMS via eMBMS

In order to address the 5GMS via eMBMS use case documented in key issue #7, clause 5.8, the following aspects would deserve standardization:

For Option A (5GMS uses MBMS User Services):

1. For stand-alone service without unicast:

a. M1d extensions to provision for MBMS User service delivery.

b. xMB extensions to identify content as 5GMSd Service.

c. M5d extensions provide the service signaling for MBMS.

d. 5GMSd extensions to support the MBMS-APIs.

2. In addition, for a service that also leverages the use of 5GMSd unicast, the selected hybrid scenarios introduced in clause 6.2.3 may be provided.

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# 8 Conclusions and Next Steps

## 8.X Conclusions on Key Issue #7: 5GMS via eMBMS

To support 5GMS over eMBMS and in particular systems that address the 5G Broadcast requirements (including ROM-services, SFN, broadcast-only, etc.), it is proposed to define the architectural enhancements, call flows and procedures for 5GMS using MBMS User Services as well as hybrid 5GMS services via MBMS User Services and unicast. Stage-3 aspects to support these functionalities include extensions on 5GMS Protocols as well as extensions in xMB, MBMS user services and MBMS-APIs.

Furthermore, it is proposed to further study to what extent "5MBS uses MBMS transport-only mode” as introduced in clause 5.8.2.2 is feasible based on the SA2 defined architecture and address potential normative work at a later stage.