**Agenda item:** 8.8

**Source:** Qualcomm Incorporated

**Title:** [5MBUSA] Procedures

**Document for** Discussion andAgreement

# Introduction

This document addresses

* Define relevant call flows and procedures to support 5GMS over 5MBS
* concrete steps in TR 26.802, clause 5.5.2 on DASH/HLS over MBMS as defined in TS 26.346, clause 5.6 and 5.7, including Low-Latency CMAF as defined in 5GMS.

This document assumes that architectures and session concepts from S4-211270 are agreed. Clause 2 summarizes the main proposals.

# Proposed Architecture and Procedures

Figure 3.1-1 updates Figure 5.1-2 from TS 23.247 to provide a more user service centric view. It also provides an update to Figure 4.4.3-1 from TR 26.802. The red highlights provide the main scope for User Service Specification from a northbound interface.



Figure 3.1-1 User Service Centric 5G MBS system architecture in reference point representation

In Figure 3.1-2, a proposed update to the 5MBS User Service Architecture is proposed that addresses the different interfaces defined in the work item description.



Figure 3.1-2 5G Multicast Broadcast User Service (5MBUS) Architecture

The following definitions are assumed

**Application Service**: An end-user service for which parts of the data or all of the data of this service is accessible by joining an 5MB User Service.

**5MB User Service:** The transport-level service using an MBS Delivery Sessions to delivery an Application Service.

**MBS delivery session:** time, protocols and protocol state (i.e. parameters) which define sender and receiver configuration and use an MBS session for the delivery of an application data session.

**Application data session:** time, protocols and protocol state (i.e. parameters) provided by an 5MBS application provider for delivery over 5MBS and provided to the 5MBS aware application.

This concept is now also presented in the below Figure



Initial session and service procedures are provided in Figure 6-1.



Figure 6-1 5MB User Service Workflow

# 5GMS-over-5MBS Architecture and Call Flow

The architecture in Figure X below represents a harmonized architecture for 5G Media Streaming via 5MBS.



Figure X Harmonized architecture for 5G Media Streaming over 5MBS

Two deployment options are provided, as indicated also in Annex A of TS 26.501.

- 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 5 MBS 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. This is discussed in more details in S4-210009.

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

# Call flow for 5GMS via 5MBS

Editor’s Note: make the same simplifications to the call flow as S4-211347r01. The call flow needs to also adopt the terminology defined in TS 26.502.

The initial call flow addresses the delivery of 5GMS media data exclusively via 5MBS broadcast. For this, the call flow in TS 26.501, clause 5.3.2 is extended accordingly.

**Figure X: High Level Procedure for DASH content via 5MBS**

Prerequisites:

- The 5GMSd Application Provider has provisioned the 5GMS System at reference point M1d and has set up content ingest in the 5GMS AS using procedures at reference point M3.

- The 5GMS AF has configured an MBS User Service in the MBSF (via reference point Nmb10) based on the M1d provisioning parameters.

- The MBSTF has been configured by the MBSF (via reference point Nmb2) to ingest content from the 5GMS AS.

- The 5GMSd Aware Application has received the service announcement from the 5GMS Application Provider at reference point M8.

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 5GMS-Aware Application and the 5GMSd Content Provider. 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: A media content item is selected.

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

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

5–10: The Media Session Handler acts as a 5MBS-Aware Application and initiates the service acquisition. For details, see TS 26.347. This establishes a transport session for the MPD and content.

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

12: The Media Player retrieves the MPD.

13: The Media Player processes the MPD. It determines, for example, the number of needed 5GMS 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.

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

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

16: The Media Player configures the media playback pipeline.

17: The Media Player retrieves initialization information according to the MPD. The Media Player repeats this step for each required initialization segment, and puts them into the appropriate media rendering pipeline.

21: The Media Player retrieves media segments according to the MPD and puts them into the appropriate media rendering pipeline.

# Proposal

Based on this contribution it is proposed:

1. Agree the User Service workflow in figure 6-1 as the basis for further work.
2. Adopt the basic call flow in clause 4 for 5GMS via 5MBS as the basis for further work.

Appropriate pCRs for TS 26.502 will be developed after SA4#116e.