**3GPP TSG SA WG4#117e S4-220018**

**E-meeting, 14th – 23rd February 2022 revision of S4-211666**

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| *CR-Form-v12.0* |
| **DRAFT CHANGE REQUEST** |
|  |
|  | **26**.**501** | **CR** | draft | **rev** | **1** | **Current version:** | **16.9.0** |  |
|  |
| *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 - Architecture, Broadcast and Reporting** |
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| ***Source to WG:*** | Qualcomm Incorporated, BBC |
| ***Source to TSG:*** |  |
|  |  |
| ***Work item code:*** | 5MBUSA |  | ***Date:*** | 07/02/2022 |
|  |  |  |  |  |
| ***Category:*** | **B** |  | ***Release:*** | 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-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, 4.2.4 (new), 5.10.1 (new), 5.10.2, 5.10.3 |
|  |  |
|  | **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:*** | This version is a revision of S4-211666 as agreed during SA4#116-e. In order to track the updates, all revisions in S4-211666 are accepted.This version also takes into account the discussion around S4aV211256 and S4aV211267. It also takes into account the proposed updates from BBC in [S4aI211267 BBC.docx](https://www.3gpp.org/ftp/tsg_sa/WG4_CODEC/3GPP_SA4_AHOC_MTGs/SA4_MBS/Inbox/Drafts/S4aI211267%20BBC.docx).

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| [**S4aI211256**](https://www.3gpp.org/ftp/TSG_SA/WG4_CODEC/3GPP_SA4_AHOC_MTGs/SA4_MBS/Docs/S4aI211256.zip) | [5MBUSA] 5GMS via eMBMS - Procedures | Qualcomm CDMA Technologies | Thomas Stockhammer |

**Email Discussion**

|  |  |  |
| --- | --- | --- |
| **[Subject](https://list.etsi.org/scripts/wa.exe?A1=ind2112A&L=3GPP_TSG_SA_WG4_MBS&O=T&D=1&TOC=&S=)** | **[From](https://list.etsi.org/scripts/wa.exe?A1=ind2112A&L=3GPP_TSG_SA_WG4_MBS&O=A&D=0&TOC=&S=)** | **[Date](https://list.etsi.org/scripts/wa.exe?A1=ind2112A&L=3GPP_TSG_SA_WG4_MBS&O=D&D=0&TOC=&S=)**  |
| [[5MBUSA] S4aI211256: 5GMS via eMBMS](https://list.etsi.org/scripts/wa.exe?A2=3GPP_TSG_SA_WG4_MBS;e9ae55fc.2112A&S=) | Richard Bradbury | Tue, 7 Dec 2021 14:52:40 +0000 |
| [Re: [5MBUSA] S4aI211256: 5GMS via eMBMS](https://list.etsi.org/scripts/wa.exe?A2=3GPP_TSG_SA_WG4_MBS;be897a4a.2112A&S=) | Thomas Stockhammer | Tue, 7 Dec 2021 16:49:06 +0000 |
| [Re: [5MBUSA] S4aI211256: 5GMS via eMBMS](https://list.etsi.org/scripts/wa.exe?A2=3GPP_TSG_SA_WG4_MBS;a25a0847.2112A&S=) | Richard Bradbury | Tue, 7 Dec 2021 19:00:10 +0000 |
| [Re: [5MBUSA] S4aI211256: 5GMS via eMBMS](https://list.etsi.org/scripts/wa.exe?A2=3GPP_TSG_SA_WG4_MBS;33fc67d0.2112A&S=) | Thomas Stockhammer | Tue, 7 Dec 2021 19:17:01 +0000 |
| [Re: [5MBUSA] S4aI211256: 5GMS via eMBMS](https://list.etsi.org/scripts/wa.exe?A2=3GPP_TSG_SA_WG4_MBS;e7d81dfa.2112A&S=) | Thorsten Lohmar | Tue, 7 Dec 2021 20:22:51 +0000 |
| [Re: [5MBUSA] S4aI211256: 5GMS via eMBMS](https://list.etsi.org/scripts/wa.exe?A2=3GPP_TSG_SA_WG4_MBS;ac5fc6e1.2112A&S=) | Thomas Stockhammer | Tue, 7 Dec 2021 20:41:00 +0000 |
| [Re: [5MBUSA] S4aI211256: 5GMS via eMBMS](https://list.etsi.org/scripts/wa.exe?A2=3GPP_TSG_SA_WG4_MBS;29b3a894.2112B&S=) | Richard Bradbury | Wed, 8 Dec 2021 11:44:38 +0000 |
| [Re: [5MBUSA] S4aI211256: 5GMS via eMBMS](https://list.etsi.org/scripts/wa.exe?A2=3GPP_TSG_SA_WG4_MBS;3b447fb9.2112B&S=) | Thomas Stockhammer | Thu, 9 Dec 2021 20:27:45 +0000 |

**Revisions:*** <https://www.3gpp.org/ftp/tsg_sa/WG4_CODEC/3GPP_SA4_AHOC_MTGs/SA4_MBS/Inbox/Drafts/S4aI211256r01.docx>
* https://www.3gpp.org/ftp/tsg\_sa/WG4\_CODEC/3GPP\_SA4\_AHOC\_MTGs/SA4\_MBS/Inbox/Drafts/S4aI211256r02.docx
* <https://www.3gpp.org/ftp/tsg_sa/WG4_CODEC/3GPP_SA4_AHOC_MTGs/SA4_MBS/Inbox/Drafts/S4aI211256r03.docx>
* https://www.3gpp.org/ftp/tsg\_sa/WG4\_CODEC/3GPP\_SA4\_AHOC\_MTGs/SA4\_MBS/Inbox/Drafts/S4aI211256r04.docx

**Presenter**: Thomas Stockhamer (Qualcomm) presented r04**Discussion**: * Thorsten explained comment that description MBMS User Service session should use terminology in 26.348
* Richard: supports Thorsten
* Thomas: OK
* Thorsten: is xMB-U File Distribution for live streaming or progressive download?
* Richard: reception in time meaning differs based on live streaming or NRT file download; for DASH streaming
* Thorsten; for file repair, FDT expiry need to be set more aggressively
* Frederic: need to clarify meaning of not received on time - too late for application or as defined by FDT expiry
* Frederic: unclear how long to make partial object available
* Thorsen: when DASH client requests object from MBMS Client - either nothing provided, or just partial object; clean-up process driven by expiration time
* Thomas: I don’t agree on everything you said - we need to further discuss
* Thorsten: On extensions to 5GMS reference points - unclear for reader of future versions which version a certain feature was defined
* Richard: suggests to roll extension into main document where it is defined
* Thorsten: adding feature tag to identify 5GMS content is fine
* Thomas: he understand Thorsten’s point about extensions and will ix accordingly
* Richard: is proposal to define a feature tag?
* Thomas: yes
* Richard: if so would need CR to TS 26.346 as well
* Thomas: it’s no longer about extensions
* Thomas: many good comments, and will produce another revision

**Decision**:**S4aI211256** is **noted.** Revision expected at future call.

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| [S4aI211267](https://www.3gpp.org/ftp/TSG_SA/WG4_CODEC/3GPP_SA4_AHOC_MTGs/SA4_MBS/Docs/S4aI211267.zip) | [5MBUSA] 5GMS via eMBMS - Procedures | Qualcomm CDMA Technologies | Thomas Stockhammer |

**Presenter**: Thomas Stockhammer (Qualcomm)**Discussion**: * Richard: which stage 3 spec would define the availability time requirement of the application in the Note before 4.5.2?
* Thomas: should be TS 26.346
* Richard: usage of M2-M4 for specific case and how to document - might need to look more carefully
* Frederic: metrics will need to be adjusted; also question on consumption reports
* Richard: only consumption reporting is about media consumed, but might need to extend to indicate where it came from
* Thomas: also pertains to multi-CDN delivery
* Richard: could just point to host name
* Thomas: for MBMS it can be a URL to localhost

**Decision**:* Content appears agreeable as basis for further work

**S4aI211267** is **noted.**

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| [**S4aI221283**](https://www.3gpp.org/ftp/TSG_SA/WG4_CODEC/3GPP_SA4_AHOC_MTGs/SA4_MBS/Docs/S4aI221283.zip) | [5MBUSA] 5GMS via eMBMS - Procedures | Qualcomm CDMA Technologies | Thomas Stockhammer |

**Comments:**<https://www.3gpp.org/ftp/tsg_sa/WG4_CODEC/3GPP_SA4_AHOC_MTGs/SA4_MBS/Inbox/Drafts/S4aI221283-Ericsson.docx>**Presenter**: Thomas Stockhammer (Qualcomm)**Discussion**: * Thorsten: There needs to be a clear distinction between eMBMS consumption reporting and 5GMS consumption reporting.On metrics reporting, there is the object loss metrics. Is this metrics  sent to PSH, BM-SC…?
	+ Thomas: MBMS is not deployed. The idea is to connect to 5GMS. We need to basically allow this in 5GMS. The MSH would do the report.
	+ Thorsten: On metrics reporting, I am not sure the object loss metric is relevant in the 5GMS system. My thinking is that we could deactivate eMBMS reporting when 5GMS reporting is used.
	+ Thorsten: eMBMS has push and pull mode. In 5GMS, push ingest is not implemented. We will need to take care about supporting push.
	+ Richard: Is push needed?
	+ Thorsten: It is fine to leave it to implementation but maybe we could indicate to take care.
* Thomas: OK, I will do a revision. Maybe we should not specify all the details as we will implement it with the reference tool.
* Thorsten: One trick could also be that the MBMS client could also push metrics to 5GMS AS over HTTP.

**Decision**:* Revised.

**S4aI221283** is **revised to S4aI221287.**

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| [**S4aI221287**](https://www.3gpp.org/ftp/TSG_SA/WG4_CODEC/3GPP_SA4_AHOC_MTGs/SA4_MBS/Docs/S4aI221287.zip) | [5MBUSA] 5GMS via eMBMS - Procedures | Qualcomm CDMA Technologies |

**Presenter**: Thomas Stockhammer (Qualcomm)**Discussion**: * Richard: some additional bugs to fix in Fig. 5.10.4-1
* Thomas: will do so
* Thomas: planned to submit CR at -117e

**Decision**:* **-1287 is Agreed as basis for further work**

**S4aI211287** is **agreed.****This revision:*** 1. **Addresses the final comments**
	2. **Removes the aspects that are new and will add those to a separate draft CR.**
 |

**===== 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 23.548: "5G System Enhancements for Edge Computing; Stage 2".

[16] 3GPP TS 23.558: "Architecture for enabling Edge Applications".

[17] 3GPP TS 28.538: "Management and orchestration; Edge Computing Management".

[18] 3GPP TS 23.246: "Multimedia Broadcast/Multicast Service (MBMS); Architecture and functional description".

[19] 3GPP TS 26.346: "Multimedia Broadcast/Multicast Service (MBMS); Protocols and codecs".

[20] 3GPP TS 26.347: "Multimedia Broadcast/Multicast Service (MBMS); Application Programming Interface and URL".

[21] 3GPP TS 26.348: "Northbound Application Programming Interface (API) for Multimedia Broadcast/Multicast Service (MBMS) at the xMB reference point".

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

## 4.5 5G Downlink Media Streaming via eMBMS

### 4.5.1 Architecture for 5G Downlink Media Streaming over eMBMS

Figure 4.5.1-1 below depicts an architecture for downlink 5G Media Streaming via eMBMS that combines the functions and reference points of the 5GMS System with those of the MBMS System.



Figure 4.5.1-1: Architecture for 5G Media Streaming over eMBMS

This arrangement allows 5GMS-based downlink media streaming to be deployed as an MBMS-aware Application on top of eMBMS as defined in TS 23.246 [18], TS 26.346 [19], TS 26.347 [20] and TS 26.348 [21].

In this case:

1. The 5GMSd AF configures the delivery of 5GMSd content to an MBMS Client in the UE by creating a Service as defined in TS 26.348 [21], clause 5.3. In order to additionally deliver this content over an MBMS User Service, the 5GMSd AF invokes xMB-C control plane procedures on the BM‑SC as specified in clauses 5.3 and 5.4 of TS 26.348 [21] and, as a result, content is ingested by the BM-SC from the 5GMSd AS using the xMB-U File Distribution procedures specified in clause 5.5.2 of TS 26.348 [21] to allow xMB-C Session types *Application* and *Files*.

2. The 5GMSd Client acts as eMBMS-Aware Application (as defined in TS 26.347 [20]) for the MBMS Client. Thus, the *MBMS Client* is controlled by the 5GMSd Client via the Media Streaming Service API specified in clause 6.3 of TS 26.347 [20] or via the File Delivery Application Service API specified in clause 6.2 of TS 26.347 [20]. (This interaction is labelled MBMS-API-C\* in the above figure.)

3. The MBMS Client receives media and other objects from the BM‑SC according to the MBMS Download Delivery Method specified in clause 7 of TS 26.346 [19]. If an uplink is available to the MBMS Client, and if associated delivery procedures as specified in clause 9.3 of TS 26.346 [19] are activated, the MBMS Client uses the associated delivery procedures to recover damaged media objects received from the BM-SC for xMB-C Session type *Files*.

4. The *Media Server* function interfaces with the MBMS Client per figure 5.1 of TS 26.347 [20], and shall expose the content received (and possibly repaired) by the MBMS Client to the 5GMSd Client via the HTTP client-to-application interface specified in clause 7.2 of TS 26.347 [20]. (This interaction is labelled MBMS-API-U in the above figure.)

5. The media player sends requests according to the signaled object availability times in the manifest. In case a media object transmitted via the MBMS User Service is not received by the MBMS Client by the object availability times, or if it cannot be repaired in time for consumption by the 5GMS Client, the Media Server returns an error or a partial object in response to the Media Player’s request for the media object, and the Media Player may instead attempt to retrieve the media object, or ranges of it, from the 5GMSd AS at reference point M4d, if available. The object shall be available for the application for a well-defined time duration.

NOTE: Details on determining the availability time requirements of the application are deferred to stage-3.

The usage of existing reference points to support these scenarios is documented in the following clauses. Procedures for 5GMS via eMBMS are defined in clause 5.10.

### 4.5.2 Usage of 5GMS reference points for eMBMS-based delivery

#### 4.5.2.1 Usage of M1d

Reference point M1d is used as defined in clauses 4.1 to 4.4.

In addition, the content provider shall authorize via M1d that 5GMS content may be distributed via eMBMS.

The translation of M1d information to eMBMS delivery provisioning is left to implementation.

NOTE: The 5GMS Application Provider may provision specific use-cases (high velocity, specific reception area, indoor/outdoor/mobile users) at reference point M1d. These service requirements are translated by the 5GMSd AF into specific xMB-C calls to provision the BM‑SC with a service that has the right parameters for a specific location.

#### 4.5.2.2 Usage of M2d

Reference point M2d is be used as defined in clauses 4.1 to 4.4.

#### BM-SC4.5.2.3 Usage of M3d

Reference point M3d is used as defined in clauses 4.1 to 4.4.

#### 4.5.2.4 Usage of M4d

Reference point M4d is used as defined in clauses 4.1 to 4.4.

#### 4.5.2.5 Usage of M5d

Reference point M5d is is used as defined in sub-clauses 4.1 to 4.4.

In addition, for 5GMS content to be distributed via eMBMS:

- The 5GMS Service Access Information shall include the relevant information of the eMBMS Service Announcement in order to bootstrap reception of the MBMS service, typically via a service identifier (i.e., the **serviceId** attribute of the bundleDescription.userServiceDescription element of the USD – see TS 26.346 [19]). This is passed by the Media Session Handler to the MBMS Client via reference point MBMS-API-C [20]. When this information is present in the Service Access Information and when the UE is MBMS-capable, the 5GMSd Client shall invoke the MBMS Client to initiate reception of the corresponding MBMS User Service.

- The 5GMS Service Access Information shall include the relevant information of the eMBMS Service Announcement in order to collect metrics of the MBMS service. This metrics collection is initiated, and these metrics are passed to the Media Session Handler from the MBMS Client via reference point MBMS-API-C [20].

#### 4.5.2.6 Usage of M6d

Reference point M6d is used as defined in clauses 4.1 to 4.4.

#### 4.5.2.7 Usage of M7d

Reference point M7d is used as defined in clauses 4.1 to 4.4.

#### 4.5.2.7 Usage of M8d

Reference point M8d is used as defined in clauses 4.1 to 4.4.

### 4.5.3 Usage of MBMS reference points and interfaces

#### 4.5.3.1 Usage of xMB-C

The 5GMSd AF provisions MBMS User Services in the BM‑SC as defined in clauses 5.3 and 5.4 of TS 26.348 [21].

#### 4.5.3.2 Usage of xMB-U

The BM‑SC ingests content from the 5GMSd AS using the push-based ingest method.

#### 4.5.3.3 Usage of User Service Announcement

The MBMS User Service Announcement as defined in TS 26.346 is used to advertise the availability of 5GMS content delivered via eMBMS.

#### 4.5.3.4 Usage of MBMS-API-C\*

The MBMS Client exposes information to the Media Session Handler to manage the reception of MBMS User Services.

#### 4.5.3.4 Usage of MBMS-API-U

The MBMS Client exposes fully- and partially-received media objects to the Media Player in the 5GMSd Client.

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

## 5.10 5GMS via eMBMS

### 5.10.1 General

This clause defines procedures for different use cases and scenarios when 5GMS is using eMBMS for delivery as introduced in clause 4.5.

### 5.10.2 Procedures for 5GMS content delivered exclusively via eMBMS

In this case, 5GMS media data is exclusively delivered via eMBMS, i.e. media content is not delivered via reference point M4d, but only via MBMS User Services. The 5GMSd Client acts as an MBMS-Aware Application.

The call flow in Figure 5.10.2‑1 extends the call flow defined in clause 5.3.2 to address the delivery of 5GMS media data exclusively via eMBMS. Aspects specific to this use-case are indicated in bold.



**Figure 5.10.2-1: High-level procedure for DASH content delivery via eMBMS**

Prerequisites (step 0):

- The 5GMSd Application Provider has provisioned the 5G Media Streaming System, including content ingest **and the authorization to distribute 5GMS content via eMBMS**.

- **The 5GMS AF has informed the BM-SC about the availability of 5GMS content** by provisioning an MBMS service **and has obtained relevant information from the eMBMS Service Announcement (such as the MBMS service identifier).**

- The BM‑SC is ingesting content **from the 5GMS AS**, using either pull mode or push mode.

- The BM‑SC has broadcast the MBMS Service Announcement, **including an indication that the content is 5GMS content**.

Steps:

1: The 5GMSd-Aware Application triggers the Service Announcement procedure and the 5GMS Service and Content Discovery procedure at reference point M8.

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 Service Access Information (see step 1), the Media Session Handler interacts with the 5GMSd AF to acquire the whole Service Access Information. **This includes relevant information from the eMBMS Service Announcement (such as the MBMS service identifier) in order to bootstrap reception of the MBMS service.**

**5–11: The Media Session Handler acts as an MBMS-Aware Application and initiates service acquisition. For details, see TS 26.347 [18]. This establishes a transport session for the MPD and the Content.**

NOTE: The MPD and Initialization Segment(s) are forwarded by the MBMS Client to the Media Server to enable their subsequent delivery to the Media Player upon request.

12: The Media SessionHandler provides the MPD URL to the Media Player either directly or through the 5GMSd-Aware Application.

13: The Media Player is invoked to start media access and playback.

14: The Media Player retrieves the Media Player Entry resource (an MPD) from the proxy Media Server.

15: The Media Player processes the retrieved MPD. It determines, for example, the number of transport sessions needed for media acquisition. The Media Player should be able to use the MPD information to initialize the media pipelines for each media stream (see step 18). When DRM is used (see step 17) the MPD should also contain sufficient information to initialize the DRM client.

16: The Media Player notifies the Media Session Handler about the start of a new downlink media streaming session. The notification may include parameters from the MPD.

17: Optional: The Media Player acquires any necessary DRM information, for example a DRM License.

18: The Media Player configures the media playback pipeline.

19: The Media Player retrieves initialization segment(s) referenced by the MPD.

**20–25: Content is delivered using DASH-over-MBMS. Session Announcemnent updates are provided to the MBMS Client as necessary. MPD updates and Segments are pushed to the media server. The Media Player retrieves media segments from the proxy Media Server according to the MPD and forwards them to the appropriate media rendering pipeline.**

### 5.10.3 5GMS Consumption Reporting procedures for eMBMS

In this case, 5GMS consumption reporting is used to report consumption of 5GMSd content via an eMBMS service.

NOTE: eMBMS consumption reporting is disabled in this case.

The call flow in Figure 5.10.3‑1 extends the call flow defined in clause 5.6.1 to address consumption reporting. Aspects specific to this use-case are indicated in bold.



Figure 5.10.3-1: Consumption reporting for 5GMS via eMBMS

Prerequisites (step 0):

- The 5GMSd Application Provider has provisioned the 5G Media Streaming System, including content ingest, consumption reporting **and the permission to distribute 5GMS content via eMBMS**.

- The BM‑SC is ingesting content **from the 5GMS AS**, using either pull mode or push mode.

- eMBMS media delivery is established.

- Consumption reporting is established.

Steps:

relating to consumption reporting

1

2

The first phase is initialisation.

3: The 5GMSd-Aware Application is started.

4: A media content item is selected.

5: The 5GMSd-Aware Application triggers the Media Session Handler to start content playback. The Media Player Entry is provided.

6If the 5GMS-Aware Application has received only a reference to the Service Access Information, the Media Session Handler interacts with the 5GMSd AF to acquire the whole Service Access Information. **This includes a client consumption reporting configuration**including such as

**7: The MBMS service is initiated.**

8: The Media Session Handler triggers consumption reporting.

9: The Media Session Handler starts the Media Player with the Media Player Entry.

The second phase is media playback.

When media is playing, the consumption reporting parameters may be updated by the 5GMSd AF.

10: The Media Session Handler acquires updated Service Access Information from the 5GMSd AF including updated consumption reporting parameters.

When media is playing:

**11:** Media content is accessed through different networks, **possibly via eMBMS** or unicast.

12: The Media Player transmits information about the media streaming resources consumed to the Media Session Handler, **including the source of the media**.

13: The Media Session Handler regularly sends consumption report(s) to the 5GMSd AF, **including information about the delivery network from which the media was acquired**.

**14: The Media Player provides an update to the Media Session Handler about the consumed media streaming resources, for example a change in the delivery network.**

The last phase is to stop the media:

15: The 5GMSd-Aware Application triggers the Media Session Handler to stop content playback.

6

17: The Media Session Handler stops consumption reporting.

18: The Media Session Handler may send final consumption report(s) to the 5GMSd AF.

### 5.10.4 5GMS Metrics Reporting procedures for eMBMS

In this case, 5GMS metrics reporting is used to report 5GMS and eMBMS metrics to the 5GMSa AF.

NOTE: eMBMS metrics reporting is disabled in this case.

The call flow in Figure 5.10.4‑1 extends the call flow defined in clause 5.6.1 to address metrics reporting. Aspects specific to this use-case are indicated in bold.



Figure 5.10.3-1: Metrics reporting for 5GMS via eMBMS

Prerequisites (step 0):

- The 5GMSd Application Provider has provisioned the 5G Media Streaming System, including content ingest, metrics reporting **and the permission to distribute 5GMS content via eMBMS**.

- The BM-SC is ingesting content **from the 5GMS AS**, using either pull mode or push mode.

- eMBMS media delivery is established.

- Metrics reporting is established.

Steps:

The user preferences relating to metrics reporting may be changed:

1: The 5GMSd-Aware Application selects/changes the user preferences.

2: The Media Player transmits metrics reporting user preferences to the Media Session Handler.

The first phase is initialisation.

3: The 5GMSd-Aware Application is started.

4: A media content item is selected.

5: The 5GMSd-Aware Application triggers the Media Session Handler to start content playback. The Media Player Entry is provided.

6: If the 5GMS-Aware Application has received only a reference to the Service Access Information, the Media Session Handler interacts with the 5GMSd AF to acquire the whole Service Access Information. **This includes a client metrics reporting configuration** including parameters such as reporting frequency.

**7: The MBMS service is initiated.**

8: The Media Session Handler triggers metrics reporting.

9: The Media Session Handler starts the Media Player with the Media Player Entry.

The second phase is media playback.

When media is playing, the metrics reporting parameters may be updated by the 5GMSd AF.

10: The Media Session Handler acquires updated Service Access Information from the 5GMSd AF including updated metrics reporting parameters.

When media is playing:

**11:** Media content is accessed through different networks, **possibly via eMBMS** or unicast.

**12: The Media Player provides DASH metrics to the Media Session Handler.**

**13: The MBMS Client provides MBMS metrics to the Media Session Handler using MBMS-API-C\*.**

14: The Media Session Handler regularly sends metrics report(s) to the 5GMSd AF, **including information about the delivery network from which the media was acquired**.

The last phase is to stop the media:

15: The 5GMSd-Aware Application triggers the Media Session Handler to stop content playback.

16: The Media Session Handler stops the Media Player.

17: The Media Session Handler stops metrics reporting.

18: The Media Session Handler may send final metrics report(s) to the 5GMSd AF.