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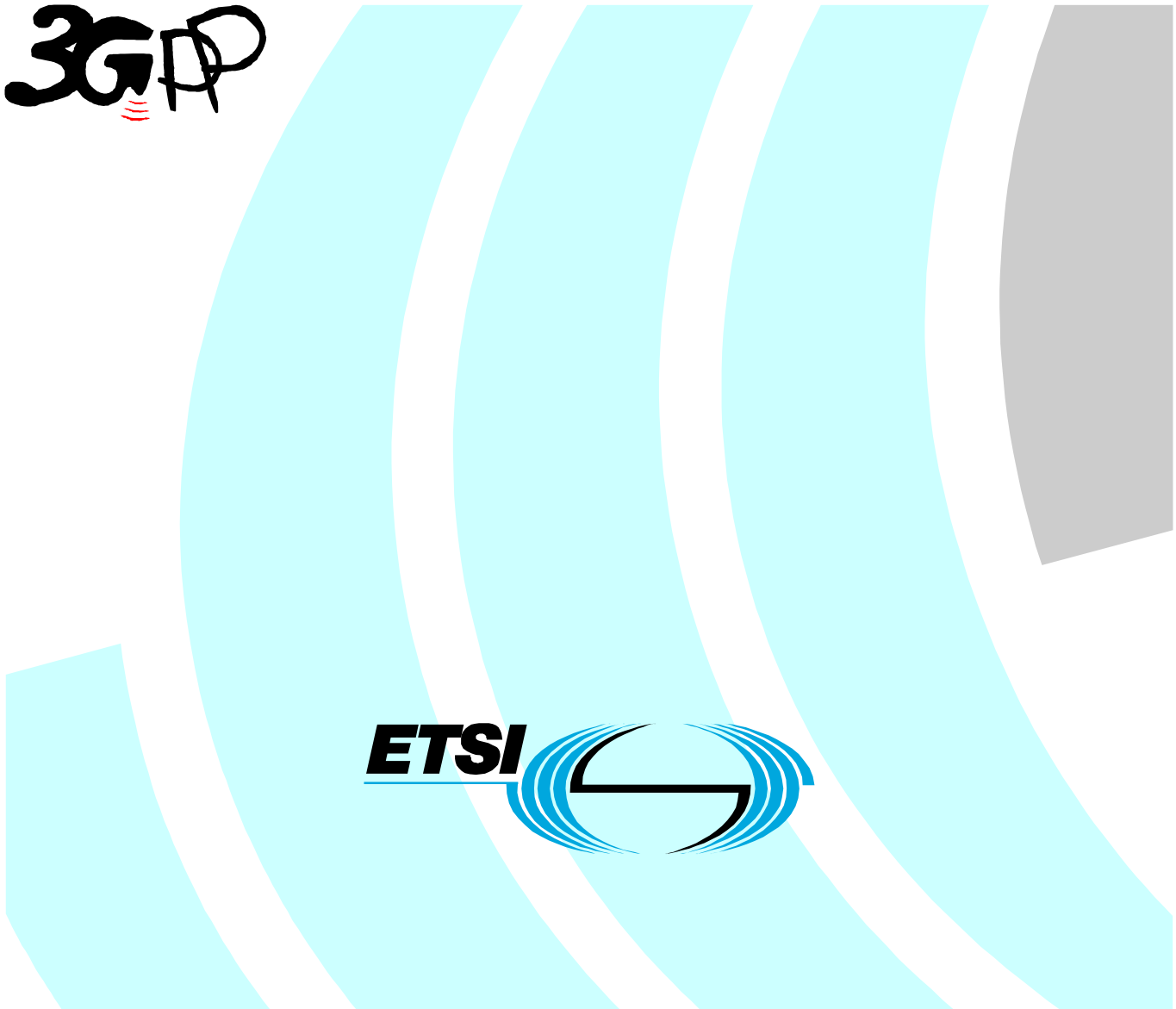
Technical Specification

Universal Mobile Telecommunications System (UMTS);
End-to-end transparent streaming service;
General description
(3GPP TS 26.233 version 5.0.0 Release 5)



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Foreword

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Contents

Foreword

This Technical Specification has been produced by the 3rd Generation Partnership Project (3GPP).

The contents of the present document are subject to continuing work within the TSG and may change following formal TSG approval. Should the TSG modify the contents of the present document, it will be re-released by the TSG with an identifying change of release date and an increase in version number as follows:

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The 3GPP packet-switched streaming service (PSS) specification consists of three 3GPP TSs; 3GPP TS 22.233 "Transparent end-to-end packet switched streaming service; Stage 1 [1], 3GPP TS 26.234 [1] and the present document. The service requirements for PSS are listed in [1]. The present document provides an overview of the 3GPP PSS and [1] specifies the set of PSS protocols and codecs used by the service.

Introduction

Streaming refers to the ability of an application to play synchronised media streams like audio and video streams in a continuous way while those streams are being transmitted to the client over a data network.

Applications, which can be built on top of streaming services, can be classified into on-demand and live information delivery applications. Examples of the first category are music and news-on-demand applications. Live delivery of radio and television programs are examples of the second category.

Streaming over fixed-IP networks is already a major application today. While IETF and W3C have developed a set of protocols used in fixed-IP streaming services, no complete standardised streaming framework has yet been defined. For 3G systems, the 3G packet-switched streaming service (PSS) fills the gap between 3G MMS, e.g. downloading, and conversational services.

PSS enables mobile streaming applications, where the protocol and terminal complexity is lower than for conversational services, which in contrast to a streaming terminal require media input devices, media encoders and more complex protocols.

The present document describes the transparent 3G packet-switched streaming services (3G PSS) on a general application level.

1 Scope

The present document contains a general description of a transparent packet-switched streaming service in 3G networks. In particular, it defines the usage scenarios, overall high level end-to-end service concept, and lists terminal related functional components. It also lists any identified service interworking requirements. PSS protocols and codecs are defined in [1].

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.*

The present document may contain references to pre-Release-4 GSM specifications. These references shall be taken to refer to the Release 5 version where that version exists. Conversion from the pre-Release-4 number to the Release 4 (onwards) number is given in clause 6.1 of 3GPP TR 41.001[2].

[1] 3GPP TS 26.234:"End-to-end transparent streaming service; Protocols and codecs".

[2] 3GPP TR 41.001: "GSM Specification set".

[3] 3GPP TS 22.140: "Service aspects; Stage 1; Multimedia Messaging Service".

[4] 3GPP TS 23.140: "Multimedia Messaging Service (MMS), Functional description stage 2/3".

[5] 3GPP TS 23.060: "General Packet Radio Service (GPRS); Service description; Stage 2".

[1] 3GPP TS 22.233: “Transparent end-to-end packet switched streaming service; Stage 1”

3 Abbreviations

For the purposes of the present document, the following abbreviations apply:

DRM	Digital Rights Management
GIF	Graphics Interchange Format
HTML	HyperText Markup Language
IETF	Internet Engineering Task Force
IP	Internet Protocol
MMS	Multimedia Messaging Service
PDP	Packet Data Protocol
PSS	Packet-switched Streaming Service
RAB	Radio Access Bearer
RFC	IETF Request For Comments
RTP	Real-time Transport Protocol
RTSP	Real-Time Streaming Protocol
SDP	Session Description Protocol
TCP	Transport Control Protocol
UDP	User Datagram Protocol
URI	Universal Resource Identifier
WAP	Wireless Application Protocol
WWW	World Wide Web

4 Usage scenarios

4.1 Applications

The streaming platform supports a multitude of different applications including streaming of news at very low bitrates using still images and speech, music listening at various bitrates and qualities, video clips and watching live sports events.

4.2 Use case descriptions

4.2.1 Simple streaming

The simple streaming service includes a basic set of streaming control protocols, transport protocols, media codecs and scene description protocol. In this basic case defined for the first time in the Release 4 version of this specification, there is neither explicit capability exchange, nor any encryption or digital rights management.

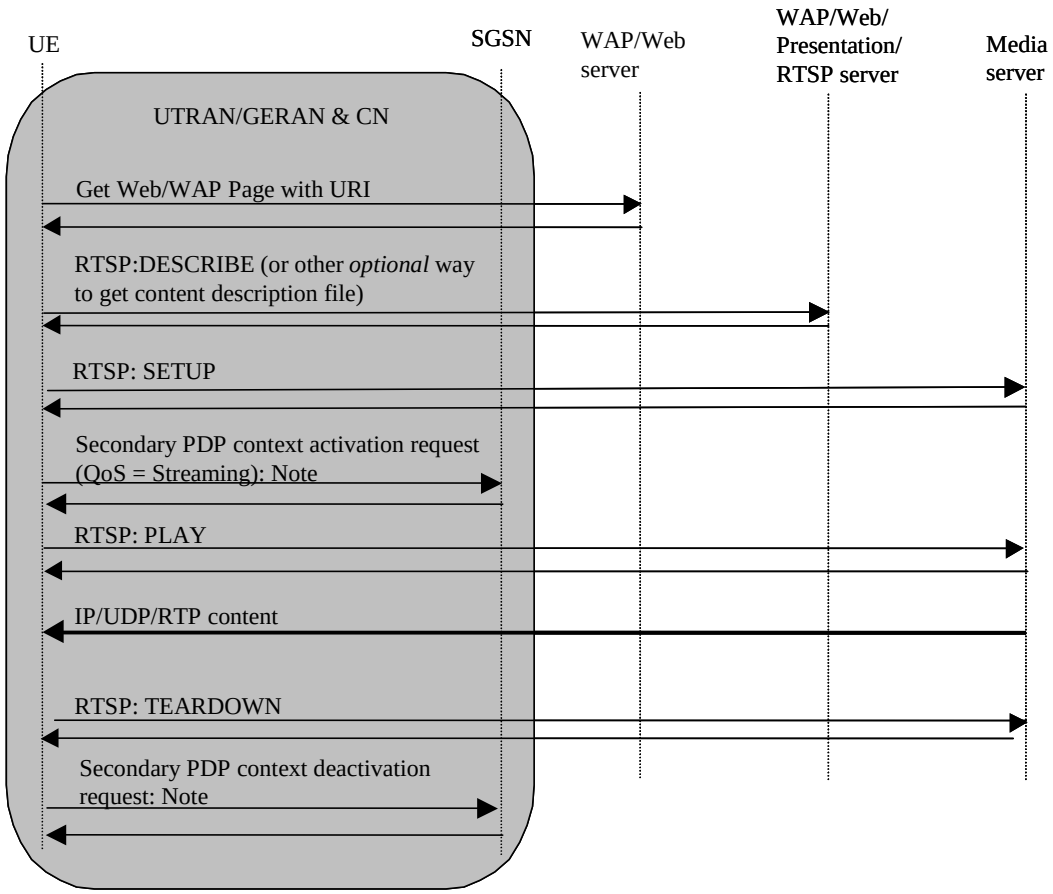
A mobile user gets a URI to specific content that suits his or her terminal. This URI may come from a WWW-browser, a WAP-browser, or typed in by hand. This URI specifies a streaming server and the address of the content on that server. A PSS application that establishes the multimedia session shall understand a Session Description Protocol (SDP) file. Sessions containing only non-streamable content such as a SMIL file, still images and text to form a time-synchronised presentation don't require use of an SDP file in session establishment. Instead HTTP protocol shall be used for receiving the presentation files. PSS SMIL sessions can also include URIs to streamable content, requiring parsing a SDP file and/or RTSP signalling.

The SDP file may be obtained in a number of ways. It may be provided in a link inside the HTML page that the user downloads, via an embed tag. It may also be directly obtained by typing it as a URI. It may also be obtained through RTSP signalling via the DESCRIBE method. In case of streaming delivery option of MMS service, the SDP file is obtained via the MMS user agent that receives a modified MMS message from the MMS relay or server. The SDP file contains the description of the session (session name, author, …), the type of media to be presented, and the bitrate of the media.

The session establishment is the process in which the browser or the mobile user invokes a streaming client to set up the session against the server. The UE is expected to have an active PDP context in accordance with [5] or other type of radio bearer that enables IP packet transmission at the start of session establishment signalling. The client may be able to ask for more information about the content. The client shall initiate the provisioning of a bearer with appropriate QoS for the streaming media.

The set up of the streaming service is done by sending an RTSP SETUP message for each media stream chosen by the client. This returns the UDP and/or TCP port etc. to be used for the respective media stream. The client sends a RTSP PLAY message to the server that starts to send one or more streams over the IP network.

This case is illustrated below in figure 1a. Figure 1b illustrates the service use case when the SDP file is obtained via MMS.



NOTE: These messages are one example of how to establish and terminate the bearer with the desired QoS. Other alternatives exist, e.g., an existing PDP context might be modified.

Figure 1a : Schematic view of a basic streaming session

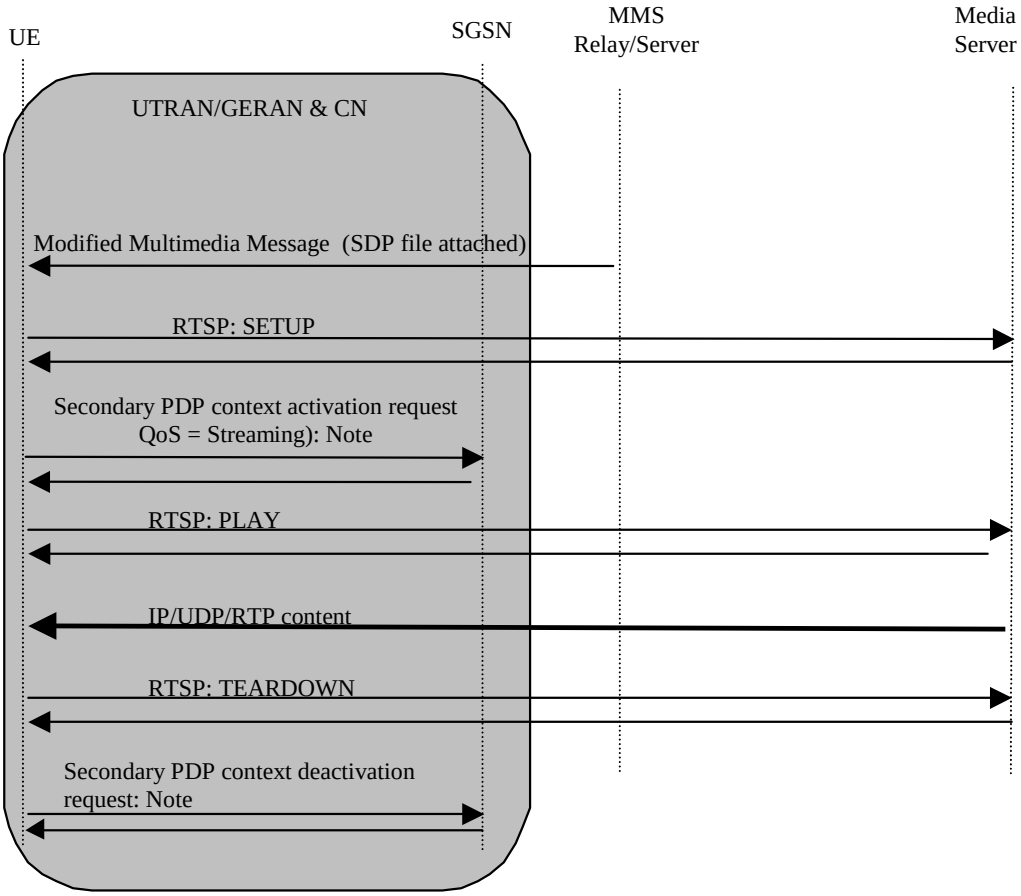


Figure 1b: Schematic view for streaming session originated via MMS

4.2.2 Other streaming cases

The streaming service defined in [0] will support all features defined for the Release 4 streaming case in a fully backwards compatible manner, and may additionally include more advanced service features, such as capability exchange. More extensions to PSS features, such as interworking with core network services, security and Digital Rights Management can be specified in future 3GPP Releases.

5 General service architecture

Figure 2 shows the most important service specific entities involved in a 3G packet -switched streaming service. A streaming service requires at least a content server and a streaming client. A streaming server is located behind the Gi interface. Additional components like portals, profile servers, caching servers and proxies located behind the Gi interface might be involved as well to provide additional services or to improve the overall service quality.

Portals are servers allowing convenient access to streamed media content. For instance, a portal might offer content browse and search facilities. In the simplest case, it is simply a Web/WAP-page with a list of links to streaming content. The content itself is usually stored on content servers, which can be located elsewhere in the network.

User and device profile servers are used to store user preferences and device capabilities. This information can be used to control the presentation of streamed media content to a mobile user. A high-level illustration of the capability exchange framework can be seen in figure 3.

NOTE: specific user preference attributes have not yet been defined for PSS. The extensible device capability attributes allow specifying such attributes in the future releases.

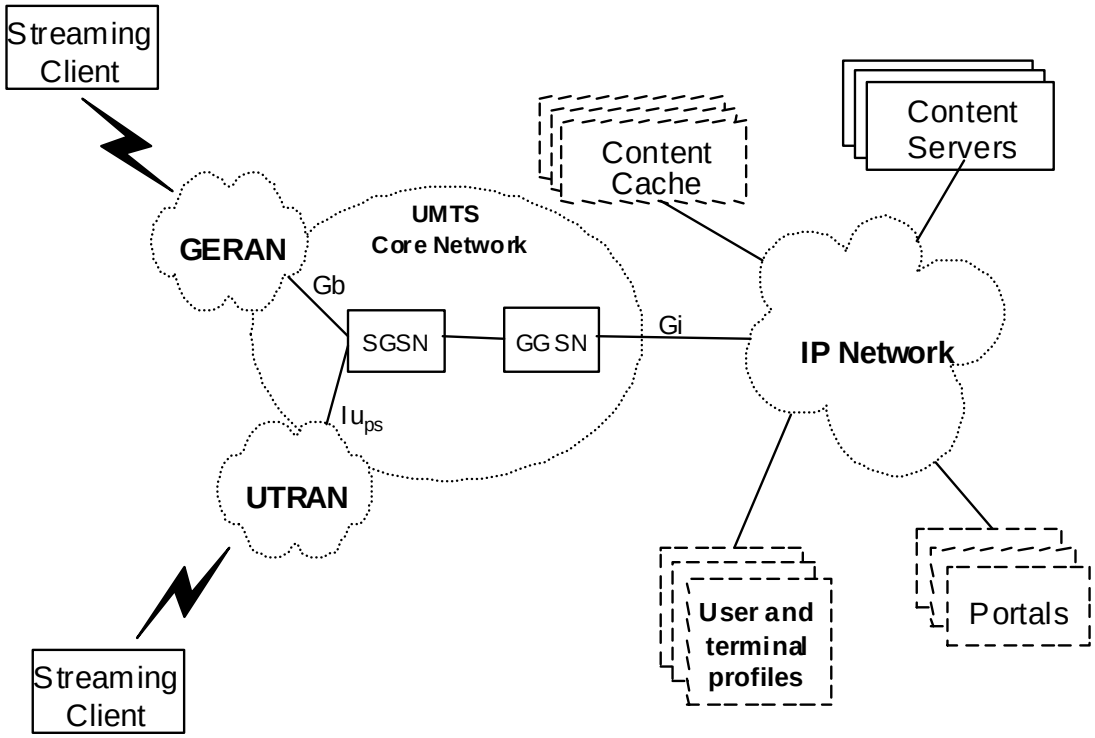


Figure 2: Network elements involved in a 3G packet switched streaming service

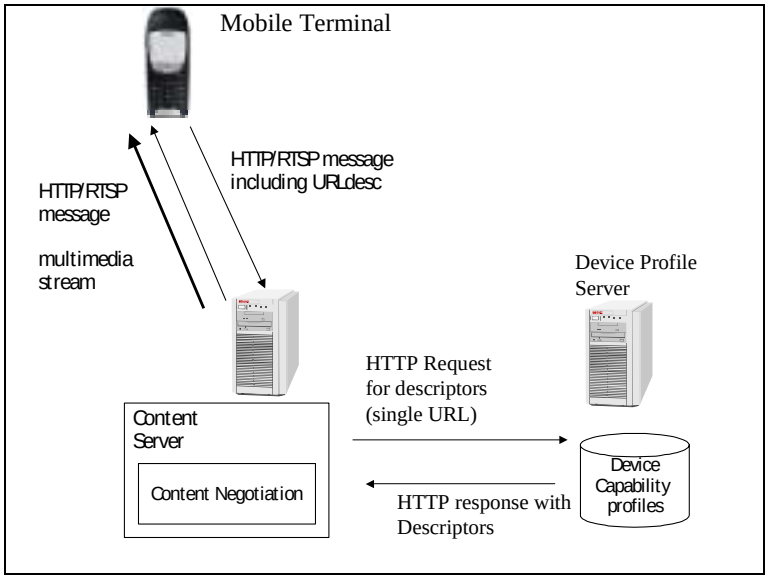


Figure 3. Logical system architecture of the capability negotiation mechanism applied in PSS.

6 Functional components of a PSS terminal

This clause lists the 3G packet-switched streaming service components, which belong to the terminal. Note that not all of the components are mandatory. The functional behaviour of the different components is discussed in the following.

6.1 Session protocols and data transport

Protocols are needed for PSS session establishment, session setup, capability exchange, session control, scene description, and data transport of streaming media and other data. The PSS protocols to be used are specified in [1].

Note that for the simple streaming case defined in clause 4.2.1, no specific capability exchange protocol in addition to the session description mechanism is required.

The normative part of device capability and user preference profile exchange mechanism is defined in clause 5.2 and Annex E of [1]. An informative part is included in Annex A.3 of [1].

6.2 Codecs

Decoders are needed for speech, natural and synthetic audio, video, still images, bitmap graphics, vector graphics and text. The codecs to be used are specified in [1].

7 File format

The file format is an important element of the content manipulation chain. Conceptually, there is a difference between the coding format and the file format. The coding format is related to the action of a specific coding algorithm that codes the content information into a codestream. The file format is instead a way of organising the prestored codestream in such way that it can be accessed for local decoding and playback, or transferred as a file on different media, or streamed over different transport. Some file formats are optimised for one or more of these functions, others aim instead at achieving a higher flexibility.

When a single media type is involved, the coding and the file format are often considered, and referred to, as a single entity. When multimedia information is involved, instead, it is appropriate to maintain, at least conceptually, the distinction between these two instances. The file format can play an important role in facilitating the organisation and the access to the coded information, independently of the specific coding formats.

The clause 9 in [1] specifies how the 3GPP MMS [3] shall utilise a file format. The format establishes a standardised content transport for audio-visual content between MMS elements. It also allows the delivery of the content to the recipient both as a file download or through streaming. A priori knowledge of the delivery mechanism is not needed when the message is created. See also clause 8.2.

8 Interworking with other core network services

8.1 Interworking with WAP

Not required. As shown in Figure 1 the service may be initiated by an URI or a SDP file received via WAP.

8.2 Interworking with MMS

TS 23.140 [4] defines a new optional feature for the MMS, which enables streaming of the MMS messages by the message recipient. The MMS streaming option uses the codecs and protocols in accordance with TS 26.234 [1].

Additionally, [4] mandates the use of the interchange format recommendation specified in 3GPP TS 26.234 [1], clause 9 for MMS purposes.

8.3 Interworking with charging/billing services

Interworking with charging/billing services can be part of a future release of PSS.

9 Security

Streaming security mechanisms can be part of a future release of PSS.

10 Digital Rights Management

Standardisation of 3G PSS needs to be aligned with standardised or industry solutions for media rights management. An appropriate DRM framework has been identified as a new active 3GPP feature to be completed for the next 3GPP release.

Annex A (informative): Change history

Change history							
Date	**TSG SA#**	**TSG Doc.**	**CR**	**Rev**	**Subject/Comment**	**Old**	**New**
03-2001	11	SP-010093			Version for Release 4		4.0.0
12-2001	14	SP-010702	001	1	Correction of RTSP TEARDOWN protocol flow in Figure 1	4.0.0	4.1.0
03-2002	15	SP-020085	002	1	Correction of missing use case example: PSS service activation via MMS	4.1.0	4.2.0
03-2002	15	SP-020086	003		Consolidated addition of Release 5 PSS-E features to TS 26.233 Rel-4	4.2.0	5.0.0

History

Document history		
V5.0.0	March 2002	Publication