



**Universal Mobile Telecommunications System (UMTS);
LTE;
Transparent end-to-end Packet-switched
Streaming Service (PSS);
Protocols and codecs
(3GPP TS 26.234 version 13.1.0 Release 13)**



Reference

RTS/TSGS-0426234vd10

Keywords

LTE,UMTS

ETSI

650 Route des Lucioles
F-06921 Sophia Antipolis Cedex - FRANCE

Tel.: +33 4 92 94 42 00 Fax: +33 4 93 65 47 16

Siret N° 348 623 562 00017 - NAF 742 C
Association à but non lucratif enregistrée à la
Sous-Préfecture de Grasse (06) N° 7803/88

Important notice

The present document can be downloaded from:

<http://www.etsi.org/standards-search>

The present document may be made available in electronic versions and/or in print. The content of any electronic and/or print versions of the present document shall not be modified without the prior written authorization of ETSI. In case of any existing or perceived difference in contents between such versions and/or in print, the only prevailing document is the print of the Portable Document Format (PDF) version kept on a specific network drive within ETSI Secretariat.

Users of the present document should be aware that the document may be subject to revision or change of status.

Information on the current status of this and other ETSI documents is available at

<http://portal.etsi.org/tb/status/status.asp>

If you find errors in the present document, please send your comment to one of the following services:

<https://portal.etsi.org/People/CommitteeSupportStaff.aspx>

Copyright Notification

No part may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilm except as authorized by written permission of ETSI.

The content of the PDF version shall not be modified without the written authorization of ETSI.

The copyright and the foregoing restriction extend to reproduction in all media.

© European Telecommunications Standards Institute 2016.

All rights reserved.

DECT™, **PLUGTESTS™**, **UMTS™** and the ETSI logo are Trade Marks of ETSI registered for the benefit of its Members.
3GPP™ and **LTE™** are Trade Marks of ETSI registered for the benefit of its Members and
of the 3GPP Organizational Partners.
GSM® and the GSM logo are Trade Marks registered and owned by the GSM Association.

Intellectual Property Rights

IPRs essential or potentially essential to the present document may have been declared to ETSI. The information pertaining to these essential IPRs, if any, is publicly available for **ETSI members and non-members**, and can be found in ETSI SR 000 314: *"Intellectual Property Rights (IPRs); Essential, or potentially Essential, IPRs notified to ETSI in respect of ETSI standards"*, which is available from the ETSI Secretariat. Latest updates are available on the ETSI Web server (<https://ipr.etsi.org/>).

Pursuant to the ETSI IPR Policy, no investigation, including IPR searches, has been carried out by ETSI. No guarantee can be given as to the existence of other IPRs not referenced in ETSI SR 000 314 (or the updates on the ETSI Web server) which are, or may be, or may become, essential to the present document.

Foreword

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

The present document may refer to technical specifications or reports using their 3GPP identities, UMTS identities or GSM identities. These should be interpreted as being references to the corresponding ETSI deliverables.

The cross reference between GSM, UMTS, 3GPP and ETSI identities can be found under <http://webapp.etsi.org/key/queryform.asp>.

Modal verbs terminology

In the present document "**shall**", "**shall not**", "**should**", "**should not**", "**may**", "**need not**", "**will**", "**will not**", "**can**" and "**cannot**" are to be interpreted as described in clause 3.2 of the [ETSI Drafting Rules](#) (Verbal forms for the expression of provisions).

"**must**" and "**must not**" are **NOT** allowed in ETSI deliverables except when used in direct citation.

Contents

Intellectual Property Rights	2
Foreword.....	2
Modal verbs terminology.....	2
Foreword.....	9
Introduction	9
1 Scope	10
2 References	10
3 Definitions and abbreviations.....	15
3.1 Definitions	15
3.2 Abbreviations	15
4 System description	17
5 Protocols.....	19
5.1 Session establishment.....	19
5.2 Capability exchange	19
5.2.1 General.....	19
5.2.2 The device capability profile structure.....	19
5.2.3 Vocabularies for PSS.....	20
5.2.3.1 General	20
5.2.3.2 PSS base vocabulary	20
5.2.3.2.1 PssCommon component	20
5.2.3.2.2 Streaming component.....	22
5.2.3.2.3 ThreeGPPFileFormat component	29
5.2.3.2.4 Void.....	32
5.2.3.3 Attributes from UAProf	32
5.2.4 Extensions to the PSS schema/vocabulary.....	33
5.2.4.1 Vocabulary definitions	33
5.2.4.2 Backward compatibility	34
5.2.5 Signalling of profile information between client and server.....	34
5.2.6 Merging device capability profiles	34
5.2.7 Profile transfer between the PSS server and the device profile server.....	35
5.3 Session set-up and control.....	35
5.3.1 General.....	35
5.3.2 RTSP.....	35
5.3.2.1 The 3GPP-Link-Char header.....	36
5.3.2.2 The 3GPP-Adaptation header.....	37
5.3.2.3 The Quality of Experience headers	37
5.3.2.3.1 Protocol initiation and termination	37
5.3.2.3.2 Metrics feedback	39
5.3.2.3.3 Metrics feedback over HTTP	40
5.3.2.3.3.0 Requirements and semantics.....	40
5.3.2.3.3.1 XML Syntax for a QoE Report.....	40
5.3.2.3.3.2 Example XML for the QoE Report.....	41
5.3.2.4 Video buffering headers	42
5.3.3 SDP.....	42
5.3.3.1 General	42
5.3.3.2 Additional SDP fields	43
5.3.3.3 The 'alt' and 'alt-default-id' attributes	46
5.3.3.4 The session level grouping attribute, 'alt-group'.....	47
5.3.3.5 The bit-rate adaptation support attribute, '3GPP-Adaptation-Support'.....	47
5.3.3.6 The Quality of Experience support attribute, "3GPP-QoE-Metrics"	48
5.3.3.7 The asset information attribute, "3GPP-Asset-Information"	48

5.3.3.8	OMA-DM Configuration of QoE Metrics.....	49
5.3.3.8.0	General	49
5.3.3.8.1	QoE metrics reporting management object	49
5.3.3.8.2	QoE reporting rule definition	54
5.4	MIME media types.....	54
5.5	Extension for Fast Content Switching and Start-up	56
5.5.1	Introduction.....	56
5.5.2	Extensions to RTSP 1.0	56
5.5.2.1	Introduction.....	56
5.5.2.2	Capability Handling	56
5.5.2.2.1	Introduction	56
5.5.2.2.2	Definition of the 'Supported' RTSP Header Field.....	56
5.5.2.3	SSRC in the 'RTP-Info' RTSP Header Field	57
5.5.2.4	Semantics of RTSP PLAY method	58
5.5.3	Start-up	58
5.5.4	Fast Content Switching.....	58
5.5.4.1	Introduction.....	58
5.5.4.2	'Switch-Stream' RTSP Header Field	58
5.5.4.3	Switching to new content with available SDP	59
5.5.4.4	Switching to new content without SDP.....	60
5.5.4.5	Switching Media described in one SDP	60
5.5.4.6	Adding Media Components to an ongoing session	61
5.5.4.7	Removing Media Components from an ongoing session.....	61
5.6	Extension for Time-Shifting Support	61
5.6.1	Introduction.....	61
5.6.2	General Description	62
5.6.2a	Extensions to RTSP 1.0	62
5.6.3	Accept-Ranges	62
5.6.4	Signalling Time Shifting Ranges	63
5.6.5	Timeshift buffer status updates	64
5.7	Support for Trick Mode Operations.....	64
5.8	Session Update.....	65
6	Data transport	66
6.1	Packet based network interface	66
6.2	RTP over UDP/IP	66
6.2.1	General.....	66
6.2.2	RTP profiles.....	67
6.2.3	RTP and RTCP extensions	67
6.2.3.1	RTCP extended reports	67
6.2.3.2	RTCP App packet for client buffer feedback (NADU APP packet)	67
6.2.3.3	RTP retransmission	69
6.2.3.3.1	General	69
6.2.3.3.2	Multiplexing scheme	69
6.2.3.3.3	RTCP retransmission request	69
6.2.3.3.4	Congestion control and usage with rate adaptation	69
6.2.4	RTP payload formats	69
6.2.5	Coordination of Video Orientation	70
6.3	HTTP over TCP/IP	70
6.4	Transport of RTSP.....	71
7	Codecs	71
7.1	General	71
7.2	Speech	71
7.3	Audio.....	71
7.3a	Synthetic audio	72
7.4	Video.....	72
7.4.1	General video decoder requirements.....	72
7.4.2	Output timing and buffer model	73
7.4.3	Television services.....	73
7.4.4	Stereoscopic 3D Video	73
7.5	Still images.....	74

7.6	Bitmap graphics.....	74
7.7	Vector graphics	74
7.8	Text	75
7.9	Timed text	75
7.10	3GPP file format.....	75
7.11	Timed graphics	75
8	Scene description.....	75
8.1	General	75
8.2	Void.....	76
8.3	Void.....	76
9	3GPP file format (interchange format for MMS).....	76
10	Adaptation of continuous media.....	76
10.1	General	76
10.2	Bit-rate adaptation	76
10.2.1	Link-rate estimation	76
10.2.1.1	Initial values	76
10.2.1.2	Regular information sources	77
10.2.2	Transmission adaptation	77
10.2.3	Signalling for client buffer feedback	77
10.3	Issues with deriving adaptation information (informative)	78
11	Quality of Experience.....	80
11.1	General	80
11.2	QoE metrics.....	80
11.2.0	General.....	80
11.2.1	Corruption duration metric	80
11.2.1.1	Default reporting format	80
11.2.1.2	XML reporting format.....	81
11.2.2	Rebuffering duration metric.....	81
11.2.2.1	Default reporting format	81
11.2.2.2	XML reporting format.....	82
11.2.3	Initial buffering duration metric.....	82
11.2.3.1	Default reporting format	82
11.2.3.2	XML reporting format.....	82
11.2.4	Successive loss of RTP packets	82
11.2.4.1	Default reporting format	82
11.2.4.2	XML reporting format.....	83
11.2.5	Frame rate deviation	83
11.2.5.1	Default reporting format	83
11.2.5.2	XML reporting format.....	83
11.2.6	Jitter duration.....	83
11.2.6.1	Default reporting format	83
11.2.6.2	XML reporting format.....	84
11.2.7	Content Switch Time	84
11.2.7.1	Default reporting format	84
11.2.7.2	XML reporting format.....	84
11.2.8	Average Codec Bitrate.....	84
11.2.8.1	Default reporting format	84
11.2.8.2	XML reporting format.....	85
11.2.9	Codec Information	85
11.2.9.1	Default reporting format	85
11.2.9.2	XML reporting format.....	85
11.2.10	Buffer Status	85
11.2.10.1	Default reporting format	85
11.2.10.2	XML reporting format.....	86
11.3	The QoE protocol for RTSP based reporting	86
11.3.1	General.....	86
11.3.2	Metrics initiation with SDP	87
11.3.3	Metrics initiation/termination with RTSP.....	88
11.3.4	Sending the metrics feedback with RTSP.....	91

12	Adaptive HTTP Streaming.....	92
13	Networked bookmark service.....	92
13.1	Introduction	92
13.2	Bookmarking using HTTP	92
13.2.1	Bookmark storage.....	92
13.2.2	Bookmark retrieval	93
13.2.3	Bookmark deletion.....	93
13.3	Bookmarking using RTSP.....	93
Annex A (informative): Protocols		94
A.1	SDP.....	94
A.2	RTSP	101
A.2.1	General	101
A.2.2	Implementation guidelines	106
A.2.2.1	Usage of persistent TCP	106
A.2.2.2	Detecting link aliveness	107
A.3	RTP.....	107
A.3.1	General	107
A.3.2	Implementation guidelines	107
A.3.2.1	Maximum RTP packet size.....	107
A.3.2.2	Sequence number and timestamp in the presence of NPT jump	108
A.3.2.3	RTCP transmission interval	108
A.3.2.4	Timestamp handling after PAUSE/PLAY requests	109
A.3.3	Examples of RTCP APP packets for client buffer feedback	110
A.4	Capability exchange	111
A.4.1	Overview	111
A.4.2	Scope of the specification.....	113
A.4.3	The device capability profile structure	114
A.4.4	CC/PP Vocabularies.....	115
A.4.5	Principles of extending a schema/vocabulary.....	116
A.4.6	Signalling of profile information between client and server	116
A.4.7	Example of a PSS device capability description	117
Annex B (informative): SMIL authoring guidelines		119
Annex C (normative): MIME media types		120
C.1	(void).....	120
C.2	MIME media type sp-midi	120
C.3	MIME media type mobile-xmf.....	120
C.4	(void).....	121
Annex D (normative): 3GP files – codecs and identification.....		122
Annex E (normative): RTP payload format and file storage format for AMR and AMR-WB audio.....		123
Annex F (normative): RDF schema for the PSS base vocabulary.....		124
Annex G (normative): Buffering of video.....		136
G.1	Introduction	136
G.2	PSS Buffering Parameters	136
G.3	PSS server buffering verifier.....	137
G.4	PSS client buffering requirements.....	138

Annex H (informative):	Content creator guidelines for the synthetic audio medium type.....	139
Annex I (informative):	Void	140
Annex J (informative):	Mapping of SDP parameters to UMTS QoS parameters.....	141
Annex K (normative):	Void (Substituted by Annex R).....	142
Annex L (informative):	SVG Tiny 1.2 content creation guidelines.....	143
L.1	Feature analysis	143
L.2	Recommendations	144
L.2.1	General	144
L.2.2	Video element	145
L.2.2.1	Inclusion of the video element in SVG content	145
L.2.2.2	Transformation of video	145
L.2.3	Animation Element.....	145
L.2.4	Void.....	146
L.2.5	Transparency, stroking and gradients.....	146
L.2.6	Events	146
L.2.7	Text Area.....	146
L.2.8	SVG fonts	146
L.2.9	Bitmap fonts	146
L.2.10	Animation.....	147
L.2.11	User interaction and content navigation	147
L.2.12	Inheritance	147
Annex M (informative):	Examples for Fast Content Switching and Start-up	148
M.1	Pipelined Start-up Examples	148
M.1.1	Successful Pipelined Start-up	148
M.1.2	Unsuccessful Pipelined Start-up	148
M.2	Content Switch with SDP	149
M.2.1	Successful Content Switch with available SDP	149
M.2.2	Partial successful Content Switch with available SDP	150
M.2.3	Successful Content Switch with available SDP, but removal of media component	151
M.3	Content Switch without SDP	152
M.3.1	Successful Content Switch without available SDP	152
M.3.2	Partial successful Content Switch without available SDP	152
M.3.3	Partial successful Content Switch without available SDP	153
M.4	Stream Switching	154
M.4.1	Successful Stream Switch.....	154
M.4.2	Removal of Media Components from an ongoing session	155
Annex N (informative):	Recommendations for NAT traversal.....	156
N.1	NAT identification	156
N.2	NAT traversal.....	156
Annex O (informative):	Examples for PSS Timeshift	157
Annex P (informative):	QoE Reporting Management Object Device Description Framework ...	159
Annex Q (informative):	Void	164
Annex R (normative):	Content Protection extensions	165
R.1	Encryption and Transport of Protected PSS Streams	165
R.1.1	Overview	165
R.1.2	Stream format.....	165
R.1.3	Encryption	165
R.1.3.1	Encryption Algorithm	165
R.1.3.2	Content encryption using a single key	165
R.1.3.3	Content encryption using a key stream	166
R.1.4	RTP Transport of Encrypted AUs	166

R.1.5	RTSP Signalling for key stream (STKM) setup and control	166
R.1.5.1	RTSP SETUP Method	166
R.1.5.2	RTSP PLAY, PAUSE and TEARDOWN Method	166
R.2	SDP Signalling	167
R.3	Enforcement of permissions and constraints	167
R.4	Mapping to DRM systems (informative)	167
R.4.1	Mapping to OMA DRM 2.0 (informative)	167
R.4.2	Mapping to OMA DRM 2.1 (informative)	167
Annex S (normative):	MIME Type Registrations	168
S.1	MIME Type Registration for Media Presentation Description	168
Annex T (normative):	XML Schema for NetworkedBookmark.....	170
Annex U (informative):	IANA registration information for SDP attributes.....	172
U.1	Introduction	172
U.2	3GPP-framepackingtype	172
Annex V (informative):	Change history	173
History		177

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:

Version x.y.z

where:

- x the first digit:
 - 1 presented to TSG for information;
 - 2 presented to TSG for approval;
 - 3 or greater indicates TSG approved document under change control.
- y the second digit is incremented for all changes of substance, i.e. technical enhancements, corrections, updates, etc.
- z the third digit is incremented when editorial only changes have been incorporated in the specification;

The 3GPP transparent end-to-end packet-switched streaming service (PSS) specification consists of seven 3GPP TSs: 3GPP TS 22.233 [1], 3GPP TS 26.233 [2], 3GPP TS 26.244 [50], 3GPP TS 26.245 [51], 3GPP TS 26.246 [52], 3GPP TS 26.247 [112] and the present document.

The TS 22.233 contains the service requirements for the PSS. The TS 26.233 provides an overview of the PSS. The TS 26.244 defines the 3GPP file format (3GP) used by the PSS and MMS services. The TS 26.245 defines the Timed text format used by the PSS and MMS services. The TS 26.247 defines 3GPP Progressive Download and Dynamic Adaptive Streaming over HTTP (3GP-DASH). The present document provides the details of the protocols and codecs used by the PSS.

The TS 26.244 and TS 26.245 start with Release 6. Earlier releases of the 3GPP file format and the Timed text format can be found in TS 26.234. The TS 26.247 starts with Release 10. Earlier releases of the 3GPP Download and Adaptive Streaming over HTTP can be found in TS 26.234.

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.

The 3GPP PSS provides a framework for Internet Protocol (IP) based streaming applications in 3G networks.

1 Scope

The present document specifies the protocols and codecs for the PSS within the 3GPP system. Protocols for control signalling, capability exchange, media transport, rate adaptation and protection are specified. Codecs for speech, natural and synthetic audio, video, still images, bitmap graphics, vector graphics, timed text and text are specified.

The present document is applicable to IP-based packet-switched networks.

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 TS 22.233: "Transparent End-to-End Packet-switched Streaming Service; Stage 1".
- [2] 3GPP TS 26.233: "Transparent end-to-end packet switched streaming service (PSS); General description".
- [3] 3GPP TR 21.905: "Vocabulary for 3GPP Specifications".
- [4] (void)
- [5] IETF RFC 2326: "Real Time Streaming Protocol (RTSP)", Schulzrinne H., Rao A. and Lanphier R., April 1998.
- [6] IETF RFC 4566: "SDP: Session Description Protocol", Handley M., Jacobson V. and Perkins C., July 2006.
- [7] IETF STD 0006: "User Datagram Protocol", Postel J., August 1980.
- [8] IETF STD 0007: "Transmission Control Protocol", Postel J., September 1981.
- [9] IETF RFC 3550: "RTP: A Transport Protocol for Real-Time Applications", Schulzrinne H. et al., July 2003.
- [10] IETF RFC 3551: "RTP Profile for Audio and Video Conferences with Minimal Control", Schulzrinne H. and Casner S., July 2003.
- [11] IETF RFC 4867: "RTP Payload Format and File Storage Format for the Adaptive Multi-Rate (AMR) Adaptive Multi-Rate Wideband (AMR-WB) Audio Codecs", Sjoberg J. et al., April 2007.
- [12] (void)
- [13] IETF RFC 6416: "RTP Payload Format for MPEG-4 Audio/Visual Streams", M. Schmidt et al., October 2011.
- [14] IETF RFC 4629: "RTP Payload Format for the ITU-T Rec. H.263 Video", Ott J. et al., January 2007.
- [15] IETF RFC 2046: "Multipurpose Internet Mail Extensions (MIME) Part Two: Media Types", Freed N. and Borenstein N., November 1996.