

# ETSI TS 183 063 V3.6.1 (2014-08)



## Telecommunications and Internet converged Services and Protocols for Advanced Networking (TISPAN); IMS-based IPTV stage 3 specification

**PREVIEW**  
iTech Standards (standards.it-euh.eu)  
Full standard available at: <https://standards.it-euh.eu/catalogue/standards/etsi-ts-183-063-v3.6.1-3512-4431-951c-0e40acb31cb5/>  
2014-08



## Reference

---

 RTS/NTECH-00012-IPTV-IMSstage3
 

---

## Keywords

---

 IMS, IP, stage 3, TV
 

---

**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>

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:

[http://portal.etsi.org/chaircor/ETSI\\_support.asp](http://portal.etsi.org/chaircor/ETSI_support.asp)

**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 2014.

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.

# Contents

Intellectual Property Rights .....	15
Foreword.....	15
Modal verbs terminology.....	15
1 Scope .....	16
2 References .....	16
2.1 Normative references .....	16
2.2 Informative references.....	19
3 Abbreviations .....	20
4 Applicability.....	22
4.1 Overview .....	22
4.2 Functional entities .....	24
4.2.1 User Equipment (UE) .....	24
4.2.2 Service Control Function (SCF) .....	24
4.2.3 Service Discovery Function (SDF).....	24
4.2.4 Service Selection Function (SSF) .....	24
4.2.5 Media Control Function (MCF).....	24
4.2.6 Media Delivery Function (MDF).....	24
4.2.7 Core-IMS .....	24
4.2.8 Inter-destination media synchronization entities .....	25
4.2.8.1 MSAS.....	26
4.2.8.2 SC.....	26
4.2.8.3 SC'.....	26
4.2.9 Service Protection and Content Protection function (SCP) .....	26
4.3 Compliance.....	27
5 Procedures using SIP/SDP for IMS-based IPTV .....	28
5.1 User Equipment (UE).....	28
5.1.1 Procedure for IMS registration .....	28
5.1.2 Procedure for service attachment .....	28
5.1.2.1 Push mode .....	28
5.1.2.2 Pull mode .....	28
5.1.2.2.1 Subscription.....	29
5.1.2.2.2 Receiving notifications .....	30
5.1.3 Procedure for BC service .....	30
5.1.3.1 UE-initiated session initiation .....	30
5.1.3.1.1 Additional SDP lines for FEC streams .....	31
5.1.3.1A SCF-initiated session initiation .....	32
5.1.3.2 Session modification .....	33
5.1.3.3 BC service with trick-play mode.....	33
5.1.3.3.1 Trick-play mode activation.....	33
5.1.3.3.2 Trick-play mode deactivation.....	33
5.1.3.4 Session termination .....	34
5.1.3.5 Session Information .....	34
5.1.3.6 Procedure for PPV service .....	35
5.1.4 Procedure for CoD service.....	35
5.1.4.1 Procedure for retrieving missing parameters before session initiation.....	35
5.1.4.2 UE-initiated session initiation .....	36
5.1.4.2.1 Procedure for establishing the RTSP content control and content delivery channel .....	36
5.1.4.2.2 Procedure for establishing the RTSP channel separately .....	37
5.1.4.2A SCF-initiated session initiation .....	38
5.1.4.2.3 Additional SDP lines for FEC streams .....	38
5.1.4.3 Session modification .....	39
5.1.4.3.1 Procedure for establishing the content delivery channel .....	39
5.1.4.3.2 Additional SDP lines for FEC streams .....	39

5.1.4.4	Session termination .....	40
5.1.4.4.1	Session termination using RTSP Method 1 .....	40
5.1.4.4.2	Session termination using RTSP Method 2 .....	40
5.1.4.5	Procedures for handling COD Service action data .....	40
5.1.5	Procedure for Service Configuration .....	41
5.1.5.1	Subscription to notification of changes .....	41
5.1.5.2	Processing of notifications .....	42
5.1.6	Procedure for IPTV presence service.....	42
5.1.6.1	Subscribing to presence.....	44
5.1.6.2	Receiving presence notifications.....	45
5.1.7	Procedure for PVR Service.....	45
5.1.7.1	Procedures for PVR Service Capture Request .....	45
5.1.7.1.1	Procedures for Impulsive Request.....	45
5.1.7.1.2	Procedures for Offline Request .....	47
5.1.7.2	Procedures for N-PVR Session .....	47
5.1.7.3	Procedures for C-PVR Recording Session.....	48
5.1.8	Procedure for UGC Service .....	48
5.1.8.1	Procedure for UGC declaration.....	48
5.1.8.2	Procedure for publishing UGC description information by UE .....	49
5.1.8.3	Procedure for UGC creation .....	49
5.1.8.3.1	Session initiation .....	49
5.1.8.4	Procedure for UGC watching session.....	50
5.1.8.4.1	UGC selection .....	50
5.1.8.4.2	Session initiation .....	50
5.1.9	Notification service.....	51
5.1.9.1	Procedure for Notification service using signalling path .....	51
5.1.10	Procedure for Remote Service Initiation.....	51
5.1.10.1	Procedure for service initiation by remote UE .....	51
5.1.10.2	Procedure for service initiation on the Target UE .....	51
5.1.11	Procedure for Personalized Service Composition.....	52
5.1.11.1	General .....	52
5.1.11.2	Generation of the PSCid by the UE .....	52
5.1.11.3	UE-initiated session initiation .....	52
5.1.11.4	SCF-initiated session initiation .....	52
5.1.11.5	Session modification .....	52
5.1.11.6	Session termination .....	53
5.1.12	Procedure for Personalized Channel (PCh) Service.....	53
5.1.12.1	Procedure for PCh Declaration .....	53
5.1.12.2	Procedure for PCh Operation .....	53
5.1.12.2.1	PCh Session Initiation .....	53
5.1.12.2.2	Session modification due to a PCh Content Item Switch .....	54
5.1.12.2.3	PCh Overlap Handling through User interaction.....	54
5.1.13	Procedure for Content Insertion at UE Side.....	54
5.1.14	Procedures for IPTV Content Marker Service .....	55
5.1.14.1	Procedure for IPTV Content Marker handling.....	55
5.1.15	Procedure for Targeted Ad Insertion (TAI) .....	57
5.1.15.1	TAI at UE side .....	57
5.1.15.2	TAI at MF side .....	57
5.1.16	Procedures for Content Switch within a CoD Contentlist(User-Owned).....	57
5.1.16.1	UE-initiated session Session initiation .....	57
5.1.17	Procedures with other IMS Services.....	57
5.1.17.1	Instant Messaging Procedures.....	57
5.1.18	Procedures for Unicast Content Download.....	58
5.1.18.1	UE-initiated Content download session initiation for unicast download .....	58
5.1.18.2	UE-initiated Content download session initiation for multicast download .....	59
5.1.19	Procedure for Preview Service.....	59
5.1.19.1	Procedures for BC preview session.....	59
5.1.19.1.1	Session initiation .....	59
5.1.19.2	Procedures for CoD preview session.....	59
5.1.19.2.1	Session initiation .....	59
5.1.20	Procedure for Session Transfer.....	60
5.1.20.1	Generic Procedure.....	60

5.1.20.1.1	Transferee UE session initiation.....	60
5.1.20.2	Session Transfer - Push Mode.....	60
5.1.20.2.1	Transferor UE Locating a Transferee.....	60
5.1.20.2.2	Transferor UE Initiation of Session Transfer Request.....	60
5.1.20.2.3	Transferee UE Handling for Incoming Session Transfer Request.....	61
5.2	Service Discovery Function (SDF).....	61
5.2.1	Procedure for IMS registration.....	61
5.2.2	Procedure for service attachment.....	61
5.2.2.1	Push mode.....	61
5.2.2.2	Pull mode.....	62
5.2.2.3	Service Attachment Information.....	64
5.3	Service Control Function (SCF).....	65
5.3.1	Procedure for BC service.....	65
5.3.1.1	UE-initiated session initiation.....	65
5.3.1.1A	SCF-initiated session initiation.....	66
5.3.1.2	Session modification.....	67
5.3.1.3	BC service with trick-play mode.....	67
5.3.1.3.1	Trick-play mode activation.....	67
5.3.1.3.2	Trick-play mode deactivation.....	68
5.3.1.4	Session termination.....	68
5.3.1.5	Procedure for PPV service.....	68
5.3.1.5.1	PPV Session initiation.....	68
5.3.1.5.2	PPV Session termination.....	69
5.3.2	Procedure for CoD service.....	69
5.3.2.1	Procedure for handling missing parameters before session initiation.....	69
5.3.2.2	UE-initiated session initiation.....	69
5.3.2.2A	SCF-initiated session initiation.....	69
5.3.2.3	Session modification.....	70
5.3.2.4	Session termination.....	70
5.3.2.4.1	Session termination using RTSP method 1.....	70
5.3.2.4.2	Session termination using RTSP method 2.....	70
5.3.2.5	Procedures for handling COD Service action data.....	70
5.3.3	Procedure for Service Configuration.....	71
5.3.4	Procedure for PVR Service.....	71
5.3.4.1	Procedures for PVR Service Capture Request.....	71
5.3.4.1.1	Procedures for Impulsive Request.....	71
5.3.4.1.2	Procedures for Offline Request.....	72
5.3.4.2	Procedures for N-PVR Session.....	72
5.3.4.3	Procedures for C-PVR Service Recording Session.....	72
5.3.5	Procedure for UGC Service.....	72
5.3.5.1	Procedure for handling UGC declaration request.....	72
5.3.5.2	Procedure for handling publication request of UGC description information.....	73
5.3.5.3	Procedure for handling UGC creation request.....	73
5.3.5.4	Procedure for handling UGC watching request.....	74
5.3.5.4.1	UGC pre-selection.....	74
5.3.6	Notification service.....	74
5.3.6.1	Procedure for Notification service using signalling path.....	74
5.3.6.2	Procedure for Notification service using multicast media path.....	75
5.3.7	Procedure for restricted trick play.....	76
5.3.8	Procedure for Service Initiation for Remote UE.....	76
5.3.8.1	Procedure for handling the request of remote UE initial procedures.....	76
5.3.9	Procedures for Playlist handling.....	76
5.3.9.1	Network-Owned Playlist procedures for during CoD session initiation.....	76
5.3.9.2	Playlist procedures during an existing CoD session.....	77
5.3.10	Procedure for Personalized Service Composition.....	77
5.3.10.1	UE-initiated session initiation.....	77
5.3.10.2	SCF-initiated session initiation.....	78
5.3.10.3	Session modification.....	78
5.3.10.4	Session termination.....	78
5.3.11	Procedure for Personalized Channel (PCh) Service.....	78
5.3.11.1	Procedure for PCh Declaration Request Handling.....	78
5.3.11.2	Procedure for PCh Operation.....	79

5.3.11.2.1	PCh Session Initiation .....	79
5.3.11.2.2	PCh Content Item Switch .....	79
5.3.11.2.3	PCh Overlap Handling .....	80
5.3.12	Procedure for Content Insertion.....	81
5.3.12.1	Content Insertion at UE Side.....	81
5.3.12.2	Content Insertion at MF Side .....	81
5.3.13	Procedures for IPTV Content Marker Service .....	82
5.3.13.1	Procedure for IPTV Content Marker handling .....	82
5.3.14	Procedure for Targeted Ad Insertion (TAI) .....	82
5.3.14.1	TAI at UE side .....	82
5.3.14.2	TAI at MF side .....	83
5.3.15	Procedures for Content Switch within a CoD Contentlist.....	83
5.3.15.1	UE-initiated session Session initiation .....	83
5.3.16	Procedures with other IMS Services .....	83
5.3.16.1	Instant Messaging Procedures.....	83
5.3.17	Procedures for Unicast Content Download.....	84
5.3.17.1	UE-initiated Content Download session initiation .....	84
5.3.18	Procedure for Preview Service.....	84
5.3.18.1	Procedures for BC preview session.....	84
5.3.18.1.1	Session initiation .....	84
5.3.18.2	Procedures for CoD preview session.....	84
5.3.18.2.1	Session initiation .....	84
5.3.19	Procedure for Session Transfer.....	84
5.3.19.1	Generic Procedure.....	84
5.3.19.1.1	Transferee UE session initiation.....	85
5.3.19.2	Session Transfer - Push Mode.....	85
5.3.19.2.1	Transferor UE Locating a Transferee .....	85
5.3.19.2.2	Transferor and Transferee Handling of Session Transfer Request .....	85
5.4	Media Control Function (MCF) .....	85
5.4.1	Procedure for CoD service.....	85
5.4.1.1	Procedure for providing missing parameters before session initiation.....	86
5.4.1.2	Session initiation .....	86
5.4.1.2.1	Procedure for establishing the RTSP content control and content delivery channel .....	86
5.4.1.2.2	Procedure for establishing the RTSP channel separately .....	87
5.4.1.3	Session modification .....	88
5.4.1.3.1	Procedure for establishing the content delivery channel .....	88
5.4.1.4	Session termination .....	89
5.4.1.4.1	Session termination using RTSP method 1.....	89
5.4.1.4.2	Session termination using RTSP method 2.....	89
5.4.1.5	Procedures for handling COD Service action data.....	89
5.4.2	Procedure for support of BC service with trick play.....	90
5.4.3	Procedure for N-PVR Session .....	90
5.4.4	Procedure for UGC Service .....	90
5.4.4.1	Procedure for handling UGC creating Session.....	90
5.4.4.1.1	MCF as SDP answerer .....	91
5.4.5	Notification service.....	91
5.4.5.1	Procedure for Notification service using multicast media path.....	91
5.4.6	Procedure for restricted trick play.....	92
5.4.7	Procedures for Playlist handling .....	92
5.4.7.1	Procedures for updating playlist information.....	92
5.4.7.2	Procedures for Content Switching according to playlist information .....	92
5.4.8	Procedure for Personalized Channel (PCh) Service.....	92
5.4.8.1	Procedure for PCh Operation .....	92
5.4.8.1.1	PCh Session Initiation .....	92
5.4.8.1.2	PCh Content Item Switch .....	93
5.4.9	Procedure for Targeted Ad Insertion (TAI) .....	93
5.4.9.1	Procedure for Internal TAI option.....	93
5.4.9.1.1	TAI at UE side.....	93
5.4.9.1.2	TAI at MF side .....	93
5.4.10	Procedures for inter-destination media synchronization.....	93
5.4.10.1	Synchronization session initiation.....	93
5.4.10.2	Synchronization session modification.....	93

5.4.10.3	Synchronization session termination.....	94
5.4.11	Procedures for Content Switch within a CoD Contentlist.....	94
5.4.11.1	UE-initiated Session Initiation.....	94
5.4.12	Procedure for Content Insertion at MF Side.....	94
5.4.13	Procedure for Unicast Content Download.....	94
5.4.13.1	Procedure for handling UE-initiated Content Download session.....	94
5.4.13.1.1	MCF as SDP answerer.....	95
5.4.14	Procedure for Preview Service.....	95
5.4.14.1	Procedures for CoD preview session.....	95
5.5	Core IMS.....	96
5.5.1	Procedure for Registration.....	96
5.5.2	Procedure for Service Attachment.....	96
5.5.2.1	Push mode.....	96
5.5.2.2	Pull mode.....	96
5.5.3	Procedure for Service Configuration.....	96
5.5.4	Procedure for Service Selection.....	97
5.5.5	Procedure for CoD service.....	97
5.5.6	Procedure for BC service.....	97
5.6	Common Procedures.....	97
5.6.1	IMS Communication Service Identifier.....	97
5.6.2	Session Control Procedures.....	98
5.6.3	UE SIP Instance Identifier.....	98
5.6.4	UE Support for GRUU.....	99
5.7	Synchronization Client (SC).....	99
5.7.1	Procedures for inter-destination media synchronization.....	99
5.7.1.1	Synchronization session initiation.....	99
5.7.1.2	Synchronization session termination.....	100
5.8	Media Synchronization Application Server (MSAS).....	100
5.8.1	Procedures for inter-destination media synchronization.....	100
5.8.1.1	Synchronization session initiation.....	100
5.8.1.2	Synchronization session termination.....	100
6	Procedures using HTTP for IMS-based IPTV.....	101
6.1	User Equipment (UE).....	101
6.1.1	Procedures for service selection.....	101
6.1.1.1	Procedure for service personalization.....	101
6.1.1.2	Request of DVB SD&S.....	101
6.1.1.3	Request of DVB BCG.....	101
6.1.1.3.1	Container-based request.....	101
6.1.1.3.2	Query mechanism.....	101
6.1.1.4	Request of OMA BCAST ESG.....	101
6.1.1.5	Request of service action data.....	102
6.1.1.5A	Request of TV-Anytime Phase 2 XML.....	102
6.1.1.6	Use of service selection information.....	102
6.1.1.7	Query for IPTV Content Marker.....	103
6.1.2	Procedure for service configuration.....	103
6.1.2.1	General.....	103
6.1.2.2	Subscription for notification of state changes in XML document.....	103
6.1.3	Procedures for Unicast Content Download.....	104
6.1.3.1	Request of Content Download.....	104
6.2	Service Control Function (SCF).....	104
6.2.1	Procedure for service configuration.....	104
6.2.1.1	General.....	104
6.2.1.2	Manipulation acceptance.....	104
6.2.1.3	Authentication and authorization.....	104
6.2.1.4	Subscription acceptance and notification of state changes in XML document.....	105
6.3	Service Selection Function (SSF).....	105
6.3.1	Procedure for service selection.....	105
6.3.1.1	Authentication and authorization for personalized service selection information.....	105
6.3.1.2	Procedure for service personalization.....	105
6.3.1.3	Delivery of DVB SD&S.....	106
6.3.1.4	Delivery of DVB BCG.....	106

6.3.1.4.1	Container-based delivery .....	106
6.3.1.4.2	Query response .....	107
6.3.1.5	Delivery of OMA BCAST ESG .....	107
6.3.1.6	Delivery of Service Action Data .....	107
6.3.1.7	Delivery of IPTV Content Marker .....	108
6.3.1.8	Delivery of TV-Anytime Phase 2 XML .....	108
6.4	Stand-Alone XMDS .....	108
6.4.1	Procedure for service configuration .....	108
6.4.1.1	General .....	108
6.4.1.2	Manipulation acceptance .....	108
6.4.1.3	Authentication and authorization .....	108
6.4.1.4	Subscription acceptance and notification of state changes in XML document .....	109
6.5	Media Function (MF) .....	109
6.5.1	Procedures for Unicast Content Download .....	109
6.5.1.1	Response of Content Download .....	109
7	Procedures using RTSP for IMS-based IPTV .....	109
7.1	User Equipment (UE) .....	109
7.1.1	Procedures for RTSP playback control (Method 1) .....	109
7.1.1.1	Introduction .....	109
7.1.1.2	Media playback initiation procedure .....	110
7.1.1.3	Media playback modification procedure .....	110
7.1.1.4	Media playback information retrieval and setting procedure .....	110
7.1.1.5	Handling of media events .....	111
7.1.2	Procedure for content control (Method 2) .....	111
7.1.2.1	Introduction .....	111
7.1.2.2	Media description procedure .....	111
7.1.2.3	Media setup procedure .....	112
7.1.2.4	Media playback initiation procedure .....	112
7.1.2.5	Media playback modification procedure .....	112
7.1.2.6	Media teardown procedure .....	113
7.1.2.7	Handling of media events .....	113
7.1.3	Procedures for Content Switch within a CoD Contentlist .....	113
7.2	Media Control Function (MCF) .....	114
7.2.1	Procedures for RTSP playback control (Method 1) .....	114
7.2.1.1	Introduction .....	114
7.2.1.2	Media Playback Initiation Procedure .....	114
7.2.1.3	Media playback modification procedure .....	114
7.2.1.4	Media playback information retrieval and setting procedure .....	115
7.2.1.5	Handling of media events .....	115
7.2.2	Procedure for content control (Method 2) .....	115
7.2.2.1	Introduction .....	115
7.2.2.2	Media description procedure .....	115
7.2.2.3	Media setup procedure .....	116
7.2.2.4	Media playback initiation control procedure .....	116
7.2.2.5	Media playback modification procedure .....	116
7.2.2.6	Media teardown procedure .....	116
7.2.2.7	Handling of media events .....	117
7.2.3	Procedures for restricted trick play .....	117
7.2.4	Procedures for inter-destination media synchronization .....	117
7.2.5	Procedures for Content Switch within a CoD Contentlist .....	117
7.2.6	Procedure for PlayBack following Session Transfer .....	117
7.2.7	Playlist handling when end of stream is reached .....	118
7.2.8	Procedures for trick play during playlist .....	118
7.3	Synchronization Client (SC) .....	118
7.3.1	Procedures for inter-destination media synchronization .....	118
8	Procedures using IGMP/MLD for IMS-based IPTV .....	118
8.1	User Equipment (UE) .....	118
8.1.1	Procedure for service selection .....	118
8.1.1.1	Procedure to start receiving service selection information .....	118
8.1.1.2	Procedure to stop receiving service selection information .....	119



8.1.2	Procedure for BC service .....	120
8.1.2.1	Procedure for joining a BC service .....	120
8.1.2.2	Procedure for leaving BC service.....	120
8.1.3	Procedure for Notification service using multicast media path .....	121
8.2	Transport Functions.....	121
8.2.1	Receiving IGMP/MLD request corresponding to a join operation .....	121
8.2.2	Receiving IGMP/MLD request corresponding to a leave operation.....	122
9	Procedures using DVBSTP for IMS-based IPTV .....	122
9.1	User Equipment (UE).....	122
9.1.1	Procedure for service selection .....	122
9.1.1.1	Request of DVB service discovery and selection data .....	122
9.1.1.2	Request of DVB broadband content guide.....	122
9.1.1.3	Use of service selection information .....	122
9.2	Service Selection Function (SSF).....	122
9.2.1	Procedure for service selection .....	122
9.2.1.1	Delivery of DVB service discovery and selection data .....	122
9.2.1.2	Delivery of DVB broadband content guide.....	122
10	Procedures using FLUTE for IMS-based IPTV .....	123
10.1	User Equipment (UE).....	123
10.1.1	Procedure for service selection .....	123
10.1.1.1	Request of OMA BCAST service discovery and selection data .....	123
10.1.1.2	Request of OMA BCAST service guide .....	123
10.1.1.3	Use of service selection information .....	123
10.1.2	Procedure for multicast download .....	123
10.1.2.1	Request for multicast download.....	123
10.2	Service Selection Function (SSF).....	123
10.2.1	Procedure for service selection .....	123
10.2.1.1	Delivery of OMA BCAST service discovery and selection data .....	123
10.2.1.2	Delivery of OMA BCAST service guide .....	123
10.3	Media Delivery Function (MDF) .....	124
10.3.1	Procedure for multicast download .....	124
11	Procedures using UDP/RTP/RTCP for IMS-based IPTV .....	124
11.1	User Equipment (UE).....	124
11.1.1	Procedure for real-time transport.....	124
11.1.1.1	Transport using MPEG2TS.....	124
11.1.1.2	Transport using direct RTP encapsulation .....	124
11.1.2	Procedure for real-time transport eError correction.....	125
11.1.2.1	Unidirectional transport error correction.....	125
11.2	Media Delivery Function (MDF) .....	125
11.2.1	Procedure for real-time transport .....	125
11.2.1.1	Transport using MPEG2TS.....	125
11.2.1.2	Transport using direct RTP encapsulation .....	125
11.2.2	Procedure for real-time transport error correction .....	125
11.2.2.1	Unidirectional transport error correction.....	125
11.2.3	Procedures for inter-destination media synchronization.....	125
11.3	Synchronization Client (SC).....	126
11.3.1	Procedure for real-time transport .....	126
11.3.1.1	Transport using MPEG2TS.....	126
11.3.1.2	Transport using direct RTP encapsulation .....	126
11.3.2	Procedures for inter-destination media synchronization.....	126
11.4	Media Synchronization Application Server (MSAS).....	127
11.4.1	Procedures for inter-destination media synchronization.....	127
11.5	ECF/EFF .....	128
11.5.1	Procedures for inter-destination media synchronization.....	128
11.6	Synchronization Client' (SC') .....	128
11.6.1	Procedure for real-time transport .....	128
11.6.2	Procedures for inter-destination media synchronization.....	128
12	IPTV user profile schema.....	129
13	IPTV service action data schema .....	129

<b>Annex A (informative):</b>	<b>Functional entity relations and example signalling flows of IMS based IPTV operations .....</b>	<b>130</b>
A.0	Example signalling flows for IPTV services .....	130
A.1	Functional entities relations and overview of the IMS based IPTV procedures .....	130
A.2	Example signalling flows of service discovery operation .....	131
A.2.1	Push mode .....	131
A.2.2	Pull Mode .....	132
A.3	Example signalling flows of CoD operation .....	133
A.3.1	UE-initiated session initiation .....	133
A.3.1.1	Session initiation flows for case of establishing content control channel and content delivery channels separately using RTSP method 2 .....	133
A.3.1.2	Session initiation flows for case of establishing content control channel and content delivery channels using RTSP method 2 .....	136
A.3.1A	SCF-initiated session initiation.....	137
A.3.2	Session termination .....	139
A.3.3	Session modification .....	140
A.3.3.1	Session modification initiated by MF .....	140
A.4	Example signalling flows of BC operation .....	141
A.4.1	UE-initiated session initiation .....	141
A.4.1A	SCF-initiated session initiation.....	142
A.4.2	Session termination .....	143
A.4.3	Channel switching .....	143
A.4.3.1	Join after leave .....	144
A.4.3.2	Leave and Join at the same time .....	144
A.5	Example signalling flows for inter-destination media synchronization .....	145
A.5.1	Inter-destination media synchronization flows for SIP signalling .....	145
A.5.1.0	General.....	145
A.5.1.1	Inter-destination media synchronization of a BC service .....	145
A.5.1.2	Inter-destination media synchronization of a CoD service using RTSP method 1 .....	145
A.5.1.3	Inter-destination media synchronization of a CoD service using RTSP method 2 .....	146
A.5.2	Inter-destination media synchronization flows for RTCP signalling .....	147
A.5.2.0	General.....	147
A.5.2.1	Inter-destination media synchronization of BC service .....	148
A.5.2.2	Inter-destination media synchronization of CoD service .....	148
A.5.2.3	RTCP exchange between UEs directly .....	149
A.5.2.4	RTCP exchange for sync' .....	150
A.6	Example signalling flows of content insertion .....	151
A.6.1	Content insertion at the UE .....	151
A.6.2	Content insertion at the UE during pause .....	153
A.7	Example signalling flows for session transfer.....	154
<b>Annex B (normative):</b>	<b>IPTV services XCAP application usage.....</b>	<b>155</b>
B.1	General .....	155
B.2	XCAP application usage .....	155
<b>Annex C (normative):</b>	<b>XML Schema for the IPTV profile.....</b>	<b>157</b>
<b>Annex D (normative):</b>	<b>XML Schema for IPTV commands.....</b>	<b>162</b>
<b>Annex E (normative):</b>	<b>XML schema for IPTV presence document extension .....</b>	<b>164</b>
<b>Annex F (informative):</b>	<b>Example of presence information update after channel-change.....</b>	<b>167</b>
<b>Annex G (informative):</b>	<b>Example of presence document extension .....</b>	<b>169</b>

<b>Annex H (informative):</b>	<b>Summary of standards and protocols for IMS based IPTV .....</b>	<b>170</b>
H.1	SIP/SDP protocol .....	170
H.1.1	Protocol specifications used for SIP/SDP .....	171
H.2	HTTP protocol.....	173
H.3	RTSP/SDP protocol.....	173
H.3.1	Protocol specifications used for RTSP/SDP.....	173
H.4	UDP/RTP/RTCP protocol .....	174
H.5	IGMP/MLD protocol.....	174
H.6	Diameter protocol.....	175
H.7	DVBSTP protocol .....	175
H.8	FLUTE protocol .....	175
<b>Annex I (normative):</b>	<b>Procedures for discovery of SDFs prior to service attachment .....</b>	<b>176</b>
I.1	Manual configuration based manual discovery.....	176
I.2	DHCP-based discovery .....	176
I.2.1	Using DHCP option 43/60 .....	176
I.2.2	Using DHCP option 124/125.....	176
I.2.3	Format of DHCP payload.....	177
I.3	DNS Service Records (SRV) - based discovery.....	177
I.4	TR-069 based discovery .....	178
<b>Annex J (informative):</b>	<b>Integration of non SIP AS service discovery function.....</b>	<b>179</b>
J.1	Integration of non SIP AS service discovery Function based on DVB IPTV .....	179
J.1.1	User Equipment (UE).....	179
J.1.1.1	Procedure for service attachment.....	179
J.1.1.2	Procedure for service selection .....	179
J.1.1.2.1	Request of DVB SD&S.....	179
J.1.1.2.2	Request of DVB BCG.....	179
J.1.2	Service Discovery Function (SDF).....	179
J.1.2.1	Procedure for service attachment.....	179
J.1.3	Service Selection Function (SSF).....	179
J.1.3.1	Procedure for service selection .....	179
J.1.3.1.1	Delivery of DVB SD&S.....	179
J.1.3.1.2	Delivery of DVB BCG.....	180
J.2	Integration of non SIP AS service discovery function based on OMA BCAST ESG .....	180
J.2.1	User Equipment (UE).....	180
J.2.1.1	Procedure for service attachment.....	180
J.2.1.2	Procedure for service selection .....	180
J.2.1.2.1	Request of ESG provider discovery information .....	180
J.2.1.2.2	Request of OMA BCAST ESG.....	180
J.2.2	Service Discovery Function (SDF) .....	180
J.2.2.1	Procedure for service attachment.....	180
J.2.3	Service Selection Function (SSF).....	181
J.2.3.1	Procedure for service selection .....	181
J.2.3.1.1	Delivery of ESG provider discovery information .....	181
J.2.3.1.2	Delivery of OMA BCAST ESG.....	181
<b>Annex K (normative):</b>	<b>XML Schemas for the IPTV service action data.....</b>	<b>182</b>
<b>Annex L (normative):</b>	<b>Mapping of IPTV parameters to service selection.....</b>	<b>188</b>
L.1	Mapping of service attachment .....	188
L.1.1	Mapping of DVB SD&S SP discovery records to XML schema for service attachment.....	188
L.1.2	Mapping of OMA BCAST ESG delivery descriptors to XML schema for service attachment .....	189

L.1.3	Mapping of service action data record discovery records to XML schema for service attachment .....	190
L.2	Mapping of BC service.....	191
L.2.1	Mapping of BC service for DVB technology .....	191
L.2.2	Mapping of BC service for OMA BCAST technology .....	193
L.2.2A	Mapping of BC service for TV-Anytime Phase 2 technology.....	194
L.2.3	Use of the TV URI in the mapping of BC service for DVB technology and OMA BCAST technology.....	194
L.2.3.1	DVB technology .....	194
L.2.3.2	OMA BCAST technology .....	194
L.2.3.3	TV-Anytime Phase 2 technology.....	195
L.3	Mapping of CoD service .....	195
L.3.1	Mapping of CoD service for DVB technology.....	195
L.3.2	Mapping of CoD service for OMA BCAST technology .....	196
L.3.3	Mapping of CoD service for TV-Anytime Phase 2 technology .....	196
L.4	Mapping of IPTV Content Marker retrieval records to XML schema for service attachment.....	197
L.5	Mapping of Download service for DVB technology .....	197
<b>Annex M (normative):</b>	<b>XML Schema for service attachment information .....</b>	<b>199</b>
<b>Annex N:</b>	<b>Void .....</b>	<b>202</b>
<b>Annex O (normative):</b>	<b>Procedure for definition of new SSF technologies .....</b>	<b>203</b>
<b>Annex P (normative):</b>	<b>XML Schema for UE Profile.....</b>	<b>204</b>
<b>Annex Q (informative):</b>	<b>Combination of SIP and RTSP protocols for content on demand .....</b>	<b>207</b>
Q.1	User Equipment (UE) side RTSP method decision logic.....	207
Q.2	Media Control Function (MCF) side RTSP method decision logic .....	208
<b>Annex R (informative):</b>	<b>Initial Filter Criteria.....</b>	<b>209</b>
<b>Annex S (normative):</b>	<b>XML Schema for IPTV Notification .....</b>	<b>210</b>
<b>Annex T (normative):</b>	<b>XML Schema for Restricted Trick Play .....</b>	<b>212</b>
<b>Annex U (normative):</b>	<b>XML Schema for PCh Conflict Option &amp; Choice data.....</b>	<b>213</b>
<b>Annex V (normative):</b>	<b>XML Schema for IPTV Content Marker .....</b>	<b>214</b>
<b>Annex W (normative):</b>	<b>Inter-destination media synchronization.....</b>	<b>215</b>
W.1	RTCP XR Block Type for inter-destination media synchronization.....	215
W.2	SDP parameter for inter-destination media synchronization.....	217
W.3	Introduction to inter-destination media synchronization (informative) .....	217
<b>Annex X (normative):</b>	<b>XML Schema for Content Switch .....</b>	<b>219</b>
<b>Annex Y (normative):</b>	<b>Support for an Application profile for SIP User Agents.....</b>	<b>220</b>
Y.1	Introduction .....	220
Y.2	Motivation .....	220
Y.3	Overview .....	221
Y.3.1	Profile Type Definition .....	221
Y.3.2	Parameter 'appids'.....	221
Y.3.3	Summary of Event Header .....	221
Y.3.4	SUBSCRIBE Bodies .....	222
Y.3.5	NOTIFY Bodies .....	222
Y.4	Example Usage.....	223

<b>Annex Z (normative):</b>	<b>SDP attributes for IMS-based IPTV .....</b>	<b>224</b>
Z.0	General .....	224
Z.1	SDP attributes for Personalized Service Composition .....	224
Z.1.1	SDP attribute for PSC identifier .....	224
Z.2	SDP attributes for BC .....	224
Z.2.1	SDP attributes for BC Service .....	224
Z.2.2	SDP attributes for BC Service Package .....	225
Z.2.3	SDP attributes for BC Program .....	225
<b>Annex ZA (normative):</b>	<b>Definition of Info Packages .....</b>	<b>226</b>
ZA.1	Playlist Info Package .....	226
ZA.1.1	Overall General .....	226
ZA.1.2	Overall Description .....	226
ZA.1.3	Applicability .....	226
ZA.1.4	Info Package Name .....	226
ZA.1.5	Info Package Parameters .....	226
ZA.1.6	SIP Option Tags .....	226
ZA.1.7	INFO Message Body Parts .....	227
ZA.1.7.1	General .....	227
ZA.1.7.2	SIP Content-Type header field value .....	227
ZA.1.7.3	SIP Content-Disposition header field value .....	227
ZA.1.7.4	Message body syntax .....	227
ZA.1.8	Info Package Usage Restrictions .....	227
ZA.1.9	Rate of INFO Requests .....	227
ZA.1.10	Info Package Security Considerations .....	227
ZA.1.11	Implementation Details and Examples .....	227
ZA.2	Restricted-Trickplay-Policies Info Package .....	227
ZA.2.1	Overall General .....	227
ZA.2.2	Overall Description .....	228
ZA.2.3	Applicability .....	228
ZA.2.4	Info Package Name .....	228
ZA.2.5	Info Package Parameters .....	228
ZA.2.6	SIP Option Tags .....	228
ZA.2.7	INFO Message Body Parts .....	228
ZA.2.7.1	General .....	228
ZA.2.7.2	SIP Content-Type header field value .....	228
ZA.2.7.3	SIP Content-Disposition header field value .....	228
ZA.2.7.4	Message body syntax .....	229
ZA.2.8	Info Package Usage Restrictions .....	229
ZA.2.9	Rate of INFO Requests .....	229
ZA.2.10	Info Package Security Considerations .....	229
ZA.2.11	Implementation Details and Examples .....	229
ZA.3	IPTV-Content-Marker Info Package .....	229
ZA.3.1	Overall General .....	229
ZA.3.2	Overall Description .....	229
ZA.3.3	Applicability .....	230
ZA.3.4	Info Package Name .....	230
ZA.3.5	Info Package Parameters .....	230
ZA.3.6	SIP Option Tags .....	230
ZA.3.7	INFO Message Body Parts .....	230
ZA.3.7.1	General .....	230
ZA.3.7.2	SIP Content-Type header field value .....	230
ZA.3.7.3	SIP Content-Disposition header field value .....	230
ZA.3.7.4	Message body syntax .....	230
ZA.3.8	Info Package Usage Restrictions .....	230
ZA.3.9	Rate of INFO Requests .....	230
ZA.3.10	Info Package Security Considerations .....	231
ZA.3.11	Implementation Details and Examples .....	231