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Universal Mobile Telecommunications System (UMTS);
LTE;
IMS Application Level Gateway (IMS-ALG)
- IMS Access Gateway (IMS-AGW);
Iq Interface;
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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 - APE 7112B
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In the present document, modal verbs have the following meanings:

- shall** indicates a mandatory requirement to do something
- shall not** indicates an interdiction (prohibition) to do something

The constructions "shall" and "shall not" are confined to the context of normative provisions, and do not appear in Technical Reports.

The constructions "must" and "must not" are not used as substitutes for "shall" and "shall not". Their use is avoided insofar as possible, and they are not used in a normative context except in a direct citation from an external, referenced, non-3GPP document, or so as to maintain continuity of style when extending or modifying the provisions of such a referenced document.

- should** indicates a recommendation to do something
- should not** indicates a recommendation not to do something
- may** indicates permission to do something
- need not** indicates permission not to do something

The construction "may not" is ambiguous and is not used in normative elements. The unambiguous constructions "might not" or "shall not" are used instead, depending upon the meaning intended.

- can** indicates that something is possible
- cannot** indicates that something is impossible

The constructions "can" and "cannot" are not substitutes for "may" and "need not".

- will** indicates that something is certain or expected to happen as a result of action taken by an agency the behaviour of which is outside the scope of the present document
- will not** indicates that something is certain or expected not to happen as a result of action taken by an agency the behaviour of which is outside the scope of the present document
- might** indicates a likelihood that something will happen as a result of action taken by some agency the behaviour of which is outside the scope of the present document

might not indicates a likelihood that something will not happen as a result of action taken by some agency the behaviour of which is outside the scope of the present document

In addition:

is (or any other verb in the indicative mood) indicates a statement of fact

is not (or any other negative verb in the indicative mood) indicates a statement of fact

The constructions "is" and "is not" do not indicate requirements.

1 Scope

The present document describes the protocol to be used on the IMS Application Level Gateway (ALG) – IMS Access Gateway (IMS-AGW) interface. The basis for this protocol is the H.248 protocol as specified in ITU-T. The IMS architecture is described in 3GPP TS 23.228 [2]. The underlying reference model and stage 2 information is described in Annex G of 3GPP TS 23.228 [2] and in 3GPP TS 23.334 [23].

This specification describes the application of H.248 on the Iq interface (see Figure 1). Required extensions use the H.248 standard extension mechanism. In addition certain aspects of the base protocol H.248 are not needed for this interface and thus excluded by this profile.

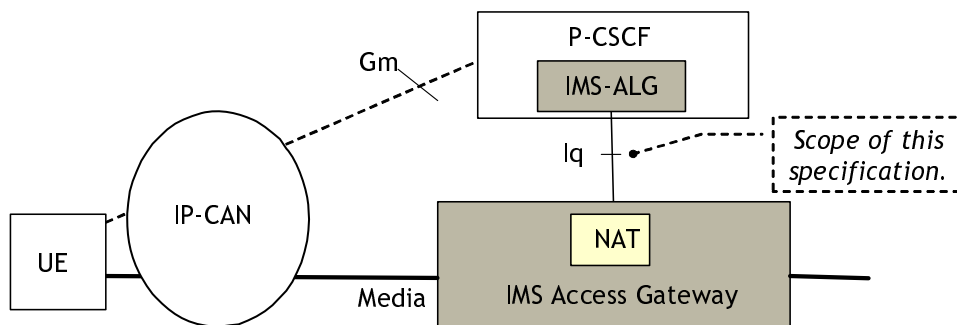


Figure 1: Reference model for IMS access

The reference model for the IMS-ALG and the IMS-AGW supporting the ATCF/ATGW function is shown in Figure 1a below.

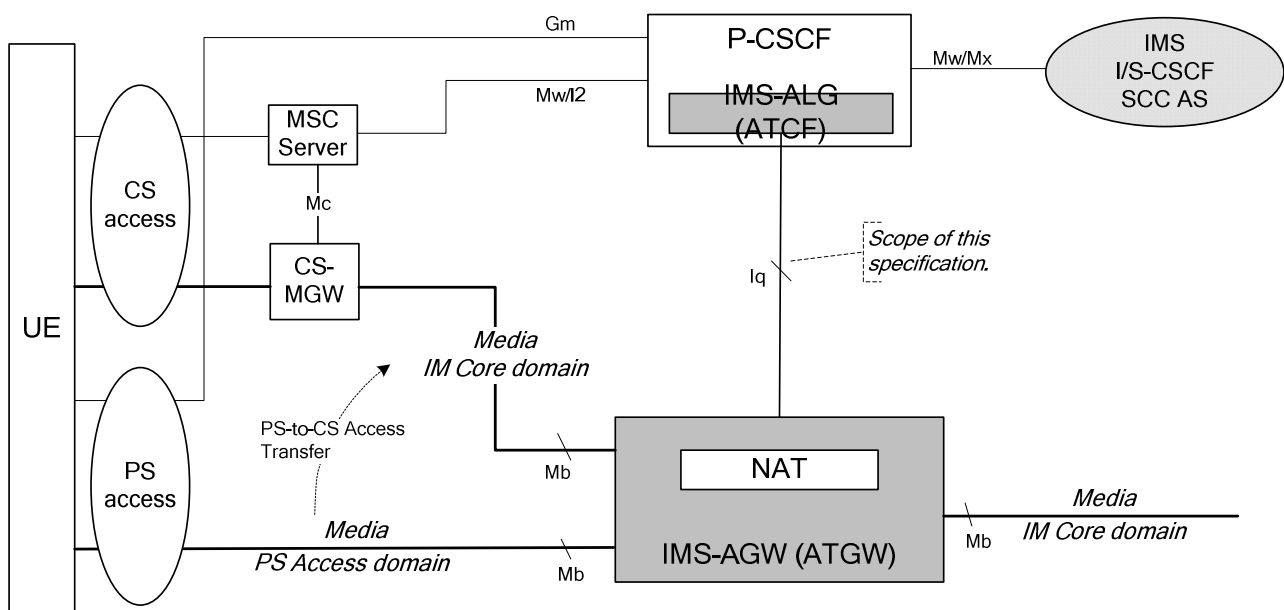


Figure 1a: Reference model for IMS-ALG/IMS-AGW with ATCF/ATGW function

See 3GPP TS 23.237 [38] clause 5.2 for a comprehensive description of the reference model.

The reference model for the P-CSCF enhanced for WebRTC (eP-CSCF) and the IMS-AGW enhanced for WebRTC (eIMS-AGW) to support WebRTC client access to IMS is shown in Figure 1b as below, see 3GPP TS 23.228 [2] Annex U for a comprehensive description of the reference model.

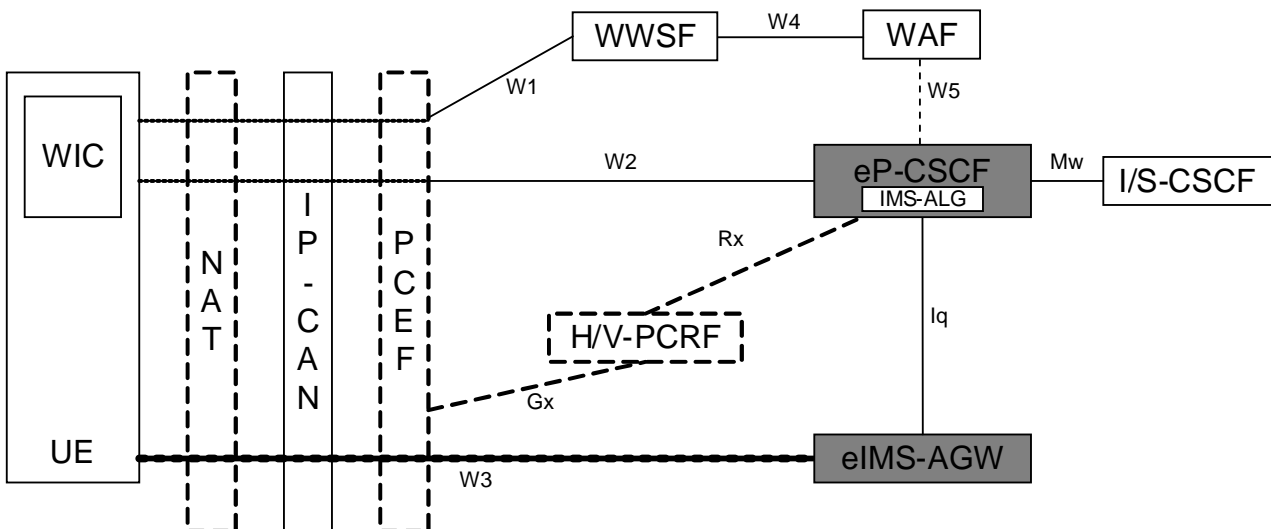


Figure 1b: Reference Architecture for eP-CSCF/eIMS-AGW supporting WebRTC access to IMS

NOTE: The presence of dashed elements in the figure depends on the configuration. PCC functional elements are present only for EPC access with QoS. The corresponding PCC elements for fixed access are also optionally supported but not shown. The NAT in figure 1b is meant for non-cellular access to IMS.

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*.

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Editor's Note: The above document cannot be formally referenced until it is published as an RFC.

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3 Definitions, symbols and abbreviations

3.1 Definitions

For the purposes of the present document, the following terms and definitions apply.

Address: term used for "network address" (IP address)

End-to-access edge security: media protection extending between an IMS UE and the first IMS core network node in the media path without being terminated by any intermediary node.

Port: term used for "transport port" (L4 port).

Transcoding: transcoding in general is the translation from one type of encoded media format to another different media format, e.g. G.711 A-law to μ -law or vice versa, G.729 to AMR with 4.75 rate.

NOTE 1: The definition of "transcoding" is according clause 3.10 of ITU-T Recommendation V.152 [23].

NOTE 2: Transcoding belongs to the category of "media aware" IP-to-IP interworking.

Transparent Forwarding: media gateway packet forwarding behaviour with the characteristic of Lx-PDU integrity. This is a unidirectional characteristic of an Lx-PDU flow.

NOTE 3: The definition is according clause 3.2.10 of ITU-T Recommendation H.248.88 [71].

NOTE 4: The semantic covers both traffic directions when applied on H.248 Streams (due to their inherent characteristic of bidirectionality).

Transport Address: term used for the combination of a *Network Address* and a *Transport Port*.

For the purposes of the present document, the following terms and definitions as defined in 3GPP TS 23.334 [23] apply:

ICE lite

Full ICE.

3.2 Symbols

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

Iq Interface between the IMS Application Level Gateway (ALG) (IMS-ALG) and the IMS Access Gateway (IMS-AGW)

3.3 Abbreviations

For the purposes of the present document, the abbreviations defined in 3GPP TR 21.905 [1] apply, with the following additions. An abbreviation defined in the present document takes precedence over the definition of the same abbreviation, if any, in 3GPP TR 21.905 [1].

ABNF	Augmented Backus-Naur Form
ATCF	Access Transfer Control Function
ATGW	Access Transfer Gateway
B-ALG	Bearer Level Application-Level Gateway
BFCP	Binary Floor Control Protocol
CCM	Codec Control Messages
CVO	Coordination of Video Orientation
DBI	Delay Budget Information
DSCP	Differentiated Service Code Point
e2ae	End-to-Access-Edge (security model)
ECN	Explicit Congestion Notification

eIMS-AGW	IMS Access Gateway enhanced for WebRTC
eP-CSCF	P-CSCF enhanced for WebRTC
FECC	Far End Camera Control
FIR	Full Intra Request
GTT	Global Text Telephony
ICE	Interactive Connectivity Establishment
IMS-AGW	IMS Access Gateway
IMS-ALG	IMS Application Level Gateway
IP	Internet Protocol
LD	Local Descriptor (H.248 protocol element)
MG	Media Gateway
MGC	Media Gateway Controller
MPS	Multimedia Priority Service
MSRP	Message Session Relay Protocol
MTSI	Multimedia Telephony Service for IMS
NA	Not Applicable
NAPT	Network Address and Port Translation
NAPT-PT	NAPT and Protocol Translation
NAT	Network Address Translation
RD	Remote Descriptor (H.248 protocol element)
ROI	Region of Interest
RTCP	RTP Control Protocol
SCTP	Stream Control Transport Protocol
SDP	Session Description Protocol
SDPCapNeg	SDP Capability Negotiation
SRVCC	Single Radio Voice Call Continuity
STUN	Session Traversal Utilities for NAT
TCP	Transmission Control Protocol
TLS	Transport Layer Security (protocol)
TMMBN	Temporary Maximum Media Stream Bit Rate Notification
TMMBR	Temporary Maximum Media Stream Bit Rate Request
ToS	Type-of-Service
TISPAN	Telecommunications and Internet converged Services and Protocols for Advanced Networking
WebRTC	Web Real Time Communication
WIC	WebRTC IMS Client
WWSF	WebRTC Web Server Function

4 Applicability

The support of the Iq interface capability set shall be identified by the H.248 Iq profile and support of this profile shall be indicated in H.248 ServiceChange procedure (during the (re-)registration phase(s)).

4.1 Architecture

See Annex G and Annex U of 3GPP TS 23.228 [2].

5 Profile Description

5.1 Profile Identification

Table 5.1.1: Profile Identification

Profile name:	threeglq
Version:	7

5.2 Summary

This Profile describes the minimum mandatory settings and procedures required to fulfil the requirements of the Iq interface (see 3GPP TS 23.334 [23]):

- allocation and translation of IP addresses and port numbers (NA(P)T and NA(P)T-PT);
- opening and closing gates (i.e. packets filtering depending on "IP address / port");
- remote NA(P)T traversal;
- policing of incoming traffic;
- QoS packet marking for outgoing traffic;
- IP realm/domain indication;
- Hanging termination detection; and
- RTCP handling;

and when ATCF/ATGW is supported:

- handover of bearer connections between PS and CS access networks;
- IP version interworking; and
- audio transcoding;

and when WebRTC is supported:

- interworking for WebRTC audio, video and optionally MSRP data between WebRTC clients and non-WebRTC user equipment; and
- optionally transparent forwarding of WebRTC bearer traffic in case of end-to-end WebRTC calls between WebRTC IMS clients.

In addition, optional settings and procedures are described which fulfil optional features and where supported, the minimum mandatory settings within the optional procedures and packages are identified that must be supported in order to support that feature.

"Optional" or "O" means that it is optional for either the sender or the receiver to implement an element. If the receiving entity receives an optional element that it has not implemented it should send an Error Code (e.g. 445 "Unsupported or Unknown Property", 501 "Not Implemented", etc.). "Mandatory" or "M" means that it is mandatory for the receiver to implement an element. Whether it is mandatory for the sender to implement depends on specific functions; detail of whether elements of the core protocol are mandatory to be sent are defined in the stage 2 procedures, stage 3 procedures and/or the descriptions of individual packages.

The setting or modification of elements described in the profile under the heading "Used in Command" has the meaning that the property can be set/modified with that command. The property may be present in other commands (in order to preserve its value in accordance with ITU-T Recommendation H.248.1 [10]) when those commands are used for other procedures that affect the same descriptor.

5.3 Gateway Control Protocol Version

Version 2 (ITU-T Recommendation H.248.1 [10]) shall be used as minimum protocol version.

5.4 Connection model

Table 5.4.1: Connection Model

Maximum number of contexts:	Provisioned
Maximum number of terminations per context:	3
Allowed terminations type combinations:	(IP,IP) ; (IP,IP,IP) (NOTE)
NOTE:	This is only a temporary context configuration, occurring during bearer access transfer phase (between PS to CS access networks or vice versa) or during the reservation of two sets of transport addresses/resources towards the access network to support the functionalities related to the Alternate Connectivity functionality (see 3GPP TS 23.334 [23]).

5.5 Context attributes

Table 5.5.1: Context Attributes

Context Attribute	Supported	Values Supported
Topology	Yes (NOTE 1)	See clause 5.7.9
Priority Indicator	Optional (NOTE 2)	0-15 (NOTE 3)
Emergency Indicator	Yes	YES/NO
IEPS Indicator	No	NA
ContextAttribute Descriptor	No	NA
ContextIdList Parameter	No	NA
AND/OR Context Attribute	No	NA
NOTE 1:	Stream ID in Topology Descriptor shall not be supported (because only used for SRVCC service support, which is a monomedia type of call ("voice call")).	
NOTE 2:	This Context Attribute parameter is allowed in ETSI TISPAN Ia Profile version 3. It is also used for MPS as specified in 3GPP TS 22.153 [39].	
NOTE 3:	Priority values 11 – 15 of the Priority Indicator are reserved for MPS.	

5.6 Terminations

5.6.1 Termination names

5.6.1.1 IP Termination

5.6.1.1.1 ABNF Coding Overview and prose specification

The Termination ID structure shall follow the guidelines of H.248 and shall be based on four fields:

- "ip/<group>/<interface>/<id>".

The individual fields are described and defined in table 5.6.1.1.1.1.

Table 5.6.1.1.1.1: IP Termination Fields

Name	Description	Values	CHOOSE Wildcard	ALL Wildcard
Ip	"ip" is a fixed prefix identifying the termination	"ip"	No	No
Group	Group of Interface and Id	Integer (0-65535)	Yes (NOTE 5)	Yes
Interface	Logical or physical interface to a network to/from which the termination will be sending/receiving media. (NOTE 1, NOTE 2)	String of max 51 alphanumeric characters	Yes (NOTE 4)	Yes
Id	Termination specific identifier (NOTE 3)	Non-zero 32 bit integer	Yes (NOTE 4)	Yes
NOTE 1: A specific <Interface> may be used together with different groups. NOTE 2: The generic field <Interface> may relate specifically to an "IP interface", "protocol layer 2 interface" or others. NOTE 3: The combination of Interface and Id is unique. NOTE 4: The MGC shall always use CHOOSE in an ADD request command. If not, the MG shall reply with an error descriptor using error code #501 "Not Implemented". NOTE 5: The CHOOSE wildcard on 'Group' is <i>not</i> allowed in ETSI TISPAN "Ia Profiles".				

NOTE: The IMS-ALG has the ability to choose the address space in which the IMS-AGW will allocate an IP address for the termination by using the *ipdc/realm* property defined in the ITU-T Recommendation H.248.41 IP domain connection package.

H.248 wildcarding may be applied on IP Termination Identifiers. Wildcarding is limited according the two columns on the right hand side.

The corresponding ABNF grammar is given below.

ABNF (IETF RFC 5234 [15]) is used for the syntax specification. The ABNF for TerminationID and relation to pathNAME is defined in annex B.2/ ITU-T Recommendation H.248.1 [10].

```

pathNAME      = EphToken SLASH EPHsystem
EphToken      = "ip"          ; prefix
EPHsystem     = WildcardALL
               / WildcardALL SLASH Interface
               / Group SLASH WildcardALL
               / (Group / WildcardCHOOSE) SLASH (Interface / WildcardCHOOSE) SLASH (Identifier
               / WildcardALL / WildcardCHOOSE)
Group         = %d0-65535      ; data type: INT16
Interface     = 1*51ALPHANUM
Identifier    = %d1-4294967295 ; data type: INT32
ALPHANUM     = ALPHA / DIGIT
WildcardCHOOSE = "$"
WildcardALL  = "*"
  
```

5.6.1.1.2 ASN.1 Coding Overview and prose specification

The following general structure of termination ID shall be used:

4 octets shall be used for the termination ID. The following defines the general structure for the termination ID:

Table 5.6.1.1.2.1: ASN.1 coding

Termination type	X
------------------	---

Termination type:

Length 3 bits

Values:

000 Reserved

001 IP (Ephemeral) termination

010 Reserved (in 3GPP Mc and Mn profile used for TDM termination)

011 - 110 Reserved

111 Reserved for ROOT termination Id (ROOT Termination ID = 0xFFFFFFFF)

X:

Length 29 bits.

For IP termination, its usage is un-specified.

5.6.2 Multiplexed terminations

Table 5.6.2.1: Multiplexed terminations

Multiplex terminations supported?	No
--	----

If yes, then:

Table 5.6.2.2: Multiplex Types

Multiplex types supported	NA
Maximum number of terminations connected to multiplex	NA

5.7 Descriptors

5.7.1 TerminationState Descriptor

Table 5.7.1.1: ServiceState property

ServiceState property used:	Yes (InService/OutOfService) NOTE 1, NOTE 2
NOTE 1: This is restricted to the ROOT termination (for MGW audit).	
NOTE 2: Ephemeral H.248 Terminations have a ServiceState property according to ITU-T Recommendation H.248.1 [10], but explicit usage of the TerminationState Descriptor ServiceState property is not required by this Profile. ServiceState changes can still occur, however, and can be indicated in ServiceChange Commands (i.e. this means that the value of the ServiceState property may be implicitly changed by ServiceChange procedures).	

Table 5.7.1.2: EventBufferControl property

EventBufferControl property used:	No
--	----

Table 5.7.1.3: Group semantics property

Group semantics property used:	Yes
NOTE: This is restricted to ephemeral H.248 Terminations used for WebRTC service support. The property is used in conjunction with the <i>media grouping</i> package, see clause 5.14.3.23.	

Table 5.7.1.4: SDPCapNeg Extensions property

SDPCapNeg Extensions property used:	Yes
NOTE: The property is used in conjunction with the <i>Enhanced Revised Offer/Answer SDP Support</i> package, see clause 5.14.3.x1.	

5.7.2 Stream Descriptor

5.7.2.0 General

Table 5.7.2.1: Stream descriptors

Maximum number of streams per termination type	IP	Unspecified (NOTE 1, NOTE 2)
NOTE 1: At least one stream for each media component (e.g. video+audio = 2 streams). If only one stream is applicable, then the IMS-ALG may omit the Stream Descriptor and the IMS-AGW shall assume that StreamID = 1.		
NOTE 2: An IP termination for WebRTC may carry additional H.248 (de-)aggregation streams besides the legacy H.248 component streams.		

Table 5.7.2.2: Stream configuration

Stream configuration:	<p>ALL configurations are allowed.</p> <p>IP terminations for WebRTC may apply H.248 stream grouping principles, which leads to relationships of associated H.248 streams within such stream group configurations.</p>
------------------------------	--

5.7.2.1 LocalControl Descriptor

Table 5.7.2.1.1: LocalControl Descriptor and Reserve properties

		Termination Type	Stream Type
ReserveGroup used:	No	NA	NA
ReserveValue used:	Yes	IP	Audio, Video (NOTE 1, NOTE 2)
NOTE 1: The value of the H.248 Stream Type is given here by the SDP "m=" line element media type (in contrast to the SDP "m=" line element transport protocol in Table 5.7.2.1.2). Usage of ReserveValue implies thus media type aware Local and Remote Descriptors.			
NOTE 2: Not used (at this profile version (see clause 5.1 for the version number)) for TCP transport (IETF RFC 793 [51]) and media types:			
a) "Message" (for MSRP (IETF RFC 4975 [18]) and			
b) "Application" (for BFCP (IETF RFC 4582 [52]) and ROI FECC (IETF RFC 4573 [62]))			
because the application control will not use them in context ReserveValue.			

Table 5.7.2.1.2: Allowed Stream Modes

Termination Type	Stream Type	Allowed StreamMode Values
IP	RTP/AVP	SendOnly, RecvOnly, SendRecv, Inactive
	RTP/SAVP	SendOnly, RecvOnly, SendRecv, Inactive
	RTP/AVPF	SendOnly, RecvOnly, SendRecv, Inactive
	RTP/SAVPF	SendOnly, RecvOnly, SendRecv, Inactive
	TCP (NOTE 1)	SendRecv, Inactive
	TCP/MSRP (NOTE 1)	SendRecv, Inactive
	TCP/TLS (NOTE 1)	SendOnly, RecvOnly, SendRecv, Inactive
	TCP/TLS/MSRP (NOTE 1, NOTE 2)	SendOnly, RecvOnly, SendRecv, Inactive
	UDPTL	SendRecv, Inactive
	UDP	SendOnly, RecvOnly, SendRecv, Inactive
	UDP/DTLS	SendOnly, RecvOnly, SendRecv, Inactive
	UDP/DTLS/SCTP (NOTE 3)	SendOnly, RecvOnly, SendRecv, Inactive
<p>NOTE 1: The H.248 StreamMode does not affect protocol control information at the bearer interface. See clause 7.1.7.1.1 in ITU-T Recommendation H.248.1 [10] and:</p> <p>a) TCP: ITU-T Recommendation H.248.89 [47], clause 8.6.4.1, Table "Impact of StreamMode on TCP bearer traffic at external MG interface"</p> <p>b) TLS: ITU-T Recommendation H.248.90 [48], clause 8.6.4.1, Table "Impact of StreamMode on TLS bearer traffic at external MG interface".</p> <p>NOTE 2: Conditional support, dependent on support of application-aware interworking.</p> <p>NOTE 3: Conditional support, dependent on WebRTC service with data application(s).</p> <p>NOTE 4: Conditional support, dependent on WebRTC service and DTLS-based SRTP key exchange for audio or video.</p>		

Table 5.7.2.1.3: LocalControl Descriptor and other properties

		Termination Type	Stream Type
Stream Aggregation used:	No	NA	NA
Stream De-aggregation used:	Yes	IP for WebRTC	WebRTC Data (NOTE)
NOTE: Conditional, dependent on WebRTC calls with multiple data components.			

5.7.3 Events descriptor

Table 5.7.3.1: Events Descriptor

Events settable on termination types and stream types:	Yes		
<i>If yes</i>	EventID	Termination Type	Stream Type
	Cause (g/cause, 0x0001/0x0001) - See clause 5.14.3.1	ALL except ROOT	ANY
	Inactivity Timeout (it/ito, 0x0045/0x0001) - See clause 5.14.3.6	only ROOT	Not applicable
	MG_Overload (ocp/mg_overload, 0x0051/0x0001) - See clause 5.14.3.8	only ROOT	Not applicable

Termination Heartbeat (hangterm/thb, 0x0098/0x0001) - See clause 5.14.3.9	ALL except ROOT	ANY
MGCon (chp/mgcon, 0x0029/0x0001) – See clause 5.14.3.10	only ROOT	Not Applicable
Available Realms Changed (ipra/arc, 0x00e0/0x0001) – See clause 5.14.3.11	only ROOT	Not Applicable
IP Flow Stop Detection (adid/ipstop, 0x009c/0x0001) – See clause 5.14.3.14	ALL except ROOT	Any
ECN Failure (ecnrous/fail, 0x010b/0x0001) see clause 5.14.3.15	IP	RTP based
ICE New Peer Reflexive Candidate (ostuncc/nprc, 0x00c3/0x0002) – see clause 5.14.3.17	IP	Any, only applicable for full ICE
ICE Connectivity Check Result (ostuncc/ccr, 0x00c3/0x0001) – see clause 5.14.3.17	IP	Any, only applicable for full ICE
TCP connection state change ("BNC change") (tcpbcc/BNCChange, 0x0115/0x0001) see clause 5.14.3.18	IP	TCP based
TLS session state change ("BNC change") (tlsbsc/BNCChange, 0x0117/0x0001) see clause 5.14.3.19	IP	TLS or DTLS based
STUN Consent Request Failure (stnconfres/constate, 0x0120/0x0002) see clause 5.14.3.22	IP	TLS or DTLS based, only applicable for full ICE
SCTP connection state change (sctpbcc /BNCChange, 0x0121/0x0001) see clause 5.14.3.24	IP	SCTP based
Detect outgoing SCTP stream reset (sctpreset/detreset, 0x0122/0x0001) see clause 5.14.3.25	IP	SCTP based
Outgoing SCTP stream reset result (sctpreset/result, 0x0122/0x0002) see clause 5.14.3.25	IP	SCTP based

Table 5.7.3.2: Event Buffer Control

EventBuffer Control used:	No
---------------------------	----

Table 5.7.3.3: Keep active

KeepActive used on events:	No
----------------------------	----

Table 5.7.3.4: Embedded events and signals

Embedded events in an Events Descriptor:	No
Embedded signals in an Events Descriptor:	No

Table 5.7.3.5: Regulated Embedded events

Regulated Embedded events are triggered on:	None
---	------

Table 5.7.3.6: ResetEventsDescriptor

ResetEventsDescriptor used with events:	None
---	------

Table 5.7.3.7: Notification Behaviour

NotifyImmediate:	ALL Events
NotifyRegulated:	None
NeverNotify:	None

5.7.4 EventBuffer descriptor

Table 5.7.4.1: Event Buffer Descriptor

EventBuffer Descriptor used:	No	
<i>If yes</i>	EventIDs	-

5.7.5 Signals descriptor

Table 5.7.5.1: Signals Descriptor

The setting of signals is dependant on termination or streams types:	No NOTE – "No" means that all signals can be played on any termination or stream. If "Yes", any signal not listed below may be played on any termination or stream, except Signals on ROOT termination shall not be supported.		
<i>If yes</i>	SignalID	Termination Type	Stream Type / ID
	Latching (ipnapt/latch, 0x0099/0x0001)	ALL except ROOT	Any
	Send Additional Connectivity Check (ostuncc/sacc, 0x00c3/0x0002)	IP	Any, only applicable for full ICE
	Send Connectivity Check (ostuncc/scc, 0x00c3/0x0001)	IP	Any, only applicable for full ICE
	Establish BNC (tcpbcc/EstBNC, 0x0115/0x0001) see clause 5.14.3.18	IP	TCP based
	Release BNC (tcpbcc/RelBNC, 0x0115/0x0002) see clause 5.14.3.18	IP	TCP based

	Establish BNC (tlsbsc/EstBNC, 0x0117/0x0001) see clause 5.14.3.19	IP	TLS or DTLS based
	Release BNC (tlsbsc/RelBNC, 0x0117/0x0002) see clause 5.14.3.19	IP	TLS or DTLS based
	Consent Test (stnconfres/const, 0x0120/0x0001) see clause 5.14.3.22	IP	TLS or DTLS based
	Establish BNC (sctpbcc/EstBNC, 0x0121/0x0001) see clause 5.14.3.24	IP	SCTP based
	Release BNC (sctpbcc/RelBNC, 0x0121/0x0002) see clause 5.14.3.24	IP	SCTP based
	Initiate Outgoing SCTP Stream Reset (sctpreset/initreset, 0x0122/0x0001) see clause 5.14.3.25	IP	SCTP based
	Outgoing SCTP Stream Reset Response (sctpreset/resetresp, 0x0122/0x0002) see clause 5.14.3.25	IP	SCTP based

Table 5.7.5.2: Signal Lists

Signals Lists supported:	No	
<i>If yes</i>	Termination Type Supporting Lists:	-
	Stream Type Supporting lists:	-
	Maximum number of signals to a signal list:	-
	Intersignal delay parameter supported:	-

Table 5.7.5.3: Overriding Signal type and duration

Signal type and duration supported:	No	
<i>If yes</i>	SignalID	Type or duration override
	-	-

Table 5.7.5.4: Signal Direction

Signal Direction supported:	No
------------------------------------	----

Table 5.7.5.5: Notify completion

NotifyCompletion supported:	No	
<i>If yes</i>	SignalID	Type of completion supported
	-	-

Table 5.7.5.6: RequestID Parameter

RequestID Parameter supported:	No
--------------------------------	----

Table 5.7.5.7: Signals played simultaneously

Signals played simultaneously:	No	
<i>If yes</i>	SignalIDs that can be played simultaneously:	

Table 5.7.5.8: Keep active

KeepActive used on signals:	No
-----------------------------	----

5.7.6 DigitMap descriptor

Table 5.7.6.1: DigitMap Descriptor

DigitMaps supported:	No		
<i>If yes</i>	DigitMap Name	Structure	Timers
	-	-	-

5.7.7 Statistics descriptor

Table 5.7.7.1: Statistics Descriptor support

Statistics supported on:	-
--------------------------	---

Table 5.7.7.2: Statistics Report on Subtract

Statistics reported on Subtract:	No	
<i>If yes</i>	StatisticIDs reported:	-

5.7.8 ObservedEvents descriptor

Table 5.7.8.1: ObservedEvents Descriptor

Event detection time supported:	No
---------------------------------	----

5.7.9 Topology descriptor

Table 5.7.9.1: Topology Descriptor

Allowed triples:	(T1, T2, isolate) (T1, T2, bothway)
NOTE:	The Topology Descriptor shall be supported by the MGW and MGC for handover only, when PS-to-CS access transfer is supported.

5.7.10 Error descriptor

Table 5.7.10.1: Error Codes Sent by IMS-ALG

<p>Supported H.248.8 Error Codes:</p>	<p>#400 "Syntax error in message" #401 "Protocol Error" #402 "Unauthorized" #403 "Syntax Error in TransactionRequest" #406 "Version Not Supported" #410 "Incorrect identifier" #411 "The transaction refers to an unknown ContextID" #413 "Number of transactions in message exceeds maximum" #421 "Unknown action or illegal combination of actions" #422 "Syntax Error in Action" #430 "Unknown TerminationID" #431 "No TerminationID matched a wildcard" #442 "Syntax Error in Command" #443 "Unsupported or Unknown Command" #444 "Unsupported or Unknown Descriptor" #445 "Unsupported or Unknown property" #446 "Unsupported or Unknown Parameter" #447 "Descriptor not legal in this command" #448 "Descriptor appears twice in a command" #449 "Unsupported parameter or property value" #450 "No such property in this package" #451 "No such event in this package" #454 "No such parameter value in this package" #455 "Property illegal in this Descriptor" #456 "Property appears twice in this Descriptor" #457 "Missing parameter in signal or event" #458 "Unexpected Event/RequestID" #501 "Not Implemented" #502 "Not ready" #505 "Transaction Request Received before a ServiceChange Reply has been received" #506 "Number of TransactionPendings Exceeded" #533 "Response exceeds maximum transport PDU size"</p>
<p>Supported Error Codes defined in packages:</p>	<p>All error codes defined in supported packages are supported.</p>
<p>NOTE: The error codes listed need not be supplied by the IMS-ALG to differentiate each and every error described by them. The IMS-AGW shall be able to receive the error codes listed.</p>	

Table 5.7.10.2: Error Codes Sent by IMS-AGW:

Supported H.248.8 Error Codes:	#400 "Syntax error in message" #401 "Protocol Error" #402 "Unauthorized" #403 "Syntax Error in TransactionRequest" #406 "Version Not Supported" #410 "Incorrect identifier" #411 "The transaction refers to an unknown ContextID" #412 "No ContextIDs available" #413 "Number of transactions in message exceeds maximum" #421 "Unknown action or illegal combination of actions" #422 "Syntax Error in Action" #430 "Unknown TerminationID" #431 "No TerminationID matched a wildcard" #432 "Out of TerminationIDs or No TerminationID available" #433 "TerminationID is already in a Context" #434 "Max number of Terminations in a Context exceeded" #435 "Termination ID is not in specified Context" #440 "Unsupported or unknown Package" #441 "Missing Remote or Local Descriptor" #442 "Syntax Error in Command" #443 "Unsupported or Unknown Command" #444 "Unsupported or Unknown Descriptor" #445 "Unsupported or Unknown property" #446 "Unsupported or Unknown Parameter" #447 "Descriptor not legal in this command" #448 "Descriptor appears twice in a command" #449 "Unsupported parameter or property value" #450 "No such property in this package" #451 "No such event in this package" #452 "No such signal in this package" #454 "No such parameter value in this package" #455 "Property illegal in this Descriptor" #456 "Property appears twice in this Descriptor" #457 "Missing parameter in signal or event" #471 "Implied Add for Multiplex failure" #488 "Incorrect stream endpoint interlinkage" #489 "Invalid aggregation and/or deaggregation" #500 "Internal software Failure in MG or MGC" #501 "Not Implemented" #502 "Not ready" #505 "Transaction Request Received before a ServiceChange Reply has been received" #506 "Number of TransactionPendings Exceeded" #510 "Insufficient resources" #511 "Temporarily Busy" #512 "Media Gateway unequipped to detect requested Event" #513 "Media Gateway unequipped to generate requested Signals" #515 "Unsupported Media Type" #517 "Unsupported or invalid mode" #522 "Functionality Requested in Topology Triple Not Supported" #526 "Insufficient bandwidth" #529 "Internal hardware failure in MG" #530 "Temporary Network failure" #531 "Permanent Network failure" #532 "Audited Property, Statistic, Event or Signal does not exist" #533 "Response exceeds maximum transport PDU size" #534 "Illegal write of read only property" #542 "Command is not allowed on this termination"
Supported Error Codes defined in packages:	All error codes defined in supported packages need to be supported.

NOTE: The error codes listed need not be supplied by the IMS-AGW to differentiate each and every error described by them. The IMS-ALG shall be able to receive the error codes listed.

5.8 Command API

5.8.1 Add

Table 5.8.1.1: Descriptors used by Command Add Request

Descriptors used by Add request:	Media (Stream(LocalControl, Local, Remote)), Event, Signals
---	---

Table 5.8.1.2: Descriptors used by Command Add Reply

Descriptors used by Add reply:	Media (Stream (Local)), Error When command request excludes an Audit Descriptor, the MGW response shall only include descriptors which contained underspecified or overspecified properties in the command request. Furthermore, only those properties that were underspecified or overspecified in the request shall be sent in the reply. Exceptions to this rule are: <ul style="list-style-type: none"> - The Error Descriptor - SDP properties returned in "Reserve AGW Connection Point" and "Reserve and Configure AGW Connection Point" procedures, as specified in 15.17.2.2 and 15.17.2.4.
---------------------------------------	---

5.8.2 Modify

Table 5.8.2.1: Descriptors used by Command Modify Request

Descriptors used by Modify request:	Media (TerminationState, Stream (LocalControl, Local, Remote)), Signals, Event
--	--

Table 5.8.2.2: Descriptors used by Command Modify Reply

Descriptors used by Modify reply:	Media (Stream(Local)), Error When command request excludes an Audit Descriptor, the MGW response shall only include descriptors which contained underspecified or overspecified properties in the command request. Furthermore, only those properties that were underspecified or overspecified in the request shall be sent in the reply. Exceptions to this rule are: <ul style="list-style-type: none"> - The Error Descriptor - SDP properties returned in " Configure AGW Connection Point " procedure as specified in 15.17.2.3.
--	---

5.8.3 Subtract

Table 5.8.3.1: Descriptor used by Command Subtract Request

Descriptors used by Subtract request:	None, Audit() NOTE
NOTE: This requests that no statistics are to be returned	

Table 5.8.3.2: Descriptor used by Command Subtract Reply

Descriptors used by Subtract reply:	None, Error
--	-------------

5.8.4 Move

Table 5.8.4.1: Command Move

Move command used:	No
---------------------------	----

If used:

Table 5.8.4.2: Descriptor used by Move command

Descriptors used by Move request:	-
Descriptors used by Move reply:	-

5.8.5 AuditValue

Table 5.8.5.1: Auditvalue

Audited Properties:	Property Name and Identity	Descriptor
	TerminationState: - Root (MGW Audit)	TerminationState Descriptor
	For Packages: Root	Packages Descriptor
	None (MGW Audit) : - Root	Audit (empty) Descriptor
	IP Realm Availability : - ipra/* (ROOT)	TerminationState Descriptor
	Base root properties: - root/* (ROOT)	TerminationState Descriptor
	SDPCapNeg Extensions: - sdpe/*	TerminationState Descriptor
Audited Statistics:	None	
Audited Signals:	None	
Audited Events:	None	
Packages Audit possible:	Yes	

5.8.6 AuditCapabilities

Table 5.8.6.1: Auditcapability

Audited Properties:	Property Name and Identity	Descriptor
	None	-
Audited Statistics:	None	
Audited Signals:	None	
Audited Events:	None	

Table 5.8.6.2: Scoped Auditing

Audited Properties / ContextAttributes used for a scoped audit :	None
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5.8.7 Notify

Table 5.8.7.1: Descriptors Used by Notify Request

Descriptors used by Notify Request	ObservedEvents
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Table 5.8.7.2: Descriptors Used by Notify Reply

Descriptors used by Notify Reply:	None, Error
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5.8.8 ServiceChange

Table 5.8.8.1: ServiceChangeMethods and ServiceChangeReasons sent by IMS-ALG:

Service Change Methods Supported:	ServiceChange Reasons supported:
Handoff (NOTE 2, NOTE 3)	"903 MGC Directed Change" (Optional, NOTE 4)
Restart (NOTE 2)	"901 Cold Boot" (Optional) "902 Warm Boot" (Optional)
Forced (NOTE 2)	"905 Termination Taken Out Of Service" (Optional)
Graceful (NOTE 2)	"905 Termination Taken Out Of Service" (Optional)
NOTE 1: When a Service Change command on the Root termination with a method other than Graceful is sent, the command shall always be sent as the only command in a message. The sending node shall always wait for the reply to a Service Change command on the Root termination with a method other than Graceful before sending further command requests. A Service Change command on the Root termination with method Graceful may be combined with other commands in a single message.	
NOTE 2: ROOT Only.	
NOTE 3: Not involving more than 1 IMS-ALG. This does not preclude the use of the MGCIId in a ServiceChange (Handoff) scenario, nor does it change the expected IMS-AGW behaviour upon receipt of such a message, as the IMS-AGW has actually no means to differentiate whether the ServiceChangeMgclid parameter that may be received in a ServiceChange (handoff) message relates to a logical IMS-ALG inside the same IMS-ALG server or is part of another IMS-ALG.	
NOTE 4: Support of this procedure is mandatory in the IMS-AGW.	

Table 5.8.8.2: ServiceChangeMethods and ServiceChangeReasons sent by IMS-AGW:

Service Change Methods Supported:	ServiceChange Reasons supported:
Forced	"904 Termination Malfunction", ALL except ROOT (Optional, NOTE 4) "905 Termination Taken Out Of Service" , ALL (Mandatory) "906 Loss Of Lower Layer Connectivity" , ALL except ROOT (Optional, NOTE 4) "907 Transmission Failure" , ALL except ROOT (Optional, NOTE 4) "908 MG Impending Failure" ROOT only (Mandatory) "910 Media Capability Failure" , ALL except ROOT (Optional, NOTE 4) "915 State Loss" ROOT only (Optional, NOTE 4)
Graceful (NOTE 2)	"905 Termination Taken Out Of Service" , (Optional, NOTE 4) "908 MG Impending Failure" (Optional, NOTE 4)
Disconnected (NOTE 2)	"900 Service Restored" (Mandatory) "916 Packages Change" (Optional) "917 Capability Change" (Optional)
Restart (NOTE 2)	"900 Service Restored" (Mandatory) "901 Cold Boot" (Mandatory) "902 Warm Boot" (Mandatory) "916 Packages Change" (Optional) "917 Capability Change "(Optional)
Handoff (NOTE 2, NOTE 3)	"903 MGC Directed Change" (Mandatory)
<p>NOTE 1: When a Service Change command on the Root termination with a method other than Graceful is sent, the command shall always be sent as the only command in a message. The sending node shall always wait for the reply to a Service Change command on the Root termination with a method other than Graceful before sending further command requests. A Service Change command on the Root termination with method Graceful may be combined with other commands in a single message.</p> <p>NOTE 2: ROOT Only.</p> <p>NOTE 3: In response to a IMS-ALG Ordered Re-Register (clause 5.17.3.7).</p> <p>NOTE 4: Support of this procedure is mandatory in the IMS-ALG.</p>	

Table 5.8.8.3: Service Change Address

ServiceChangeAddress used:	No
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Table 5.8.8.4: Service Change Delay

ServiceChangeDelay used:	No
<i>If yes</i>	Valid time period:

Table 5.8.8.5: Service Change Incomplete Flag

ServiceChange Incomplete Flag used:	No
--	----

Table 5.8.8.6: Service Change Version

Version used in ServiceChangeVersion:	2 or 3
NOTE: Version 2 shall be supported as the minimum protocol version. See clause 5.3.	

Table 5.8.8.7: ServiceChangeProfile

ServiceChangeProfile mandatory:	Yes
NOTE: The ServiceChangeProfile is mandatory in the AGW Register and AGW Re-Register procedures.	

Table 5.8.8.8: Profile negotiation

Profile negotiation as per H.248.18:	No
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Table 5.8.8.9: ServiceChangeMGCIId

ServiceChangeMGCIId used:	Yes
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5.8.9 Manipulating and auditing context attributes

Table 5.8.9.1: Manipulating and auditing context attributes

Context Attributes Manipulated:	Emergency Indicator, Priority Indicator, Topology
Context Attributes Audited:	None

5.9 Generic command syntax and encoding

Table 5.9.1: Encodings

Supported Encodings:	Text (NOTE 1, NOTE 2) and Binary
NOTE 1: The receiver shall be capable of receiving both Short Token Notation and Long Token Notation on an H.248 control association.	
NOTE 2: The transmitter may select between long and short token forms per H.248 control association.	
NOTE 3: ETSI TISPAN "Ia Profile" [3] uses only text encoding.	

5.10 Transactions

Table 5.10.1: Transactions per Message

Maximum number of TransactionRequests / TransactionReplies / TransResponseAcks / Segment Replies per message:	10 (NOTE)
NOTE: ETSI TISPAN "Ia Profile" [3] maximum is "1", this is foreseen to be the typical case.	

Table 5.10.2: Commands per Transaction Requests

Maximum number of commands per TransactionRequest:	Unspecified (NOTE)
NOTE: ETSI TISPAN "Ia Profile" [3] maximum is "2", this is foreseen to be the typical case.	

Table 5.10.3: Commands per Transaction Reply

Maximum number of commands per TransactionReply:	Unspecified (NOTE)
NOTE: ETSI TISPAN "Ia Profile" [3] maximum is "2", this is foreseen to be the typical case.	

Table 5.10.4: Optional Commands

Commands able to be marked "Optional":	<Add, Modify, Move, Subtract, Auditvalue, Auditcapability, Servicechange, All, None>
---	--

Table 5.10.5: Commands marked for Wildcarded Responses

Wildcarded responses may be requested for:	Subtract
--	----------

Table 5.10.6: Procedures for Wildcarded Responses

Procedures that make use of wildcarded responses:	Release AGW Termination
---	-------------------------

Table 5.10.7: Transaction Timers

Transaction Timer:	Value
normalMGExecutionTime	Provisioned
normalMGCEExecutionTime	Provisioned
MGOOriginatedPendingLimit	Provisioned
MGCOriginatedPendingLimit	Provisioned
MGProvisionalResponseTimerValue	Provisioned
MGCProvisionalResponseTimerValue	Provisioned

5.11 Messages

It is recommended that IMS-AGW and IMS-ALG names are in the form of fully qualified domain name. For example the domain name of the IMS-ALG may be of the form: "ALG1.whatever.net." and the name of the IMS-AGW may be of the form: "mg1.whatever.net."

The fully qualified domain name will be used by the IMS-AGW and IMS-ALG as part of the "Message Identifier" in the H.248 messages which identifies the originator of the message.

The IMS-ALG domain name is provisioned in the IMS-AGW or retrieved from the DNS using SRV records.

The use of a domain name provides the following benefits:

- IMS-AGWs and IMS-ALGs are identified by their domain name, not their network addresses. Several addresses can be associated with a domain name. If a command cannot be forwarded to one of the network addresses, implementations shall retry the transmission using another address.

NOTE: There are then e.g. multiple numerical address entries per single MGC entity in the "MG database of MGC entries"; see Table 5 in ITU-T H.Sup7 [29].

- IMS-AGWs and IMS-ALGs may move to another platform. The association between a logical name (domain name) and the actual platform are kept in the Domain Name Service (DNS). IMS-AGW and IMS-ALG shall keep track of the record's time-to-live read from the DNS. They shall query the DNS to refresh the information if the time-to-live has expired.

The domain name may be used by IMS-ALG/IMS-AGW for authentication purposes.

5.12 Transport

Specifies what H.248 subseries transports are supported by the profile.

Table 5.12.1: Transport

Supported transports:	<ol style="list-style-type: none"> 1. IPv4-based network control plane: <ul style="list-style-type: none"> - SCTP/IPv4 (Recommended) - UDP/IPv4 (Optional) 2. IPv6-based network control plane: <ul style="list-style-type: none"> - SCTP/IPv6 (Recommended) - UDP/IPv6 (Optional)
NOTE 1: When using SCTP as defined in IETF RFC 4960 [16] the IMS-AGW shall always be the node to perform the "Initiation".	

Table 5.12.2: Segmentation

Segmentation supported:	SCTP: Inherent in Transport UDP: No
--------------------------------	--

Table 5.12.3: Control Association

Control Association Monitoring supported:	Monitoring mechanism is dependent on used H.248 transport (see above table 5.12/1): SCTP: inherent capability of SCTP. UDP: H.248.14 (MG-driven monitoring). Empty AuditValue on ROOT (MGC-driven monitoring).
--	---

5.13 Security

Table 5.13.1: Security

Supported Security:	None
NOTE: IPsec shall not be used by the IMS-ALG or IMS-AGW for the Iq interface. Normally the Iq interface lies within a single operator's secure domain. If this is not the case then a Za interface (Security Gateway deploying IPsec) may be required, however this is a separate logical function/entity and thus is not applicable to the Iq profile, the IMS-ALG or the IMS-AGW. For further details see 3GPP TS 33.210 [27].	

5.14 Packages

5.14.1 Mandatory Packages

Table 5.14.1.1: Mandatory Packages

Mandatory Packages:		
Package Name	PackageID	Version
IP NAPT traversal (ITU-T Recommendation H.248.37 [4])	ipnapt, (0x0099)	1
Generic (ITU-T Recommendation H.248.1 [10], annex E.1)	g, (0x0001)	1
Base root (ITU-T Recommendation H.248.1 [10], annex E.2)	root, (0x0051)	2
Gate management (ITU-T Recommendation H.248.43 [6], Appendix I)	gm, (0x008c)	2
Traffic management (ITU-T Recommendation H.248.53 [7])	tman, (0x008d)	1
IP Domain Connection (ITU-T Recommendation H.248.41 [8])	ipdc, (0x009d)	1
Hanging Termination Detection (ITU-T Recommendation H.248.36 [9])	hangterm, (0x0098)	1
Diffserv (ITU-T Recommendation H.248.52 [12])	ds, (0x008b)	2
RTP Control Protocol (ITU-T Recommendation H.248.57 [5])	rtcph, (0x00b5)	1

5.14.2 Optional Packages

Table 5.14.2.1: Optional Packages

Optional Packages:			
Package Name	PackageID	Version	Support dependent on:
Inactivity Timer (ITU-T Recommendation H.248.14 [11])	it, (0x0045)	1	MGC polling by MG. Only applicable for UDP transport.
Media Gateway Overload Control (ITU-T Recommendation H.248.11 [13])	ocp, (0x0051)	1	Support of message throttling, based on rate limitation, from MGC towards MG.
Media Gateway Resource Congestion Handling Package (see ITU-T Recommendation H.248.10 [14])	chp, (0x0029)	1	Support of message throttling, based on percentage limitation, from MGC towards MG.
IP realm availability (ITU-T Recommendation H.248.41 Amendment 1) [8]	ipra (0x00e0)	1	Support of mechanisms allowing the MGC to discover the IP realms that are available at the MG at a certain time and allowing the MG to inform the MGC about any changes in the availability of realms.
Application Data Inactivity Detection (ITU-T Recommendation H.248.40 [24])	adid (0x009c)	1	MGC requires to be explicitly informed of a cessation of an application data flow.
Explicit Congestion Notification for RTP-over-UDP Support (see ITU-T Recommendation H.248.82 [40])	ecnrous (0x010b)	1	Support of Transparent forwarding of ECN packets
MG Act-as STUN Server (ITU-T Recommendation H.248.50 [43])	mgastuns (0x00c2)	1	Support of incoming STUN connectivity checks. Applicable for ICE lite and full ICE
Originate STUN Continuity Check (see ITU-T Recommendation H.248.50 [43])	ostuncc (0x00c3)	1	Support of originating STUN connectivity checks Only applicable for full ICE
TCP basic connection control (ITU-T Recommendation H.248.89 [47])	tcpbcc, (0x0115)	1	Support of state-aware TCP handling (TCP proxy mode) (NOTE).
TLS basic session control (ITU-T Recommendation H.248.90 [48])	tlsbsc, (0x0117)	1	Support of a) TCP-based media using TLS b) UDP-based media using DTLS, c) SCTP-based media using DTLS (WebRTC)
Stream endpoint interlinkage (ITU-T Recommendation H.248.92 [49])	seplink, (0x011b)	1	Support of state-aware TCP handling (TCP proxy mode) and of Forward Incoming TCP Connection Establishment Requests Indicator.
MG located Bearer Level ALG [ITU-T Recommendation H.248.78 [56])	mgbalg (0x011d)	1	Support of a bearer level application gateway (B-ALG) function for application-aware MSRP interworking.
STUN Consent Freshness (ITU-T Recommendation H.248.50 [43])	stnconfres(0x0120)	1	Support of STUN usage for consent freshness procedures. Applicable for full ICE.
Media Grouping (ITU-T Recommendation H.248.96 [65])	mgroup (0x011f)	1	Support of WebRTC data channels
SCTP basic connection control package (ITU-T Recommendation H.248.97 [66])	sctpbcc (0x0121)	1	Support of WebRTC data channels: control of establishment and release of SCTP associations, and the allocation of local SCTP stream identifiers
SCTP Re-configuration Stream reset ([ITU-T Recommendation H.248.97 [66])	sctpreset, (0x0122)	1	Support of WebRTC data services: control of SCTP stream reset ("release") procedure

Enhanced Revised Offer/Answer SDP Support ([ITU-T Recommendation H.248.80 [73])	eroas, (0x0109)	1	Support of the SDP Capability Negotiation syntax
NOTE: Stateless TCP handling (i.e. TCP relay and TCP merge mode) are solely based on SDP indication (thus, package-less) according to ITU-T Recommendation H.248.84 [46], clause 13.			

5.14.3 Package usage information

5.14.3.1 Generic (g)

Table 5.14.3.1.1: Generic package

Properties	Mandatory/Optional	Used in command	Supported Values	Provisioned Value
None	-	-	-	-
Signals	Mandatory/Optional	Used in command		Duration Provisioned Value
None	-	-	-	-
	Signal Parameters	Mandatory/Optional	Supported Values	Duration Provisioned Value
	-	-	-	-
Events	Mandatory/Optional	Used in command		
Cause (g/cause, 0x0001/0x0001)	M	ADD, MOD, NOTIFY		
	Event Parameters	Mandatory/Optional	Supported Values	Provisioned Value
	None			
	ObservedEvent Parameters	Mandatory/Optional	Supported Values	Provisioned Value
	General cause (Generalcause, 0x0001)	M	"NR" (0x0001) Normal Release "UR" (0x0002) Unavailable Resources "FT" (0x0003) Failure, Temporary "FP" (0x0004) Failure, Permanent "IW" (0x0005) Interworking Error "UN" (0x0006) Unsupported	Not Applicable
Failure cause (Failurecause, 0x0002)	O	Octet String	Not Applicable	
Events	Mandatory/Optional	Used in command		
Signal Completion. (g/sc, 0x0001/0x0002)	Not Used	-		
	Event Parameters	Mandatory/Optional	Supported Values	Provisioned Value
	-	-	-	-
	ObservedEvent Parameters	Mandatory/Optional	Supported Values	Provisioned Value
	-	-	-	-
Statistics	Mandatory/Optional	Used in command	Supported Values	
None	-	-	-	
Error Codes	Mandatory/Optional			
None	-			

5.14.3.2 Base root (root)

Table 5.14.3.2.1: Base root package

Properties	Mandatory/Optional	Used in command	Supported Values	Provisioned Value
MaxNrOfContexts (root/maxNumberOfContexts, 0x0002/0x0001)	O	AUDITVALUE	ALL	YES
MaxTerminationsPerContext (root/maxTerminationPerContext, 0x0002/0x0002)	O	AUDITVALUE	ALL	YES
normalMGCExecutionTime (root/normalMGCExecutionTime, 0x0002/0x0003)	O	AUDITVALUE	ALL	YES
normalMGCExecutionTime (root/normalMGCExecutionTime, 0x0002/0x0004)	O	AUDITVALUE	ALL	YES
MGProvisionalResponseTimerValue (root/MGProvisionalResponseTimerValue, 0x0002/0x0005)	O	AUDITVALUE	ALL	YES
MGCProvisionalResponseTimerValue (root/MGCProvisionalResponseTimerValue, 0x0002/0x0006)	O	AUDITVALUE	ALL	YES
MGCOriginatedPendingLimit (root/MGCOriginatedPendingLimit, 0x0002/0x0007)	O	AUDITVALUE	ALL	YES
MGCOriginatedPendingLimit (root/MGCOriginatedPendingLimit, 0x0002/0x0008)	O	AUDITVALUE	ALL	YES
Signals	Mandatory/Optional	Used in command		Duration Provisioned Value
None	-	-		-
	Signal Parameters	Mandatory/Optional	Supported Values	Duration Provisioned Value
	-	-	-	-
Events	Mandatory/Optional	Used in command		
None	-	-		
	Event Parameters	Mandatory/Optional	Supported Values	Provisioned Value
	-	-	-	-
	ObservedEvent Parameters	Mandatory/Optional	Supported Values	Provisioned Value
-	-	-	-	-
Statistics	Mandatory/Optional	Used in command		Supported Values
None	-	-		-
Error Codes	Mandatory/Optional			
None	-			

5.14.3.3 Differentiated Services (ds)

Table 5.14.3.3.1: Differentiated Services package

Properties	Mandatory/Optional	Used in command	Supported Values	Provisioned Value
Differentiated Services Code Point (ds/dscp,0x008b/0x0001)	M	ADD, MODIFY	ALL	Yes
Tagging Behaviour (ds/tb, 0x008b/0x0002)	O	ADD, MODIFY	ALL	Yes
Signals	Mandatory/Optional	Used in command		Duration Provisioned Value
None	-	-		-
	Signal Parameters	Mandatory/Optional	Supported Values	Duration Provisioned Value
	-	-	-	-
Events	Mandatory/Optional	Used in command		
None	-	-		
	Event Parameters	Mandatory/Optional	Supported Values	Provisioned Value
	-	-	-	-
	ObservedEvent Parameters	Mandatory/Optional	Supported Values	Provisioned Value
	-	-	-	-
Statistics	Mandatory/Optional	Used in command	Supported Values	
None	-	-	-	
Error Codes	Mandatory/Optional			
None	-			

5.14.3.4 Gate Management (gm)

Table 5.14.3.4.1: Gate Management Package

Properties	Mandatory/Optional	Used in command	Supported Values	Provisioned Value
Remote Source Address Filtering (gm/saf,0x008c/0x0001)	M	ADD, MODIFY	ALL	Not Applicable
Remote Source Address Mask (gm/sam,0x008c/0x0002)	O	ADD, MODIFY	ALL	Not Applicable
Remote Source Port Filtering (gm/spf,0x008c/0x0003)	M	ADD, MODIFY	ALL	Not Applicable
Remote Source Port (gm/spr,0x008c/0x0004)	O	ADD, MODIFY	ALL	Not Applicable
Explicit Source Address Setting (gm/esas,0x008c/0x0005)	Not Supported	NONE	-	Not Applicable
Local Source Address (gm/lisa,0x008c/0x0006)	Not Supported	NONE	-	Not Applicable
Explicit Source Port Setting (gm/esps,0x008c/0x0007)	Not Supported	NONE	-	Not Applicable
Local Source Port (gm/lsp,0x008c/0x0008)	Not Supported	NONE	-	Not Applicable
Remote Source Port Range (gm/sprr,0x008c/0x000A)	O	ADD, MODIFY	ALL	Not Applicable
Signals	Mandatory/Optional	Used in command		Duration Provisioned Value
None	-	-		-
	Signal Parameters	Mandatory/Optional	Supported Values	Duration Provisioned Value
	-	-	-	-

Events	Mandatory/Optional	Used in command		
None	-	-		
	Event Parameters	Mandatory/Optional	Supported Values	Provisioned Value
	-	-	-	-
	ObservedEvent Parameters	Mandatory/Optional	Supported Values	Provisioned Value
-	-	-	-	
Statistics	Mandatory/Optional	Used in command	Supported Values	
Discarded Packets	NOT USED	-	-	
Error Codes	Mandatory/Optional			
None	-			

5.14.3.5 Traffic management (tman)

Table 5.14.3.5.1: Traffic Management Package

Properties	Mandatory/Optional	Used in command	Supported Values	Provisioned Value
Policing (tman/pol, 0x008d/0x0005)	M	ADD, MODIFY	ALL	Not Applicable
Peak Data Rate (tman/pdr, 0x008d/0x0001)	O	ADD, MODIFY	ALL	Not Applicable
Delay Variation Tolerance (tman/dvt, 0x008d/0x0004)	O	ADD, MODIFY	ALL	ALL
Sustainable Data Rate (tman/sdr, 0x008d/0x0002)	M	ADD, MODIFY	ALL	Not Applicable
Maximum burst size (tman/mbs, 0x008d/0x0003)	M	ADD, MODIFY	ALL	Not Applicable
Signals	Mandatory/Optional	Used in command		Duration Provisioned Value
None	-	-		-
	Signal Parameters	Mandatory/Optional	Supported Values	Duration Provisioned Value
	-	-	-	-
Events	Mandatory/Optional	Used in command		
None	-	-		
	Event Parameters	Mandatory/Optional	Supported Values	Provisioned Value
	-	-	-	-
	ObservedEvent Parameters	Mandatory/Optional	Supported Values	Provisioned Value
-	-	-	-	
Statistics	Mandatory/Optional	Used in command	Supported Values	
None	-	-	-	
Error Codes	Mandatory/Optional			
None	-			

NOTE: The data rate shall be calculated using the packet size from IP layer upwards. The Token Bucket method as described by ITU-T Recommendation H.248.53 [7] clause 9.4.3 (as per IETF RFC 2216 [32]) shall be followed where SDR = "r" and MBS = "b" (i.e. the additional "M" value does not apply).

5.14.3.6 Inactivity Timer (it)

Table 5.14.3.6.1: Inactivity Timer Package

Properties	Mandatory/Optional	Used in command	Supported Values	Provisioned Value
None	-	-	-	-
Signals	Mandatory/Optional	Used in command		Duration Provisioned Value
None	-	-	-	-
	Signal Parameters	Mandatory/Optional	Supported Values	Duration Provisioned Value
	-	-	-	-
Events	Mandatory/Optional	Used in command		
Inactivity Timeout (it/ito, 0x0045/0x0001)	M	MODIFY, NOTIFY		
	Event Parameters	Mandatory/Optional	Supported Values	Provisioned Value
	Maximum Inactivity Time (mit, 0x0001)	O	ALL	Yes
	ObservedEvent Parameters	Mandatory/Optional	Supported Values	Provisioned Value
	None	-	-	-
Statistics	Mandatory/Optional	Used in command	Supported Values	
None	-	-	-	
Error Codes	Mandatory/Optional			
None	-			

5.14.3.7 IP Domain Connection (ipdc)

Table 5.14.3.7.1: IP domain connection package

Properties	Mandatory/Optional	Used in command	Supported Values	Provisioned Value
IP Realm Identifier (ipdc/realm, 0x009d/0x0001)	M	ADD, MODIFY (NOTE 2)	ALL (NOTE 1)	Yes
Signals	Mandatory/Optional	Used in command		Duration Provisioned Value
None	-	-		-
	Signal Parameters	Mandatory/Optional	Supported Values	Duration Provisioned Value
	-	-	-	-
Events	Mandatory/Optional	Used in command		
None	-	-		
	Event Parameters	Mandatory/Optional	Supported Values	Provisioned Value
	-	-	-	-
	ObservedEvent Parameters	Mandatory/Optional	Supported Values	Provisioned Value
	-	-	-	-
Statistics	Mandatory/Optional	Used in command	Supported Values	
None	-	-	-	
Error Codes	Mandatory/Optional			
No	-			
NOTE 1: If the MGC uses an IP Realm Identifier (<i>ipdc/realm</i>) property exceeding the maximum length limitation defined in ITU-T Recommendation H.248.41 [8], the MG shall reply with an error descriptor using error code #410: "Incorrect identifier".				
NOTE 2: The MODIFY command is listed due to the fact that subsequent Streams may be "added" by MODIFY requests in case of multi-Stream-per-Termination structures. The subsequent Streams shall then carry the same IP Realm Identifier (<i>ipdc/realm</i>) property value as the very first Stream.				

5.14.3.8 Media Gateway Overload Control Package (ocp)

Table 5.14.3.8.1: Media Gateway Overload Control Package

Properties	Mandatory/Optional	Used in command	Supported Values	Provisioned Value
None	-	-	-	-
Signals	Mandatory/Optional	Used in command		Duration Provisioned Value
None	-	-	-	-
	Signal Parameters	Mandatory/Optional	Supported Values	Duration Provisioned Value
	-	-	-	-
Events	Mandatory/Optional	Used in command		
MG_Overload (ocp/mg_overload, 0x0051/0x0001) (NOTE 1)	M	MODIFY, NOTIFY (NOTE 1)		
	Event Parameters	Mandatory/Optional	Supported Values	Provisioned Value
	None	-	-	-
	ObservedEvent Parameters	Mandatory/Optional	Supported Values	Provisioned Value
	None	-	-	-
Statistics	Mandatory/Optional	Used in command	Supported Values	
None	-	-	-	
Error Codes	Mandatory/Optional			
None	-			

NOTE 1: When the MG is overloaded, overload Events may be sent **either** only following the **first ADD.request** which creates a new Context, **or** following **all ADD.request** commands (see ITU-T Recommendation H.248.11 [13] Corrigendum 1).
These two options result in different normalisations of the overload event rate as an indicator of the level of MG overload.

5.14.3.9 Hanging Termination Detection (hangterm)

Table 5.14.3.9.1: Hanging Termination Detection Package

Properties	Mandatory/Optional	Used in command	Supported Values	Provisioned Value
None	-	-	-	-
Signals	Mandatory/Optional	Used in command		Duration Provisioned Value
None	-	-	-	-
	Signal Parameters	Mandatory/Optional	Supported Values	Duration Provisioned Value
	-	-	-	-
Events	Mandatory/Optional	Used in command		
Termination Heartbeat (hangterm/thb, 0x0098/0x0001)	M	ADD, MODIFY, NOTIFY		
	Event Parameters	Mandatory/Optional	Supported Values	Provisioned Value
	Timer X (timerx,0x0001)	M	ALL (NOTE1)	YES
	ObservedEvent Parameters	Mandatory/Optional	Supported Values	Provisioned Value
	-	-	-	-
Statistics	Mandatory/Optional	Used in command	Supported Values	
None	-	-	-	
Error Codes	Mandatory/Optional			
None	-			

NOTE1: The heartbeat timer shall be configured to a value much greater than the mean call holding time.

5.14.3.10 Media Gateway Resource Congestion handling Package (chp)

Table 5.14.3.10.1: Media Gateway Resource Congestion handling Package

Properties	Mandatory/Optional	Used in command	Supported Values	Provisioned Value
None	-	-	-	-
Signals	Mandatory/Optional	Used in command		Duration Provisioned Value
None	-	-	-	-
	Signal Parameters	Mandatory/Optional	Supported Values	Duration Provisioned Value
	-	-	-	-
Events	Mandatory/Optional	Used in command		
MGCon (chp/mgcon, 0x0029/0x0001)	M	MODIFY, NOTIFY		
	Event Parameters	Mandatory/Optional	Supported Values	Provisioned Value
	None	-	-	-
	ObservedEvent Parameters	Mandatory/Optional	Supported Values	Provisioned Value
	Reduction (reduction,0x0001)	M	0-100	Not Applicable
Statistics	Mandatory/Optional	Used in command	Supported Values	
None	-	-	-	
Error Codes	Mandatory/Optional			
None	-			

5.14.3.11 IP Realm Availability (ipra)

Table 5.14.3.11.1: IP Realm Availability Package

Properties	Mandatory/Optional	Used in command	Supported Values	Provisioned Value
Available Realms, (ipra/ar, 0x00e0/0x0001)	M	AUDITVALUE	ALL	Not Applicable
Signals	Mandatory/Optional	Used in command		Duration Provisioned Value
None	-	-		-
	Signal Parameters	Mandatory/Optional	Supported Values	Duration Provisioned Value
	-	-	-	-
Events	Mandatory/Optional	Used in command		
Available Realms Changed, (ipra/arc, 0x00e0/0x0001)	M	MODIFY, NOTIFY		
	Event Parameters	Mandatory/Optional	Supported Values:	Provisioned Value
	-	-	-	-
	ObservedEvent Parameters	Mandatory/Optional	Supported Values	Provisioned Value
	Newly Available Realms (nar, 0x0001)	M	ALL	Not applicable
	Newly Unavailable Realms (nur, 0x0002)	M	ALL	Not applicable
Statistics	Mandatory/Optional	Used in command	Supported Values	
None	-	-	-	
Error Codes	Mandatory/Optional			
None	-			

5.14.3.12 IP NAPT Traversal (ipnapt)

Table 5.14.3.12.1: IP NAPT Traversal Package

Properties	Mandatory/Optional	Used in command	Supported Values	Provisioned Value
None	-	-	-	-
Signals	Mandatory/Optional	Used in command		Duration Provisioned Value
Latching (ipnapt/latch) 0x0099/0x0001)	M	ADD, MODIFY		Not Applicable
	Signal Parameters	Mandatory/Optional	Supported Values	Duration Provisioned Value
	NAPT Traversal Processing (napt, 0x0001)	M	ALL	Not Applicable
Events	Mandatory/Optional	Used in command		
None	-	-		
	Event Parameters	Mandatory/Optional	Supported Values	Provisioned Value
	-	-	-	-
	ObservedEvent Parameters	Mandatory/Optional	Supported Values	Provisioned Value
	-	-	-	-
Statistics	Mandatory/Optional	Used in command	Supported Values	
None	-	-	-	
Error Codes	Mandatory/Optional			
None	-			

5.14.3.13 RTCP Handling Package (rtcph)

Table 5.14.3.13.1: RTCP Handling Package

Properties	Mandatory/Optional	Used in command	Supported Values	Provisioned Value
RTCP Allocation Specific Behaviour (rtcph/rsb,0x00b5/0x0009)	M	ADD, MODIFY	ALL	OFF
Signals	Mandatory/Optional	Used in command		Duration Provisioned Value
None	-	-		-
	Signal Parameters	Mandatory/Optional	Supported Values	Duration Provisioned Value
	-	-	-	-
Events	Mandatory/Optional	Used in command		
None	-	-		
	Event Parameters	Mandatory/Optional	Supported Values	Provisioned Value
	-	-	-	-
	ObservedEvent Parameters	Mandatory/Optional	Supported Values	Provisioned Value
	-	-	-	-
Statistics	Mandatory/Optional	Used in command	Supported Values	
None	-	-	-	
Error Codes	Mandatory/Optional			
None	-			

5.14.3.14 Application Data Inactivity Detection (adid)

Table 5.14.3.14.1: Application Data Inactivity Detection package

Properties	Mandatory/Optional	Used in command	Supported Values	Provisioned Value
None	-	-	-	-
Signals	Mandatory/Optional	Used in command		Duration Provisioned Value
None	-	-	-	-
	Signal Parameters	Mandatory/Optional	Supported Values	Duration Provisioned Value
	-	-	-	-
Events	Mandatory/Optional	Used in command		
IP Flow Stop Detection (adid/ipstop, 0x009c/0x0001)	M	ADD, MODIFY, NOTIFY		
	Event Parameters	Mandatory/Optional	Supported Values	Provisioned Value
	Detection time (dt, 0x0001)	M	ALL	Yes
	Direction (dir, 0x002)	M	ALL	Yes
	ObservedEvent Parameters	Mandatory/Optional	Supported Values	Provisioned Value
	None	-	-	-
Statistics	Mandatory/Optional	Used in command	Supported Values	
None	-	-	-	
Error Codes	Mandatory/Optional			
None				

5.14.3.15 Explicit Congestion Notification for RTP-over-UDP Support (ecnrous)

Table 5.14.3.15.1: Explicit Congestion Notification for RTP-over-UDP Support package

Properties	Mandatory/Optional	Used in command	Supported Values	Provisioned Value
ECN Enabled (ecnrous/ecnen, 0x010b/0x0001)	M	ADD, MODIFY	True, False	-
Congestion Response Method (ecnrous/crm, 0x010b/0x0002)	Not Signalled	-	-	"RDCC"(0x0002) (NOTE 1, NOTE 2)
Initiation Method (ecnrous/initmethod, 0x010b/0x0003)	M	ADD, MODIFY	"inactive", "leap"	"inactive"
ECN Mode (ecnrous/mode, 0x010b/0x0004)	Not Signalled	-	-	"setonly" (0x0001) in the Remote Descriptor and "readonly" (0x0002) in the Local Descriptor
ECT Marking (ecnrous/ectmark, 0x010b/0x0005)	Not Signalled	-	-	"0" (0x0002) (NOTE 2)
ECN Congestion Marking (ecnrous/congestmark, 0x010b/0x0006)	Not Signalled	-	-	"nomark" (0x0003)
ECN SDP Usage (ecnrous/ecnsdp, 0x010b/0x0007)	Not Signalled	-	-	"P" (0x0001)
Signals	Mandatory/Optional	Used in command		Duration Provisioned Value
None	-	-		-
	Signal Parameters	Mandatory/Optional	Supported Values	Duration Provisioned Value
	-	-	-	-

Events	Mandatory/Optional	Used in command		
ECN Failure (ecnrous/fail, 0x010b/0x0001)	O (NOTE 2)	ADD, MODIFY, NOTIFY		
	Event Parameters	Mandatory/Optional	Supported Values	Provisioned Value
	-	-	-	-
	-	-	-	-
	ObservedEvent Parameters	Mandatory/Optional	Supported Values	Provisioned Value
	Failure Type (type,0x0001)	Mandatory	INIT, USE	
Media Sender SSRC (ssrc, 0x0002)	Not Supported			
Statistics	Mandatory/Optional	Used in command	Supported Values	
Source (ecnrous/ssrc, 0x010b/0x0001)	Not Supported	-	-	
CE Counter (ecnrous/cecount, 0x010b/0x0002)	Not Supported	-	-	
ECT0 Counter (ecnrous/ectzero, 0x010b/0x0003)	Not Supported	-	-	
ECT1 Counter (ecnrous/ectone, 0x010b/0x0004)	Not Supported	-	-	
Not-ECT Counter (ecnrous/notect, 0x010b/0x0005)	Not Supported	-	-	
Lost Packets Counter (ecnrous/lost 0x010b/0x0006)	Not Supported	-	-	
Extended Highest Sequence number (ecnrous/ehsn, 0x010b/0x0007)	Not Supported	-	-	
Duplication Counter (ecnrous/dup, 0x010b/0x0008)	Not Supported	-	-	
Error Codes	Mandatory/Optional			
None	-			
NOTE 1: Application Specific Rate Adaptation shall be applied in accordance with 3GPP TS 26.114 [26]. For speech this requires support of CMR and TMMBR for video.				
NOTE 2: Not used for ECN transparent. Mandatory for ECN endpoint.				

5.14.3.16 MG Act-as STUN Server (mgastuns)

Table 5.14.3.16.1: MG Act-as STUN Server

Properties	Mandatory/Optional	Used in command	Supported Values	Provisioned Value
Act-as STUN Server (mgastuns/astuns, 0x00c2/0x0001)	M	ADD, MODIFY	ALL	-
Signals	Mandatory/Optional	Used in command		Duration Provisioned Value
None	-	-		-
Signal Parameters	Mandatory/Optional	Supported Values	Duration Provisioned Value	
-	-	-	-	
Events	Mandatory/Optional	Used in command		
None	-	-		
Event Parameters	Mandatory/Optional	Supported Values	Provisioned Value	
-	-	-	-	
-	-	-	-	
ObservedEvent Parameters	Mandatory/Optional	Supported Values	Provisioned Value	
-	-			

Statistics	Mandatory/Optional	Used in command	Supported Values
None	-	-	-
Error Codes	Mandatory/Optional		
None	-		

5.14.3.17 Originate STUN Continuity Check (ostuncc)

Table 5.14.3.17.1: Originate STUN Continuity Check Package

Properties	Mandatory/Optional	Used in command	Supported Values	Provisioned Value
Host Candidate Realm (ostuncc/hcr, 0x00c3/0x0001)	O	ADD, MODIFY	ALL	Yes
Signals	Mandatory/Optional	Used in command		Duration Provisioned Value
Send Connectivity Check (ostuncc/scc, 0x00c3/0x0001)	M	ADD, MODIFY		Not Applicable
	Signal Parameters	Mandatory/Optional	Supported Values	Duration Provisioned Value
	Control (cntrl, 0x0001)	O	"controlling", "controlled"	Not Applicable
Send Additional Connectivity Check (ostuncc/sacc, 0x00c3/0x0002)	Mandatory/Optional	Used in command		Duration Provisioned Value
	M	MODIFY		Not Applicable
	Signal Parameters	Mandatory/Optional	Supported Values	Duration Provisioned Value
	Control (cntrl, 0x0001)	O	"controlling", "controlled"	Not Applicable
Events	Mandatory/Optional	Used in command		
Connectivity Check Result (ostuncc/ccr, 0x00c3/0x0001)	M	ADD, MODIFY, NOTIFY		
	Event Parameters	Mandatory/Optional	Supported Values	Provisioned Value
	-	-	-	-
	ObservedEvent Parameters	Mandatory/Optional	Supported Values	Provisioned Value
	Candidate/Transport Pair (ctp, 0x0001)	M	ALL	Not applicable
New Peer Reflexive Candidate (ostuncc/nprc, 0x00c3/0x0002)	Mandatory/Optional	Used in command		
	M	ADD, MODIFY, NOTIFY		
	Event Parameters	Mandatory/Optional	Supported Values	Provisioned Value
	-	-	-	-
	ObservedEvent Parameters	Mandatory/Optional	Supported Values	Provisioned Value
	Candidate (can, 0x0001)	M	ALL	Not applicable
Statistics	Mandatory/Optional	Used in command	Supported Values	
None	-	-	-	
Error Codes	Mandatory/Optional			
None	-			

5.14.3.18 TCP basic connection control (tcpbcc)

Table 5.14.3.18.1: TCP basic connection control package

Properties	Mandatory/Optional	Used in command	Supported Values	Provisioned Value
Incoming bearer connection establishment blocking (tcpbcc/bceb, 0x0115/0x0001)	O (NOTE 1)	ADD, MODIFY	ALL	"Unblocked"
Oneway Release Indicator (tcpbcc/ori, 0x0115/0x0002)	not supported	-	-	"False"
Signals	Mandatory/Optional	Used in command		Duration Provisioned Value
Establish BNC (tcpbcc/EstBNC, 0x0115/0x0001)	M	ADD, MODIFY		-
	Signal Parameters	Mandatory/Optional	Supported Values	Duration Provisioned Value
	-	-	-	-
Release BNC (tcpbcc/RelBNC, 0x0115/0x0002)	O (NOTE 2)	ADD, MODIFY-		-
	Signal Parameters	Mandatory/Optional	Supported Values	Duration Provisioned Value
	-	-	-	-
Events	Mandatory/Optional	Used in command		
TCP connection state change (tcpbcc/BNCChange, 0x0115/0x0001)	O (NOTE 3)	ADD, MODIFY, NOTIFY-		
	Event Parameters	Mandatory/Optional	Supported Values	Provisioned Value
	Type of state change (Type, 0x0001)	M	Est [0x01] Bearer Established, Rel [0x05] Bearer Released	-
	ObservedEvent Parameters	Mandatory/Optional	Supported Values	Provisioned Value
	Type of state change (Type, 0x0001)	M	Est [0x01] Bearer Established, Rel [0x05] Bearer Released	-
Statistics	Mandatory/Optional	Used in command	Supported Values	
None	-	-	-	
Error Codes	Mandatory/Optional			
None	-			
NOTE 1: Shall be supported if delayed TCP bearer connection establishment is required.				
NOTE 2: When the IMS-ALG wants to explicitly trigger the TCP bearer connection release procedure (instead of the implicit trigger related to the removal of the H.248 stream (via a MODify.request or SUBtract.request command)).				
NOTE 3: When the IMS-ALG wants to monitor the execution of TCP bearer control procedures.				

5.14.3.19 TLS basic session control (tlbsbc)

Table 5.14.3.19.1: TLS basic session control package

Properties	Mandatory/Optional	Used in command	Supported Values	Provisioned Value
Incoming security session establishment blocking (tlbsbc/bceb, 0x0117/0x0001)	O (NOTE 1)	ADD, MODIFY	ALL	"Unblocked"
Signals	Mandatory/Optional	Used in command		Duration Provisioned Value
Establish BNC (tlbsbc/EstBNC, 0x0117/0x0001)	M	ADD, MODIFY		-
	Signal Parameters	Mandatory/Optional	Supported Values	Duration Provisioned Value
	-	-	-	-

Release BNC (tlsbsc/RelBNC, 0x0117/0x0002)	O (NOTE 2)	ADD, MODIFY-		-
	Signal Parameters	Mandatory/Optional	Supported Values	Duration Provisioned Value
	-	-	-	-
Events	Mandatory/Optional	Used in command		
TLS session state change (tlsbsc/BNCChange, 0x0117/0x0001)	O (NOTE 3)	ADD, MODIFY, NOTIFY-		
	Event Parameters	Mandatory/Optional	Supported Values	Provisioned Value
	Type of state change (Type, 0x0001)	M	Est [0x01] Bearer Established, Rel [0x05] Bearer Released	-
	ObservedEvent Parameters	Mandatory/Optional	Supported Values	Provisioned Value
Type of state change (Type, 0x0001)	M	Est [0x01] Bearer Established, Rel [0x05] Bearer Released	-	
Statistics	Mandatory/Optional	Used in command	Supported Values	
None	-	-	-	
Error Codes	Mandatory/Optional			
None	-			
NOTE 1: When the IMS-ALG wants to block incoming (D)TLS bearer session establishment requests.				
NOTE 2: When the IMS-ALG wants to explicitly trigger the (D)TLS bearer session release procedure (instead of the implicit trigger related to the removal of the H.248 stream (via a MODify.request or SUBtract.request command)).				
NOTE 3: When the IMS-ALG wants to monitor the execution of (D)TLS bearer control procedures.				

5.14.3.20 Stream endpoint interlinkage (seplink)

Table 5.14.3.20.1: Stream endpoint interlinkage package

Properties	Mandatory/Optional	Used in command	Supported Values	Provisioned Value
Interlinkage topology (seplink/linktopo, 0x011b/0x0001)	M	ADD, MODIFY	only TCP endpoints	empty list
Signals	Mandatory/Optional	Used in command		Duration Provisioned Value
None	-	-		-
	Signal Parameters	Mandatory/Optional	Supported Values	Duration Provisioned Value
	-	-	-	-
Events	Mandatory/Optional	Used in command		
None	-	-		
	Event Parameters	Mandatory/Optional	Supported Values	Provisioned Value
	-	-	-	-
	ObservedEvent Parameters	Mandatory/Optional	Supported Values	Provisioned Value
	-	-	-	-
Statistics	Mandatory/Optional	Used in command	Supported Values	
None	Not Supported	-	-	
Error Codes	Mandatory/Optional			
#488	M			

5.14.3.21 MG located Bearer Level ALG (mgbalg)

Table 5.14.3.21.1: MG located Bearer Level ALG package

Properties	Mandatory/Optional	Used in command	Supported Values	Provisioned Value
Protocol type bearer level ALG (mgbalg/ptbalg, 0x011d/0x0001)	M	ADD, MODIFY	ALL	"OFF"
Upper layer protocol filter (mgbalg/ulpf, 0x011d/0x0002)	O (NOTE)	ADD, MODIFY	0	"0"
Source of replaced source address information part (mgbalg/sosaip, 0x011d/0x0003)	O (NOTE)	ADD, MODIFY	ALL	"SD"
Source of replaced destination address information part (mgbalg/sodaip, 0x011d/0x0004)	O (NOTE)	ADD, MODIFY	ALL	"SD"
Signals	Mandatory/Optional	Used in command		Duration Provisioned Value
None	-	-		-
	Signal Parameters	Mandatory/Optional	Supported Values	Duration Provisioned Value
	-	-	-	-
Events	Mandatory/Optional	Used in command		
None	-	-		
	Event Parameters	Mandatory/Optional	Supported Values	Provisioned Value
	-	-	-	-
	ObservedEvent Parameters	Mandatory/Optional	Supported Values	Provisioned Value
	-	-	-	-
Statistics	Mandatory/Optional	Used in command	Supported Values	
None	-	-	-	
Error Codes	Mandatory/Optional			
None	-			

NOTE: When B-ALG service configuration is provisioned in IMS-AGW.

5.14.3.22 STUN Consent Freshness (stnconfres)

Table 5.14.3.22.1: STUN Consent Freshness package

Properties	Mandatory/Optional	Used in command	Supported Values	Provisioned Value
None	-	-	-	-
Signals	Mandatory/Optional	Used in command		Duration Provisioned Value
Consent Test (stnconfres/contst, 0x0120/0x0001)	M	ADD, MODIFY		-
	Signal Parameters	Mandatory/Optional	Supported Values	Duration Provisioned Value
	tstint (0x0001)	O	Integer	0.8N and 1.2N Default N=5000 (NOTE)
Events	Mandatory/Optional	Used in command		
Consent State (stnconfres/constate, 0x0120/0x0001)	Not supported	-		
	Event Parameters	Mandatory/Optional	Supported Values	Provisioned Value
	Request States (reqstate, 0x0001)	Not supported	-	-
	ObservedEvent Parameters	Mandatory/Optional	Supported Values	Provisioned Value

	States (state, 0x0001)	Not supported	-	-
STUN Consent Request Failure (stnconfres/confail, 0x0120/0x0002)	Mandatory/Optional	Used in command		
	M	ADD, MOD, NOTIFY		
	Event Parameters	Mandatory/Optional	Supported Values	Provisioned Value
	-	-	-	-
	ObservedEvent Parameters	Mandatory/Optional	Supported Values	Provisioned Value
-	-	-	-	
Statistics	Mandatory/Optional	Used in command	Supported Values	
None	-	-	-	
Error Codes	Mandatory/Optional			
None	-			

NOTE: The parameter "N" refers to the basic period of the consent check interval defined in IETF RFC 7675 [58].

5.14.3.23 Media Grouping (mgroup)

Table 5.14.3.23.1: Media Grouping package

Properties	Mandatory/Optional	Used in command	Supported Values	Provisioned Value
Group Semantics (mgroup/groupse, 0x011f/0x0001)	M	ADD, MODIFY	ALL (NOTE)	-
Stream Aggregation (mgroup/stragg, 0x011f/0x0002)	Not supported			
Stream Deaggregation (mgroup/strdeagg, 0x011f/0x0003)	M	ADD, MODIFY	ALL	-
Signals	Mandatory/Optional	Used in command		Duration Provisioned Value
None	-	-		-
	Signal Parameters	Mandatory/Optional	Supported Values	Duration Provisioned Value
	-	-	-	-
Events	Mandatory/Optional	Used in command		
None	-	-		
	Event Parameters	Mandatory/Optional	Supported Values	Provisioned Value
	-	-	-	-
	ObservedEvent Parameters	Mandatory/Optional	Supported Values	Provisioned Value
-	-	-	-	
Statistics	Mandatory/Optional	Used in command	Supported Values	
None	-	-	-	
Error Codes	Mandatory/Optional			
#489	M			

NOTE: Only semantics "SCTP" is required (for WebRTC data channels).

5.14.3.24 SCTP basic connection control package (sctpbcc)

Table 5.14.3.24.1: SCTP basic connection control package

Properties	Mandatory/Optional	Used in command	Supported Values	Provisioned Value
Incoming bearer connection establishment blocking (sctpbcc/bceb, 0x0121/0x0001)	Not supported			
SCTP StreamID (sctpbcc/sctpid, 0x0121/0x0002)	M	ADD, MODIFY	ALL	-
Signals	Mandatory/Optional	Used in command		Duration Provisioned Value
Establish BNC (sctpbcc/EstBNC, 0x0121/0x0001)	M	ADD, MODIFY		-
	Signal Parameters	Mandatory/Optional	Supported Values	Duration Provisioned Value
	-	-	-	-
Release BNC (sctpbcc/RelBNC, 0x0121/0x0002)	O (NOTE 1)	ADD, MODIFY		-
	Signal Parameters	Mandatory/Optional	Supported Values	Duration Provisioned Value
	-	-	-	-
Events	Mandatory/Optional	Used in command		
SCTP connection state change (sctpbcc/BNCChange, 0x0121/0x0001)	O (NOTE 2)	ADD, MODIFY, NOTIFY-		
	Event Parameters	Mandatory/Optional	Supported Values	Provisioned Value
	Type of state change (Type, 0x0001)	M	Est [0x01] Bearer Established, Rel [0x05] Bearer Released	-
	ObservedEvent Parameters	Mandatory/Optional	Supported Values	Provisioned Value
Type of state change (Type, 0x0001)	M	Est [0x01] Bearer Established, Rel [0x05] Bearer Released	-	
Statistics	Mandatory/Optional	Used in command	Supported Values	
None	-	-	-	
Error Codes	Mandatory/Optional			
None	-			
NOTE 1: When the IMS-ALG wants to explicitly trigger the SCTP Association shutdown procedure (instead of the implicit trigger related to the removal of the H.248 Stream (via a MODify.request or SUBtract.request command)).				
NOTE 2: When the IMS-ALG wants to monitor the execution of SCTP bearer control procedures.				

5.14.3.25 SCTP Re-configuration Stream Reset (sctpreset)

Table 5.14.3.25.1: SCTP Re-configuration Stream Reset package

Properties	Mandatory/Optional	Used in command	Supported Values	Provisioned Value
None.	-	-	-	-
Signals	Mandatory/Optional	Used in command		Duration Provisioned Value
Initiate Outgoing SCTP Stream Reset (sctpreset/initreset, 0x0122/0x0001)	M	ADD, MODIFY		-
	Signal Parameters	Mandatory/Optional	Supported Values	Duration Provisioned Value
	sctpid (0x0001)	M	ALL	-
Outgoing SCTP Stream Reset Response (sctpreset/resetresp, 0x0122/0x0002)	O (NOTE)	ADD, MODIFY		-
	Signal Parameters	Mandatory/Optional	Supported Values	Duration Provisioned Value
	sctpid (0x0001)	M	ALL	-
action (0x0002)	M	ALL	-	

Events	Mandatory/Optional	Used in command		
Detect outgoing SCTP stream reset (sctpreset/detreset, 0x0122/0x0001)	M	ADD, MODIFY, NOTIFY-		
	Event Parameters	Mandatory/Optional	Supported Values	Provisioned Value
	outresp (0x0001)	O	ALL	"accept"
	ObservedEvent Parameters	Mandatory/Optional	Supported Values	Provisioned Value
sctpid (0x0001)	M	ALL	-	
Outgoing SCTP stream reset result (sctpreset/result, 0x0122/0x0002)	O	ADD, MODIFY, NOTIFY-		
	Event Parameters	Mandatory/Optional	Supported Values	Provisioned Value
	None.	-	-	-
	ObservedEvent Parameters	Mandatory/Optional	Supported Values	Provisioned Value
	sctpid (0x0001)	M	ALL	-
result (0x0002)	M	ALL	-	
Statistics	Mandatory/Optional	Used in command	Supported Values	
None	-	-	-	
Error Codes	Mandatory/Optional			
None	-			
NOTE: The signal is optional because dependent on an MGC determined or MG determined response behaviour (see also figures 10 and 11 in ITU-T Recommendation H.248.97 [66]).				

5.14.3.26 Enhanced Revised Offer/Answer SDP Support (eroas)

Table 5.14.3.26.1: Enhanced Revised Offer/Answer SDP Support package

Properties	Mandatory/Optional	Used in command	Supported Values	Provisioned Value
SDPCapNeg Extensions (eroas/scpe, 0x0109/0x0001)	M	AuditValue	"cap-v0"	"cap-v0"
Signals	Mandatory/Optional	Used in command		Duration Provisioned Value
None	-	-		-
	Signal Parameters	Mandatory/Optional	Supported Values	Duration Provisioned Value
	-	-	-	-
Events	Mandatory/Optional	Used in command		
None	-	-		
	Event Parameters	Mandatory/Optional	Supported Values	Provisioned Value
	-	-	-	-
	ObservedEvent Parameters	Mandatory/Optional	Supported Values	Provisioned Value
-	-	-	-	
Statistics	Mandatory/Optional	Used in command	Supported Values	
None	-	-	-	
Error Codes	Mandatory/Optional			
None	-			

5.15 Mandatory support of SDP and Annex C information elements

Table 5.15.1: Mandatory Annex C and SDP information elements

Information Element	Annex C Support	SDP Support
v-line	"SDP_V "	The value must always be equal to zero: v=0
c-line	"SDP_C "	<p><nettype> <addrtype> and <connection address> are required. The network type shall be set to "IN". The address type may be IPv4 or IPv6. The MGC may apply parameter underspecification to the <connection address> subfield.</p>
m-line	"SDP_M "	<p>There are four fields (or SDP values) <media>, <port>, <proto> and <fmt> in the "m=" line (see IETF RFC 4566 [17];NOTE 1). The "m=" line may be omitted from SDP.</p> <p><media>, <port>, <proto > and <fmt-list> are required if the "m=" line is included.</p> <p>Media type <media> :</p> <p>The <media> field shall be set to "audio", "video", "message", "application", "text" or "-". When "-" is used for the <i>media</i> value then no media resources are required to be reserved at this stage (NOTE 1). If the MG does not support the requested media value it shall reject the command with error code 515.</p> <p>Transport port <port> The <i>port</i> value may be underspecified with CHOOSE wildcard.</p> <p>Transport protocol <proto> As in table 5.15.2.</p> <p>Media format <fmt> Various values may be used for media-format, dependent on the related <media> (NOTE 3).</p> <p>"-" may be used for the <i>format list</i> value if no media reservation is required at this stage. If the MG does not support the requested media format value the MG shall reject the command with error code 449.</p>
b-line	"SDP_B "	<p>Shall not be used without a "m=" line.</p> <p>The <i>modifier</i> values shall be "AS", "RS" and "RR".</p> <p>The AS <i>modifier</i> implies that the <i>bandwidth-value</i> represents the "maximum bandwidth" (see clause 5.8/ IETF RFC 4566 [17]). The <i>bandwidth-value</i> relates therefore to the <i>peak bitrate</i> (NOTE 2).</p> <p>The <i>bandwidth-value</i> value defines the IP layer bandwidth for the specific H.248 Stream.</p> <p>For RTP flows, where RTCP resources are reserved together with the RTP resources using the "RTP Specific Behaviour" property of the Gate Management package (gm) property, the IMS-ALG may also supply additional RTCP bandwidth modifiers (i.e. RR and RS, see IETF RFC 3556 [28]). The AS <i>bandwidth</i> value will include the bandwidth used by RTP. In the absence of the RTCP bandwidth modifiers the IMS-AGW shall allow an additional 5% of the AS bandwidth value for the bandwidth for RTCP, in accordance with IETF RFC 3556 [28].</p>

o-line	"SDP_O"	<p>The origin line consists of six fields: (<username>, <sess-id>, <sess-version>, <nettype>, <addrtype> and <unicast-address>).</p> <p>The MGC is not required to supply this line but shall accept it (see clause 7.1.8/ITU-T Recommendation H.248.1 [10]).</p> <p>The MG shall return the value received from the MGC or if there is no o-line sent by the MGC, the MG shall populate this line as follows:</p> <ul style="list-style-type: none"> - <user name> should contain an hyphen - <session ID> and <version> should contain one or more digits as described in IETF RFC 4566 [17] - <network type> shall be set to IN - <address type> shall be set to IP4 or IP6 The Address Type shall be set to "IP4" or "IP6" depending on the addressing scheme used by the network to which the MG is connected. - <address> should contain the fully qualified domain name or IP address of the gateway.
s-line	"SDP_S"	<p>The session name "s=" line contains a single field s= <session name>.</p> <p>The MGC is not required to supply this line but shall accept it (see clause 7.1.8/ITU-T Recommendation H.248.1 [10]).</p> <p>The MG shall return the value received from the MGC or if there is no s-line sent by the MGC, the MG shall populate this line as follows:</p> <ul style="list-style-type: none"> - "s="
t-line	"SDP_T"	<p>The time "t=" line consists of two fields t= <start time> and <stop time>.</p> <p>The MGC is not required to supply this line but shall accept it (see clause 7.1.8/ITU-T Recommendation H.248.1 [10]).</p> <p>The MG shall return the value received from the MGC or if there is no t-line sent by the MGC, the MG shall populate this line as follows:</p> <ul style="list-style-type: none"> "t=0 0"
<p>NOTE 1: IETF RFC 4566 [17] enables "-" as a valid character.</p> <p>NOTE 2: The unit for the <i>bandwidth-value</i> (peak bitrate) is "kbit/s". The "b=" line is not providing any information about the traffic characteristic, i.e. whether the traffic flow has a Constant BitRate (CBR) or Variable BitRate (VBR). The <i>bandwidth-value</i> is thus independent of the traffic characteristic and relates to the peak bitrate for CBR and VBR traffic.</p> <p>NOTE 3: In particular, WebRTC uses value "webrtc-datachannel" in case of WebRTC data applications.</p>		

Table 5.15.2: Transport Protocol

Transport Protocol <proto> in m-line:	If the MG does not support the requested transport protocol, it shall reject the command with error code 449.
RTP/AVP	RTP profile according IETF RFC 3551 [19]. Allow only L4 protocol = UDP (see NOTE 1).
RTP/AVPF	Extended RTP profile for RTCP-based Feedback (RTP/AVPF) according IETF RFC 4585 [25]. See 3GPP TS 26.114 [26]. Allow only L4 protocol = UDP (see NOTE 1).
RTP/SAVP	SRTP profile according IETF RFC 3711 [30] (NOTE 3). Allow only L4 protocol = UDP (see NOTE 1).
RTP/SAVPF	Extended SRTP profile for RTCP-based Feedback (RTP/SAVPF) according IETF RFC 5124 [31] (NOTE 3). Allow only L4 protocol = UDP (see NOTE 1).
TCP	Allow only L4 protocol = TCP (NOTE 2)
TCP/MSRP	Message service using IETF RFC 4975 [18] (NOTE 6).
TCP/TLS	Application agnostic indication with L4 protocol = TCP (NOTE 4).
TCP/TLS/MSRP	Application-specific indication with L4 protocol = TCP and TLS-based transport security (SDP codepoint see IETF RFC 4975 [18]) (NOTE 6).
udptl	Allow only L4 protocol = UDP

udp	Allow only L4 protocol = UDP (NOTE 1, NOTE 7).
UDP/DTLS	Application agnostic indication with L4 protocol = UDP and DTLS-based transport security (NOTE 5).
UDP/TLS/RTP/SAVP	Indication for WebRTC end-to-access edge transport security using DTLS-SRTP, where DTLS is used to establish keys for SRTP according to IETF RFC 5763 [60] and IETF RFC 5764 [61].
UDP/TLS/RTP/SAVPF	Indication for WebRTC end-to-access edge transport security using DTLS-SRTP, where DTLS is used to establish keys for extended SRTP according to IETF RFC 5763 [60] and IETF RFC 5764 [61].
UDP/DTLS/SCTP	See IETF RFC 8841 [68]. For WebRTC data channel support (for the indication of the protocol stack segment "SCTP-over-DTLS").
<p>NOTE 1: Parameter "udp" is introduced by IETF RFC 4566 [17].</p> <p>NOTE 2: Upper case TCP is defined by IETF RFC 4145 [20] and registered by IANA.</p> <p>NOTE 3: The IMS AGW does not need to reserve resources for end-to-access edge media (e2ae) security en-/decryption at this stage if RTP profile identifiers "RTP/SAVP" or "RTP/SAVPF" are signalled without the "a=crypto" property for that stream. For e2e media security either "RTP/SAVP" is signalled at all terminations in a context, or "RTP/SAVPF" is signalled at all terminations in a context and no media attribute will be signalled; the IMS AGW shall then not terminate the SRTP / SRTCP protocol, but shall pass the encrypted media and control flows (as indicated with the rtcp/rsb property) transparently.</p> <p>NOTE 4: Parameter "TCP/TLS" is defined by IETF RFC 8122 [55] for the TLS protocol according to 3GPP TS 33.210 [27].</p> <p>NOTE 5: Parameter "UDP/DTLS" is introduced by IETF draft-schwarz-mmusic-sdp-for-gw [54] (based on ITU-T Recommendation H.248.93 [50]).</p> <p>NOTE 6: Conditional support, dependent on application-aware interworking.</p> <p>NOTE 7: Codepoint used for e.g. "UDP payload transparent forwarding" (such as DTLS-encrypted end-to-end WebRTC bearer traffic).</p>	

5.16 Optional support of SDP and Annex C information elements

Specifies what SDP attributes and Annex C information elements may be supported.

Table 5.16.1: Optional Annex C and SDP information elements

Information Element	Annex C Support	SDP Support
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a-line	"SDP_A "	<p>1) Application "RTCP transport address control":</p> <p>a) Default mode "without RTP/RTCP transport multiplexing": The attribute "a=rtcp" line may either contain (a=rtcp: <port>) or (a=rtcp: <port> <network type> <address type> <connection address>) when the "a=" line is used for RTCP transport port and optionally network address transmission (see IETF RFC 3605 [21]). . The MGC shall supply the "a=rtcp" line in the RD when non-default RTCP network address or transport port values are used by the peer media entity. "RTCP transport address control" should be supported by MG (NOTE 2).</p> <p>b) Optional extension mode "with RTP/RTCP transport multiplexing": The attribute "a=rtcp-mux" (see IETF RFC 5761 [59]) is used for indicating RTP/RTCP transport multiplexing. Tables 4/1 to 4/5 in ITU-T Recommendation H.248.57 [5] define the appropriate RTCP port allocation rules.</p> <p>2) Media related parameters in general: The "a=" line provides the complementary information for the "m=" line with regards to a specified media type/format (e.g. an optional SDP „a=ptime" line for a particular media format). For a dynamic RTP payload type, for each media information on the codec type shall be provided in a separate SDP "a=rtpmap"line and possibly additional SDP "a=fmtp"-line(s).</p> <p>3) Application " Media interworking (transcoding)": See "a=" line specification in (2). Media interworking is limited to audio transcoding only (NOTE 1).</p> <p>4) IMS media plane security related parameters:</p> <p>4.1) SRTP-specific security parameters: The attribute "a=crypto" (see IETF RFC 4568 [29]) shall be provided for an m-line in the local and remote descriptor of an access network termination if the IMS-ALG wants that the corresponding media is encrypted, decrypted and/or integrity protected by the IMS-AGW (IMS end-to-access-edge media plane security). For each m-line, only a single "a=crypto" attribute shall be provisioned (i.e. only information related to a single crypto suite is provisioned to the IMS-AGW). The "a=crypto" attribute may contain several master keys. An IMS-AGW supporting end-to-access-edge media plane security shall support parameters within the "a=crypto" attribute in accordance with the profile in Annex of 3GPP TS 33.328 [34].</p> <p>4.2) (D)TLS-specific security parameters: The attribute(s) "a=fingerprint" (see IETF RFC 8122 [55]) shall be provided in accordance with ITU-T Recommendation H.248.90 [48] for an "m="-line in the local and remote descriptor of an access network termination if the IMS-ALG wants that the corresponding media is encrypted, decrypted and/or integrity protected by the IMS-AGW (IMS end-to-access-edge media plane security).</p> <p>5) Coordination of Video Orientation The attribute "a=extmap" (see IETF RFC 5285 [41]) may be provided for an m-line in the local and remote descriptor if the IMS-AGW supports the extended RTP header with Coordination of Video Orientation information, see also 3GPP TS 26.114 [26].</p> <p>6) Generic Image Attribute The attribute "a=imageattr" (see IETF RFC 6236 [42]) may be provided for an m-line in the local and remote descriptor if the IMS-AGW supports the generic image attributes, see also 3GPP TS 26.114 [26]. The local descriptor indicates the image sizes which the IMS-AGW supports in the receiving direction for the selected payload type and corresponds to the "recv" keyword (see IETF RFC 6236 [42]) in the "a=imageattr" that the IMS-ALG will send within the SDP body on the Mw/Mx interface. The remote descriptor indicates the image sizes which the IMS-AGW supports in the sending direction for the selected payload type and corresponds to the "send" keyword (see IETF RFC 6236 [42]) in the "a=imageattr"</p>
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		<p>that the IMS-ALG will send within the SDP body on the Mw/Mx interface.</p> <p>7) ICE support The attributes "a=candidate", "a=ice-pwd", "a=ice-ufrag" and "a=ice-pacing" (see IETF RFC 8839 [81]) may be provided for an SDP m-line in the local and remote descriptor if the IMS-AGW supports ICE, see also 3GPP TS 24.229 [45]. In the local descriptor, the IMS-ALG shall provide "a=ice-pwd", and "a=ice-ufrag" with wildcard sign "\$" to request the allocation of a password and user name fragment, and the "a=candidate" of type "host" with the transport, port and priority parameters with wildcard sign "\$" to request the allocation of a host candidate, and "a=ice-pacing" with wildcard sign "\$" to request the desired pacing value for connectivity checks. The IMS-AGW shall then reply with completed "a=ice-pwd", "a=ice-ufrag", "a=candidate" and "a=ice-pacing" attributes in the local descriptor, and shall include "a=ice-lite" if it only supports ICE lite. In the remote descriptor, the IMS-ALG may provide the "a=candidate", "a=ice-pwd", "a=ice-ufrag" and "a=ice-pacing".</p> <p>8) state-agnostic and state-aware TCP handling: The attribute "a=setup" (see IETF RFC 4145 [20]) shall be provided for TCP-based media, in accordance with ITU-T Recommendation H.248.84 [46], when triggering an end-to-end TCP simultaneous open (leading to a TCP merge mode in the IMS-AGW) or other TCP modes of operation.</p> <p>9) Application-aware interworking for MSRP traffic: The attribute "a=path" (see IETF RFC 4975 [11]) shall be provided, when enabling a bearer level application gateway (B-ALG) function for MSRP traffic, according to ITU-T Recommendation H.248.78 [56].</p> <p>10) Handling of RTCP APP messages when transcoding between EVS and non EVS codecs: The attribute "a=3gpp_mtsi_app_adapt" (see 3GPP TS 26.114 [26]) containing the allowed RTCP APP message types shall be provided when the IMS-AGW is allowed to send RTCP APP messages.</p> <p>11) Pre-defined Video Region-of-Interest (ROI): The attribute "a=rtcp-fb" with the "Predefined ROI" type expressed by the parameter "3gpp-roi-predefined" may be provided for an m-line in the local and remote descriptor if the IMS-AGW supports the Predefined ROI mode, see also 3GPP TS 26.114 [26]. In addition, the attribute "a=extmap" (see IETF RFC 5285 [41]) may be provided for an m-line in the local and remote descriptor if the IMS-AGW supports the extended RTP header for carriage of pre-defined video Region of Interest (ROI) information in the sent video, see also 3GPP TS 26.114 [26].</p> <p>12) Arbitrary Video Region of Interest (ROI): The attribute "a=rtcp-fb" with the "Arbitrary ROI" type expressed by the parameter "3gpp-roi-arbitrary" may be provided for an m-line in the local and remote descriptor if the IMS-AGW supports the Arbitrary ROI mode, see also 3GPP TS 26.114 [26]. In addition, the attribute "a=extmap" (see IETF RFC 5285 [41]) may be provided for an m-line in the local and remote descriptor if the IMS-AGW supports the extended RTP header for carriage of arbitrary video Region of Interest (ROI) information in the sent video, see also 3GPP TS 26.114 [26].</p> <p>13) WebRTC data channel: The attributes "a=sctp-port" and "a=max-message-size" shall be provided in the remote descriptor (see IETF RFC 8841 [68]). In the local descriptor, the IMS-ALG shall provide "a=sctp-port" with omission sign "-" to indicate that the IMS-ALG shall use the same port as for UDP, and "a=max-message-size" with wildcard sign "\$". The IMS-AGW shall then reply with completed "a=sctp-port" and "a=max-message-size" attributes in the local descriptor, The attribute</p>
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		<p>"a=dcmap" shall be provided in the local and remote descriptor, with the parameter "subprotocol" either set to "-" (Application-agnostic data channel configuration) or with real value (Application-aware data channel configuration).</p> <p>14) Application aware interworking of traffic within a WebRTC data channel: The attribute "a=dcsa" may be provided in the local descriptor and/or remote descriptor (see IETF RFC 8864 [69], NOTE 3). T.140 (see ITU-T Recommendation T.140 [75]) is used for Global Text Telephony (GTT). Application aware interworking between the transport according to IETF RFC 8865 [77] within WebRTC data channels and the transport according to IETF RFC 4103 [76] in the IMS core network should be applied for T.140 according to ITU-T Recommendation H.248.94 [67] Appendix 2. For application aware T.140 interworking, the "a= rtpmap" attribute shall be provided with "t140" payload type for the termination towards the IMS core network and "t140" value of the "subprotocol" parameter of the SDP "a=dcmap" attribute shall be provided for the termination towards the served WIC.</p> <p>15) SDP Capability Negotiation: The attributes of "a=acap", "a=tcap", "a=pcfg" and "a=acfg" (see IETF RFC 5939 [72]) may be provided in the local descriptor and/or remote descriptor.</p> <p>16) Rate adaptation for media endpoints: If the IMS-AGW performs media transcoding and if the rate adaptation for media endpoints using the enhanced bandwidth negotiation is supported by the IMS-AGW, attribute(s) "a=bw-info" with direction "send" or "sendrecv" may be provided for an m-line and the selected IP payload type and applicable IP version in the remote descriptor. The following bandwidth properties, as defined in 3GPP TS 26.114 [26], clause 19, may be included in "a=bw-info" line: <payload type> <dir> <MaxSupBw>, <MaxDesBw>, <MinDesBw>, <MinSupBw> and <IpVer>.</p> <p>17) "RTP-level pause and resume" signalling: The "rtcp-fb" SDP attribute with the "ccm" feedback parameter and the "pause" ccm parameter as defined in IETF RFC 7728 [79] may be provided for an m-line in the local and remote descriptor to indicate that the IMS-AGW shall forward RTCP feedback "CCM PAUSE-RESUME" messages transparently.</p> <p>18) "RTCP Codec Control Commands and Indications" signalling: The "rtcp-fb" SDP attribute with the "ccm" feedback parameter and the "fir" and/or "tmmb" ccm parameters as defined in IETF RFC 5104 [78] may be provided for an m-line in the local and remote descriptor to indicate that the IMS-AGW shall be prepared to receive and is allowed to send, respectively, the RTCP CCM feedback messages FIR, and/or TMMBR and TMMBN.</p> <p>19) DBI signalling: The "rtcp-fb" SDP attribute with the "3gpp-delay-budget" feedback parameter (as defined in 3GPP TS 26.114 [26] clause 6.2.8) may be provided for an m-line in the local and remote descriptor to indicate that the IMS-AGW shall forward RTCP feedback "DBI" messages (as defined in 3GPP TS 26.114 [26] clause 7.3.8) transparently.</p>
<p>NOTE 1: Media Interworking is optional. NOTE 2: Table 1 in ITU-T Recommendation H.248.57 [5] provides the correspondent RTCP port allocation rules. NOTE 3: See IETF RFC 8873 [70] for WebRTC data application 'MSRP'.</p>		

Editor's Note: The support for video transcoding is required for vSRVCC but should be changed from Rel-11, separate CRs would be required for this change.

5.17 Procedures

5.17.1 Formats and Codes

Table 5.17.1.1 shows the parameters which are required for the procedures defined in the following clauses.

The coding rules applied in ITU-T Recommendation H.248.1 [10] for the applicable coding technique shall be followed for the UMTS capability set.

The binary encoding rules which are applicable to the defined Abstract Syntaxes are the Basic Encoding Rules for Abstract Syntax Notation One, defined in ITU-T Recommendation X.690 [22]. Specifically in accordance with ITU-T Recommendation X.690 [22] clause 7.3, alternative encodings based on the definite and indefinite form of length are permitted by the basic encoding rules as a sender's option. Receivers shall support both alternatives.

Unsupported values of parameters or properties may be reported by the IMS-AGW and shall be supported by the IMS-ALG as such by using H.248.1 error code #449 "Unsupported or Unknown Parameter or Property Value ". The unsupported or unknown value is included in the error text in the error descriptor.

Table 5.17.1.1: Information Elements Used in Procedures

Signalling Object	H.248 Descriptor	Coding
Additional Bandwidth Properties	Remote Descriptor	The "a=bw-info" SDP attribute defined in 3GPP TS 26.114 [26], see table 5.16.1.
Allowed RTCP APP message types	Remote Descriptor	The "a=3gpp_mtsi_app_adapt" SDP attribute defined in 3GPP TS 26.114 [26].
Alternate MGC Id	ServiceChange	The MGCIIdToTry parameter in ITU-T Recommendation H.248.1 [10].
Arbitrary ROI	Local Descriptor or Remote Descriptor	The "rtcp-fb" SDP attribute defined in IETF RFC 4585 [21] to indicate the "Arbitrary ROI" RTCP feedback message expressed by the "3gpp-roi-arbitrary" parameter, as described in 3GPP TS 26.114 [26].
Available Realms	Termination State	According to <i>Available Realms</i> property in ITU-T Recommendation H.248.41 [8].
Application-aware MSRP interworking request	LocalControl	This is the <i>ptbalg</i> property from ITU-T Recommendation H.248.78 [56] concerning the configuration of a B-ALG service (for MSRP traffic).
BNC Release	Events, ObservedEvents	As for the Events/ObservedEvents Descriptor in clause E.1.2.1/ ITU-T Recommendation H.248.1 [10] "Cause"
CCM BASE	Local Descriptor or Remote Descriptor	"rtcp-fb" SDP attribute (defined in IETF RFC 4585 [25]) with the "ccm" feedback parameter and the "fir" and/or "tmnbr" ccm parameters as defined in IETF RFC 5104 [78].
CCM pause-resume	Local Descriptor or Remote Descriptor	"rtcp-fb" SDP attribute (defined in IETF RFC 4585 [25]) with the "ccm" feedback parameter (defined in IETF RFC 5104 [78]) and the "pause" ccm parameter as defined in IETF RFC 7728 [79].
Cause	ObservedEvents	As for the ObservedEvent Parameter in clause E.1.2.1/ ITU-T Recommendation H.248.1 [10] "General cause"
Changed Realms	Observed Events	According to Observed Events Parameters for <i>Available Realms Changed</i> event in ITU-T Recommendation H.248.41 [8].
Codec List	Local Descriptor or Remote Descriptor	<fmt list> in a single SDP m-line. For a static RTP payload type, the codec type should be implied by the RTP payload type, if not then each codec type shall be provided in a separate SDP "a=rtpmap"-line and possibly additional SDP "a=fmtp"-line(s). For a dynamic RTP payload type, for each codec information on the codec type shall be provided in a separate SDP "a=rtpmap"-line and possibly additional SDP "a=fmtp"-line(s).
Connectivity Mode	LocalControl	ITU-T Recommendation H.248.1 [10] Mode property. Binary Encoding: Encoding as per ITU-T Recommendation H.248.1 Annex A [10] "streamMode" Textual Encoding: Encoding as per ITU-T Recommendation H.248.1 Annex B [10] "streamMode".
Context ID	NA	Binary Encoding: As per ITU-T Recommendation H.248.1 [10] Annex A. Textual Encoding: As per ITU-T Recommendation H.248.1 [10] Annex B.
Cryptographic SDES Attribute	Local Descriptor or Remote Descriptor	"crypto" attribute in SDP a-line as defined in IETF RFC 4568 [29], see 5.16
Delay Variation Tolerance	LocalControl	This is the <i>tman/dvt</i> property from ITU-T Recommendation H.248.53 [7].
Diffserv Code Point	LocalControl	Defined according to the <i>Differentiated Services Code Point</i> property in ITU-T Recommendation H.248.52 [12].
Diffserv Tagging Behaviour	LocalControl	Defined according to the <i>Tagging Behaviour</i> property in ITU-T Recommendation H.248.52 [12].
Discard Incoming TCP Connection Establishment Requests Indicator	LocalControl	Defined according to the <i>Incoming bearer connection establishment blocking</i> property (<i>tcpbcc/bceb</i>) in ITU-T Recommendation H.248.89 [47].
ECN Enabled	Local Descriptor or Remote Descriptor	Defined according to the "ECN Enabled" property in ITU-T Recommendation H.248.82 [40].
DBI	Local Descriptor or Remote Descriptor	"rtcp-fb" SDP attribute defined in IETF RFC 4585 [25] with the "3gpp-delay-budget" feedback parameter (as defined in 3GPP TS 26.114 [26] clause 6.2.8).
ECN Failure	Events, Observed Events	Defined according to the "ECN Failure" Event in ITU-T Recommendation H.248.82 [40].
ECN Failure Type	ObservedEvents Descriptor	As for the ObservedEventsDescriptor Parameter "Failure Type" in ITU-T Recommendation H.248.82 [40].

ECN Initiation Method	Local Descriptor or Remote Descriptor	Defined according to "Initiation Method" property in ITU-T Recommendation H.248.82 [40].
Emergency Call Indication	NA	ITU-T Recommendation H.248.1 [10] 6.1.1 Emergency Call Indicator Binary Encoding: Encoding as per ITU-T Recommendation H.248.1 [10] Annex A "Emergency" context attribute Textual Encoding: Encoding as per ITU-T Recommendation H.248.1 [10] Annex B "EmergencyToken" context attribute
Establish (D)TLS session	Signals	Defined according to the <i>Establish BNC</i> signal (<i>tlsbsc/EstBNC</i>) in ITU-T Recommendation H.248.90 [48].
Extended Header For CVO	Local Descriptor or Remote Descriptor	"extmap" attribute in SDP a-line as defined in IETF RFC 5285 [41], see 5.16
Extended RTP Header for Sent ROI	Local Descriptor or Remote Descriptor	"extmap" attribute in SDP a-line to pass on the ROI extended RTP header as defined by IETF RFC 5285 [41] for carriage of predefined and/or arbitrary ROI information, see 5.16
Forward Incoming TCP Connection Establishment Requests Indicator	LocalControl	Defined according to the <i>Interlinkage topology</i> property (<i>seplink/linktopo</i>) in ITU-T Recommendation H.248.93 [50].
Generic Image Attribute	Local Descriptor or Remote Descriptor	"imageattr" attribute in SDP a-line as defined in IETF RFC 6236 [46], see table 5.16.1.
ICE host candidate request	Local Descriptor	The "a=candidate" SDP attribute defined in IETF RFC 8839 [81] of type "host" with the transport, port and priority parameters with wildcard sign "\$" to request the allocation of a host candidate
ICE host candidate	Local Descriptor	The "a=candidate" SDP attribute defined in IETF RFC 8839 [81].
ICE lite indication	Local Descriptor	The "a=ice-lite" SDP attribute defined in IETF RFC 8839 [81].
ICE pacing	Local Descriptor	The "a=ice-pacing" SDP attribute defined in IETF RFC 8839 [81]. Only applicable for full ICE as specified in IETF RFC 8445 [80].
ICE pacing request	Local Descriptor	The "a=ice-pacing" SDP attribute defined in IETF RFC 8839 [81] with wildcard sign "\$". Only applicable for full ICE as specified in IETF RFC 8445 [80].
ICE password request	Local Descriptor	The "a=ice-pwd" SDP attribute defined in IETF RFC 8839 [81] with wildcard sign "\$".
ICE password	Local Descriptor	The "a=ice-pwd" SDP attribute defined in IETF RFC 8839 [81].
ICE received candidate	Remote Descriptor	The "a=candidate" SDP attribute defined in IETF RFC 8839 [81].
ICE received pacing	Remote Descriptor	The "a=ice-pacing" SDP attribute defined in IETF RFC 8839 [81]. Only applicable for full ICE as specified in IETF RFC 8445 [80].
ICE received password	Remote Descriptor	The "a=ice-pwd" SDP attribute defined in IETF RFC 8839 [81].
ICE received Ufrag	Remote Descriptor	The "a=ice-ufrag" SDP attribute defined in IETF RFC 8839 [81].
ICE Ufrag request	Local Descriptor	The "a=ice-ufrag" SDP attribute defined in IETF RFC 8839 [81] with wildcard sign "\$".
ICE Ufrag	Local Descriptor	The "a=ice-ufrag" SDP attribute defined in IETF RFC 8839 [81].
ICE Connectivity Check Result	Events, Observed Events	Defined according to <i>Connectivity Check Result</i> event in ITU-T Recommendation H.248.50 [43].
ICE Send Connectivity Check	Signals	Defined as the <i>ostuncc/scc</i> signal in ITU-T Recommendation H.248.50 [43].
ICE New Peer Reflexive Candidate	Events, Observed Events	Defined according to <i>New Peer Reflexive Candidate</i> event in ITU-T Recommendation H.248.50 [43], only applicable for full ICE.
ICE Send Additional Connectivity Check	Signals	Defined as the <i>ostuncc/sacc</i> signal in ITU-T Recommendation H.248.50 [43], only applicable for full ICE.
Consent freshness test request	Signals	Defined according to <i>stnconfres/contest</i> signal in ITU-T Recommendation H.248.50 [43].
STUN consent freshness test failure	Events, Observed Events	Defined according to <i>stnconfres/confail</i> event in ITU-T Recommendation H.248.50 [43].
Inactivity Timer	Events, Observed Events	Defined according to <i>Inactivity Timeout</i> event in ITU-T Recommendation H.248.14 [11].
IP Address	Local Descriptor or Remote Descriptor	<connection address> in SDP "c-line"
IP Realm	LocalControl	According to <i>IP Realm Identifier</i> property in ITU-T Recommendation H.248.41 [8].
IP Version	Local Descriptor or Remote Descriptor	<address type> in SDP "c-line", see 5.15
Latching	Signals	This is the <i>ipnapt/latch</i> signal in ITU-T Recommendation H.248.37 [4].
Local certificate fingerprint	Local Descriptor	"fingerprint" attribute in SDP "a="-line as defined in IETF RFC 8122 [55] see table 5.16.1.

Local certificate fingerprint Request	Local Descriptor	"fingerprint" attribute in SDP "a="-line as defined in IETF RFC 8122 [55] with wildcard choose "\$".
Local Dcmap	Local Descriptor	The SDP attribute "a=dcmap" (see IETF RFC 8864 [69]).
Local Dcsa	Local Descriptor	The SDP attribute "a=dcsa" (see IETF RFC 8864 [69]).
Local SCTP maximum message size Request	Local Descriptor	The SDP attribute "a= max-message-size" (see IETF RFC 8841 [68]) with wildcard sign "\$".
Local SCTP maximum message size	Local Descriptor	The SDP attribute "a= max-message-size" (see IETF RFC 8841 [68])
Local SCTP Port Request	Local Descriptor	The SDP attribute "a= sctp-port" (see IETF RFC 8841 [68]) with omission sign "-" to indicate that the same port as for UDP shall be used.
Local SCTP Port	Local Descriptor	The SDP attribute "a= sctp-port" (see IETF RFC 8841 [68])
Maximum Burst Size	LocalControl	This is the tman/mbs property from ITU-T Recommendation H.248.53 [7].
Media Inactivity Detection	Events, Observed Events	Defined according to <i>ipstop</i> event in ITU-T Recommendation H.248.40 [24].
Media Inactivity Detection Time	Events	As for the Event Parameter in ITU-T Recommendation H.248.40 [24] "Detection Time"
Media Inactivity Detection Direction	Events	As for the Event Parameter in ITU-T Recommendation H.248.40 [24] "Direction"
Media Type	Local Descriptor or Remote Descriptor	<media> in SDP m-line "audio" or "video" or "-"
MSRP Path	Remote Descriptor	The "a=path" SDP attribute defined in IETF RFC 4975 [18].
Notify (D)TLS session establishment Failure Event	ObservedEvents	As for the ObservedEvent Parameter in clause E.1.2.1/ ITU-T Recommendation H.248.1 [10] "General cause"
Notify TCP Connection Establishment Failure Event	ObservedEvents	As for the ObservedEvent Parameter in clause E.1.2.1/ ITU-T Recommendation H.248.1 [10] "General cause"
Overload Notification	Events, ObservedEvents	This is the chp/mgcon event from ITU-T Recommendation H.248.10 [14] or the ocp/mg_overload event from ITU-T Recommendation H.248.11 [13].
Peak Data Rate	LocalControl	This is the tman/pdr property from ITU-T Recommendation H.248.53 [7].
Policing Required	LocalControl	This is the tman/pol property from ITU-T Recommendation H.248.53 [7].
Port	Local Descriptor or Remote Descriptor	<port> in SDP m-line.
Predefined ROI	Local Descriptor or Remote Descriptor	The "rtcp-fb" SDP attribute defined in IETF RFC 4585 [25] to indicate the "Predefined ROI" RTCP feedback message expressed by the "3gpp-roi-predefined" parameter, as described in 3GPP TS 26.114 [26].
Priority Information	NA	Priority Indicator (clause 6.1.1 of ITU-T Recommendation H.248.1 [10]) Binary Encoding: Encoding as per ITU-T Recommendation H.248.1 [10] Annex A "priority" context attribute Textual Encoding: Encoding as per ITU-T Recommendation H.248.1 [10] Annex B "priority" context attribute
Realm Availability Change	Events, Observed Events	According to <i>Available Realms Changed</i> event in ITU-T Recommendation H.248.41 [8].
Received SCTP Stream Reset Request	Events, ObservedEvents	Defined according to the <i>Detect outgoing SCTP Stream reset</i> event (<i>sctpreset/detreset</i>) in ITU-T Recommendation H.248.97 [66].
Received SCTP Stream Reset Response	Events, ObservedEvents	Defined according to the <i>Outgoing SCTP Stream reset result</i> event (<i>sctpreset/result</i>) in ITU-T Recommendation H.248.97 [66].
Reduction	ObservedEvent Descriptor	As for the ObserverdEventDescriptor in clause 4.2.1/ ITU-T Recommendation H.248.10 [14] "MGCongestion".
Release (D)TLS session	Signals	Defined according to the <i>Release BNC</i> signal (<i>tlbsbc/RelBNC</i>) in ITU-T Recommendation H.248.90 [48].
Remote certificate fingerprint	Remote Descriptor	"fingerprint" attribute in SDP "a="-line as defined in IETF RFC 8122 [55], see table 5.16.1.
Remote Dcmap	Remote Descriptor	The SDP attribute "a=dcmap" (see IETF RFC 8864 [69]).
Remote Dcsa	Remote Descriptor	The SDP attribute "a=dcsa" (see IETF RFC 8864 [69]).
Remote SCTP maximum message size	RemoteDescriptor	The SDP attribute "a= max-message-size" (see IETF RFC 8841 [68])
Remote SCTP Port	Remote Descriptor	The SDP attribute "a= sctp-port" (see IETF RFC 8841 [68])

Remote Source Address Filtering	LocalControl	Defined according to <i>Remote Source Address Filtering</i> property in ITU-T Recommendation H.248.43 [6].
Remote Source Address Mask	LocalControl	Defined according to <i>Remote Source Address Mask</i> property in ITU-T Recommendation H.248.43 [6].
Remote Source Port Filtering	LocalControl	Defined according to <i>Remote Source Port Filtering</i> property in ITU-T Recommendation H.248.43 [6].
Remote Source Port	LocalControl	Defined according to <i>Remote Source Port</i> property in ITU-T Recommendation H.248.43 [6].
Remote Source Port Range	LocalControl	Defined according to <i>Remote Source Port Range</i> property in ITU-T Recommendation H.248.43 [6].
Reserve_Value	LocalControl	ITU-T Recommendation H.248.1 [10] Reserve property. Binary Encoding: Encoding as per ITU-T Recommendation H.248.1 [10] Annex A "reserveValue" Textual Encoding: Encoding as per ITU-T Recommendation H.248.1 [10] Annex B "reservedValueMode".
ROOT Properties	Termination State	The properties in clause E.2.1/ ITU-T Recommendation H.248.1 [10]
RTCP allocation ((NOTE 1)	Local Control	Defined according to <i>RTCP Allocation Specific Behaviour</i> property in ITU-T Recommendation H.248.57 [5].
RTP/RTCP transport multiplexing	Local Descriptor or Remote Descriptor	The SDP attribute "a=rtcp-mux" according to IETF RFC 5761 [59]. (NOTE 2)
explicit RTCP transport address	Remote Descriptor	The SDP attribute "a=rtcp:" according to IETF RFC 3605 [21].
RtcpbwRR	Local Descriptor or Remote Descriptor	<bandwidth> in SDP "b:RR"-line. see 5.15
RtcpbwRS	Local Descriptor or Remote Descriptor	<bandwidth> in SDP "b:RS"-line. see 5.15
Rtpbw	Local Descriptor or Remote Descriptor	<bandwidth> in SDP "b:AS"-line. see 5.15
RTPpayload	Local Descriptor or Remote Descriptor	<fmt list> in SDP m-line. This may be set to CHOOSE (\$) in a LD sent from the IMS-ALG toward the IMS-AGW.
SCTP Group Semantics	Termination State	Group Semantics (mgroupp/groupse) defined in ITU-T Recommendation H.248.96 [65] with semantics "SCTP" defined in ITU-T Recommendation H.248.97 [66]
SCTP stream deaggregation	LocalControl	Stream Deaggregation (mgroupp/strdeagg) related semantics "SCTP" defined in ITU-T Recommendation H.248.96 [65]
SCTP stream ID	LocalControl	SCTP StreamID (sctpbcc/sctpid) defined in ITU-T Recommendation H.248.97 [66]
SDPCapNeg configuration	Local Descriptor or Remote Descriptor	The SDP attributes for SDP capability negotiation as defined in IETF RFC 5939 [72].
SDPCapNeg Supported Capabilities	Termination State	Defined according to <i>SDPCapNeg Extensions</i> property in ITU-T Recommendation H.248.80 [73].
Send SCTP Association Establishment Requests Indicator	Signals	Defined according to the <i>Establish BNC</i> signal (<i>sctpbcc/EstBNC</i>) in ITU-T Recommendation H.248.97 [66].
Send SCTP Stream Reset Requests Indicator	Signals	Defined according to the <i>Initiate Outgoing SCTP Stream Reset</i> signal (<i>sctpreset/initreset</i>) in ITU-T Recommendation H.248.97 [66].
Send SCTP Stream Reset Response Indicator	Signals	Defined according to the <i>Outgoing SCTP Stream Reset Response</i> signal (<i>sctpreset/resetresp</i>) in ITU-T Recommendation H.248.97 [66].
Send TCP Connection Establishment Requests Indicator	Signals	Defined according to the <i>Establish BNC</i> signal (<i>tcpbcc/EstBNC</i>) in ITU-T Recommendation H.248.89 [47].
Stream Number	Stream	Encoding as per ITU-T Recommendation H.248.1 [10] Annex B "Stream"/"ST". For a single stream, this may be omitted by the IMS-ALG.
STUN server request	LocalControl	Encoding as per ITU-T Recommendation H.248.50 [43] "MG Act-as STUN Server" (mgastuns) package "Act-as STUN Server" (astuns, 0x0001) property.
Sustainable Data Rate	LocalControl	This is the tman/sdr property from ITU-T Recommendation H.248.53 [7].
TCP State-aware Handling Indicator and Setup Direction	Local Descriptor or Remote Descriptor	The "a=setup" SDP attribute as per clause 13.5.1 of ITU-T Recommendation H.248.84 [46].
Termination heartbeat	Events ObservedEvents	As per <i>Termination Heartbeat</i> defined in ITU-T Recommendation H.248.36 [9] Clause 5.2.1.

Termination ID	NA	Binary Encoding: As per ITU-T Recommendation H.248.1 [10] Annex A. Textual Encoding: As per ITU-T Recommendation H.248.1 [10] Annex B.
Transaction ID	NA	Binary Encoding: As per ITU-T Recommendation H.248.1 [10] Annex A. Textual Encoding: As per ITU-T Recommendation H.248.1 [10] Annex B.
Transport	Local Descriptor or Remote Descriptor	<transport> in SDP m-line, see 5.15
NOTE 1: Signalling element "RTCP allocation" corresponds to the stage 2 information element "RTCP handling".		
NOTE 2: RTP/RTCP transport multiplexing can be agreed with the served UE using the SDP attribute(s) "a=rtcp-mux" and/or "a=rtcp-mux-only" (defined in IETF RFC 8858 [74]), see 3GPP TS 23.334 [23]. However, the SDP attribute "rtcp-mux-only" is not used on Iq interface.		

5.17.2 Call Related Procedures

5.17.2.1 General

This clause describes the various call related procedures performed by the IMS-AGW, which are listed in table 5.17.2.1.1

Table 5.17.2.1.1: IMS-AGW Call Related Procedures

Transaction defined in 3GPP TS 23.334 [23]	Supported	Comment
Reserve AGW Connection Point	Mandatory	See 5.17.2.2
Configure AGW Connection Point	Mandatory	See 5.17.2.3
Reserve and Configure AGW Connection Point	Mandatory	See 5.17.2.4
Release AGW Termination	Mandatory	See 5.17.2.5
Termination Heartbeat Indication	Mandatory	See 5.17.2.6
IP Bearer Released	Mandatory	See 5.17.2.7
Media Inactivity Notification	Optional	See 5.17.2.8
Change Through Connection	Mandatory	See 5.17.2.9
Change Flow Direction	Optional	See 5.17.2.10.
ECN Failure Indication	Optional	See 5.17.2.11 Only applicable if ECN endpoint capability is supported
ICE Connectivity Check Result Notification	Optional	See 5.17.2.12 Only applicable if full ICE is supported
ICE New Peer Reflexive Candidate Notification	Optional	See 5.17.2.13 Only applicable if full ICE is supported
Notify TCP connection establishment Failure Indication	Optional	See 5.17.2.14 Only applicable if state-aware TCP handling (proxy mode) is supported
Notify (D)TLS session establishment Failure Indication	Optional	See 5.17.2.15 Only applicable if IMS media security for TCP and/or UDP is supported
Notify SCTP Stream Reset	Optional	See 5.17.2.17 Only applicable if WebRTC data channels are supported
Notify SCTP Stream Reset Result	Optional	See 5.17.2.18 Only applicable if WebRTC data channels are supported

5.17.2.2 Reserve AGW Connection Point

The IMS-ALG sends an ADD request command as in Table 5.17.2.2.1.

Table 5.17.2.2.1: Reserve AGW Connection Point Request

Address Information	Control information	Bearer information
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	<p>If Media Inactivity Detection Required: NotificationRequested (Event ID = x, "Media Inactivity Detection(Media Inactivity Detection Time, Media Inactivity Detection Direction) ") (NOTE 1)</p> <p>If RTCP handling required: RTCP allocation</p> <p>If ECN transparent support required: ECN Enable = "True" Initiation Method = "inactive"</p> <p>If ECN Endpoint support required ECN Enable = "True" Initiation Method = "ECN Initiation Method" (NOTE 2)</p> <p>If notification of ECN Failure Report: NotificationRequested (Event ID = x, "ECN Failure")</p> <p>If ICE is applied: STUN server request</p> <p>If Discard Incoming TCP connection establishment request required: Discard Incoming TCP Connection Establishment Requests Indicator</p> <p>If Forward Incoming TCP connection establishment request required: Forward Incoming TCP Connection Establishment Requests Indicator</p> <p>If indication on TCP connection establishment failure requested: NotificationRequested (Event ID = x, "TCP connection establishment failure")</p> <p>If (D)TLS session establishment required: Establish (D)TLS session</p> <p>If indication on (D)TLS session establishment failure requested: NotificationRequested (Event ID = x, "(D)TLS session establishment failure")</p> <p>If media is "message": If B-ALG for MSRP required: Application-aware MSRP interworking request</p> <p>If SCTP association for WebRTC data channels: SCTP Group Semantics SCTP stream deaggregation SCTP stream ID</p>	
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	NotificationRequested (Event ID = x, "Received SCTP Stream Reset Request")	
<p>NOTE 1: The event parameters "Media Inactivity Detection Time" and "Media Inactivity Detection Direction" are optional.</p> <p>NOTE 2: This shall be set to a value other than "inactive". See Table 5.14.3.15.1.</p> <p>NOTE 3: If the IMS-AGW supports the extended RTP header with Coordination of Video Orientation information it shall pass any received extended RTP header with CVO bits on to outgoing RTP streams. If the IMS-AGW is transcoding between video payloads and it supports the extended RTP header with Coordination of Video Orientation information it shall convey received RTP header bytes on the outgoing RTP stream after transcoding associated packets as specified in 3GPP TS 26.114 [26], clause 7.4.5.</p> <p>NOTE 4: The support of the generic image attributes is optional for the IMS-AGW. The list of image sizes per payload type supported by the IMS-AGW is preconfigured in the IMS-ALG. If none of the image sizes received within an SDP body on Mx/Mw interface is supported by the IMS-AGW then the IMS-ALG will not send the generic image attribute parameter to the IMS-AGW.</p> <p>NOTE 5: This element is optional. The RTCP port allocation rules are specified in tables 4/1 to 4/5 in ITU-T Recommendation H.248.57 [5].</p>		

On reserving the termination, the IMS-AGW responds as in Table 5.17.2.2.2.

Table 5.17.2.2.2: Reserve AGW Connection Point Acknowledge

Address Information	Control information	Bearer information
Local Descriptor { Port IP Address IP Version }	Transaction ID = x Context ID = C1 Termination ID = T1 Stream Number	Local Descriptor { If media is "audio" or "video": Codec List RTP Payloads Rtpbw If RTCP bandwidth RtcpbwRS RtcpbwRR If IMS media plane security was provided in the request: Cryptographic SDES Attribute If media is "video": If CVO extension header provided in the request: Extended Header For CVO If image attribute negotiation: Generic Image Attribute If Predefined ROI provided in the request: RTCP feedback for Predefined ROI ROI Extended Header for Sent ROI If Arbitrary ROI provided in the request: RTCP feedback for Arbitrary ROI Extended Header for Sent ROI If ICE is applied: ICE host candidate ICE password ICE Ufrag ICE pacing If ICE lite implementation ICE lite indication If media is "message" or "application" or "-": If Local certificate fingerprint was requested: Local certificate fingerprint If SCTP association for WebRTC data channels: Local SCTP Port Local SCTP maximum message size If SDPCapNeg is signalled to the gateway: SDPCapNeg configuration }

5.17.2.3 Configure AGW Connection Point

This procedure is used to configure the AGW connection point during session establishment or to reconfigure it during session establishment or after the session is established

The IMS-ALG sends a MODIFY request command as in Table 5.17.2.3.1.

Table 5.17.2.3.1: Configure AGW Connection Point Request

Address Information	Control information	Bearer information
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<p>If local resources are modified: Local Descriptor { Port IP Address IP Version }</p> <p>If remote resources are modified: Remote Descriptor { Port IP Address IP Version }</p>	<p>Transaction ID = x Context ID = C1 Termination ID = T1</p> <p>If MPS priority is modified: Priority Indicator = x (NOTE 4)</p> <p>If Stream Number specified: Stream Number</p> <p>If Resources for multiple Codecs required: Reserve_Value</p> <p>If diffserv required:- Diffserv Code Point</p> <p>If tagging behaviour Diffserv Tagging Behaviour</p> <p>If Remote Source Address Filtering required:- Remote Source Address Filtering If Remote Source Address range required: Remote Source Address Mask</p> <p>If Remote Source Port Filtering required:- Remote Source Port Filtering If individual port: Remote Source Port If range of ports Remote Source Port Range</p> <p>NotificationRequested (Event ID = x, "termination heartbeat")</p> <p>If IP Realm specified:- IP Realm (NOTE 1)</p> <p>If Latching Required:- Latching</p> <p>If Sustainable Data Rate Policing Required:- Policing Required Sustainable Data Rate Maximum Burst Size</p> <p>If Peak Data Rate Policing Required: Policing Required Peak Data Rate If Delay Variation Required Delay Variation Tolerance</p> <p>If Media Inactivity Detection Required: NotificationRequested (Event ID = x, "Media Inactivity Detection(Media Inactivity Detection Time, Media Inactivity Detection Direction)") (NOTE 2)</p> <p>If RTCP handling required: RTCP allocation</p> <p>If ECN transparent support required:</p>	<p>If local resources are modified: Local Descriptor { If media is "audio" or "video": Codec List RTP Payloads Rtpbw If RTCP bandwidth RtcpbwRS RtcpbwRR If RTCP handling required: RTP/RTCP transport multiplexing (NOTE 9) If IMS media plane security required: Cryptographic SDES Attribute If RTP-level pause and resume: CCM pause-resume If RTCP Codec Control Commands and Indications: CCM BASE If RTCP Delay Budget Information: DBI</p> <p>If media is "video": If CVO required: Extended Header For CVO (NOTE 5) If imageattr negotiation: Generic Image Attribute (NOTE 6) If Predefined ROI required: RTCP feedback for Predefined ROI Extended Header for Sent ROI If Arbitrary ROI required: RTCP feedback for Arbitrary ROI Extended Header for Sent ROI</p> <p>If TCP state-aware handling required: TCP State-aware Handling Indicator and Setup Direction</p> <p>If SCTP association for WebRTC data channels: Local Dcmap If application aware interworking Local Dcsa</p> <p>If SDPCapNeg is signalled to the gateway: SDPCapNeg configuration }</p> <p>If remote resources are modified: Remote Descriptor { If media is "audio" or "video": Codec List RTP Payloads Rtpbw If rate adaptation for media endpoints: Additional Bandwidth Properties (NOTE 10) If RTCP bandwidth RtcpbwRS RtcpbwRR</p>
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	<p>ECN Enable = "True" Initiation Method = "inactive"</p> <p>If ECN Endpoint support required ECN Enable = "True" Initiation Method = "ECN Initiation Method" (NOTE 3)</p> <p>If notification of ECN Failure Report: NotificationRequested (Event ID = x, "ECN Failure")</p> <p>If full ICE is applied: Send Connectivity Check ("Control") If notification of ICE Connectivity Check Result Report: NotificationRequested (Event ID= xx, "Connectivity Check Result") If notification of New Peer Reflexive Candidate: NotificationRequested (Event ID = xy, "New Peer Reflexive Candidate") Send Additional Connectivity Check ("Control")</p> <p>If Discard Incoming TCP connection establishment request required: Discard Incoming TCP Connection Establishment Requests Indicator</p> <p>If Forward Incoming TCP connection establishment request required: Forward Incoming TCP Connection Establishment Requests Indicator</p> <p>If TCP connection establishment required: Send TCP Connection Establishment Request Indicator</p> <p>If indication on TCP connection establishment failure requested: NotificationRequested (Event ID = x, "TCP connection establishment failure")</p> <p>If (D)TLS session establishment required: Establish (D)TLS session</p> <p>If indication on (D)TLS session establishment failure requested: NotificationRequested (Event ID = x, "(D)TLS session establishment failure")</p> <p>If (D)TLS session release required: Release (D)TLS session</p> <p>If media is "message": If B-ALG for MSRP required:</p>	<p>If RTCP handling required: RTP/RTCP transport multiplexing (NOTE 9) If RTCP handling required: explicit RTCP transport address (NOTE 8) If IMS media plane security required: Cryptographic SDES Attribute If RTP-level pause and resume: CCM pause-resume If RTCP APP messages allowed Allowed RTCP APP message Types If RTCP Codec Control Commands and Indications: CCM BASE If RTCP Delay Budget Information: DBI</p> <p>If media is "message" or "application" or "-": If IMS media plane security required: Remote certificate fingerprint If media is "video": If CVO required: Extended Header For CVO (NOTE 5) If imageattr negotiation: Generic Image Attribute (NOTE 6) If Predefined ROI required: RTCP feedback for Predefined ROI Extended Header for Sent ROI If Arbitrary ROI required: RTCP feedback for Arbitrary ROI Extended Header for Sent ROI</p> <p>If media is "message": If B-ALG for MSRP required: MSRP Path</p> <p>If ICE is applied: ICE received candidate ICE received password ICE received Ufrag (NOTE 7) ICE received pacing (NOTE 11) If STUN consent freshness test required: STUN consent freshness request NotificationRequested(Event ID= x, "STUN consent freshness test failure")</p> <p>If TCP state-aware handling required: TCP State-aware Handling Indicator and Setup Direction</p> <p>If SCTP association for WebRTC data channels: Remote SCTP Port Remote SCTP maximum message size</p>
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	<p>Application-aware MSRP interworking request</p> <p>If SCTP association for WebRTC data channels: SCTP Group Semantics SCTP stream deaggregation SCTP stream ID NotificationRequested (Event ID = x, "Received SCTP Stream Reset Response")</p> <p>If reset of SCTP Stream for WebRTC data channels: Send SCTP Stream Reset Requests Indicator If Notification of reset result desired: NotificationRequested (Event ID = x, "Received SCTP Stream Reset Response")</p>	<p>Remote Dcmap If application aware interworking Remote Dcsc</p> <p>If SDPCapNeg is signalled to the gateway: SDPCapNeg configuration }</p>
<p>NOTE 1: This can only be set to the same realm as at the reservation stage. If a different realm is specified, the IMS-AGW shall return error 501 "Not Implemented".</p> <p>NOTE 2: The event parameters "Media Inactivity Detection Time" and "Media Inactivity Detection Direction" are optional.</p> <p>NOTE 3: This shall be set to a value other than "inactive". See Table 5.14.3.15.1.</p> <p>NOTE 4: The support of the modification of the Priority Indicator value is optional for the IMS-AGW and depends on implementation solution for Priority call/session authorisation (see 3GPP TS 23.334 [23]).</p> <p>NOTE 5: If the IMS-AGW supports the extended RTP header with Coordination of Video Orientation information it shall pass any received extended RTP header with CVO bits on to outgoing RTP streams. If the IMS-AGW is transcoding between video payloads and it supports the extended RTP header with Coordination of Video Orientation information it shall convey received RTP header bytes on the outgoing RTP stream after transcoding associated packets as specified in 3GPP TS 26.114 [26], clause 7.4.5.</p> <p>NOTE 6: The support of the generic image attributes is optional for the IMS-AGW. The list of image sizes per payload type supported by the IMS-AGW is preconfigured in the IMS-ALG. If none of the image sizes received within an SDP body on Mx/Mw interface is supported by the IMS-AGW then the IMS-ALG will not send the generic image attribute parameter to the IMS-AGW.</p> <p>NOTE 7: The support of ICE received candidate, ICE received password, ICE received Ufrag are optional for ICE lite, as specified in 3GPP TS 23.334 [23].</p> <p>NOTE 8: The basic RTCP port allocation rules are defined by table 1 in ITU-T Recommendation H.248.57 [5], which summarizes all rules, with and without the "explicit RTCP transport address" element.</p> <p>NOTE 9: This element is optional. The RTCP port allocation rules are specified in tables 4/1 to 4/5 in ITU-T Recommendation H.248.57 [5].</p> <p>NOTE 10: The support of rate adaptation for media endpoints using the additional bandwidth properties is optional for the IMS-AGW. If media transcoding is required the IMS-ALG may provide for the selected payload type and the used IP version the additional bandwidth properties.</p> <p>NOTE 11: The ICE received pacing is only applicable for full ICE, as specified in IETF RFC 8445 [80].</p>		

The IMS-AGW responds as in Table 5.17.2.3.2.

Table 5.17.2.3.2: Configure AGW Connection Point Request Acknowledge

Address Information	Control information	Bearer information
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<p>If local resources were provided in request: Local Descriptor { Port IP Address IP Version } If remote resources are provided in request: Remote Descriptor { Port IP Address IP Version } NOTE</p>	<p>Transaction ID = x Context ID = C1 Termination ID = T1 If Stream Number Specified: Stream Number</p>	<p>If local resources were provided in request: Local Descriptor { If media is "audio" or "video": Codec List RTP Payloads Rtpbw If RTCP bandwidth RtcpbwRS RtcpbwRR If IMS media plane security was provided in request: Cryptographic SDES Attribute If RTP-level pause and resume: CCM pause-resume If RTCP Codec Control Commands and Indications: CCM BASE If RTCP Delay Budget Information: DBI If media is "video": If CVO extension header provided in the request: Extended Header For CVO If image attribute negotiation: Generic Image Attribute If Predefined ROI provided in the request: RTCP feedback for Predefined ROI Extended Header for Sent ROI If Arbitrary ROI provided in the request: RTCP feedback for Arbitrary ROI Extended Header for Sent ROI } If remote resources are provided in request: Remote Descriptor { If media is "audio" or "video": Codec List RTP Payloads Rtpbw If rate adaptation for media endpoints: Additional Bandwidth Properties If RTCP bandwidth RtcpbwRS RtcpbwRR If IMS media plane security was provided in the request: Cryptographic SDES Attribute If RTP-level pause and resume: CCM pause-resume If RTCP Codec Control Commands and Indications: CCM BASE If RTCP Delay Budget Information: DBI If media is "video": If CVO extension header provided in the request:</p>
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		Extended Header For CVO If image attribute negotiation: Generic Image Attribute If Predefined ROI provided in the request: RTCP feedback for Predefined ROI Extended Header for Sent ROI If Arbitrary ROI provided in the request: RTCP feedback for Arbitrary ROI Extended Header for Sent ROI } NOTE
NOTE: Sending of the Remote Descriptor is optional.		

5.17.2.4 Reserve and Configure AGW Connection Point

The IMS-ALG sends an ADD request command as in Table 5.17.2.4.1.

Table 5.17.2.4.1: Reserve and Configure AGW Connection Point Request

Address Information	Control information	Bearer information
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<p>Local Descriptor { Port = \$ IP Address = \$ IP Version = IPv4 or IPv6 } Remote Descriptor { Port IP Address IP Version }</p>	<p>Transaction ID = x If Context Requested: Context ID = \$ If Emergency Call: Emergency Call Indication If MPS call/session: Priority Indicator = x If Context Provided: Context ID = c1 Termination ID = \$ If Stream Number Specified: Stream Number If Resources for multiple Codecs shall be reserved: Reserve_Value If IP Interface Type: IP interface = "IP interface type" If indication on Bearer Released requested: NotificationRequested (Event ID = x, "BNC Release") If diffserv required:- Diffserv Code Point If tagging behaviour Diffserv Tagging Behaviour If Remote Source Address Filtering required:- Remote Source Address Filtering If Remote Source Address range required: Remote Source Address Mask If Remote Source Port Filtering required:- Remote Source Port Filtering If individual port: Remote Source Port If range of ports Remote Source Port Range NotificationRequested (Event ID = x, "termination heartbeat") If IP Realm specified:- IP Realm If Latching Required:- Latching If Sustainable Data Rate Policing Required:- Policing Required Sustainable Data Rate Maximum Burst Size If Peak Data Rate Policing Required: Policing Required Peak Data Rate If Delay Variation Required</p>	<p>Local Descriptor { If media is "audio" or "video": Codec List RTP Payloads Rtpbw If RTCP bandwidth RtcpbwRS RtcpbwRR If RTCP handling required: RTP/RTCP transport multiplexing (NOTE 7) If IMS media plane security required: Cryptographic SDES Attribute If RTP-level pause and resume: CCM pause-resume If RTCP Codec Control Commands and Indications: CCM BASE If RTCP Delay Budget Information: DBI If media is "video": If CVO required: Extended Header For CVO (NOTE 3) If imageattr negotiation: Generic Image Attribute (NOTE 4) If Predefined ROI required: RTCP feedback for Predefined ROI Extended Header for Sent ROI If Arbitrary ROI required: RTCP feedback for Arbitrary ROI Extended Header for Sent ROI If ICE is applied: ICE host candidate request ICE password request ICE Ufrag request ICE pacing request If media is "message" or "application" or "-": If IMS media plane security required: Local certificate fingerprint Request If TCP state-aware handling required: TCP State-aware Handling Indicator and Setup Direction If SCTP association for WebRTC data channels: Local SCTP Port Request Local SCTP maximum message size Request Local Dcmep If application aware interworking Local Dcsa If SDPCapNeg is signalled to the gateway: SDPCapNeg configuration</p>
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	<p>Delay Variation Tolerance</p> <p>If Media Inactivity Detection Required: NotificationRequested (Event ID = x, "Media Inactivity Detection(Media Inactivity Detection Time, Media Inactivity Detection Direction)") (NOTE 1)</p> <p>If RTCP handling required: RTCP allocation</p> <p>If ECN transparent support required: ECN Enable = "True" Initiation Method = "inactive"</p> <p>If ECN Endpoint support required ECN Enable = "True" Initiation Method = "ECN Initiation Method" (NOTE 2)</p> <p>If notification of ECN Failure Report: NotificationRequested (Event ID = x, "ECN Failure")</p> <p>If ICE is applied: STUN server request If full ICE is applied Send Connectivity Check ("Control") If notification of ICE Connectivity Check Result Report: NotificationRequested (Event ID = xx, "Connectivity Check Result") If notification of New Peer Reflexive Candidate: NotificationRequested (Event ID = xy, "New Peer Reflexive Candidate")</p> <p>If Discard Incoming TCP connection establishment request required: Discard Incoming TCP Connection Establishment Requests Indicator</p> <p>If Forward Incoming TCP connection establishment request required: Forward Incoming TCP Connection Establishment Requests Indicator</p> <p>If indication on TCP connection establishment failure requested: NotificationRequested (Event ID = x, "TCP connection establishment failure")</p> <p>If (D)TLS session establishment required: Establish (D)TLS session</p> <p>If indication on (D)TLS session establishment failure requested:</p>	<p>}</p> <p>Remote Descriptor { If media is "audio" or "video": Codec List RTP Payloads Rtpbw If rate adaptation for media endpoints: Additional Bandwidth Properties (NOTE 8) If RTCP bandwidth RtcpbwRS RtcpbwRR If RTCP handling required: RTP/RTCP transport multiplexing (NOTE 7) If RTCP handling required: explicit RTCP transport address (NOTE 6) If IMS media plane security required: Cryptographic SDES Attribute If RTP-level pause and resume: CCM pause-resume If RTCP APP messages allowed Allowed RTCP APP message types If RTCP Codec Control Commands and Indications: CCM BASE If RTCP Delay Budget Information: DBI</p> <p>If media is "video": If CVO required: Extended Header For CVO (NOTE 3) If imageattr negotiation: Generic Image Attribute (NOTE 4) If Predefined ROI required: RTCP feedback for Predefined ROI Extended Header for Sent ROI If Arbitrary ROI required: RTCP feedback for Arbitrary ROI Extended Header for Sent ROI</p> <p>If media is "message": If B-ALG for MSRP required: MSRP Path</p> <p>If ICE is applied: ICE received candidate ICE received password ICE received Ufrag (NOTE 5) ICE received pacing (NOTE 9) If STUN consent freshness test required: STUN consent freshness request NotificationRequested(Event ID= x, "STUN consent freshness test failure")</p>
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	<p>NotificationRequested (Event ID = x, "(D)TLS session establishment failure")</p> <p>If media is "message": If B-ALG for MSRP required: Application-aware MSRP interworking request</p> <p>If SCTP association for WebRTC data channels: SCTP Group Semantics SCTP stream deaggregation SCTP stream ID NotificationRequested (Event ID = x, "Received SCTP Stream Reset Request")</p>	<p>If media is "message" or "application" or "-": If IMS media plane security required: Remote certificate fingerprint</p> <p>If TCP state-aware handling required: TCP State-aware Handling Indicator and Setup Direction</p> <p>If SCTP association for WebRTC data channels: Remote SCTP Port Remote SCTP maximum message size Remote Dcmap If application aware interworking Remote Dcsa</p> <p>If SDPCapNeg is signalled to the gateway: SDPCapNeg configuration</p> <p>}</p>
<p>NOTE 1: The event parameters "Media Inactivity Detection Time" and "Media Inactivity Detection Direction" are optional.</p> <p>NOTE 2: This shall be set to a value other than "inactive". See Table 5.14.3.15.1.</p> <p>NOTE 3: If the IMS-AGW supports the extended RTP header with Coordination of Video Orientation information it shall pass any received extended RTP header with CVO bits on to outgoing RTP streams. If the IMS-AGW is transcoding between video payloads and it supports the extended RTP header with Coordination of Video Orientation information it shall convey received RTP header bytes on the outgoing RTP stream after transcoding associated packets as specified in 3GPP TS 26.114 [26], clause 7.4.5.</p> <p>NOTE 4: The support of the generic image attributes is optional for the IMS-AGW. The list of image sizes per payload type supported by the IMS-AGW is preconfigured in the IMS-ALG. If none of the image sizes received within an SDP body on Mx/Mw interface is supported by the IMS-AGW then the IMS-ALG will not send the generic image attribute parameter to the IMS-AGW.</p> <p>NOTE 5: The support of ICE received candidate, ICE received password, ICE received Ufrag are optional for ICE lite, as specified in 3GPP TS 23.334 [23].</p> <p>NOTE 6: The basic RTCP port allocation rules are defined by table 1 in ITU-T Recommendation H.248.57 [5], which summarizes all rules, with and without the "explicit RTCP transport address" element.</p> <p>NOTE 7: This element is optional. The RTCP port allocation rules are specified in tables 4/1 to 4/5 in ITU-T Recommendation H.248.57 [5].</p> <p>NOTE 8: The support of rate adaptation for media endpoints using the additional bandwidth properties is optional for the IMS-AGW. If media transcoding is required the IMS-ALG may provide for the selected payload type and the used IP version the additional bandwidth properties.</p> <p>NOTE 9: The ICE received pacing is only applicable for full ICE, as specified in IETF RFC 8445 [80].</p>		

The IMS-AGW responds as in Table 5.17.2.4.2.

Table 5.17.2.4.2: Reserve and Configure AGW Connection Point Request Acknowledge

Address Information	Control information	Bearer information
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<p>Local Descriptor { Port IP Address IP Version } Remote Descriptor { Port IP Address IP Version } NOTE</p>	<p>Transaction ID = x Context ID = C1 Termination ID = T1 Stream Number</p>	<p>Local Descriptor { If media is "audio" or "video": Codec List RTP Payloads Rtpbw If RTCP bandwidth RtcpbwRS RtcpbwRR If IMS media plane security was provided in the request: Cryptographic SDES Attribute If RTP-level pause and resume: CCM pause-resume If RTCP Codec Control Commands and Indications: CCM BASE If RTCP Delay Budget Information: DBI If media is "video": If CVO extension header provided in the request: Extended Header For CVO If image attribute negotiation: Generic Image Attribute If Predefined ROI provided in the request: RTCP feedback for Predefined ROI Extended Header for Sent ROI If Arbitrary ROI provided in the request: RTCP feedback for Arbitrary ROI Extended Header for Sent ROI If ICE is applied: ICE host candidate ICE password ICE Ufrag ICE pacing If ICE lite implementation ICE lite indication If media is "message" or "application" or "-": If Local certificate fingerprint was requested: Local certificate fingerprint If SCTP association for WebRTC data channels: Local SCTP Port Local SCTP maximum message size If SDPCapNeg is signalled to the gateway: SDPCapNeg configuration Remote Descriptor { If media is "audio" or "video": Codec List RTP Payloads Rtpbw If rate adaptation for media endpoints: Additional Bandwidth Properties</p>
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		<p>If RTCP bandwidth RtcpbwRS RtcpbwRR</p> <p>If IMS media plane security was provided in the request: Cryptographic SDES Attribute</p> <p>If RTP-level pause and resume: CCM pause-resume</p> <p>If RTCP Codec Control Commands and Indications: CCM BASE</p> <p>If RTCP Delay Budget Information: DBI</p> <p>If media is "video": If CVO extension header provided in the request: Extended Header For CVO</p> <p>If image attribute negotiation: Generic Image Attribute</p> <p>If Predefined ROI provided in the request: RTCP feedback for Predefined ROI</p> <p>Extended Header for Sent ROI</p> <p>If Arbitrary ROI provided in the request: RTCP feedback for Arbitrary ROI</p> <p>Extended Header for Sent ROI</p> <p>If SDPCapNeg is signalled to the gateway: SDPCapNeg configuration</p> <p>} NOTE</p>
<p>NOTE: Sending of the Remote Descriptor is optional.</p>		

5.17.2.5 Release AGW Termination

The IMS-ALG sends a SUBTRACT command as in Table 5.17.2.5.1.

Table 5.17.2.5.1: Release AGW Termination Request

Address Information	Control information	Bearer information
	<p>Transaction ID = x Context ID= C1/ALL Termination ID = T1/ALL</p>	

On releasing the termination, the IMS-AGW responds as in Table 5.17.2.5.2

Table 5.17.2.5.2: Release AGW Termination Request Acknowledge

Address Information	Control information	Bearer information
	<p>Transaction ID = x Context ID = C1/ALL Termination ID = T1/ALL</p>	

5.17.2.6 Termination Heartbeat Indication

When the procedure "Termination heartbeat indication" is required the following procedure is initiated: the IMS-AGW sends a NOT.req command with the following information.

5.17.2.6.1 NOT.req (Termination heartbeat)

Address Information	Control information	Bearer information
	Transaction ID = x Context ID = C1 Termination ID = T1 Event_ID (Event ID = x, "termination heartbeat")	

When the processing of command is complete, the IMS-ALG initiates the following procedure.

5.17.2.6.2 NOT.resp (Termination heartbeat)

Address Information	Control information	Bearer information
	Transaction ID = x Context ID = C1 Termination ID = T1	

The IMS-ALG shall correct any detected mismatch, by subtracting hanging terminations or clearing hanging contexts.

5.17.2.7 IP Bearer Released

When the procedure "IP Bearer Released" is required the following procedure is initiated: the IMS-AGW sends a NOT.req command with the following information.

5.17.2.7.1 NOT.req (IP Bearer Released)

Address Information	Control information	Bearer information
	Transaction ID = x Context ID = C1 Termination ID = T1 Event_ID (Event ID = x, "BNC Release (Cause)")	

When the processing of command is complete, the IMS-ALG initiates the following procedure.

5.17.2.7.2 NOT.resp (IP Bearer Released)

Address Information	Control information	Bearer information
	Transaction ID = x Context ID = C1 Termination ID = T1	

5.17.2.8 Media Inactivity Notification

When the procedure "Media Inactivity Notification" is required the following procedure is initiated: the IMS-AGW sends a NOT.req command with the following information.

5.17.2.8.1 NOT.req (Media Inactivity)

Address Information	Control information	Bearer information
	Transaction ID = x Context ID = C1 Termination ID = T1 Event_ID (Event ID = x, "Media Inactivity Detection")	

When the processing of command is complete, the IMS-ALG initiates the following procedure.

5.17.2.8.2 NOT.resp (Media Inactivity)

Address Information	Control information	Bearer information
	Transaction ID = x Context ID = C1 Termination ID = T1	

5.17.2.9 Change Through Connection

The IMS-ALG sends an ADD or a MODIFY request command as in Table 5.17.2.9.1.

5.17.2.9.1 Change Through Connection Request

Address Information	Control information	Bearer information
	Transaction ID = x If Context Requested: Context ID = \$ If Context Provided: Context ID = c1 If Termination Requested: Termination ID = \$ If Termination Provided: Termination ID = T1 Through-Connection = Connectivity Mode	

The IMS-AGW responds as in Table 5.17.2.9.2.

5.17.2.9.2 Change Through Connection Request Acknowledge

Address Information	Control information	Bearer information
	Transaction ID = x Context ID = C1 Termination ID = T1	

5.17.2.10 Change Flow Direction

The IMS-ALG sends an ADD or a MODIFY request command as in Table 5.17.2.10.1.

5.17.2.10.1 Change Flow Direction

Address Information	Control information	Bearer information
	Transaction ID = x If Context Requested: Context ID = \$ If Context Provided: Context ID = c1 If Termination Requested: Termination ID = \$ If Termination Provided: Termination ID = T1 Connection Configuration = (TerminationID= x1, TerminationID=x2, [type = x]),...	

The IMS-AGW responds as in Table 5.17.2.10.2.

5.17.2.10.2 Change Flow Direction Acknowledge

Address Information	Control information	Bearer information
	Transaction ID = x Context ID = C1 Termination ID = T1	

5.17.2.11 ECN Failure Indication

The IMS-AGW sends a NOTIFY request command as in Table 5.17.2.11.1.

Table 5.17.2.11.1: ECN Failure Indication

Address Information	Control information	Bearer information
	Transaction ID = x Context ID= C1 Termination ID = T1 Event_ID (Event ID = x, " ECN Failure (ECN Failure Type)")	

The IMS-ALG responds as in Table 5.17.2.11.2

Table 5.17.2.11.2: ECN Failure Indication Ack

Address Information	Control information	Bearer information
	Transaction ID = x Context ID = C1 Termination ID = T1	

5.17.2.12 ICE Connectivity Check Result Notification

The IMS-AGW sends a NOTIFY request command as defined in Table 5.17.2.12.1.

Table 5.17.2.12.1: ICE Connectivity Check Result Notification

Address Information	Control information	Bearer information
	Transaction ID = x Context ID= C1 Termination ID = T1 Event_ID (Event ID = x, "Connectivity Check Result (Candidate/Transport Pair)")	

The IMS-ALG responds as defined in Table 5.17.2.12.2

Table 5.17.2.12.2: ICE Connectivity Check Result Notification Ack

Address Information	Control information	Bearer information
	Transaction ID = x Context ID = C1 Termination ID = T1	

5.17.2.13 ICE New Peer Reflexive Candidate Notification

The IMS-AGW sends a NOTIFY request command as defined in Table 5.17.2.13.1.

Table 5.17.2.13.1: ICE New Peer Reflexive Candidate Notification

Address Information	Control information	Bearer information
	Transaction ID = x Context ID= C1 Termination ID = T1 Event_ID (Event ID = x, "New Peer Reflexive Candidate (Candidate)")	

The IMS-ALG responds as defined in Table 5.17.2.13.2

Table 5.17.2.13.2: ICE New Peer Reflexive Candidate Ack

Address Information	Control information	Bearer information
	Transaction ID = x Context ID = C1 Termination ID = T1	

5.17.2.14 Notify TCP connection establishment Failure Indication

When the procedure "Notify TCP connection establishment Failure Indication" is required the following procedure is initiated: the IMS-AGW sends a NOT.req command with the following information.

5.17.2.14.1 NOT.req (TCP connection establishment Failure)

Address Information	Control information	Bearer information
	Transaction ID = x Context ID = C1 Termination ID = T1 Event_ID (Event ID = y, "TCP connection establishment Error Indication")	

When the processing of command is complete, the IMS-ALG initiates the following procedure.

5.17.2.14.2 NOT.resp (TCP connection establishment Failure)

Address Information	Control information	Bearer information
	Transaction ID = x Context ID = C1 Termination ID = T1	

5.17.2.15 Notify (D)TLS session establishment Failure Indication

When the procedure "Notify (D)TLS session establishment Failure Indication" is required the following procedure is initiated: the IMS-AGW sends a NOT.req command with the following information.

5.17.2.15.1 NOT.req ((D)TLS session establishment Failure)

Address Information	Control information	Bearer information
	Transaction ID = x Context ID = C1 Termination ID = T1 Event_ID (Event ID = y, "(D)TLS session establishment Error Indication")	

When the processing of command is complete, the IMS-ALG initiates the following procedure.

5.17.2.15.2 NOT.resp ((D)TLS session establishment Failure)

Address Information	Control information	Bearer information
	Transaction ID = x Context ID = C1 Termination ID = T1	

5.17.2.16 STUN Consent Freshness Test Failure Notification

The eIMS-AGW sends a NOTIFY request command as defined in Table 5.17.2.16.1.

Table 5.17.2.16.1: STUN Consent Freshness Test Failure Notification

Address Information	Control information	Bearer information
	Transaction ID = x Context ID = C1 Termination ID = T1 Event_ID (Event ID = x, "STUN Consent Freshness Test Failure (STUN Consent Freshness Test Failure Type)")	

The eP-CSCF responds as defined in Table 5.17.2.16.2

Table 5.17.2.16.2: STUN Consent Freshness Test Failure Notification Ack

Address Information	Control information	Bearer information
	Transaction ID = x Context ID = C1 Termination ID = T1	

5.17.2.17 Notify SCTP Stream Reset

The IMS-AGW sends a NOTIFY request command as defined in Table 5.17.2.17.1.

Table 5.17.2.17.1: Notify SCTP Stream Reset

Address Information	Control information	Bearer information
	Transaction ID = x Context ID= C1 Termination ID = T1 Event_ID (Event ID = x, " Received SCTP Stream Reset Request (SCTP Stream ID)")	

The IMS-ALG responds as defined in Table 5.17.2.17.2

Table 5.17.2.17.2: Notify SCTP Stream Reset Ack

Address Information	Control information	Bearer information
	Transaction ID = x Context ID = C1 Termination ID = T1	

5.17.2.18 Notify SCTP Stream Reset Result

The IMS-AGW sends a NOTIFY request command as defined in Table 5.17.2.18.1.

Table 5.17.2.18.1: Notify SCTP Stream Reset Result

Address Information	Control information	Bearer information
	Transaction ID = x Context ID= C1 Termination ID = T1 Event_ID (Event ID = x, " Received SCTP Stream Reset Result (SCTP Stream ID, result)")	

The IMS-ALG responds as defined in Table 5.17.2.18.2

Table 5.17.2.18.2: Notify SCTP Stream Reset Result Ack

Address Information	Control information	Bearer information
	Transaction ID = x Context ID = C1 Termination ID = T1	

5.17.3 Non-Call Related Procedures

5.17.3.1 General

This clause describes the various non-call related procedures which are listed in Table 5.17.3.1.1

Table 5.17.3.1.1: IMS-AGW Non-Call Related Procedures

Transaction in 3GPP TS 23.334 [23]	Support	Comment
IMS-AGW Out of service	Mandatory	5.17.3.2
IMS-AGW Communication Up	Mandatory	5.17.3.3
IMS-AGW Restoration	Mandatory	5.17.3.4
IMS-AGW Register	Mandatory	5.17.3.5
IMS-AGW Re-register	Optional (NOTE 3)	5.17.3.6
IMS-ALG Ordered Re-register	Optional (NOTE 3)	5.17.3.7
IMS-ALG Restoration	Optional	5.17.3.8
IMS-ALG Out of Service	Optional	5.17.3.9
Audit Value	Optional (NOTE 3)	5.17.3.10
Command Rejected	Mandatory	The "Command Rejected" procedure may be used in response both to call-related and non-call-related ITU-T Recommendation H.248 Commands – 5.17.3.11
Capability Update	Optional	5.17.3.12
IMS-AGW Resource Congestion Handling – Activate	Optional	5.17.3.13
IMS-AGW Resource Congestion Handling – Indication	Optional	5.17.3.14
Inactivity timeout activation	Optional (NOTE 4)	5.17.3.15
Inactivity timeout indication	Optional (NOTE 4)	5.17.3.16
Realm Availability Change activation	Optional	5.17.3.17
Realm Availability Change indication	Optional	5.17.3.18
Termination Out of Service	Optional (NOTE 1)	5.17.3.19 (NOTE 2)
NOTE 1: Support of this procedure is mandatory in the IMS-ALG. NOTE 2: The "Termination Out-of-Service procedure" is also used as a call-related H.248 command NOTE 3: Support of this procedure is mandatory in the IMS-AGW. NOTE 4: Support of this procedure is mandatory in the IMS-AGW if UDP transport is supported.		

5.17.3.2 IMS-AGW Out Of Service

The IMS-AGW sends a SERVICE CHANGE request command as in Table 5.17.3.2.1.

Table 5.17.3.2.1: IMS-AGW Out Of Service Request

Address Information	Control information	Bearer information
	Transaction ID = x Context ID= - Termination ID = ROOT SC Method = FORCED or GRACEFUL SC Reason = 905 Termination Taken OOS or 908, MG Impending Failure, or 915 State Loss	

The IMS-ALG responds as in Table 5.17.3.2.2.

Table 5.17.3.2.2: IMS-AGW Out Of Service Request Ack

Address Information	Control information	Bearer information
	Transaction ID = x Context ID = - Termination ID = ROOT	

5.17.3.3 IMS-AGW Communication Up

The IMS-AGW sends a SERVICE CHANGE request command as in Table 5.17.3.3.1 to the IMS-ALG address to which the control link association was previously established.

Table 5.17.3.3.1: IMS-AGW Communication Up

Address Information	Control information	Bearer information
	Transaction ID = x Context ID = - Termination ID = ROOT SC Method = DISCONNECTED SC Reason = 900 , Service Restored	

The IMS-ALG may respond as in table 5.17.3.3.2. If a response is received, the control link association is re-established and the inactivity timer would be restarted.

Table 5.17.3.3.2: IMS-AGW Communication Up Ack

Address Information	Control information	Bearer information
	Transaction ID = x Context ID = - Termination ID = ROOT If required to register to a new IMS-ALG: Alternate MGC Id	

5.17.3.4 IMS-AGW Restoration

When the IMS-AGW has recovered, the IMS-AGW sends a SERVICE CHANGE as in Table 5.17.3.4.1,

Table 5.17.3.4.1: IMS-AGW Restoration

Address Information	Control information	Bearer information
	Transaction ID = x Context ID = - Termination ID = ROOT SC Method = RESTART SC Reason = 900, Service Restored	

The IMS-ALG responds as in Table 5.17.3.4.2.

Table 5.17.3.4.2: IMS-AGW Restoration Ack

Address Information	Control information	Bearer information
	Transaction ID = x Context ID = - Termination ID = ROOT If required to register to a new IMS-ALG: Alternate MGC Id	

5.17.3.5 IMS-AGW Register

The IMS-AGW sends a SERVICE CHANGE request command as in Table 5.17.3.5.1.

Table 5.17.3.5.1: IMS-AGW Register

Address Information	Control information	Bearer information
	Transaction ID = x Context ID= - Termination ID = ROOT SC Method = RESTART SC Reason =901, Cold Boot or 902, Warm Boot H248 Profile Identity H248 Protocol Version	

The IMS-ALG responds as in Table 5.17.3.5.2.

Table 5.17.3.5.2: IMS-AGW Register Ack

Address Information	Control information	Bearer information
	Transaction ID = x Context ID = - Termination ID = ROOT If applicable (NOTE): H248 Protocol Version If applicable:- H248 Profile Identity If required to register to a new IMS- ALG: Alternate MGC Id	
NOTE: The IMS-ALG shall include the H.248 Protocol Version if the protocol version it supports or offers is lower than that proposed by the IMS-AGW. The IMS-ALG may include the H.248 Protocol Version if the protocol version it supports or offers is the protocol version proposed by the IMS-AGW.		

5.17.3.6 IMS-AGW Re-Register

The IMS-AGW sends a SERVICE CHANGE request command as in Table 5.17.3.6.1.

Table 5.17.3.6.1: IMS-AGW Re-Registration

Address Information	Control information	Bearer information
	Transaction ID = x Context ID= - Termination ID = ROOT SC Method = Handoff SC Reason = 903, MGC Directed Change H248 Profile Identity H248 Protocol Version	

The IMS-ALG responds as in Table 5.17.3.6.2.

Table 5.17.3.6.2: IMS-AGW Re-Registration Ack

Address Information	Control information	Bearer information
	Transaction ID = x Context ID = - Termination ID = ROOT If applicable (NOTE): H248 Protocol Version If applicable:- H248 Profile Identity If required to register to a new IMS-ALG: Alternate MGC Id	
NOTE: The IMS-ALG shall include the H.248 Protocol Version if the protocol version it supports or offers is lower than that proposed by the IMS-AGW. The IMS-ALG may include the H.248 Protocol Version if the protocol version it supports or offers is the protocol version proposed by the IMS-AGW.		

5.17.3.7 IMS-ALG Ordered Re-register

The IMS-ALG sends a SERVICE CHANGE request command as in Table 5.17.3.7.1.

Table 5.17.3.7.1: IMS-ALG Ordered Re-Register

Address Information	Control information	Bearer information
	Transaction ID = x Context ID = - Termination ID = ROOT SC Method = HANDOFF SC Reason = 903, MGC Directed Change Alternate MGC Id	

The IMS-AGW responds as in Table 5.17.3.7.2.

Table 5.17.3.7.2: IMS-ALG Ordered Re-Register Ack

Address Information	Control information	Bearer information
	Transaction ID = x Context ID = - Termination ID = ROOT	

The IMS-AGW then performs an IMS-AGW Re-Register procedure according to Clause 5.17.3.6.

5.17.3.8 IMS-ALG Restoration

When the IMS-ALG has recovered, the IMS-ALG sends a SERVICE CHANGE as in Table 5.17.3.8.1,

Table 5.17.3.8.1: IMS-ALG Restoration

Address Information	Control information	Bearer information
	Transaction ID = x Context ID = - Termination ID = ROOT SC Method = RESTART SC Reason = 901, Cold Boot OR 902, Warm Boot	

The IMS-AGW responds as in Table 5.17.3.8.2.

Table 5.17.3.8.2: IMS-ALG Restoration Ack

Address Information	Control information	Bearer information
	Transaction ID = x Context ID = - Termination ID = ROOT	

5.17.3.9 IMS-ALG Out of Service

The IMS-ALG sends a SERVICE CHANGE request command as in Table 5.17.3.9.1.

Table 5.17.3.9.1: IMS-ALG Out Of Service

Address Information	Control information	Bearer information
	Transaction ID = x Context ID = - Termination ID = ROOT SC Method = FORCED or GRACEFUL SC Reason = 905, Termination Taken OOS	

The IMS-AGW responds as in Table 5.17.3.9.2.

Table 5.17.3.9.2: IMS-ALG Out Of Service Ack

Address Information	Control information	Bearer information
	Transaction ID = x Context ID = - Termination ID = ROOT	

5.17.3.10 Audit Value

The IMS-ALG sends an AUDIT VALUE request command as in Table 5.17.3.10.1.

Table 5.17.3.10.1: Audit Value

Address Information	Control information	Bearer information
	Transaction ID = x Context ID= -/ALL/C1 Termination ID = ROOT/ALL/T1/PartialWildcard (NOTE 4, NOTE 5) Audit Packages (NOTE 1) Audit Descriptor = IndAuditParameter:= IndAudMediaDescriptor:= IndAudTerminationStateDescriptor:= serviceState Audit Descriptor = Empty (NOTE 2) Audit Descriptor = IndAuditParameter:= IndAudMediaDescriptor:= IndAudTerminationStateDescriptor:= Available Realms (NOTE 3) Audit Descriptor = IndAuditParameter:= IndAudMediaDescriptor:= IndAudTerminationStateDescriptor:= ROOT properties (NOTE 6) Audit Descriptor = IndAuditParameter:= IndAudMediaDescriptor:= IndAudTerminationStateDescriptor:= SDPCapNeg Supported Capabilities (NOTE 7)	
NOTE 1: Packages is for Null/Root Combination. NOTE 2: Used for control association monitoring. NOTE 3: Used for auditing available IP realms NOTE 4: The partial wildcard termination is used for the context audit (see table 5.17.3.10.3) and specifies the "group" part of the termination identity (e.g. "ip/5/*"). NOTE 5: Partial wildcard shall only be used when text encoding is used on the H.248 interface. NOTE 6: Used for auditing ROOT properties. NOTE 7: Used for auditing SDPCapNeg Extensions when SDPCapNeg signalling to the gateway is supported.		

The IMS-AGW responds as in Table 5.17.3.10.2.

Table 5.17.3.10.2: Audit Value Ack

Address Information	Control information	Bearer information
	Transaction ID = x Context ID = -/C1 Termination ID = ROOT/T1 Packages List serviceState Available Realms ROOT Properties SDPCapNeg Extensions	

Upon reception of the command in the IMS-AGW:

- The Service State returns the current Service State
- When Packages are requested, the Package Names and Versions are returned
- When realm availability is audited, the list of available realms is returned.

- When root properties are audited, the values of root properties are returned.

The following table illustrates the allowed combinations that can be obtained with the AuditValue Command:

Table 5.17.3.10.3: Combinations of AuditValue Command

ContextID	TerminationID	Information Obtained
Specific	Wildcard	Audit of matching Terminations in a Context
Specific	Specific	Audit of a single Termination in a Context
Null	Root	Audit of Media Gateway state and/or control association or available realms, or supported packages or ROOT properties.
All	Specific	(Non-null) ContextID in which the Termination currently exists
All	Partial Wildcard	(Non-null) ContextIDs in which the Terminations currently exist
NOTE: Partial wildcard shall only be used when text encoding is used on the H.248 interface.		

5.17.3.11 Command Rejected

When the procedure "Command Reject" is required the following procedure is initiated:

The IMS-AGW / IMS-ALG sends .a response to any command.req with the following information.

Table 5.17.3.11.1: ANYcommand.resp (command reject) IMS-AGW / IMS-ALG to IMS-ALG/ IMS-AGW

Address Information	Control information	Bearer information
	Transaction ID = z Context ID = c1 or no context Termination ID = T1 or no termination ID Reason=Error	

5.17.3.12 AGW Capability Change

The IMS-AGW sends a SERVICE CHANGE request command as in Table 5.17.3.12.1.

Table 5.17.3.12.1: AGW Capability Update

Address Information	Control information	Bearer information
	Transaction ID = x Context ID= - Termination ID = ROOT SC Method = RESTART or DISCONNECTED SC Reason = 916, Packages Change or 917, Capability Change	

The IMS-ALG responds as in table 5.17.3.12.2.

Table 5.17.3.12.2 AGW Capability Update Ack

Address Information	Control information	Bearer information
	Transaction ID = x Context ID = - Termination ID = ROOT	

5.17.3.13 IMS-AGW Resource Congestion Handling – Activate

The IMS-ALG sends a MODIFY request command as in Table 5.17.3.13.1

Table 5.17.3.13.1: IMS-AGW Resource Congestion Handling – Activate

Address Information	Control information	Bearer information
	Transaction ID = x Context ID = - Termination ID = ROOT NotificationRequested (Event ID = x, "Overload Notification")	

The IMS-AGW responds as in Table 5.17.3.13.2.

Table 5.17.3.13.2: IMS-AGW Resource Congestion Handling – Activate Ack

Address Information	Control information	Bearer information
	Transaction ID = x Context ID = - Termination ID = ROOT	

5.17.3.14 IMS-AGW Resource Congestion Handling – Indication

The IMS-AGW sends a NOTIFY request command as in Table 5.17.3.14.1

Table 5.17.3.14.1: IMS-AGW Resource Congestion Handling – Indication

Address Information	Control information	Bearer information
	Transaction ID = x Context ID = - Termination ID = ROOT If H.248.11 used: Event_ID (Event ID = x, "Overload Notification") If H.248.10 used: Event_ID (Event ID = x, "Overload Notification (Reduction)")	

The IMS-ALG responds as in Table 5.17.3.14.2

Table 5.17.3.14.2: IMS-AGW Resource Congestion Handling – Indication Ack

Address Information	Control information	Bearer information
	Transaction ID = x Context ID = - Termination ID = ROOT	

5.17.3.15 Inactivity Timeout – Activation

The IMS-ALG sends a MODIFY request command as in Table 5.17.3.15.1

Table 5.17.3.15.1: Inactivity Timeout – Activation

Address Information	Control information	Bearer information
	Transaction ID = x Context ID = NULL Termination ID = ROOT NotificationRequested (Event ID = x, "Inactivity Timeout")	

The IMS-AGW responds as in Table 5.17.3.15.2.

Table 5.17.3.15.2: Inactivity Timeout – Activation Ack

Address Information	Control information	Bearer information
	Transaction ID = x Context ID = NULL Termination ID = ROOT	

5.17.3.16 Inactivity Timeout – Indication

The IMS-AGW sends a NOTIFY request command as in Table 5.17.3.16.1.

Table 5.17.3.16.1: Inactivity Timeout – Indication

Address Information	Control information	Bearer information
	Transaction ID = x Context ID= NULL Termination ID = ROOT Event_ID (Event ID = x, "Inactivity Timeout")	

The IMS-ALG responds as in Table 5.17.3.16.2

Table 5.17.3.16.2: Inactivity Timeout – Indication Ack

Address Information	Control information	Bearer information
	Transaction ID = x Context ID = NULL Termination ID = ROOT	

5.17.3.17 Realm Availability Change – Activation

The IMS-ALG sends a MODIFY request command as in Table 5.17.3.17.1.

Table 5.17.3.17.1: Realm Availability Change – Activation

Address Information	Control information	Bearer information
	Transaction ID = x Context ID= - Termination ID = ROOT NotificationRequested (Event ID = x, "Realm Availability Change")	

The IMS-AGW responds as in Table 5.17.3.17.2.

Table 5.17.3.17.2: Realm Availability Change – Activation Ack

Address Information	Control information	Bearer information
	Transaction ID = x Context ID = - Termination ID = ROOT	

5.17.3.18 Realm Availability Change – Indication

The IMS-AGW sends a NOTIFY request command as in Table 5.17.3.18.1.

Table 5.17.3.18.1: Realm Availability Change – Indication

Address Information	Control information	Bearer information
	Transaction ID = x Context ID= - Termination ID = ROOT Event_ID (Event ID = x, "Realm Availability Change (Changed Realms)")	
NOTE: The ObservedEvent Parameters returned within the Changed Realms are defined as mandatory since it shall contain at minimum 1 parameter but may contain both Newly Available Realms and Newly Unavailable Realms.		

The IMS-ALG responds as in Table 5.17.3.18.2

Table 5.17.3.18.2: Realm Availability Change – Indication Ack

Address Information	Control information	Bearer information
	Transaction ID = x Context ID = - Termination ID = ROOT	

5.17.3.19 Termination Out Of Service

This procedure only applies when text encoding is used on the H.248 interface.

The IMS-AGW sends a SERVICE CHANGE request command as in Table 5.17.3.19.1.

Table 5.17.3.19.1: Termination Out Of Service Request

Address Information	Control information	Bearer information
	Transaction ID = x Context ID= C1/ALL Termination ID = T1 or Wildcarded Termination (NOTE) SC Method = FORCED SC Reason = 904 ("Termination Malfunction") or 905 ("Termination Taken OOS") or 906 ("Loss of Lower Layer Connectivity"), or 907 ("Transmission Failure") or 910 ("Media Capability Failure")	
NOTE: This is set to a specific termination identity or a partially wildcarded identity (i.e. specifying the "interface" part of the termination ID and wildcarding the "group" and "Id" parts) or a wholly wildcarded identity (i.e. ip/*).		

The IMS-ALG responds as in Table 5.17.3.19.2.

Table 5.17.3.19.2: Termination Out Of Service Request Ack

Address Information	Control information	Bearer information
	Transaction ID = x Context ID = C1/ALL Termination ID = As received	

Annex A (informative): Change history

Date	TSG #	TSG Doc.	CR	Rev	Ca t	Subject/Comment	New
2009-12	CT#46	CP-090823				3GPP TS Presented for information and approval in CT#46	9.0.0
2010-03	CT#47	CP-100050	0001	2		IMS media plane security stage 3	9.1.0
		CP-100044	0002	1		Non-call Related Procedures Naming update	
		CP-100044	0006	1		Correction to table notes and references	
		CP-100044	0007	1		Termination Type Alignment	
		CP-100044	0008			Returned SDP Properties	
		CP-100044	0009	1		Manipulating and Auditing Context Attributes	
		CP-100044	0010	1		Inactivity Timeout	
		CP-100044	0011	1		Clean-up Proposals	
2010-06	CT#48	CP-100289	0012	1		Transport protocol to be indicated to gateway for end-to-end media securit	9.2.0
			0015			Profiling of SDES crypto attribute for e2a media security	
		CP-100284	0013	1		Handling of Stream mode	
2010-09	CT#49	CP-100461	0016			Procedures for Emergency indicator	9.3.0
		CP-100461	0017	1		Error Descriptor	
2011-03	CT#51	CP-110278	0019	10		ECN Support in Iq Interface	10.0.0
2011-06	CT#52	CP-110368	0021	1		Alignment of 3GPP profiles with SG16 ECN package definition	10.1.0
2011-09	CT#53	CP-110573	0022	1		Transcoding at ATCF/ATGW during eSRVCC	10.2.0
2011-12	CT#54	CP-110798	0023	1		Explicit Congestion Notification	10.3.0
		CP-110796	0024	1		Update of reference to H.248.52	
2012-06	CT#56	CP-120226	0025	1		Reference update: draft-ietf-avtcore-ecn-for-rtp	10.4.0
2012-09	CT#57	CP-120478	0026	3		Support of Multimedia Priority Service (MPS) over Iq Interface – Stage 3	11.0.0
2012-12	CT#58	CP-120723	0036	-		Iq interface updates of ECN Support Package	11.1.0
		CP-120734	0037	3		Support of Multimedia Priority Service (MPS) in Modify over Iq Interface – Stage 3	
2013-06	CT#60	CP-130294	0039	2		ECN relying reference change	11.2.0
2013-06	CT#60	CP-130299	0044	2		Introduction of support for Coordination of Video Orientation (CVO)	12.0.0
2013-09	CT#61	CP-130471	0045	3		Introduction of support for Generic Image Attribute/signalling of image size	12.1.0
2013-12	CT#62	CP-130636	0049	1		No indication of generic image attributes in Iq	12.2.0
2014-06	CT#64	CP-140248	0053	3		Support for Interactive Connectivity Establishment (ICE)	12.3.0
		CP-140234	0056	-		Aligning Mandatory Features with stage 2	
		CP-140249	0059	1		WebRTC support for Iq	

		CP-140268	0060	-		AGW Capability Change	
2014-09	CT#65	CP-140504	0057	3		IMS media security for TCP-based media using TLS and UDP-based media using DTLS	12.4.0
		CP-140504	0058	3		Bearer-level application level gateway (B-ALG) for TCP-based media	
2014-12	CT#66	CP-140798	0063	1		RTCP port allocation rules – Semantical clarification	12.5.0
		CP-140777	0067	2		WebRTC Architecture Update	
		CP-140777	0071	2		Support of Consent Freshness in WebRTC	
		CP-140788	0070	1		Adding support for EVS codec	
		CP-140786	0072	-		Reference update: draft-schwarz-mmusic-sdp-for-gw	
		CP-140791	0073	1		Alternative connection (ALTC) addresses management	
2014-12	CT#66	CP-14079	0051	4		Support of RTP transport multiplexing (Iq, stage 3)	13.0.0
2015-03	CT#67	CP-150030	0075	1		TCP basic connection control package	13.1.0
		CP-150030	0077	1		TLS basic session control package	
		CP-150030	0079	1		Stream endpoint interlinkage package	
		CP-150030	0081	1		MG located Bearer Level ALG package	
		CP-150027	0085	1		IMS WebRTC reference update	
2015-06	CT#68	CP-150258	0087	1		Updating ITU-T references	13.2.0
		CP-150258	0089	1		TCP descriptor correction	
		CP-150258	0094	1		Updating references to H.248.90 and IETF Draft	
		CP-150256	0091	1		WebRTC transport protocols	
2015-12	CT#70	CP-150783	0098	3		Support for Video Enhancements by Region-of-Interest Information Signalling	13.3.0
		CP-150754	0100	-		Update of IMS WebRTC reference	
		CP-150758	0103	-		Update of media security reference	
		CP-150779	0104	2		WebRTC Data Channels	
2016-03	CT#71	CP-160028	0105	2		WebRTC Data Channels	13.4.0
		CP-160032	0106	1		WebRTC gateway configuration for end-to-end WebRTC calls (stage 3)	
		CP-160034	0107	1		Support of enhanced bandwidth negotiation mechanism for MTSI sessions	
		CP-160021	0108	2		Iq stage 3 to support SDP Capability Negotiation	
2016-06	CT#72	CP-160229	0109	-		Clarifications related to the rate adaptation for media endpoints	13.5.0
2016-09	CT#73	CP-160429	0111	1		Mandatory support of RTP/RTCP multiplexing	14.0.0
2016-09	CT#73	CP-160431	0112	1		Transport of T.140 within data channels	14.0.0
2016-12	CT#74	CP-160684	0113	1		Support of RTP-level pause and resume functionality	14.1.0
2017-03	CT#75	CP-170023	0115	-		RFC 4572 obsoleted by draft-ietf-mmusic-4572-update	14.2.0
2017-03	CT#75	CP-170051	0116	1		RTCP Codec Control Commands and Indications	14.2.0
2017-06	CT#76	CP-171015	0118	-		Reference update: RFC 8122	14.3.0
2017-06	CT#76	CP-171027	0119	-		Reference update: draft-ietf-mmusic-mux-exclusive	14.3.0
2017-06	CT#76	CP-171024	0121	-		Reference update: draft-ietf-mmusic-sctp-sdp	14.3.0

2018-10	-	-	-	-		Update to Rel-15 version (MCC)	15.0.0
2019-06	CT#84	CP-191053	0149	2		Iq interface enhancement to support DBI	16.0.0
2019-12	CT#86	CP-193019	0133	-		Reference update: draft-ietf-mmusic-msrp-usage-data-channel	16.1.0
2019-12	CT#86	CP-193019	0129	1		Reference update: draft-ietf-mmusic-t140-usage-data-channel	16.1.0
2020-12	CT#90e	CP-203024	0138	-		Update on draft references	16.2.0
2021-03	CT#91e	CP-210066	0142	-		Reference update: RFC 8841, RFC 8864 and RFC 8873	16.3.0
2021-03	CT#91e	CP-210068	0145	-		Reference update: RFC 8858 and RFC 8865	16.3.0
2021-12	CT#94e	CP-213104	0146	-	B	Alignment with SA3 supported TLS profiles	17.0.0
2022-03	CT#94e	CP-220052	0147	-	B	Update of IETF references for ICE	17.1.0

History

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