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**Digital cellular telecommunications system (Phase 2+);  
Universal Mobile Telecommunications System (UMTS);  
LTE;  
Interconnection Border Control Functions (IBCF)  
- Transition Gateway (TrGW) interface, Ix interface;  
Stage 3  
(3GPP TS 29.238 version 12.3.0 Release 12)**



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# 1 Scope

The present document describes the protocol to be used on the Interconnection Border Control Function (IBCF) – Transition Gateway (TrGW) interface and the CS-IBCF – CS-TrGW interface. The basis for this protocol is the H.248 protocol as specified in ITU-T. The Profile provides MG control function for IMS and CS Border Control. The IMS architecture is described in 3GPP TS 23.228 [2]. The underlying reference model and stage 2 information is described in Annex I of 3GPP TS 23.228 [2] and in 3GPP TS 29.162 [18]. The CS architecture is described in Annex A of 3GPP TS 29.235 [17].

This specification describes the application of H.248 Ix profile for both Ix and CS-Ix interfaces (see Figure 1.1 and Figure 1.2). 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.

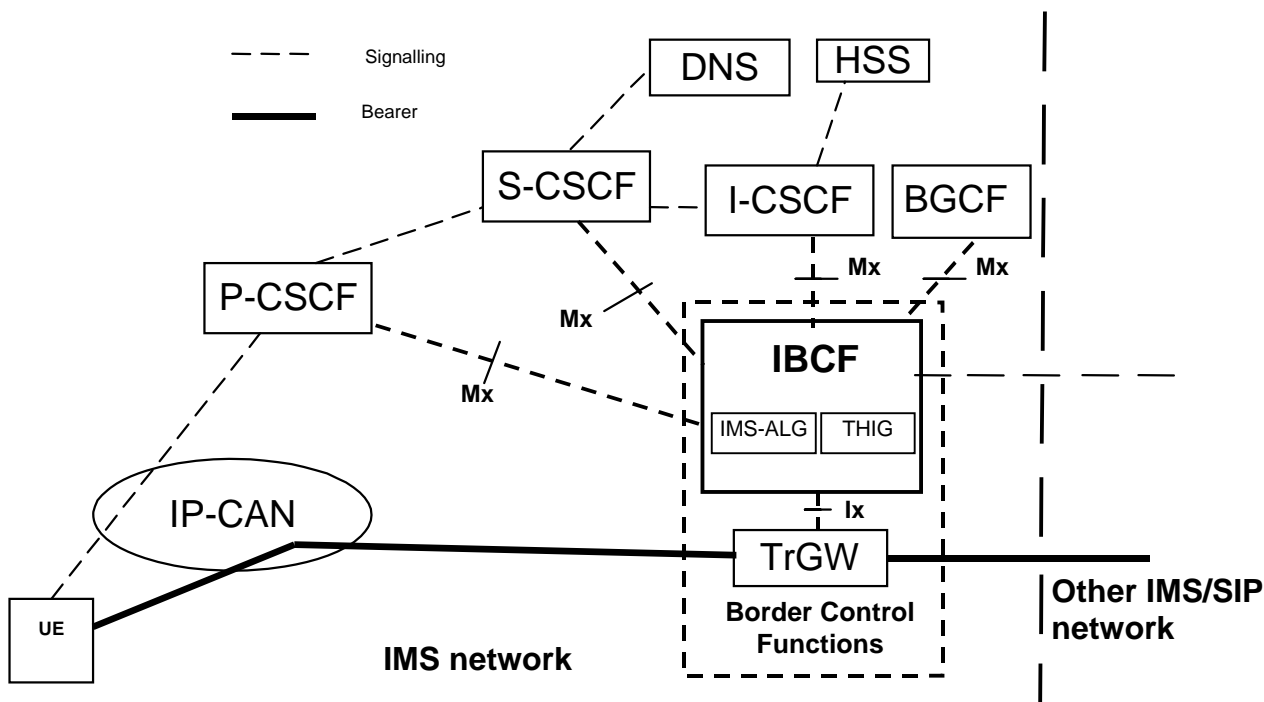


Figure 1.1: Reference model for IMS Border Control Functions

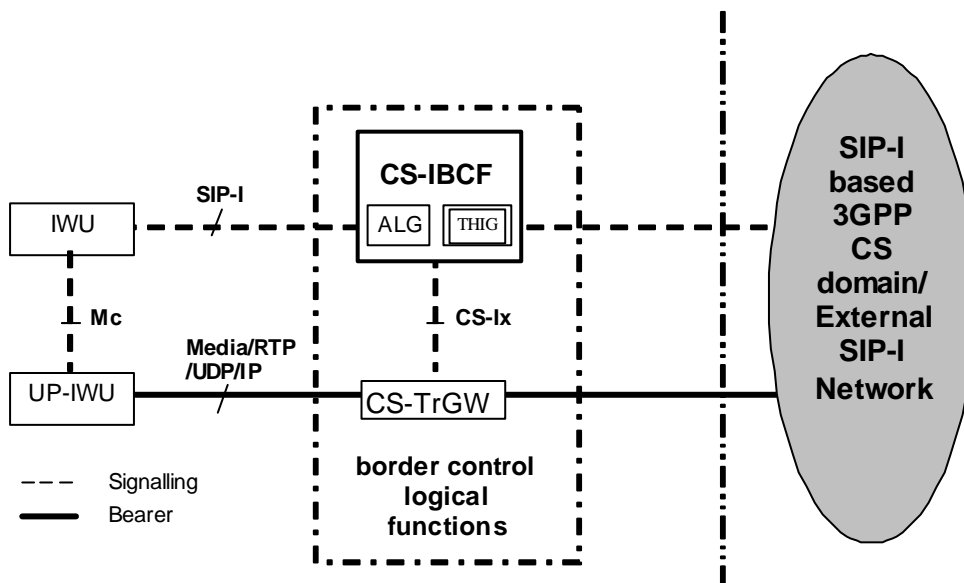
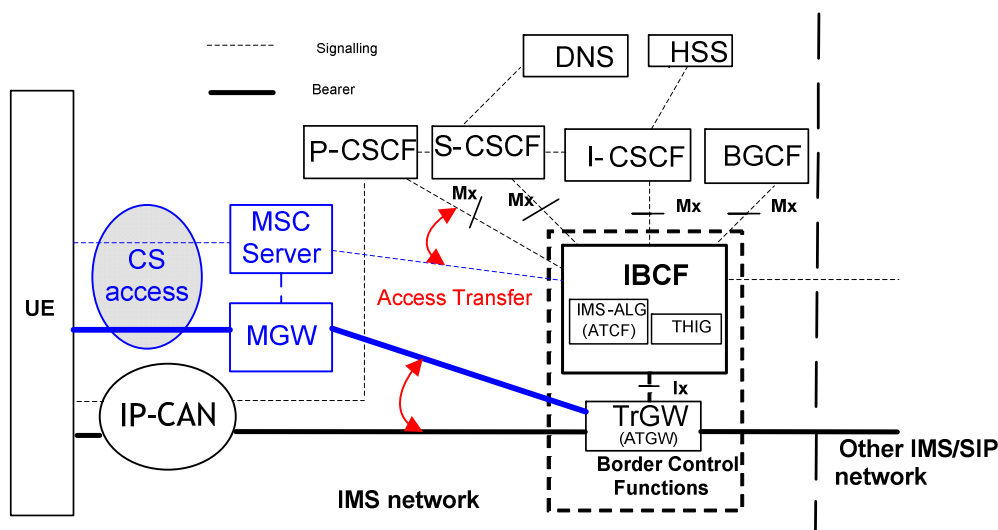


Figure 1.2: Reference model for CS Border Control Functions



The reference model for the IBCF and the TrGW supporting the ATCF/ATGW function is shown in Figure 1.x below.



**Figure 1.3: Reference model for IBCF/TrGW with ATCF/ATGW function**

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

NOTE: The Ix profile is applied over both IMS and CS Ix interfaces.

In the following text the terms IBCF and TrGW also include respectively the CS-IBCF and CS-TrGW functionalities.

## 2 References

The following documents contain provisions which, through reference in this text, constitute provisions of the present document.

- References are either specific (identified by date of publication, edition number, version number, etc.) or non-specific.
- For a specific reference, subsequent revisions do not apply.
- For a non-specific reference, the latest version applies. In the case of a reference to a 3GPP document (including a GSM document), a non-specific reference implicitly refers to the latest version of that document *in the same Release as the present document*.

- [1] 3GPP TR 21.905: "Vocabulary for 3GPP Specifications".
- [2] 3GPP TS 23.228: "IP Multimedia Subsystem (IMS); Stage 2".
- [3] ITU-T Recommendation H.248.1 (2002): "Gateway Control Protocol: Version 2" including the Corrigendum 1 for Version 2 (03/04).
- [4] ETSI TS 183 018 V3.5.1(2009-07): "Telecommunications and Internet converged Services and Protocols for Advanced Networking (TISPAN); Resource and Admission Control: H.248 Profile Version 3 for controlling Border Gateway Functions (BGF) in the Resource and Admission Control Subsystem (RACS); Protocol specification".
- [5] ITU-T Recommendation H.248.57 (06/2008): "Gateway control protocol: RTP Control Protocol Package".
- [6] ITU-T Recommendation H.248.43 (06/2008): "Gateway control protocol: Gate Management and Gate Control packages".
- [7] IETF RFC 3605 (2003): "Real Time Control Protocol (RTCP) attribute in Session Description Protocol (SDP)".

- [8] IETF RFC 4566 (2006): "SDP: Session Description Protocol".
- [9] IETF RFC 4975 (2007): "The Message Session Relay Protocol (MSRP)".
- [10] IETF RFC 3551 (2003): "RTP Profile for Audio and Video Conferences with Minimal Control".
- [11] IETF RFC 4145 (2005): "TCP-Based Media Transport in the Session Description Protocol (SDP)".
- [12] ITU-T Recommendation H.248.52 (06/2008): "Gateway control protocol: QoS support packages".
- [13] ITU-T Recommendation H.248.53 (06/2008) inclusive *Revision 1* (03/2009): "Gateway control protocol: Traffic management packages".
- [14] ITU-T Recommendation H.248.41 Amendment 1 (06/2008): "Gateway control protocol: IP domain connection package: IP Realm Availability Package".
- [15] ITU-T Recommendation H.248.36 (09/2005): "Gateway control protocol: Hanging Termination Detection package".
- [16] ITU-T Recommendation H.248.11 (11/2002): "Gateway control protocol: Media gateway overload control package".  
Inclusive Corrigendum 1 (06/2008) to H.248.11 "Gateway control protocol: Media gateway overload control package: Clarifying MG-overload event relationship to ADD commands".
- [17] 3GPP TS 29.235: "Interworking between SIP-I based circuit-switched core network and other networks".
- [18] 3GPP TS 29.162: "Interworking between the IM CN subsystem and IP networks".
- [19] ITU-T Recommendation H.248.14 (03/2009): "Gateway control protocol: Inactivity timer package".
- [20] ITU-T Recommendation H.248.10 (07/2001): "Media gateway resource congestion handling package".
- [21] 3GPP TS 29.232: "Media Gateway Controller (MGC) - Media Gateway (MGW) interface; Stage 3".
- [22] 3GPP TS 33.210: "Technical Specification Group Services and System Aspects; 3G Security; Network Domain Security; IP Network Layer Security".
- [23] ITU-T Recommendation V.152 (01/2005): "Procedures for supporting voice-band data over IP networks".
- [24] ITU-T Supplement 7 to ITU-T H-series Recommendations H.Sup7 (05/2008): "Gateway control protocol: Establishment procedures for the H.248 MGC-MG control association".
- [25] IETF RFC 5234 (2008): "Augmented BNF for Syntax Specifications: ABNF".
- [26] IETF RFC 4960 (2007): "Stream control transmission protocol".
- [27] ITU-T Recommendation H.248.40 (01/2007): "Gateway control protocol: Application Data Inactivity Detection package".
- [28] ITU-T Recommendation X.690 (11/2008): "ASN.1 encoding rules: Specification of Basic Encoding Rules (BER), Canonical Encoding Rules (CER) and Distinguished Encoding Rules (DER)".
- [29] IETF RFC 3556 (2003): "Session Description Protocol (SDP) Bandwidth Modifiers for RTP Control Protocol (RTCP) Bandwidth".
- [30] IETF RFC 4585 (2006): "Extended RTP Profile for Real-time Transport Control Protocol (RTCP) - Based Feedback (RTP/AVPF)".
- [31] 3GPP TS 26.114: "IP Multimedia Subsystem (IMS); Multimedia telephony; Media handling and interaction".

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- [33] IETF RFC 3711 (2004): "The Secure Real-time Transport Protocol (SRTP)".
- [34] IETF RFC 5124 (2008): "Extended Secure RTP Profile for Real-time Transport Control Protocol (RTCP)-Based Feedback (RTP/SAVPF)".
- [35] IETF RFC 6679 (2012): "Explicit Congestion Notification (ECN) for RTP over UDP".
- [36] IETF RFC 3611 (2003): "RTP Control Protocol Extended Reports (RTCP XR)".
- [37] IETF RFC 3168 (2001): "The Addition of Explicit Congestion Notification (ECN) to IP".
- [38] 3GPP TS 23.237: "IP Multimedia subsystem (IMS) Service Continuity; Stage 2".
- [39] 3GPP TS 22.153: "Multimedia Priority Service".
- [40] ITU-T Recommendation H.248.82 (03/2013): "Gateway control protocol: Explicit Congestion Notification Support".
- [41] IETF RFC 5285: "A General Mechanism for RTP Header Extensions".
- [42] IETF RFC 6236: "Negotiation of Generic Image Attributes in the Session Description Protocol (SDP)".
- [43] IETF RFC 5245: "Interactive Connectivity Establishment (ICE): A Protocol for Network Address Translator (NAT) Traversal for Offer/Answer Protocols".
- [44] ITU-T Recommendation H.248.50 (09/2010) Corrigendum 1 (02/12): "Gateway control protocol: NAT traversal toolkit packages".
- [45] 3GPP TS 24.229: "IP Multimedia Call Control Protocol based on SIP and SDP".

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## 3 Definitions, symbols and abbreviations

### 3.1 Definitions

For the purposes of the present document, the terms and definitions given in TR 21.905 [1] and the following apply. A term defined in the present document takes precedence over the definition of the same term, if any, in TR 21.905 [1].

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

**CS-TrGW:** packet-to-packet gateway for user plane media traffic. The CS-TrGW performs both policy enforcement functions and NA(P)T functions under the control of the CS-IBCF

**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  $\mu$ -law or vice versa, G.729 to AMR with 4.75 rate.

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

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

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

**TrGW:** packet-to-packet gateway for user plane media traffic. The TrGW performs both policy enforcement functions and NA(P)T functions under the control of the IBCF

NOTE 3: A Transition Gateway (TrGW) provides the interface between two IP-transport domains. The TrGW has the "H.248 MG" role in the scope of this Profile.

For the purposes of the present document, the following terms and definitions as defined in 3GPP TS 29.162 [18] apply:

**ICE lite**

**Full ICE.**

## 3.2 Symbols

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

Ix                      Interface between IBCF and TrGW or CS-IBCF and CS-TrGW.

## 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  |
| BGF     | Border Gateway Function  |
| CE      | Congestion Experienced   |
| CVO     | Coordination of Video Orientation  |
| ECN     | Explicit Congestion Notification   |
| GCP     | Gateway Control Protocol   |
| IBCF    | Interconnect Border Control Function   |
| ICE     | Interactive Connectivity Establishment   |
| LD      | Local Descriptor (H.248 protocol element)  |
| MG      | Media Gateway  |
| MGC     | Media Gateway Controller   |
| MPS     | Multimedia Priority Service  |
| NA      | Not Applicable   |
| NAPT    | Network Address and Port Translation   |
| NAPT-PT | NAPT and Protocol Translation  |
| NAT     | Network Address Translation  |
| PCI     | Protocol Control Information   |
| RD      | Remote Descriptor (H.248 protocol element)   |
| RTCP    | RTP Control Protocol   |
| SRVCC   | Single Radio Voice Call Continuity   |
| STUN    | Session Traversal Utilities for NAT  |
| TCP     | Transmission Control Protocol  |
| ToS     | Type-of-Service  |
| TrGW    | Transition Gateway   |
| TISPAN  | Telecommunications and Internet converged Services and Protocols for Advanced Networking |

---

## 4 Applicability

The support of the IMS and CS Ix interfaces capability sets shall be identified by the H.248 Ix 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 I of 3GPP TS 23.228 [2], Annex A of 3GPP TS 29.235 [17] and 3GPP TS 29.162 [18].

## 5 Profile Description

### 5.1 Profile Identification

**Table 5.1.1: Profile Identification**

|                      |                 |
|----------------------|-----------------|
| <b>Profile name:</b> | <b>threeglx</b> |
| Version:             | 3               |

### 5.2 Summary

This profile supports the control of the following functionality in (IP-to-IP) Transition Gateways:

- Allocation and translation of IP addresses and port numbers (NA(P)T and NA(P)T-PT);
- Hanging termination detection;
- IP realm/domain indication;
- Media inactivity detection;
- Opening and closing gates (i.e. packets filtering depending on "IP address / port");
- Policing of incoming traffic;
- QoS packet marking for outgoing traffic (differentiated services);
- RTCP handling;
- Explicit Congestion Notification support;
- Multimedia Priority Service;

and when ATCF/ATGW is supported:

- Handover of bearer connections between PS and CS access networks;
- IP version interworking;
- Audio transcoding.

In addition, optional settings and procedures are described which fulfil optional features. 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 [3]) 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 [3]) shall be used as the minimum protocol version.

## 5.4 Connection model

**Table 5.4.1: Connection Model**

|  |   |
|--|---|
| <b>Maximum number of contexts:</b>                         | Provisioned   |
| <b>Maximum number of terminations per context:</b>         | 3   |
| <b>Allowed termination type combinations in a context:</b> | (IP,IP) ;<br>(IP,IP,IP) (NOTE)  |
| <b>NOTE:</b>   | This is only a temporary context configuration, occurring during bearer access transfer phase (between PS to CS access networks or vice versa). |

## 5.5 Context attributes

**Table 5.5.1: Context Attributes**

| Context Attribute                  | Supported  | Values Supported |
|------------------------------------|--|------------------|
| <b>Topology</b>                    | Yes (NOTE 1)   | See clause 5.7.9 |
| <b>Priority Indicator</b>          | Optional (NOTE 2)  | 0-15 (NOTE 3)    |
| <b>Emergency Indicator</b>         | Yes  | YES/NO           |
| <b>IEPS Indicator</b>              | No   | NA               |
| <b>ContextAttribute Descriptor</b> | No   | NA               |
| <b>ContextIdList Parameter</b>     | No   | NA               |
| <b>AND/OR Context Attribute</b>    | No   | NA               |
| <b>NOTE 1:</b>                     | 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")). |                  |
| <b>NOTE 2:</b>                     | 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].            |                  |
| <b>NOTE 3:</b>                     | 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 *not* allowed in ETSI TISPAN "Ia Profiles".

NOTE: The IBCF has the ability to choose the address space in which the TrGW will allocate an IP address for the termination by using the *ipdc/realm* property defined in the ITU-T Recommendation H.248.41 [14] 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 [25]) is used for the syntax specification. The ABNF for TerminationID and relation to pathNAME is defined in Annex B.2 of ITU-T Recommendation H.248.1 [3].

**ABNF coding:**

```

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**

|  |    |
|--|----|
| <b>Multiplex Terminations Supported?</b> | No |
|--|----|

*If yes then:*

**Table 5.6.2.2: Multiplex Types**

|  |      |
|--|------|
| <b>Multiplex Types Supported</b>                             | None |
| <b>Maximum Number of Terminations Connected to Multiplex</b> | -    |

## 5.7 Descriptors

### 5.7.1 TerminationState Descriptor

**Table 5.7.1.1: ServiceState property**

|   |   |
|---|---|
| <b>ServiceState property used:</b>  | 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 [3], 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**

|  |    |
|--|----|
| <b>EventBufferControl property used:</b> | No |
|--|----|

### 5.7.2 Stream Descriptor

#### 5.7.2.0 General



**Table 5.7.2.1: Stream descriptor**

|  |    |                    |
|--|----|--------------------|
| <b>Maximum number of streams per termination type:</b>   | IP | Unspecified (NOTE) |
| NOTE: At least one stream for each media component (e.g. video+audio = 2 streams). If only one stream is applicable, then the IBCF may omit the Stream Descriptor and the TrGW shall assume that StreamID = 1. |    |                    |

**Table 5.7.2.2: Stream configuration**

|                              |                                |
|------------------------------|--------------------------------|
| <b>Stream Configuration:</b> | ALL configurations are allowed |
|------------------------------|--------------------------------|

### 5.7.2.1 LocalControl Descriptor

**Table 5.7.2.1.1: Reserve Group and Reserve Value**

|                            |     | <b>Termination Type</b> | <b>Stream Type</b> |
|----------------------------|-----|-------------------------|--------------------|
| <b>Reserve group used:</b> | No  | NA                      | NA                 |
| <b>Reserve value used:</b> | Yes | IP                      | Audio, Video       |

**Table 5.7.2.1.2: Stream Mode**

| <b>Termination Type</b>   | <b>Stream Type</b> | <b>Allowed StreamMode Values</b>       |
|---|--------------------|--|
| 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                | SendRecv, Inactive                     |
|   | TCP/MSRP           | SendRecv, Inactive                     |
|   | udptl              | SendRecv, Inactive                     |
|   | udp                | SendOnly, RecvOnly, SendRecv, Inactive |
| NOTE: See table 5.15.2 for the stream types applicable to IMS-Ix and CS-Ix. |                    |  |

## 5.7.3 Events descriptor

Table 5.7.3.1: Events Descriptor

|   |  |                         |                                   |
|---|--|-------------------------|-----------------------------------|
| <b>Events settable on termination types and stream types:</b> | Yes  |                         |                                   |
| <i>If yes</i>   | <b>Event ID</b>  | <b>Termination Type</b> | <b>Stream Type</b>                |
|   | Cause (g/cause, 0x0001/0x0001) - See sub-clause 5.14.3.1                                 | ALL except ROOT         | ANY                               |
|   | Inactivity Timeout (it/ito, 0x0045/0x0001) – See sub-clause 5.14.3.6                     | only ROOT               | Not applicable                    |
|   | MG_Overload (ocp/mg_overload, 0x0051/0x0001) – See sub-clause 5.14.3.8                   | only ROOT               | Not applicable                    |
|   | Termination Heartbeat (hangterm/thb, 0x0098/0x0001) – See sub-clause 5.14.3.9            | ALL except ROOT         | Not applicable                    |
|   | MGCon (chp/mgcon, 0x0029/0x0001) – See sub-clause 5.14.3.10                              | only ROOT               | Not applicable                    |
|   | Available Realms Changed (ipra/arc, 0x00e0/0x0001) – See sub-clause 5.14.3.11            | only ROOT               | Not applicable                    |
|   | IP Flow Stop Detection (adid/ipstop, 0x009c/0x0001) – See sub-clause 5.14.3.14           | ALL except ROOT         | ANY                               |
|   | ECN Failure (ecnrousfail, 0x010b/0x0001) – See sub-clause 5.14.3.15                      | IP                      | RTP Based                         |
|   | ICE New Peer Reflexive Candidate (ostuncc/nprc, 0x00c3/0x0002) – see subclause 5.14.3.17 | IP                      | Any, only applicable for full ICE |
|   | ICE Connectivity Check Result (ostuncc/ccr, 0x00c3/0x0001) – see subclause 5.14.3.17     | IP                      | Any, only applicable for full ICE |

Table 5.7.3.2: Event Buffer Control

|                                   |    |
|-----------------------------------|----|
| <b>Event Buffer Control used:</b> | No |
|-----------------------------------|----|

Table 5.7.3.3: Keep Active

|                                   |    |
|-----------------------------------|----|
| <b>Keepactive used on events:</b> | No |
|-----------------------------------|----|

Table 5.7.3.4: Embedding in event

|   |    |
|---|----|
| <b>Embedded events in an event descriptor:</b>  | No |
| <b>Embedded signals in an event descriptor:</b> | No |

Table 5.7.3.5: Regulated Embedded Events

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

Table 5.7.3.6: Reset Events Descriptor Flag

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

Table 5.7.3.7: Notification Behaviour

|                  |            |
|------------------|------------|
| NotifyImmediate: | ALL Events |
| NotifyRegulated: | None       |
| NeverNotify:     | None       |

NOTE: tables 5.7.3.4 – 5.7.3.7 apply to version 3 of ITU-T Recommendation H.248.1 [3].

## 5.7.4 EventBuffer descriptor

Table 5.7.4.1: Event Buffer

|                               |          |
|-------------------------------|----------|
| Event Buffer descriptor used: | No       |
| If yes                        | EventIDs |

## 5.7.5 Signals descriptor

Table 5.7.5.1: Signals dependant on termination or streams

|  |  |                         |                                   |
|--|--|-------------------------|-----------------------------------|
| The setting of signals is dependant on termination or streams types: | No<br>NOTE – "No" means that all signals can be played on any termination or stream. |                         |                                   |
| If yes   | <b>Signal ID</b>   | <b>Termination Type</b> | <b>Stream Type / ID</b>           |
|  | Send Connectivity Check (ostuncc/scc, 0x00c3/0x0001)                                 | IP                      | Any, only applicable for full ICE |
|  | Send Additional Connectivity Check (ostuncc/sacc, 0x00c3/0x0002)                     | IP                      | Any, only applicable for full ICE |

Table 5.7.5.2: Signal Lists

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

Table 5.7.5.3: Overriding Signal type and duration

|                                     |                  |                                  |
|-------------------------------------|------------------|----------------------------------|
| Signal type and duration supported: | No               |                                  |
| If yes                              | <b>Signal ID</b> | <b>Type or duration override</b> |
|                                     | -                | -                                |

Table 5.7.5.4: Signal Direction

|                                    |    |
|------------------------------------|----|
| <b>Signal Direction supported:</b> | No |
|------------------------------------|----|

Table 5.7.5.5: Notify completion

|                                    |                  |                                     |
|------------------------------------|------------------|-------------------------------------|
| <b>NotifyCompletion supported:</b> | No               |                                     |
| <i>If yes</i>                      | <b>Signal ID</b> | <b>Type of completion supported</b> |
|                                    | -                | -                                   |

Table 5.7.5.6: RequestID Parameter

|                                       |    |
|---------------------------------------|----|
| <b>RequestID Parameter Supported:</b> | No |
|---------------------------------------|----|

Table 5.7.5.7: Signals played simultaneously

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

Table 5.7.5.8: Keep Active

|                                    |    |
|------------------------------------|----|
| <b>KeepActive used on signals:</b> | No |
|------------------------------------|----|

## 5.7.6 DigitMap descriptor

Table 5.7.6.1: DigitMap Descriptor

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

## 5.7.7 Statistics descriptor

Table 5.7.7.1: Statistics Descriptor

|                                 |   |
|---------------------------------|---|
| <b>Statistics supported on:</b> | - |
|---------------------------------|---|

Table 5.7.7.2: Statistics reported on Subtract

|   |                               |                         |                    |
|---|-------------------------------|-------------------------|--------------------|
| <b>Statistics reported on Subtract:</b> | No                            |                         |                    |
| <i>If yes</i>                           | <b>Statistic IDs Reported</b> | <b>Termination Type</b> | <b>Stream Type</b> |
|   | -                             | -                       | -                  |

## 5.7.8 ObservedEvents descriptor

**Table 5.7.8.1: ObservedEvents Descriptor**

|  |    |
|--|----|
| <b>Event detection time supported:</b> | No |
|--|----|

## 5.7.9 Topology descriptor

**Table 5.7.9.1: Topology descriptor**

|                  |  |
|------------------|--|
| Allowed triples: | (T1, T2, isolate)<br>(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 the IBCF**

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

Table 5.7.10.2: Error codes sent by the TrGW

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

|   |
|---|
| them. The IBCF 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 Add request**

|   |   |
|---|---|
| <b>Descriptors used by Add request:</b> | Media (Stream(LocalControl, Local, Remote)), Event, Signals |
|---|---|

**Table 5.8.1.2: Descriptors used by Add reply**

|                                       |   |
|---------------------------------------|---|
| <b>Descriptors used by Add reply:</b> | Media (Stream (Local)), Error<br><br>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:<br><ul style="list-style-type: none"> <li>- The Error Descriptor</li> <li>- SDP properties returned in "Reserve TrGW Connection Point" and "Reserve and Configure TrGW Connection Point" procedures, as specified in 15.17.2.2 and 15.17.2.4</li> </ul> |
|---------------------------------------|---|

### 5.8.2 Modify

**Table 5.8.2.1: Descriptors used by Modify request**

|  |  |
|--|--|
| <b>Descriptors used by Modify request:</b> | Media (TerminationState, Stream (LocalControl, Local, Remote)), Signals, Event |
|--|--|

**Table 5.8.2.2: Descriptors used by Modify reply**

|  |   |
|--|---|
| <b>Descriptors used by Modify reply:</b> | Media (Stream(Local)), Error<br><br>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:<br><ul style="list-style-type: none"> <li>- The Error Descriptor</li> <li>- SDP properties returned in "Configure TrGW Connection Point" procedure as specified in 15.17.2.3.</li> </ul> |
|--|---|

### 5.8.3 Subtract

**Table 5.8.3.1: Descriptors used in Subtract request**

|   |                      |
|---|----------------------|
| <b>Descriptors used by Subtract request:</b>                | None or Audit() NOTE |
| NOTE: this is to explicitly avoid reporting any statistics. |                      |

**Table 5.8.3.2: Descriptors used in Subtract reply**

|  |             |
|--|-------------|
| <b>Descriptors used by Subtract reply:</b> | None, Error |
|--|-------------|

### 5.8.4 Move

**Table 5.8.4.1: Command Move**

|                           |    |
|---------------------------|----|
| <b>Move command used:</b> | No |
|---------------------------|----|

**Table 5.8.4.2: Descriptor used by Move command**

|  |   |
|--|---|
| <b>Descriptors used by Move Request:</b> | - |
| <b>Descriptors used by Move Reply:</b>   | - |

### 5.8.5 AuditValue

**Table 5.8.5.1: Descriptors used by AuditValue**

| <b>Audited Properties:</b>     | <b>Property Name and Identity</b>          | <b>Descriptor</b>           |
|--------------------------------|--|-----------------------------|
|                                | Base root properties:<br>- root/* (ROOT)   | TerminationState Descriptor |
|                                | TerminationState:<br>- Root (MGW Audit)    | TerminationState Descriptor |
|                                | For Packages:<br>- Root                    | Packages Descriptor         |
|                                | None (MGW Audit) :<br>- Root               | Audit (empty) Descriptor    |
|                                | IP Realm Availability :<br>- ipra/* (ROOT) | TerminationState Descriptor |
| <b>Audited Statistics:</b>     | None                                       |                             |
| <b>Audited Signals:</b>        | None                                       |                             |
| <b>Audited Events:</b>         | None                                       |                             |
| <b>Package Audit possible:</b> | Yes  |                             |

### 5.8.6 AuditCapabilities

**Table 5.8.6.1: AuditCapabilities**

| <b>Audited Properties:</b> | <b>Property Name and Identity</b> | <b>Descriptor</b> |
|----------------------------|-----------------------------------|-------------------|
|                            | None                              | -                 |
| <b>Audited Statistics:</b> | None                              |                   |
| <b>Audited Signals:</b>    | None                              |                   |
| <b>Audited Events:</b>     | None                              |                   |



Table 5.8.6.2: Scoped Auditing

|   |      |
|---|------|
| <b>Audited Properties / ContextAttributes used for a scoped audit :</b> | None |
|---|------|

## 5.8.7 Notify

Table 5.8.7.1: Descriptors used by Notify

|  |                |
|--|----------------|
| <b>Descriptors used by Notify Request:</b> | ObservedEvents |
| <b>Descriptors used by Notify Reply:</b>   | None, Error    |
|  |                |

## 5.8.8 ServiceChange

Table 5.8.8.1: ServiceChangeMethods and ServiceChangeReasons sent by IBCF

| <b>ServiceChangeMethods Supported:</b>   | <b>ServiceChangeReasons supported:</b>                   |
|--|--|
| Handoff (NOTE 2, NOTE 3)   | "903 MGC Directed Change" (Optional, NOTE 4)             |
| Restart (NOTE 2)   | "901 Cold Boot" (Optional)<br>"902 Warm Boot" (Optional) |
| Forced (NOTE 2)  | "905 Termination Taken Out Of Service" (Optional)        |
| Graceful (NOTE 2)  | "905 Termination Taken Out Of Service" (Optional)        |
| <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: Not involving more than 1 IBCF. This does not preclude the use of the MGCIId in a ServiceChange (Handoff) scenario, nor does it change the expected TrGW behaviour upon receipt of such a message, as the TrGW has actually no means to differentiate whether the ServiceChangeMgcId parameter that may be received in a ServiceChange (handoff) message relates to a logical IBCF inside the same IBCF server or is part of another IBCF.</p> <p>NOTE 4: Support of this procedure is mandatory in the TrGW.</p> |  |

**Table 5.8.8.2: Service Change Methods and Reason sent by TrGW**

| <b>Service Change Methods Supported:</b>  | <b>ServiceChange Reasons supported:</b>  |
|---|--|
| Forced  | "904 Termination Malfunction", ALL except ROOT (Optional, NOTE 4)<br>"905 Termination Taken Out Of Service", ALL(Mandatory)<br>"906 Loss Of Lower Layer Connectivity", ALL except ROOT (Optional, NOTE 4)<br>"907 Transmission Failure", ALL except ROOT (Optional, NOTE 4)<br>"908 MG Impending Failure" ROOT only (Mandatory)<br>"910 Media Capability Failure", ALL except ROOT (Optional, NOTE 4)<br>"915 State Loss" ROOT only (Optional, NOTE 4) |
| Graceful  | "905 Termination Taken Out Of Service", (Optional, NOTE 4)<br>"908 MG Impending Failure" (Optional, NOTE 4)  |
| Disconnected (NOTE 1)   | "900 Service Restored" (Mandatory)<br>"916 Packages Change" (Optional)<br>"917 Capability Change" (Optional)   |
| Restart (NOTE 1)  | "900 Service Restored" (Mandatory)<br>"901 Cold Boot" (Mandatory)<br>"902 Warm Boot" (Mandatory)<br>"916 Packages Change" (Optional)<br>"917 Capability Change" (Optional)   |
| Handoff (NOTE 1, NOTE 2)  | "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 an IBCF Ordered Re-Register.</p> <p>NOTE 4: Support of this procedure is mandatory in the IBCF.</p> |  |

**Table 5.8.8.3: Service Change Address**

|                                   |    |
|-----------------------------------|----|
| <b>ServiceChangeAddress used:</b> | No |
|-----------------------------------|----|

**Table 5.8.8.4: Service Change Delay**

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

**Table 5.8.8.5: Service Change Incomplete Flag**

|  |    |
|--|----|
| <b>ServiceChange Incomplete Flag used:</b> | No |
|--|----|

**Table 5.8.8.6: Service Change Version**

|  |        |
|--|--------|
| <b>Version used in ServiceChangeVersion:</b>   | 2 or 3 |
| NOTE: Version 2 shall be supported as the minimum protocol version. See subclause 5.3. |        |

**Table 5.8.8.7: ServiceChangeProfile**

|   |     |
|---|-----|
| <b>ServiceChangeProfile mandatory:</b>  | Yes |
| NOTE: The ServiceChangeProfile is mandatory in the TrGW Register and TrGW Re-Register procedures. |     |

**Table 5.8.8.8: Profile negotiation**

|   |    |
|---|----|
| <b>Profile negotiation as per H.248.18:</b> | No |
|---|----|

**Table 5.8.8.9: ServiceChangeMGCIId**

|                                  |     |
|----------------------------------|-----|
| <b>ServiceChangeMGCIId used:</b> | Yes |
|----------------------------------|-----|

## 5.8.9 Manipulating and auditing context attributes

**Table 5.8.9.1: Manipulating and Auditing Context Attributes**

|  |   |
|--|---|
| <b>Context Attributes Manipulated:</b> | Emergency Indicator, Priority Indicator |
| <b>Context Attributes Audited:</b>     | None                                    |

## 5.9 Generic command syntax and encoding

**Table 5.9.1: Command Encoding**

|   |   |
|---|---|
| <b>Supported Encodings:</b>   | Text (NOTE 1, NOTE 2, NOTE 3) 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" [4] uses only text encoding.   |   |

## 5.10 Transactions

**Table 5.10.1: Transactions**

|  |           |
|--|-----------|
| <b>Maximum number of Transaction Requests / Replies / TransResponseAcks / Segment Replies per message:</b> | 10 (NOTE) |
| NOTE: ETSI TISPAN "Ia Profile" [4] maximum is "1", this is foreseen to be the typical case                 |           |

**Table 5.10.2: Commands per Transaction Request**

|  |                    |
|--|--------------------|
| <b>Maximum number of commands per Transaction request:</b>                                 | Unspecified (NOTE) |
| NOTE: ETSI TISPAN "Ia Profile" [4] maximum is "2", this is foreseen to be the typical case |                    |

**Table 5.10.3: Commands per Transaction Reply**

|  |                    |
|--|--------------------|
| <b>Maximum number of commands per Transaction reply:</b>                                   | Unspecified (NOTE) |
| NOTE: ETSI TISPAN "Ia Profile" [4] maximum is "2", this is foreseen to be the typical case |                    |

**Table 5.10.4: Optional Commands**

|  |     |
|--|-----|
| <b>Commands able to be marked "Optional":</b>  | ALL |
| NOTE: The meaning of this table is that if one of the listed commands failed then the possibly present subsequent command within the same transaction will be processed. |     |

**Table 5.10.5: Commands marked for Wildcarded Responses**

|   |          |
|---|----------|
| <b>Wildcarded responses may be requested for:</b> | Subtract |
|---|----------|

**Table 5.10.6: Procedures for Wildcarded Responses**

|  |                          |
|--|--------------------------|
| <b>Procedures that make use of wildcarded responses:</b> | Release TrGW Termination |
|--|--------------------------|

**Table 5.10.7: Transaction Timers**

| <b>Transaction Timer:</b>               | <b>Value</b> |
|---|--------------|
| <b>NormalMGExecutionTime</b>            | Provisioned  |
| <b>NormalMGCEExecutionTime</b>          | Provisioned  |
| <b>MGOriginatedPendingLimit</b>         | Provisioned  |
| <b>MGCOriginatedPendingLimit</b>        | Provisioned  |
| <b>MGProvisionalResponseTimerValue</b>  | Provisioned  |
| <b>MGCProvisionalResponseTimerValue</b> | Provisioned  |

## 5.11 Messages

It is recommended that TrGW and IBCF names are in the form of fully qualified domain name. For example the domain name of the IBCF may be of the form: "IBCF1.whatever.net." and the name of the TrGW may be of the form: "TrGW1.whatever.net."

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

The IBCF domain name is provisioned in the TrGW or retrieved from the DNS using SRV records.

The use of a domain name provides the following benefits:

- TrGWs and IBCFs 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 [24].

- TrGWs and IBCFs 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). TrGW and IBCF 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 IBCF/TrGW for authentication purposes.

## 5.12 Transport

**Table 5.12.1: Transport**

|  |  |
|--|--|
| <b>Supported Transports:</b>   | <ol style="list-style-type: none"> <li>1. IPv4-based network control plane: <ul style="list-style-type: none"> <li>• SCTP/IPv4 (Recommended) NOTE1</li> <li>• UDP/IPv4 (Optional)</li> </ul> </li> <li>2. IPv6-based network control plane: <ul style="list-style-type: none"> <li>• SCTP/IPv6 (Recommended) NOTE1</li> <li>• UDP/IPv6 (Optional)</li> </ul> </li> </ol> |
| NOTE1: When using SCTP as defined in IETF RFC 4960 [26] the TrGW shall always be the node to perform the "Initiation". |  |

Table 5.12.2: Segmentation

|                                |  |
|--------------------------------|--|
| <b>Segmentation Supported:</b> | SCTP: Inherent in Transport<br>UDP: No |
|--------------------------------|--|

Table 5.12.3: Control Association

|  |   |
|--|---|
| <b>Control Association Monitoring Supported:</b> | Monitoring mechanism is dependent on used H.248 transport (see above table 5.12.1):<br><b>SCTP:</b><br>inherent capability of SCTP.<br><b>UDP:</b><br>H.248.14 (MG-driven monitoring).<br>Empty AuditValue on ROOT (MGC-driven monitoring). |
|--|---|

## 5.13 Security

Table 5.13.1: Security

|                            |  |
|----------------------------|--|
| <b>Supported Security:</b> | None   |
| <b>NOTE:</b>               | IPsec shall not be used by the IBCF or TrGW for the Ix interface. Normally the Ix 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 Ix profile, the IBCF or the TrGW; for further details see 3GPP TS 33.210 [22]. |

## 5.14 Packages

### 5.14.1 Mandatory Packages

Table 5.14.1.1: Mandatory Packages

| Mandatory Packages  |                       |         |
|---|-----------------------|---------|
| Package Name  | Package ID            | Version |
| Generic (ITU-T Recommendation H.248.1 [3], annex E.1)   | g, (0x0001)           | 1       |
| Base root (ITU-T Recommendation H.248.1 [3], annex E.2)   | root, (0x0051)        | 2       |
| RTP Control Protocol Package (ITU-T Recommendation H.248.57 [5])                                    | rtcph, (0x00b5)       | 1       |
| Gate management Source Address/Port Filtering Package (ITU-T Recommendation H.248.43, Clause 7 [6]) | gm, (0x008c)          | 2       |
| Traffic management (ITU-T Recommendation H.248.53 [13])   | tman, (0x008d)        | 1       |
| IP Domain Connection (ITU-T Recommendation H.248.41 [14])   | ipdc, (0x009d)        | 1       |
| Hanging Termination Detection (ITU-T Recommendation H.248.36 [15])                                  | hangterm,<br>(0x0098) | 1       |
| Diffserv (ITU-T Recommendation H.248.52 [12])   | ds, (0x008b)          | 2       |

## 5.14.2 Optional Packages

**Table 5.14.2.1: Optional Packages**

| Optional Packages  |                    |         |  |
|--|--------------------|---------|--|
| Package Name   | Package ID         | Version | Support dependent on   |
| Inactivity Timer (ITU-T Recommendation H.248.14 [19])  | it, (0x0045)       | 1       | MGC polling by MG.<br>Only applicable for UDP transport.   |
| Media Gateway Overload Control (ITU-T Recommendation H.248.11 [16])                                | 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 [20])        | 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 [14])                             | 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. |
| 3G Interface Type package (see subclause 15.2.11 of 3GPP TS 29.232 [21])                           | threegint (0x00e3) | 1       | Indication of interface type for statistical purposes at the MG.   |
| Application Data Inactivity Detection (ITU-T Recommendation H.248.40 [27])                         | 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 (ITU-T Recommendation H.248.82 see [40]) | ecnrous (0x010b)   | 1       | Support of ECN feature   |
| MG Act-as STUN Server (ITU-T Recommendation H.248.50 [44])   | mgastuns (0x00c2)  | 1       | Support of incoming STUN connectivity checks.<br>Applicable for ICE lite and full ICE  |
| Originate STUN Continuity Check (see ITU-T Recommendation H.248.50 [44])                           | ostuncc (0x00c3)   | 1       | Support of originating STUN connectivity checks.<br>Only applicable for full ICE   |

## 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                                     | -                               | -  | -                       | -                                 |
| <b>Signals</b>                           | <b>Mandatory/Optional</b>       | <b>Used in command</b>   |                         | <b>Duration Provisioned Value</b> |
| None                                     | -                               | -  |                         | -                                 |
|  | <b>Signal Parameters</b>        | <b>Mandatory/Optional</b>  | <b>Supported Values</b> | <b>Duration Provisioned Value</b> |
|  | -                               | -  | -                       | -                                 |
| <b>Events</b>                            | <b>Mandatory/Optional</b>       | <b>Used in command</b>   |                         |                                   |
| Cause (g/cause, 0x0001/0x0001)           | M                               | ADD, MOD, NOTIFY   |                         |                                   |
|  | <b>Event Parameters</b>         | <b>Mandatory/Optional</b>  | <b>Supported Values</b> | <b>Provisioned Value</b>          |
|  | None                            | -  | -                       | -                                 |
|  | <b>ObservedEvent Parameters</b> | <b>Mandatory/Optional</b>  | <b>Supported Values</b> | <b>Provisioned Value</b>          |
| General cause (Generalcause, 0x0001)     | M                               | "NR" (0x0001)<br>Normal Release<br>"UR" (0x0002)<br>Unavailable Resources<br>"FT" (0x0003)<br>Failure, Temporary<br>"FP" (0x0004)<br>Failure, Permanent<br>"IW" (0x0005)<br>Interworking Error<br>"UN" (0x0006)<br>Unsupported | Not Applicable          |                                   |
| Failure cause (Failurecause, 0x0002)     | O                               | Octet String   | Not Applicable          |                                   |
| <b>Events</b>                            | <b>Mandatory/Optional</b>       | <b>Used in command</b>   |                         |                                   |
| Signal Completion. (g/sc, 0x0001/0x0002) | Not Used                        | -  |                         |                                   |
|  | <b>Event Parameters</b>         | <b>Mandatory/Optional</b>  | <b>Supported Values</b> | <b>Provisioned Value</b>          |
|  | -                               | -  | -                       | -                                 |
|  | <b>ObservedEvent Parameters</b> | <b>Mandatory/Optional</b>  | <b>Supported Values</b> | <b>Provisioned Value</b>          |
|  | -                               | -  | -                       | -                                 |
| <b>Statistics</b>                        | <b>Mandatory/Optional</b>       | <b>Used in command</b>   | <b>Supported Values</b> |                                   |
| None                                     | -                               | -  | -                       |                                   |
| <b>Error Codes</b>                       | <b>Mandatory/Optional</b>       |  |                         |                                   |
| 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<br>(root/maxNumberOfContexts, 0x0002/0x0001)                               | O                        | AUDITVALUE         | ALL              | YES                        |
| MaxTerminationsPerContext<br>(root/maxTerminationPerContext, 0x0002/0x0002)                | O                        | AUDITVALUE         | ALL              | YES                        |
| normalMGExecutionTime<br>(root/normalMGExecutionTime, 0x0002/0x0003)                       | O                        | AUDITVALUE         | ALL              | YES                        |
| normalMGCEExecutionTime<br>(root/normalMGCEExecutionTime, 0x0002/0x0004)                   | O                        | AUDITVALUE         | ALL              | YES                        |
| MGProvisionalResponseTimerValue<br>(root/MGProvisionalResponseTimerValue, 0x0002/0x0005)   | O                        | AUDITVALUE         | ALL              | YES                        |
| MGCProvisionalResponseTimerValue<br>(root/MGCProvisionalResponseTimerValue, 0x0002/0x0006) | O                        | AUDITVALUE         | ALL              | YES                        |
| MGCOriginatedPendingLimit<br>(root/MGCOriginatedPendingLimit, 0x0002/0x0007)               | O                        | AUDITVALUE         | ALL              | YES                        |
| MGOrganatedPendingLimit<br>(root/MGOrganatedPendingLimit, 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<br>(gm/saf,0x008c/0x0001)  | M                        | ADD, MODIFY        | ALL              | Not Applicable             |
| Remote Source Address Mask<br>(gm/sam,0x008c/0x0002)   | O                        | ADD, MODIFY        | ALL              | Not Applicable             |
| Remote Source Port Filtering<br>(gm/spf,0x008c/0x0003)   | M                        | ADD, MODIFY        | ALL              | Not Applicable             |
| Remote Source Port<br>(gm/spr,0x008c/0x0004)   | O                        | ADD, MODIFY        | ALL              | Not Applicable             |
| Explicit Source Address Setting<br>(gm/esas,0x008c/0x0005)   | Not Supported            | NONE               | -                | -                          |
| Local Source Address<br>(gm/lsa,0x008c/0x0006)   | Not Supported            | NONE               | -                | -                          |
| Explicit Source Port Setting<br>(gm/esps,0x008c/0x0007)  | Not Supported            | NONE               | -                | -                          |
| Local Source Port<br>(gm/lsp,0x008c/0x0008)  | Not Supported            | NONE               | -                | -                          |
| Remote Source Port Range<br>(gm/spr,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<br>(gm/dp,0x008c/0x0001)   | Not Supported            | None               | -                |                            |
| Error Codes  | Mandatory/Optional       |                    |                  |                            |
| None   | -                        |                    |                  |                            |
| NOTE : This package extends RTP Control Protocol package (ITU-T Recommendation H.248.57 [5]) and thus inherits RTCP Allocation Specific Behaviour property ( <i>rsb</i> ). |                          |                    |                  |                            |

## 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              | ANY                        |
| 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 [13] sub-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 <i>ipdc/realm</i> property exceeding the length limitation defined in ITU-T Recommendation H.248.41 [14], the MG shall reply with an error descriptor using error code #410: "Incorrect identifier".   |                          |                      |                  |                            |
| NOTE 2: The MODIFY command is listed due to the ETSI TISPAN "Ia profile" [4]: subsequent Streams may be "added" by MODIFY requests in case of multi-Stream-per-Termination structures. The subsequent Streams do then carry the same <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<br>(ocp/mg_overload,<br>0x0051/0x0001)<br>(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 <b>either</b> only following the <b>first ADD.request</b> which creates a new Context, <b>or</b> following <b>all ADD.request</b> commands (see ITU-T Recommendation H.248.11 [16] Corrigendum 1).<br>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<br>Heartbeat<br>(hangterm/thb,<br>0x0098/0x0001)   | M                          | ADD, MODIFY, NOTIFY |                  |                            |
|  | Event Parameters           | Mandatory/Optional  | Supported Values | Provisioned Value          |
|  | Timer X<br>(timerx,0x0001) | M (NOTE1)           | ALL (NOTE2)      | YES                        |
|  | ObservedEvent Parameters   | Mandatory/Optional  | Supported Values | Provisioned Value          |
|  | -                          | -                   | -                | -                          |
| Statistics   | Mandatory/Optional         | Used in command     | Supported Values |                            |
| None   | -                          | -                   | -                |                            |
| Error Codes  | Mandatory/Optional         |                     |                  |                            |
| None   | -                          |                     |                  |                            |
| NOTE1: Timer X is optional in the ETSI TISPAN Ia version 3 profile [4].<br>NOTE2: 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<br>(chp/mgcon,<br>0x0029/0x0001) | M                               | MODIFY, NOTIFY     |                  |                            |
|  | Event Parameters                | Mandatory/Optional | Supported Values | Provisioned Value          |
|  | None                            | -                  | -                | -                          |
|  | ObservedEvent Parameters        | Mandatory/Optional | Supported Values | Provisioned Value          |
|  | Reduction<br>(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,<br>(ipra/ar,<br>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<br>Changed, (ipra/arc,<br>0x00e0/0x0001) | M  | MODIFY, NOTIFY     |                   |                            |
|   | Event Parameters                             | Mandatory/Optional | Supported Values: | Provisioned Value          |
|   | -  | -                  | -                 | -                          |
|   | ObservedEvent Parameters                     | Mandatory/Optional | Supported Values  | Provisioned Value          |
|   | Newly Available<br>Realms (nar,<br>0x0001)   | M                  | ALL               | Not applicable             |
|   | Newly Unavailable<br>Realms (nur,<br>0x0002) | M                  | ALL               | Not applicable             |
| Statistics  | Mandatory/Optional                           | Used in command    | Supported Values  |                            |
| None  | -  | -                  | -                 |                            |
| Error Codes   | Mandatory/Optional                           |                    |                   |                            |
| None  | -  |                    |                   |                            |

## 5.14.3.12 3G Interface Type package (threegint)

Table 5.14.3.12.1: 3G Interface Type Package

| Properties   | Mandatory/Optional          | Used in command    | Supported Values  | Provisioned Value             |
|--|-----------------------------|--------------------|---|-------------------------------|
| IP Interface Type<br>(threegint /ipint,<br>(0x00e3/0x0001) | M                           | ADD, MOD           | "NboIP" (0x0001)<br>"MboIP" (0x0003)<br>"ExtSIP" (0x0004) | None                          |
| Signals  | Mandatory/Optional          | Used in command    |   | Duration<br>Provisioned Value |
| None   | -                           | -                  |   | -                             |
|  | Signal Parameters           | Mandatory/Optional | Supported Values  | Duration<br>Provisioned Value |
|  | -                           | -                  | -   | -                             |
| Events   | Mandatory/Optional          | Used in command    |   |                               |
| None   | -                           | -                  |   |                               |
|  | Event Parameters            | Mandatory/Optional | Supported Values  | Provisioned Value             |
|  | -                           | -                  | -   | -                             |
|  | ObservedEvent<br>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<br>(rtcph/rsb,0x00b5/0x0009) | M                           | ADD, MODIFY            | ALL                 | OFF                              |
| Signals   | Mandatory/Optional          | Used in command        |                     | Duration<br>Provisioned Value    |
| None  | -                           | -                      |                     | -                                |
|   | Signal Parameters           | Mandatory/<br>Optional | Supported<br>Values | Duration<br>Provisioned<br>Value |
|   | -                           | -                      | -                   | -                                |
| Events  | Mandatory/Optional          | Used in command        |                     |                                  |
| None  | -                           | -                      |                     |                                  |
|   | Event Parameters            | Mandatory/<br>Optional | Supported<br>Values | Provisioned<br>Value             |
|   | -                           | -                      | -                   | -                                |
|   | ObservedEvent<br>Parameters | Mandatory/<br>Optional | Supported<br>Values | Provisioned<br>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          |
|   | -                          | -                   | -                | -                          |
| 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

|  | 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)        | O                                | ADD, MODIFY               | "SDCC" (0x0001) (NOTE 2)<br>"RDCC" (0x0002) (NOTE 1)                | "RDCC" (0x0002)   |
| Initiation Method (ecnrous/initmethod, 0x010b/0x0003)          | M                                | ADD, MODIFY               | "rtp" (NOTE 2)<br>"leap",<br>"inactive"                             | "leap"  |
| ECN Mode (ecnrous/mode, 0x010b/0x0004)                         | O                                | ADD, MODIFY               | "setonly" (0x0001) (NOTE 2)<br>"readonly" (0x0002) (NOTE 2)         | "setonly" (0x0001) in the Remote Descriptor and "readonly" (0x0002) in the Local Descriptor |
| ECT Marking (ecnrous/ectmark, 0x010b/0x0005)                   | O                                | ADD, MODIFY               | "1" (0x0001) (NOTE 2)<br>"0" (0x0002)<br>"Random" (0x0003) (NOTE 2) | "0" (0x0002)  |
| ECN Congestion Marking (ecnrous/congestmark, 0x010b/0x0006)    | Not Signalled                    | -                         | -   | "nomark" (0x0003)   |
| ECN SDP Usage (ecnrous/ecnsdp, 0x010b/0x0007)                  | Not Signalled                    | -                         | -   | "P" (0x0001)  |
| <b>Signals</b>   | <b>Mandatory/Optional</b>        | <b>Used in command</b>    |   | <b>Duration Provisioned Value</b>   |
| None   | -                                | -                         |   | -   |
|  | <b>Signal Parameters</b>         | <b>Mandatory/Optional</b> | <b>Supported Values</b>   | <b>Duration Provisioned Value</b>   |
|  | -                                | -                         | -   | -   |
| <b>Events</b>  | <b>Mandatory/Optional</b>        | <b>Used in command</b>    |   |   |
| ECN Failure (ecnrous/fail, 0x010b/0x0001)                      | M                                | ADD, MODIFY, NOTIFY       |   |   |
|  | <b>Event Parameters</b>          | <b>Mandatory/Optional</b> | <b>Supported Values</b>   | <b>Provisioned Value</b>  |
|  | -                                | -                         | -   | -   |
|  | -                                | -                         | -   | -   |
|  | <b>ObservedEvent Parameters</b>  | <b>Mandatory/Optional</b> | <b>Supported Values</b>   | <b>Provisioned Value</b>  |
|  | Failure Type (type, 0x0001)      | Mandatory                 | INIT, USE   | -   |
|  | Media Sender SSRC (ssrc, 0x0002) | Not Supported             | -   | -   |
| <b>Statistics</b>  | <b>Mandatory/Optional</b>        | <b>Used in command</b>    | <b>Supported Values</b>   |   |
| 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 (ecnrou/dup, 0x010b/0x0008)   | Not Supported             | - | - |
| <b>Error Codes</b>  | <b>Mandatory/Optional</b> |   |   |
| None  | -                         |   |   |
| NOTE1: Application Specific Rate Adaptation shall be applied in accordance with 3GPP TS 26.114 [31]. For speech this requires support of CMR and TMMBR for video. |                           |   |   |
| NOTE 2: This parameter is only supported for the termination towards the external IP network.   |                           |   |   |

## 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                     | -                                 |
| <b>Signals</b>                                      | <b>Mandatory/Optional</b>       | <b>Used in command</b>    |                         | <b>Duration Provisioned Value</b> |
| None  | -                               | -                         |                         | -                                 |
|   | <b>Signal Parameters</b>        | <b>Mandatory/Optional</b> | <b>Supported Values</b> | <b>Duration Provisioned Value</b> |
|   | -                               | -                         | -                       | -                                 |
| <b>Events</b>                                       | <b>Mandatory/Optional</b>       | <b>Used in command</b>    |                         |                                   |
| None  | -                               | -                         |                         |                                   |
|   | <b>Event Parameters</b>         | <b>Mandatory/Optional</b> | <b>Supported Values</b> | <b>Provisioned Value</b>          |
|   | -                               | -                         | -                       | -                                 |
|   | -                               | -                         | -                       | -                                 |
|   | <b>ObservedEvent Parameters</b> | <b>Mandatory/Optional</b> | <b>Supported Values</b> | <b>Provisioned Value</b>          |
|   | -                               | -                         | -                       | -                                 |
| <b>Statistics</b>                                   | <b>Mandatory/Optional</b>       | <b>Used in command</b>    | <b>Supported Values</b> |                                   |
| None  | -                               | -                         | -                       |                                   |
| <b>Error Codes</b>                                  | <b>Mandatory/Optional</b>       |                           |                         |                                   |
| 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   | -                                      |                     |                             |                            |

## 5.15 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>&lt;nettype&gt; &lt;addrtype&gt; and &lt;connection address&gt; 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 &lt;connection address&gt; subfield.</p>   |
| m-line              | "SDP_M "        | <p>There are four fields (or SDP values) &lt;media&gt;, &lt;port&gt;, &lt;proto&gt; and &lt;fmt&gt; in the "m=" line (see IETF RFC 4566 [8]; NOTE 1). The "m=" line may be omitted from SDP.</p> <p>&lt;media&gt;, &lt;port&gt;, &lt;proto &gt; and &lt;fmt-list&gt; are required if the "m=" line is included.</p> <p>Media type &lt;media&gt; :<br/>The &lt;media&gt; field shall be set to "audio" or "video" or "message" 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 &lt;port&gt;<br/>The <i>port</i> value may be underspecified with CHOOSE wildcard.</p> <p>Transport protocol &lt;proto&gt;<br/>As in table 5.15.2.</p> <p>Media format &lt;fmt&gt;<br/>Various values may be used for media-format, dependent on the related &lt;media&gt;.</p> <p>"-" may be used for the <i>format list</i> value if no media reservation is required at this stage.</p> <p>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 an "m=" line.</p> <p>The <i>modifier</i> values shall be "AS", "RS" and "RR".<br/>The "AS" <i>modifier</i> implies that the <i>bandwidth-value</i> represents the "maximum bandwidth" (see clause 5.8/IETF RFC 4566 [8]). 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 IBCF may also supply additional RTCP bandwidth modifiers (i.e. RR and RS, see IETF RFC 3556 [29]). The AS <i>bandwidth</i> value will include the bandwidth used by RTP. In the absence of the RTCP bandwidth modifiers, the TrGW shall allow an additional 5% of the AS bandwidth value for the bandwidth for RTCP, in accordance with IETF RFC 3556 [29].</p>   |

|   |         |   |
|---|---------|---|
| o-line  | "SDP_O" | <p>The origin line consists of six fields: (&lt;username&gt;, &lt;sess-id&gt;, &lt;sess-version&gt;, &lt;nettype&gt;, &lt;addrtype&gt; and &lt;unicast-address&gt;).</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 [3]).</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"> <li>- &lt;user name&gt; should contain an hyphen</li> <li>- &lt;session ID&gt; and &lt;version&gt; should contain one or more digits as described in IETF RFC 4566 [8]</li> <li>- &lt;network type&gt; shall be set to IN</li> <li>- &lt;address type&gt; 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.</li> <li>- &lt;address&gt; should contain the fully qualified domain name or IP address of the gateway.</li> </ul> |
| s-line  | "SDP_S" | <p>The session name "s=" line contains a single field s= &lt;session name&gt;.</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 [3]).</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"> <li>- "s=-"</li> </ul>   |
| t-line  | "SDP_T" | <p>The time "t=" line consists of two fields t= &lt;start time&gt; and &lt;stop time&gt;.</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 [3]).</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"> <li>"t=0 0"</li> </ul>  |
| <p>NOTE 1: IETF RFC 4566 [8] enables "-" as a valid character (i.e. for both IMS-Ix and CS-Ix).</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> |         |   |

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 [10]. Allow only L4 protocol = UDP (see NOTE 2)   |
| RTP/AVPF                              | Extended RTP profile for RTCP-based Feedback (RTP/AVPF) according IETF RFC 4585 [30]. See 3GPP TS 26.114 [31]. Allow only L4 protocol = UDP (NOTE 2). |
| RTP/SAVP                              | SRTP profile according IETF RFC 3711 [33]. (NOTE 4) Allow only L4 protocol = UDP (see NOTE 2)   |
| RTP/SAVPF                             | Extended SRTP profile for RTCP-based Feedback (RTP/SAVPF) according IETF RFC 5124 [34]. (NOTE 4) Allow only L4 protocol = UDP (see NOTE 2)            |
| TCP                                   | Allow only L4 protocol = TCP (NOTE 3)   |
| TCP/MSRP                              | Message service using IETF RFC 4975 [9].  |
| udp                                   | Allow only L4 protocol = UDP (NOTE 2).  |
| udptl                                 | Allow only L4 protocol = UDP  |

- NOTE 1: For IMS-Ix the above transports are applicable but for CS-Ix only RTP/AVP, TCP and udptl are applicable.
- NOTE 2: Parameter "udp" is introduced by IETF RFC 4566 [8].
- NOTE 3: Upper case TCP is defined by IETF RFC 4145 [11] and registered by IANA. .
- NOTE 4: Included for support of e2e security, in order to permit rtcp/rsb property to be applied. TrGW does not support associated SRTP/SRTCP stream handling per se. If either RTP/SAVP is signalled at any termination in a context, or if RTP/SAVPF is signalled at any termination in a context, the TrGW shall not terminate SRTP / SRTCP streams and therefore shall not reserve any associated resources, but shall pass media transparently, and shall also pass related RTCP streams (as indicated with the rtcp/rsb property) transparently (for end-to-end media security).

## 5.16 Optional support of SDP and Annex C information elements

**Table 5.16.1: Optional SDP Information Elements**

| Information Element   | Annex C Support | SDP Support  |
|---|-----------------|--|
| a-line  | "SDP_A "        | <p>1) Application "RTCP transport address control":<br/>The attribute "a=rtcp" line may either contain (a=rtcp: &lt;port&gt;) or (a=rtcp: &lt;port&gt; &lt;network type&gt; &lt;address type&gt; &lt;connection address&gt;) when the "a=" line is used for RTCP transport port and optionally network address transmission, see IETF RFC 3605 [7].<br/>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.<br/>"RTCP transport address control" should be supported by MG.</p> <p>2) Application " Media interworking (transcoding)":<br/>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).<br/>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). For AVPF transport, the "rtcp-fb" SDP attribute defined in IETF RFC 4585 [30] may be used to provide the feedback message types the TrGW is allowed to send and to indicate RTCP timing information. For ECN interworking, the "rtcp-xr" SDP attribute defined in IETF RFC 3611 [36] may be used with "ecn-sum" value as defined in IETF RFC 6679 [35]. (NOTE)</p> <p>3) Coordination of Video Orientation<br/>The attribute "a=extmap" (see IETF RFC 5285 [41]) with CVO information may be provided for an m-line in the local and remote descriptor if the TrGW supports the extended RTP header with Coordination of Video Orientation information, see also 3GPP TS 26.114 [31].</p> <p>4) Generic Image Attribute<br/>The attribute "a=imageattr" (see IETF RFC 6236 [42]) may be provided for an m-line in the local and remote descriptor if the TrGW supports the generic image attributes, see also 3GPP TS 26.114 [31]. The local descriptor indicates the image sizes which the TrGW 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 IBCF will send within the SDP body on the Mx interface. The remote descriptor indicates the image sizes which the TrGW 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" that the IBCF will send within the SDP body on the Mx interface.</p> <p>5) Interactive Connectivity Establishment support<br/>The attributes "a=candidate", "a=ice-pwd", and "a=ice-ufrag" (see IETF RFC 5245 [43]) 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. The IMS-AGW shall then reply with completed "a=ice-pwd", and "a=ice-ufrag" and "a=candidate" 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", and "a=ice-ufrag".</p> |
| NOTE: Media Interworking is optional for IMS-Ix and not required for CS-Ix. |                 |  |

## 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 [3] 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 [28]. Specifically in accordance with ITU-T Recommendation X.690 [28] section 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 TrGW and shall be supported by the IBCF 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   |
|----------------------------|--|--|
| Alternate MGC Id           | ServiceChange                            | The MGCIdToTry parameter in ITU-T Recommendation H.248.1 [3].  |
| Available Realms           | Termination State                        | According to <i>Available Realms</i> property in ITU-T Recommendation H.248.41 [14].   |
| BNC Release                | Events,<br>ObservedEvents<br>Descriptor  | As for the Events/ObservedEvents Descriptor in subclause E.1.2.1/ITU-T Recommendation H.248.1 [3] "Cause"  |
| Cause                      | ObservedEvents<br>Descriptor             | As for the ObservedEventsDescriptor Parameter in subclause E.1.2.1/ ITU-T Recommendation H.248.1 [3] "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 [14].   |
| Codec List                 | Local Descriptor or<br>Remote Descriptor | <fmt list> in a single SDP m-line.<br>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).<br>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          | Local Control                            | ITU-T Recommendation H.248.1 [3] Mode property.<br>Binary Encoding: Encoding as per ITU-T Recommendation H.248.1 Annex A [3] "streamMode"<br>Textual Encoding: Encoding as per ITU-T Recommendation H.248.1 Annex B [3]"streamMode".   |
| Context ID                 | NA                                       | Binary Encoding: As per ITU-T Recommendation H.248.1 [3] Annex A.<br>Textual Encoding: As per ITU-T Recommendation H.248.1 [3] Annex B.  |
| Delay Variation Tolerance  | Local Control                            | This is the tman/dvt property from ITU-T Recommendation H.248.53 [13]  |
| Diffserv Code Point        | Local Control                            | Defined according to the <i>Differentiated Services Code Point</i> property in ITU-T Recommendation H.248.52 [12].   |
| Diffserv Tagging Behaviour | Local Control                            | Defined according to the <i>Tagging Behaviour</i> property in ITU-T Recommendation H.248.52 [12].  |
| ECN Congestion Response    | Local descriptor or<br>Remote Descriptor | Defined according to "Congestion Response Method" property in ITU-T Recommendation H.248.82 [40]. (NOTE)   |
| ECN ECT Marking            | Local descriptor or<br>Remote Descriptor | Defined according to "ECT Marking" property in ITU-T Recommendation H.248.82 [40]. (NOTE)  |
| ECN Enabled                | Local Descriptor or<br>Remote Descriptor | Defined according to the "ECN Enabled" property in ITU-T Recommendation H.248.82 [40].   |
| ECN Failure                | Events,<br>Observed Events               | Defined according to the "ECN Failure" Event in ITU-T Recommendation H.248.82 [40].  |
| ECN Failure Type           | ObservedEvents<br>Descriptor             | As for the ObservedEventsDescriptor Parameter "Failure Type" in ITU-T Recommendation H.248.82 [40].  |
| ECN Initiation Method      | Local Descriptor or<br>Remote Descriptor | Defined according to "Initiation Method" property in ITU-T Recommendation H.248.82 [40].   |
| ECN Mode                   | Local Descriptor or<br>Remote Descriptor | Defined according to the "ECN Mode" property in ITU-T Recommendation H.248.82 [40]. (NOTE)   |
| ECN RTCP Feedback          | Local Descriptor or<br>Remote Descriptor | "rcfp-fb" SDP attribute with the "nack" feedback parameter as defined in IETF RFC 4585 and the "ecn" parameter value according to IETF RFC 6679 [35]   |
| ECN XR Summary Report      | Local Descriptor or<br>Remote Descriptor | "ecn-sum" value as defined in IETF RFC 6679 [35] within a "rtcp-xr" SDP attribute in accordance with IETF RFC 3611 [36]  |
| Emergency Call Indication  | NA                                       | ITU-T Recommendation H.248.1 [3] 6.1.1 Emergency Call Indicator<br>Binary Encoding: Encoding as per ITU-T Recommendation H.248.1 [3] Annex A "Emergency" context attribute<br>Textual Encoding: Encoding as per ITU-T Recommendation H.248.1 [3] Annex B "EmergencyToken" context attribute  |
| Extended Header for CVO    | Local Descriptor or<br>Remote Descriptor | "extmap" attribute in SDP a-line as defined in IETF RFC 5285 [41], see table 5.16.1.   |
| Generic Image Attribute    | Local Descriptor or<br>Remote Descriptor | "imageattr" attribute in SDP a-line as defined in IETF RFC 6236 [42], see table 5.16.1.  |
| ICE host candidate         | Local Descriptor                         | The "a=candidate" SDP attribute defined in IETF RFC 5245 [43] of   |

|  |  |   |
|--|--|---|
| request                                |  | 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 5245 [43]   |
| ICE lite indication                    | Local Descriptor                         | The "a=ice-lite" SDP attribute defined in IETF RFC 5245 [43].   |
| ICE password request                   | Local Descriptor                         | The "a=ice-pwd" SDP attribute defined in IETF RFC 5245 [43] with wildcard sign "\$".  |
| ICE password                           | Local Descriptor                         | The "a=ice-pwd" SDP attribute defined in IETF RFC 5245 [43].  |
| ICE received candidate                 | Remote Descriptor                        | The "a=candidate" SDP attribute defined in IETF RFC 5245 [43]   |
| ICE received password                  | Remote Descriptor                        | The "a=ice-pwd" SDP attribute defined in IETF RFC 5245 [43].  |
| ICE received Ufrag                     | Remote Descriptor                        | The "a=ice-ufrag" SDP attribute defined in IETF RFC 5245 [43].  |
| ICE Ufrag request                      | Local Descriptor                         | The "a=ice-ufrag" SDP attribute defined in IETF RFC 5245 [43] with wildcard sign "\$".  |
| ICE Ufrag                              | Local Descriptor                         | The "a=ice-ufrag" SDP attribute defined in IETF RFC 5245 [43].  |
| ICE Connectivity Check Result          | Events,<br>Observed Events               | Defined according to <i>Connectivity Check Result</i> event in ITU-T Recommendation H.248.50 [44].  |
| ICE Send Connectivity Check            | Signals                                  | Defined as the ostuncc/scc signal in ITU-T Recommendation H.248.50 [44].  |
| ICE New Peer Reflexive Candidate       | Events,<br>Observed Events               | Defined according to <i>New Peer Reflexive Candidate</i> event in ITU-T Recommendation H.248.50 [44], only applicable for full ICE.   |
| ICE Send Additional Connectivity Check | Signals                                  | Defined as the ostuncc/sacc signal in ITU-T Recommendation H.248.50 [44], only applicable for full ICE.   |
| Inactivity Timeout                     | Events,<br>Observed Events               | Defined according to <i>Inactivity Timeout</i> event in ITU-T Recommendation H.248.14 [19].   |
| IP Address                             | Local Descriptor or<br>Remote Descriptor | <connection address> in SDP "c-line"  |
| IP Interface                           | Local control                            | As for the property "IP interface type" in subclause 15.2.11.1 in 3GPP TS 29.232 [21]   |
| IP Realm Identifier                    | Local Control                            | According to <i>IP Realm Identifier</i> property in ITU-T Recommendation H.248.41 [14].   |
| IP Version                             | Local Descriptor or<br>Remote Descriptor | <address type> in SDP "c-line", see 5.15  |
| Maximum Burst Size                     | Local Control                            | This is the tman/mbs property from ITU-T Recommendation H.248.53 [13]   |
| Media Inactivity Detection             | Events,<br>Observed Events               | Defined according to IP Flow Stop Detection event in ITU-T Recommendation H.248.40 [27].  |
| Media Inactivity Detection Time        | Events                                   | As for the Event Parameter in ITU-T Recommendation H.248.40 [27] "Detection Time"   |
| Media Inactivity Detection Direction   | Events                                   | As for the Event Parameter in ITU-T Recommendation H.248.40 [27] "Direction"  |
| Media Type                             | Local Descriptor or<br>Remote Descriptor | <media> in SDP m-line "audio", "video" or "-"   |
| Overload Notification                  | Events,<br>Observed Events               | This is the chp/mgcon event from ITU-T Recommendation H.248.10 [20] or the ocp/mg_overload event from ITU-T Recommendation H.248.11 [16].   |
| Peak Data Rate                         | Local Control                            | This is the tman/pdr property from ITU-T Recommendation H.248.53 [13].  |
| Policing Required                      | Local Control                            | This is the tman/pol property from ITU-T Recommendation H.248.53 [13].  |
| Port                                   | Local Descriptor or<br>Remote Descriptor | <port> in SDP m-line.   |
| Priority Information                   | NA                                       | Priority Indicator (subclause 6.1.1 of ITU-T Recommendation H.248.1 [3])<br>Binary Encoding: Encoding as per ITU-T Recommendation H.248.1 [3] Annex A "priority" context attribute<br>Textual Encoding: Encoding as per ITU-T Recommendation H.248.1 [3] Annex B "priority" context attribute |
| Realm Availability Change              | Events,<br>Observed Events               | According to <i>Available Realms Changed</i> event in ITU-T Recommendation H.248.41 [14].   |
| Reduction                              | ObservedEvent<br>Descriptor              | As for the ObservedEventDescriptor in subclause 4.2.1/ ITU-T Recommendation H.248.10 [20] "MGCongestion".   |
| Remote Source Address Filtering        | Local Control                            | Defined according to <i>Remote Source Address Filtering</i> property in ITU-T Recommendation H.248.43 [6].  |
| Remote Source Address Mask             | Local Control                            | Defined according to <i>Remote Source Address Mask</i> property in ITU-T Recommendation H.248.43 [6].   |
| Remote Source Port Filtering           | Local Control                            | Defined according to <i>Remote Source Port Filtering</i> property in ITU-T Recommendation H.248.43 [6].   |
| Remote Source Port                     | Local Control                            | Defined according to <i>Remote Source Port</i> property in ITU-T  |

|   |                                       |  |
|---|---------------------------------------|--|
|   |                                       | Recommendation H.248.43 [6].   |
| Remote Source Port Range  | Local Control                         | Defined according to <i>Remote Source Port Range</i> property in ITU-T Recommendation H.248.43 [6].  |
| Reserve_Value   | Local Control                         | ITU-T Recommendation H.248.1 [3] Reserve property.<br>Binary Encoding: Encoding as per ITU-T Recommendation H.248.1[3] Annex A "reserveValue"<br>Textual Encoding: Encoding as per ITU-T Recommendation H.248.1 [3] Annex B "reservedValueMode". |
| ROOT Properties   | Termination State                     | The properties in subclause E.2.1/ITU-T Recommendation H.248.1 [3]   |
| RTCP allocation   | Local Control                         | Defined according to <i>RTCP Allocation Specific Behaviour</i> property in ITU-T Recommendation H.248.57 [5].  |
| 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 IBCF toward the TrGW.   |
| Stream Number   | Stream                                | Encoding as per ITU-T Recommendation H.248.1 [3]Annex B "Stream"/"ST".<br>For a single stream, this may be omitted by the CS-IBCF.   |
| STUN server request   | LocalControl                          | Encoding as per ITU-T Recommendation H.248.50 [44] "MG Act-as STUN Server" (mgastuns) package "Act-as STUN Server" (astuns, 0x0001) property.  |
| Sustainable Data Rate   | Local Control                         | This is the tman/sdr property from ITU-T Recommendation H.248.53 [13]  |
| Termination heartbeat   | Events ObservedEvents                 | As per <i>Termination Heartbeat</i> defined in ITU-T Recommendation H.248.36 [15] Clause 5.2.1.  |
| Termination ID  | NA                                    | Binary Encoding: As per ITU-T Recommendation H.248.1 [3] Annex A.<br>Textual Encoding: As per ITU-T Recommendation H.248.1 [3] Annex B.  |
| Transaction ID  | NA                                    | Binary Encoding: As per ITU-T Recommendation H.248.1 [3] Annex A.<br>Textual Encoding: As per ITU-T Recommendation H.248.1 [3] Annex B.  |
| Transport   | Local Descriptor or Remote Descriptor | <transport> in SDP m-line, see 5.15  |
| NOTE: This property is only signalled for IP terminations towards external IP network |                                       |  |

## 5.17.2 Call Related Procedures

### 5.17.2.1 General

This section describes the various call related procedures performed by the TrGW, which are listed in table 15.17.2.1.1

**Table 5.17.2.1.1: TrGW Call Related Procedures**

| <b>Transaction defined in 3GPP TS 29.235 [17] or 3GPP TS 29.162 [18]</b> | <b>Supported</b> | <b>Comment</b>  |
|--|------------------|---|
| Reserve TrGW Connection Point  | Mandatory        | See 5.17.2.2  |
| Configure TrGW Connection Point  | Mandatory        | See 5.17.2.3  |
| Reserve and Configure TrGW Connection Point                              | Mandatory        | See 5.17.2.4  |
| Release TrGW 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  |
| ECN Failure Indication   | Optional         | See 5.17.2.10   |
| Change Flow Direction  | Optional         | See 5.17.2.11   |
| ICE Connectivity Check Result Notification                               | Optional         | See 5.17.2.12<br>Only applicable if full ICE is supported |
| ICE New Peer Reflexive Candidate Notification                            | Optional         | See 5.17.2.13<br>Only applicable if full ICE is supported |

### 5.17.2.2 Reserve TrGW Connection Point

The IBCF sends an ADD request command as in Table 5.17.2.2.1.

Table 5.17.2.2.1: Reserve TrGW Connection Point Request

| Address Information  | Control information  | Bearer information  |
|--|--|---|
| Local Descriptor {<br>Port = \$<br>IP Address = \$<br>IP Version = IPv4 or IPv6<br>} | Transaction ID = x<br>If Context Requested:<br>Context ID= \$<br>If Emergency Call:<br>Emergency Call Indication<br><br>If MPS call/session:<br>Priority Indicator = x<br><br>If Context Provided:<br>Context ID = c1<br><br>Termination ID = \$<br>If Stream Number specified:-<br>Stream Number<br>If Resources for multiple Codecs<br>required:<br>Reserve_Value<br><br>If IP Interface Type:<br>IP interface = "IP interface type"<br><br>If indication on Bearer Released<br>requested:<br>NotificationRequested (Event ID =<br>x, "BNC Release ")<br><br>If diffserv required:-<br>Diffserv Code Point<br>If tagging behaviour<br>Diffserv Tagging Behaviour<br><br>If Remote Source Address Filtering<br>required:-<br>Remote Source Address Filtering<br>If Remote Source Address range<br>required:-<br>Remote Source Address Mask<br>If Remote Source Port Filtering<br>required:-<br>Remote Source Port Filtering<br>If individual port:-<br>Remote Source Port<br>If range of ports:<br>Remote Source Port Range<br><br>NotificationRequested (Event ID = x,<br>"termination heartbeat")<br><br>If multiple IP realms: IP realm<br>Identifier = required IP realm<br>identifier<br><br>If Media Inactivity Detection<br>Required:<br>NotificationRequested (Event ID =<br>x, "Media Inactivity Detection<br>(Media Inactivity Detection Time,<br>Media Inactivity Detection<br>Direction) ") (NOTE 1)<br><br>If Sustainable Data Rate Policing<br>Required:-<br>Policing Required<br>Sustainable Data Rate | Local Descriptor {<br>If media is "audio" or "video":<br>Codec List = Codec List<br>RTP Payloads = RTP Payload<br>Rtpbw<br>If RTCP bandwidth<br>RtcpbwRS<br>RtcpbwRR<br>If media is "video":<br>If CVO required:<br>Extended Header for CVO<br>(NOTE 4, NOTE 5)<br>If media is "video":<br>If imageattr negotiation:<br>Generic Image Attribute<br>(NOTE 6)<br><br>If ICE is applied:<br>ICE host candidate request<br>ICE password request<br>ICE Ufrag request<br>} |

|  |   |  |
|--|---|--|
|  | <p>Maximum Burst Size</p> <p>If peak data rate policing<br/>Policing Required<br/>Peak Data Rate<br/>If Delay Variation required<br/>Delay Variation Tolerance</p> <p>If RTCP handling required:<br/>RTCP allocation</p> <p>If ECN transparent support required:<br/>ECN Enable = "True"<br/>Initiation Method = "inactive"</p> <p>If ECN Endpoint support required<br/>ECN Enable = "True"<br/>Initiation Method = "ECN Initiation Method" NOTE 2</p> <p>Congestion Response = "ECN Congestion Response"<br/>NOTE 3</p> <p>ECN Mode = "ECN mode"<br/>NOTE 3</p> <p>ECT Marking = "ECN ECT marking" NOTE 3</p> <p>RTCP Feedback = "ECN RTCP Feedback" NOTE 3</p> <p>XR Summary Report = "ECN XR Summary Report" NOTE 3<br/>If notification of ECN Failure Report:<br/>NotificationRequested (Event ID = x, "ECN Failure")</p> <p>If ICE is applied:<br/>STUN server request</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"</p> <p>NOTE 3: For the IMS side/3GPP ECN profile terminations this property does not need to be signalled; default provisioned values are defined for this profile. For procedures to handle interworking between different ECN property settings see 3GPP TS 29.162 [18].</p> <p>NOTE 4: The support of the CVO feature is optional for the TrGW. The IBCF shall send the "extended RTP header for CVO" information element only with supported CVO URN(s) to the TrGW. If the TrGW does not support the CVO feature, the IBCF shall not send the "extended RTP header for CVO" information element to the TrGW.</p> <p>NOTE 5: If the TrGW 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 TrGW transcodes between video payloads and it supports the extended RTP header with CVO bits it shall keep the video orientation unchanged during the transcoding and convey received RTP header bytes on the outgoing RTP stream after transcoding associated packets as specified in 3GPP TS 26.114 [31], subclause 7.4.5.</p> <p>NOTE 6: The support of the generic image attributes is optional for the TrGW. The list of image sizes per payload type supported by the TrGW is preconfigured in the IBCF. If none of the image sizes received within an SDP body on Mx interface is supported by the TrGW then the IBCF shall not send the generic image attribute parameter to the TrGW.</p> |   |  |

Editor's Note: IP Interface Type needs to be further clarified in stage 2 – possible exclusion for IMS Ix.

On reserving the termination, the TrGW responds as in Table 5.17.2.2.2.

**Table 5.17.2.2.2: Reserve TrGW Connection Point Acknowledge**

| Address Information   | Control information   | Bearer information  |
|---|---|---|
| Local Descriptor {<br>Port<br>IP Address<br>IP Version<br>} | Transaction ID = x<br>Context ID = C1<br>Termination ID = T1<br>Stream Number | Local Descriptor {<br>If media is "audio" or "video":<br>Codec List<br>RTP Payloads<br>Rtpbw<br>If RTCP bandwidth<br>RtcpbwRS<br>RtcpbwRR<br>If media is "video":<br>If CVO extension header provided in the request:<br>Extended Header for CVO<br>If media is "video":<br>If image attribute negotiation:<br>Generic Image Attribute<br>If ICE is applied:<br>ICE host candidate<br>ICE password<br>ICE Ufrag<br>If ICE lite implementation<br>ICE lite indication<br>} |

**5.17.2.3 Configure TrGW Connection Point**

The IBCF sends a MODIFY request command as in Table 5.17.2.3.1.

**Table 5.17.2.3.1: Configure TrGW Connection Point Request**

| Address Information   | Control information  | Bearer information   |
|---|--|--|
| <p>If local resources are modified:<br/>                     Local Descriptor {<br/>                         Port<br/>                         IP Address<br/>                         IP Version<br/>                     }<br/>                     If remote resources are modified:<br/>                     Remote Descriptor {<br/>                         Port<br/>                         IP Address<br/>                         IP Version<br/>                     }</p> | <p>Transaction ID = x<br/>                     Context ID = C1<br/>                     Termination ID = T1<br/> <br/>                     If MPS priority is modified:<br/>                         Priority Indicator = x (NOTE 5)<br/> <br/>                     If Stream Number specified:<br/>                         Stream Number<br/> <br/>                     If Resources for multiple Codecs required:<br/>                         Reserve_Value<br/> <br/>                     If diffserv required:-<br/>                         Diffserv Code Point<br/>                     If tagging behaviour<br/>                         Diffserv Tagging Behaviour<br/> <br/>                     If Remote Source Address Filtering required:-<br/>                         Remote Source Address Filtering<br/>                         If Remote Source Address range required:-<br/>                             Remote Source Address Mask<br/>                         If Remote Source Port Filtering required:-<br/>                             Remote Source Port Filtering<br/>                             If individual port:-<br/>                                 Remote Source Port<br/>                             If range of ports:<br/>                                 Remote Source Port Range<br/> <br/>                     NotificationRequested (Event ID = x, "termination heartbeat")<br/> <br/>                     If multiple IP realms: IP realm Identifier = required IP realm (NOTE 1)<br/> <br/>                     If Media Inactivity Detection Required:<br/>                         NotificationRequested (Event ID = x, "Media Inactivity Detection (Media Inactivity Detection Time, Media Inactivity Detection Direction)") (NOTE 2)<br/> <br/>                     If Sustainable Data Rate Policing Required:-<br/>                         Policing Required<br/>                         Sustainable Data Rate<br/>                         Maximum Burst Size<br/> <br/>                     If peak data rate policing<br/>                         Policing Required<br/>                         Peak Data Rate<br/>                         If Delay Variation required<br/>                             Delay Variation Tolerance<br/> <br/>                     If RTCP handling required:<br/>                         RTCP allocation<br/> <br/>                     If ECN transparent support required:<br/>                         ECN Enable = "True"</p> | <p>If local resources are modified:<br/>                     Local Descriptor {<br/>                         If media is "audio" or "video":<br/>                             Codec List<br/>                             RTP Payloads<br/>                             Rtpbw<br/>                             If RTCP bandwidth<br/>                                 RtcpbwRS<br/>                                 RtcpbwRR<br/>                         If media is "video":<br/>                             If CVO required:<br/>                                 Extended Header for CVO (NOTE 6, NOTE 7)<br/>                         If media is "video":<br/>                             If imageattr negotiation:<br/>                                 Generic Image Attribute (NOTE 8)<br/>                     }<br/>                     If remote resources are modified:<br/>                     Remote Descriptor {<br/>                         If media is "audio" or "video":<br/>                             Codec List<br/>                             RTP Payloads<br/>                             Rtpbw<br/>                             If RTCP bandwidth<br/>                                 RtcpbwRS<br/>                                 RtcpbwRR<br/>                         If media is "video":<br/>                             If CVO required:<br/>                                 Extended Header for CVO (NOTE 6, NOTE 7)<br/>                         If media is "video":<br/>                             If imageattr negotiation:<br/>                                 Generic Image Attribute (NOTE 8)<br/>                     }<br/>                     If ICE is applied:<br/>                         ICE received candidate<br/>                         ICE received password<br/>                         ICE received Ufrag (NOTE 9)<br/>                     }</p> |



|   |  |  |
|---|--|--|
|   | <p>Initiation Method = "inactive"</p> <p>If ECN Endpoint support required<br/>         ECN Enable = "True"<br/>         Initiation Method = "ECN Initiation Method" NOTE 3</p> <p>Congestion Response = "ECN Congestion Response"<br/>         NOTE 4</p> <p>ECN Mode = "ECN mode"<br/>         NOTE 4</p> <p>ECT Marking = "ECN ECT marking" NOTE 4</p> <p>RTCP Feedback = "ECN RTCP Feedback" NOTE 4</p> <p>XR Summary Report = "ECN XR Summary Report" NOTE 4</p> <p>If notification of ECN Failure Report:<br/>         NotificationRequested (Event ID = x, "ECN Failure")</p> <p>If full ICE is applied:<br/>         Send Connectivity Check ("Control")<br/>         If notification of ICE Connectivity Check Result Report:<br/>         NotificationRequested (Event ID= xx, "Connectivity Check Result")<br/>         If notification of New Peer Reflexive Candidate:<br/>         NotificationRequested (Event ID = xy, "New Peer Reflexive Candidate ")<br/>         Send Additional Connectivity Check ("Control")</p> |  |
| <p>NOTE 1: This shall only be set to the same IP realm as at the reservation stage which is specified in Table 5.17.2.2.1. If a different IP realm is specified, the TrGW shall return error 501 "Not Implemented". Additional streams may be added by the Configure_TrGW_Connection_Point procedure. The additional streams shall then carry the same IP Realm Identifier as the first stream.</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".</p> <p>NOTE 4: For the IMS side/3GPP ECN profile terminations this property does not need to be signalled; default provisioned values are defined for this profile. For procedures to handle interworking between different ECN property settings see 3GPP TS 29.162 [18].</p> <p>NOTE 5: The support of the modification of the Priority Indicator value is optional for the TrGW and depends on implementation solution for Priority call/session authorisation (see 3GPP TS 29.162 [18]).</p> <p>NOTE 6: The support of the CVO feature is optional for the TrGW. The IBCF shall send the "extended RTP header for CVO" information element only with supported CVO URN(s) to the TrGW. If the TrGW does not support the CVO feature, the IBCF shall not send the "extended RTP header for CVO" information element to the TrGW.</p> <p>NOTE 7: If the TrGW 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 TrGW transcodes between video payloads and it supports the extended RTP header with CVO bits it shall keep the video orientation unchanged during the transcoding and convey received RTP header bytes on the outgoing RTP stream after transcoding associated packets as specified in 3GPP TS 26.114 [31], subclause 7.4.5.</p> |  |  |

NOTE 8: The support of the generic image attributes is optional for the TrGW. The list of image sizes per payload type supported by the TrGW is preconfigured in the IBCF. If none of the image sizes received within an SDP body on Mx interface is supported by the TrGW then the IBCF shall not send the generic image attribute parameter to the TrGW.

NOTE 9: The support of ICE received candidate, ICE received password, ICE received Ufrag are optional for ICE lite, as specified in 3GPP TS 29.162 [18].

The TrGW responds as in Table 5.17.2.3.2.

**Table 5.17.2.3.2: Configure TrGW Connection Point Request Acknowledge**

| Address Information  | Control information  | Bearer information  |
|--|--|---|
| If local resources were provided in request:<br>Local Descriptor {<br>Port<br>IP Address<br>IP Version<br>}<br>If remote resources are provided in request:<br>Remote Descriptor {<br>Port<br>IP Address<br>IP Version<br>} NOTE | Transaction ID = x<br>Context ID = C1<br>Termination ID = T1<br><br>If Stream Number Specified:<br>Stream Number | If local resources were provided in request:<br>Local Descriptor {<br>If media is "audio" or "video":<br>Codec List<br>RTP Payloads<br>Rtpbw<br>If RTCP bandwidth<br>RtcpbwRS<br>RtcpbwRR<br>If media is "video":<br>If CVO extension header provided in the request:<br>Extended Header for CVO<br>If media is "video":<br>If image attribute negotiation:<br>Generic Image Attribute<br>}<br><br>If remote resources are provided in request:<br>Remote Descriptor {<br>If media is "audio" or "video":<br>Codec List<br>RTP Payloads<br>Rtpbw<br>If RTCP bandwidth<br>RtcpbwRS<br>RtcpbwRR<br>If media is "video":<br>If CVO extension header provided in the request:<br>Extended Header for CVO<br>If media is "video":<br>If image attribute negotiation:<br>Generic Image Attribute<br>}<br>} NOTE |
| NOTE: Sending of the Remote Descriptor is optional   |  |   |

**5.17.2.4 Reserve and Configure TrGW Connection Point**

The IBCF sends an ADD request command as in Table 5.17.2.4.1.

Table 5.17.2.4.1: Reserve and Configure TrGW Connection Point Request

| Address Information  | Control information  | Bearer information   |
|--|--|--|
| Local Descriptor {<br>Port = \$<br>IP Address = \$<br>IP Version = IPv4 or IPv6<br>}<br>Remote Descriptor {<br>Port<br>IP Address<br>IP Version<br>} | Transaction ID = x<br>If Context Requested:<br>Context ID = \$<br>If Emergency Call:<br>Emergency Call Indication<br><br>If MPS call/session:<br>Priority Indicator = x<br><br>If Context Provided:<br>Context ID = c1<br><br>Termination ID = \$<br><br>If Stream Number Specified:<br>Stream Number<br>If Resources for multiple Codecs shall be reserved:<br>Reserve_Value<br><br>If IP Interface Type:<br>IP interface = "IP interface type"<br><br>If indication on Bearer Released requested:<br>NotificationRequested (Event ID = x, "BNC Release ")<br><br>If diffserv required:-<br>Diffserv Code Point<br>If tagging behaviour<br>Diffserv Tagging Behaviour<br><br>If Remote Source Address Filtering required:-<br>Remote Source Address Filtering<br>If Remote Source Address range required:-<br>Remote Source Address Mask<br><br>If Remote Source Port Filtering required:-<br>Remote Source Port Filtering<br>If individual port:-<br>Remote Source Port<br>If range of ports:<br>Remote Source Port Range<br><br>NotificationRequested (Event ID = x, "termination heartbeat")<br><br>If multiple IP realms: IP realm Identifier = required IP realm identifier<br><br>If Media Inactivity Detection Required:<br>NotificationRequested (Event ID = x, "Media Inactivity Detection (Media Inactivity Detection Time, Media Inactivity Detection Direction) ") (NOTE 1)<br><br>If Sustainable Data Rate Policing Required:- | Local Descriptor {<br>If media is "audio" or "video":<br>Codec List<br>RTP Payloads<br>Rtpbw<br>If RTCP bandwidth<br>RtcpbwRS<br>RtcpbwRR<br>If media is "video":<br>If CVO required:<br>Extended Header for CVO (NOTE 4, NOTE 5)<br>If media is "video":<br>If imageattr negotiation:<br>Generic Image Attribute (NOTE 6)<br>If ICE is applied:<br>ICE host candidate request<br>ICE password request<br>ICE Ufrag request<br>}<br><br>Remote Descriptor {<br>If media is "audio" or "video":<br>Codec List<br>RTP Payloads<br>Rtpbw<br>If RTCP bandwidth<br>RtcpbwRS<br>RtcpbwRR<br>If media is "video":<br>If CVO required:<br>Extended Header for CVO (NOTE 4, NOTE 5)<br>If media is "video":<br>If imageattr negotiation:<br>Generic Image Attribute (NOTE 6)<br>If ICE is applied:<br>ICE received candidate<br>ICE received password<br>ICE received Ufrag (NOTE 7)<br>} |

|  |   |  |
|--|---|--|
|  | <p>Policing Required<br/>Sustainable Data Rate<br/>Maximum Burst Size</p> <p>If peak data rate policing<br/>Policing Required<br/>Peak Data Rate<br/>If Delay Variation required<br/>Delay Variation Tolerance</p> <p>If RTCP handling required:<br/>RTCP allocation</p> <p>If ECN transparent support required:<br/>ECN Enable = "True"<br/>Initiation Method = "inactive"</p> <p>If ECN Endpoint support required<br/>ECN Enable = "True"<br/>Initiation Method = "ECN Initiation<br/>Method" NOTE 2</p> <p>Congestion Response = "ECN<br/>Congestion Response"<br/>NOTE 3<br/>ECN Mode = "ECN mode"<br/>NOTE 3<br/>ECT Marking = "ECN ECT<br/>marking" NOTE 3</p> <p>RTCP Feedback = "ECN RTCP<br/>Feedback" NOTE 3</p> <p>XR Summary Report = "ECN XR<br/>Summary Report" NOTE 3</p> <p>If notification of ECN Failure<br/>Report:<br/>NotificationRequested (Event<br/>ID<br/>= x, "ECN Failure")</p> <p>If ICE is applied:<br/>STUN server request<br/>If full ICE is applied<br/>Send Connectivity Check<br/>("Control")<br/>If notification of ICE Connectivity<br/>Check Result Report:<br/>NotificationRequested (Event<br/>ID = xx, "Connectivity Check<br/>Result")<br/>If notification of New Peer<br/>Reflexive Candidate:<br/>NotificationRequested (Event<br/>ID = xy, "New Peer Reflexive<br/>Candidate ")</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"</p> <p>NOTE 3: For the IMS side/3GPP ECN profile terminations this property does not need to be signalled; default provisioned values are defined for this profile. For procedures to handle interworking between different ECN property settings see 3GPP TS 29.162 [18].</p> <p>NOTE 4: The support of the CVO feature is optional for the TrGW. The IBCF shall send the "extended RTP header for CVO" information element only with supported CVO URN(s) to the TrGW. If the TrGW does not support the CVO feature, the IBCF shall not send the "extended RTP header for CVO" information element to the TrGW.</p> |   |  |

NOTE 5: If the TrGW 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 TrGW transcodes between video payloads and it supports the extended RTP header with CVO bits it shall keep the video orientation unchanged during the transcoding and convey received RTP header bytes on the outgoing RTP stream after transcoding associated packets as specified in 3GPP TS 26.114 [31], subclause 7.4.5.

NOTE 6: The support of the generic image attributes is optional for the TrGW. The list of image sizes per payload type supported by the TrGW is preconfigured in the IBCF. If none of the image sizes received within an SDP body on Mx interface is supported by the TrGW then the IBCF shall not send the generic image attribute parameter to the TrGW.

NOTE 7: The support of ICE received candidate, ICE received password, ICE received Ufrag are optional for ICE lite, as specified in 3GPP TS 29.162 [18].

The TrGW responds as in Table 5.17.2.4.2.

**Table 5.17.2.4.2: Reserve and Configure TrGW Connection Point Request Acknowledge**

| Address Information  | Control information   | Bearer information   |
|--|---|--|
| Local Descriptor {<br>Port<br>IP Address<br>IP Version<br>}<br>Remote Descriptor {<br>Port<br>IP Address<br>IP Version<br>} NOTE | Transaction ID = x<br>Context ID = C1<br>Termination ID = T1<br>Stream Number | Local Descriptor {<br>If media is "audio" or "video":<br>Codec List<br>RTP Payloads<br>Rtpbw<br>If RTCP bandwidth<br>RtcpbwRS<br>RtcpbwRR<br>If media is "video":<br>If CVO extension header provided in the request:<br>Extended Header for CVO<br>If media is "video":<br>If image attribute negotiation:<br>Generic Image Attribute<br>If ICE is applied:<br>ICE host candidate<br>ICE password<br>ICE Ufrag<br>If ICE lite implementation<br>ICE lite indication<br>}<br>Remote Descriptor {<br>If media is "audio" or "video":<br>Codec List<br>RTP Payloads<br>Rtpbw<br>If RTCP bandwidth<br>RtcpbwRS<br>RtcpbwRR<br>If media is "video":<br>If CVO extension header provided in the request:<br>Extended Header for CVO<br>If media is "video":<br>If image attribute negotiation:<br>Generic Image Attribute<br>} NOTE |
| NOTE: Sending of the Remote Descriptor is optional   |   |  |

**5.17.2.5 Release TrGW Termination**

The IBCF sends a SUBTRACT command as in Table 5.17.2.5.1.

**Table 5.17.2.5.1: Release TrGW Termination Request**

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

On releasing the termination, the TrGW responds as in Table 5.17.2.5.2

**Table 5.17.2.5.2: Release TrGW Termination Request Acknowledge**

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

### 5.17.2.6 Termination Heartbeat Indication

When the procedure "Termination heartbeat indication" is required the following procedure is initiated: the TrGW 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<br>Context ID = C1<br>Termination ID = T1<br><br>Event_ID (Event ID = x, "termination heartbeat") |                    |

When processing of the command is complete, the IBCF initiates the following procedure.

#### 5.17.2.6.2 NOT.resp (Termination heartbeat)

| Address Information | Control information  | Bearer information |
|---------------------|--|--------------------|
|                     | Transaction ID = x<br>Context ID = C1<br>Termination ID = T1 |                    |

The IBCF is in charge of correcting 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 TrGW 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<br>Context ID = C1<br>Termination ID = T1<br><br>Event_ID (Event ID = x, "BNC Release (Cause)") |                    |

When the processing of command is complete, the IBCF initiates the following procedure.

#### 5.17.2.7.2 NOT.resp (IP Bearer Released)

| Address Information | Control information  | Bearer information |
|---------------------|--|--------------------|
|                     | Transaction ID = x<br>Context ID = C1<br>Termination ID = T1 |                    |

#### 5.17.2.8 Media Inactivity Notification

When the procedure "Media Inactivity Notification" is required the following procedure is initiated: the TrGW 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<br>Context ID = C1<br>Termination ID = T1<br><br>Event_ID (Event ID = x, "Media Inactivity Detection") |                    |

When the processing of command is complete, the IBCF initiates the following procedure.

##### 5.17.2.8.2 NOT.resp (Media Inactivity)

| Address Information | Control information  | Bearer information |
|---------------------|--|--------------------|
|                     | Transaction ID = x<br>Context ID = C1<br>Termination ID = T1 |                    |

#### 5.17.2.9 Change Through Connection

The IBCF 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<br>If Context Requested:<br>Context ID = \$<br>If Context Provided:<br>Context ID = c1<br><br>If Termination Requested:<br>Termination ID = \$<br>If Termination Provided:<br>Termination ID = T1<br><br>Through-Connection = Connectivity Mode |                    |

The TrGW 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<br>Context ID = C1<br>Termination ID = T1 |                    |

### 5.17.2.10 ECN FailureIndication

The TrGW sends a NOTIFY request command as in Table 5.17.2.10.1.

**Table 5.17.2.10.1: ECN Failure Indication**

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

The IBCF responds as in Table 5.17.2.10.2

**Table 5.17.2.10.2: ECN Failure Indication Ack**

| Address Information | Control information  | Bearer information |
|---------------------|--|--------------------|
|                     | Transaction ID = x<br>Context ID = C1<br>Termination ID = T1 |                    |

### 5.17.2.11 Change Flow Direction

The TrGW sends an ADD or a MODIFY request command as in Table 5.17.2.11.1.

#### 5.17.2.11.1 Change Flow Direction

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

The IBCF responds as in Table 5.17.2.11.2.



### 5.17.2.11.2 Change Flow Direction Acknowledge

| Address Information | Control information  | Bearer information |
|---------------------|--|--------------------|
|                     | Transaction ID = x<br>Context ID = C1<br>Termination ID = T1 |                    |

### 5.17.2.12 ICE Connectivity Check Result Notification

The TrGW 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<br>Context ID = C1<br>Termination ID = T1<br><br>Event_ID (Event ID = x,<br>" Connectivity Check Result<br>(Candidate/Transport Pair)") |                    |

The IBCF 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<br>Context ID = C1<br>Termination ID = T1 |                    |

### 5.17.2.13 ICE New Peer Reflexive Candidate Notification

The TrGW 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<br>Context ID = C1<br>Termination ID = T1<br><br>Event_ID (Event ID = x,<br>" New Peer Reflexive Candidate<br>(Candidate)") |                    |

The IBCF 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<br>Context ID = C1<br>Termination ID = T1 |                    |

## 5.17.3 Non-Call Related Procedures

### 5.17.3.1 General

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

**Table 5.17.3.1.1: TrGW Non-Call Related Procedures**

| Transaction defined in 3GPP TS 29.235 [17] or 3GPP TS 29.162 [18]  | Support           | Comment  |
|--|-------------------|--|
| TrGW Out of service  | Mandatory         | 5.17.3.2   |
| TrGW Communication Up  | Mandatory         | 5.17.3.3   |
| TrGW Restoration   | Mandatory         | 5.17.3.4   |
| TrGW Register  | Mandatory         | 5.17.3.5   |
| TrGW Re-register   | Optional (NOTE 3) | 5.17.3.6   |
| IBCF Ordered Re-register   | Optional (NOTE 3) | 5.17.3.7   |
| IBCF Restoration   | Optional          | 5.17.3.8   |
| IBCF 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 |
| TrGW Capability Change   | Optional          | 5.17.3.12  |
| TrGW Resource Congestion Handling – Activate   | Optional          | 5.17.3.13  |
| TrGW 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 IBCF.<br>NOTE 2: The "Termination Out-of-Service procedure" is also used as a call-related H.248 command<br>NOTE 3: Support of this procedure is mandatory in the TrGW.<br>NOTE 4: Support of this procedure is mandatory in the TrGW if UDP transport is supported. |                   |  |

### 5.17.3.2 TrGW Out Of Service

The TrGW sends a SERVICE CHANGE request command as in Table 5.17.3.2.1.

**Table 5.17.3.2.1: TrGW Out Of Service Request**

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

The IBCF responds as in Table 5.17.3.2.2.

**Table 5.17.3.2.2: TrGW Out Of Service Request Ack**

| Address Information | Control information   | Bearer information |
|---------------------|---|--------------------|
|                     | Transaction ID = x<br>Context ID = -<br>Termination ID = ROOT |                    |

### 5.17.3.3 TrGW Communication Up

The TrGW sends a SERVICE CHANGE request command as in Table 5.17.3.3.1 to the IBCF address to which the control link association was previously established.

**Table 5.17.3.3.1: TrGW Communication Up**

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

The IBCF 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: TrGW Communication Up Ack**

| Address Information | Control information   | Bearer information |
|---------------------|---|--------------------|
|                     | Transaction ID = x<br>Context ID = -<br>Termination ID = ROOT<br>If required to register to new IBCF:<br>Alternate MGC Id |                    |

### 5.17.3.4 TrGW Restoration

When the TrGW has recovered, the TrGW sends a SERVICE CHANGE as in Table 5.17.3.4.1,

**Table 5.17.3.4.1: TrGW Restoration**

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

The IBCF responds as in Table 5.17.3.4.2.

**Table 5.17.3.4.2: TrGW Restoration Ack**

| Address Information | Control information  | Bearer information |
|---------------------|--|--------------------|
|                     | Transaction ID = x<br>Context ID = -<br>Termination ID = ROOT<br>If required to register to new IBCF :<br>Alternate MGC Id |                    |

### 5.17.3.5 TrGW Register

The TrGW sends a SERVICE CHANGE request command as in Table 5.17.3.5.1.

**Table 5.17.3.5.1: TrGW Register**

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

The IBCF responds as in Table 5.17.3.5.2.

**Table 5.17.3.5.2: TrGW Register Ack**

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

### 5.17.3.6 TrGW Re-Register

The TrGW sends a SERVICE CHANGE request command as in Table 5.17.3.6.1.

**Table 5.17.3.6.1: Re-Registration**

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

The IBCF responds as in Table 5.17.3.6.2.

**Table 5.17.3.6.2: Re-Registration Ack**

| Address Information   | Control information   | Bearer information |
|---|---|--------------------|
|   | Transaction ID = x<br>Context ID = -<br>Termination ID = ROOT<br>If applicable (NOTE 1):<br>H248 Protocol Version<br>If applicable:-<br>H248 Profile Identity<br>If required to register to a new IBCF:<br>Alternate MGC Id |                    |
| NOTE 1: The IBCF shall include the H.248 Protocol Version if the protocol version it supports or offers is lower than that proposed by the TrGW. The IBCF may include the H.248 Protocol Version if the protocol version it supports or offers is the protocol version proposed by the TrGW.              |   |                    |
| NOTE 2: The ServiceChangeMGCIId parameter may be returned in the TrGW Re-register response. If present in the response, the TrGW shall not consider itself registered and should preferably attempt to re-register with the IBCF specified in the ServiceChangeMgclid before any further alternate IBCFs. |   |                    |

### 5.17.3.7 IBCF Ordered Re-register

The IBCF sends a SERVICE CHANGE request command as in Table 5.17.3.7.1.

**Table 5.17.3.7.1: IBCF Ordered Re-Register**

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

The TrGW responds as in Table 5.17.3.7.2.

**Table 5.17.3.7.2: IBCF Ordered Re-Register Ack**

| Address Information | Control information   | Bearer information |
|---------------------|---|--------------------|
|                     | Transaction ID = x<br>Context ID = -<br>Termination ID = ROOT |                    |

The TrGW then performs a TrGW Re-Register procedure according to Clause 5.17.3.6.

### 5.17.3.8 IBCF Restoration

When the IBCF has recovered, the IBCF sends a SERVICE CHANGE as in Table 5.17.3.8.1,

**Table 5.17.3.8.1: IBCF Restoration**

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

The TrGW responds as in Table 5.17.3.8.2.

**Table 5.17.3.8.2: IBCF Restoration Ack**

| Address Information | Control information   | Bearer information |
|---------------------|---|--------------------|
|                     | Transaction ID = x<br>Context ID = -<br>Termination ID = ROOT |                    |

### 5.17.3.9 IBCF Out of Service

The IBCF sends a SERVICE CHANGE request command as in Table 5.17.3.9.1.

**Table 5.17.3.9.1: BCF Out Of Service**

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

The TrGW responds as in Table 5.17.3.9.2.

**Table 5.17.3.9.2: IBCF Out Of Service Ack**

| Address Information | Control information   | Bearer information |
|---------------------|---|--------------------|
|                     | Transaction ID = x<br>Context ID = -<br>Termination ID = ROOT |                    |

### 5.17.3.10 Audit Value

The IBCF 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<br>Context ID= -/ALL/C1<br>Termination ID =<br>ROOT/ALL/T1/PartialWildcard<br>(NOTE 4, NOTE5)<br><br>Audit Packages (NOTE 1)<br><br>Audit Descriptor =<br>IndAuditParameter:=<br>IndAudMediaDescriptor:=<br>IndAudTerminationStateDescriptor:=<br>serviceState<br><br>Audit Descriptor = Empty (NOTE 2)<br><br>Audit Descriptor =<br>IndAuditParameter:=<br>IndAudMediaDescriptor:=<br>IndAudTerminationStateDescriptor:=<br>Available Realms (NOTE 3)<br><br>Audit Descriptor =<br>IndAuditParameter:=<br>IndAudMediaDescriptor:=<br>IndAudTerminationStateDescriptor:=<br>ROOT properties (NOTE 6) |                    |
| NOTE 1: Packages is for Null/Root Combination.<br>NOTE 2: Used for control association monitoring.<br>NOTE 3: Used for auditing available IP realms<br>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/*").<br>NOTE 5: Partial wildcard shall only be used when text encoding is used on the H.248 interface.<br>NOTE 6: Used for auditing ROOT properties. |   |                    |

The TrGW 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<br>Context ID = -/C1<br>Termination ID = ROOT/T1<br>Packages List<br>serviceState<br>Available Realms<br>ROOT Properties |                    |

Upon reception of the command in the TrGW:

- 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 TrGW / IBCF sends a response to any command.req with the following information.

**Table 5.17.3.11.1: ANYcommand.resp (command reject) TrGW/IBCF to IBCF/TrGW**

| Address Information | Control information   | Bearer information |
|---------------------|---|--------------------|
|                     | Transaction ID = z<br>Context ID = c1 or no context<br>Termination ID = T1 or no termination ID<br><br>Reason=Error |                    |

### 5.17.3.12 TrGW Capability Change

The TrGW sends a SERVICE CHANGE request command as in Table 5.17.3.12.1.

**Table 5.17.3.12.1: Capability Update**

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

The IBCF responds as in table 5.17.3.12.2.

**Table 5.17.3.12.2 Capability Update Ack**

| Address Information | Control information   | Bearer information |
|---------------------|---|--------------------|
|                     | Transaction ID = x<br>Context ID = -<br>Termination ID = ROOT |                    |

### 5.17.3.13 TrGW Resource Congestion Handling – Activate

The IBCF sends a MODIFY request command as in Table 5.17.3.13.1



**Table 5.17.3.13.1: TrGW Resource Congestion Handling – Activate**

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

The TrGW responds as in Table 5.17.3.13.2.

**Table 5.17.3.13.2: TrGW Resource Congestion Handling – Activate Ack**

| Address Information | Control information   | Bearer information |
|---------------------|---|--------------------|
|                     | Transaction ID = x<br>Context ID = -<br>Termination ID = ROOT |                    |

#### 5.17.3.14 TrGW Resource Congestion Handling – Indication

The TrGW sends a NOTIFY request command as in Table 5.17.3.14.1

**Table 5.17.3.14.1: TrGW Resource Congestion Handling – Indication**

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

The IBCF responds as in Table 5.17.3.14.2

**Table 5.17.3.14.2: TrGW Resource Congestion Handling – Indication Ack**

| Address Information | Control information   | Bearer information |
|---------------------|---|--------------------|
|                     | Transaction ID = x<br>Context ID = -<br>Termination ID = ROOT |                    |

#### 5.17.3.15 Inactivity Timeout – Activation

The IBCF 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<br>Context ID= NULL<br>Termination ID = ROOT<br><br>NotificationRequested (Event ID = x, "Inactivity Timeout") |                    |

The TrGW 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<br>Context ID = NULL<br>Termination ID = ROOT |                    |

### 5.17.3.16 Inactivity Timeout – Indication

The TrGW 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<br>Context ID= NULL<br>Termination ID = ROOT<br>Event_ID (Event ID = x, "Inactivity Timeout") |                    |

The IBCF 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<br>Context ID = NULL<br>Termination ID = ROOT |                    |

### 5.17.3.17 Realm Availability Change – Activation

The IBCF 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<br>Context ID= -<br>Termination ID = ROOT<br><br>NotificationRequested (Event ID = x, "Realm Availability Change") |                    |

The TrGW 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<br>Context ID = -<br>Termination ID = ROOT |                    |

**5.17.3.18 Realm Availability Change – Indication**

The TrGW 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<br>Context ID = -<br>Termination ID = ROOT<br><br>Event_ID (Event ID = x,<br>"Realm Availability Change<br>(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 IBCF 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<br>Context ID = -<br>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 TrGW 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<br>Context ID = C1/ALL<br>Termination ID = T1 or Wildcarded<br>Termination (NOTE)<br>SC Method = FORCED<br>SC Reason = 904 ("Termination<br>Malfunction") or 905 ("Termination<br>Taken OOS") or 906 ("Loss of Lower<br>Layer Connectivity"), or 907<br>("Transmission Failure") or 910<br>("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 IBCF 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<br>Context ID = C1/ALL<br>Termination ID = As received |                    |

## Annex A (informative): Illustration of Gate/Pinhole Concept

### A.1 General

The purpose of this informative annex is the illustration of the H.248 Stream/Termination model by showing exemplary realisations of gates for unidirectional versus bidirectional media flows.

Only point-to-point sessions are in scope of this H.248 Profile (see clause 5.4). Interconnection of individual H.248 Streams is based on the basic principle described in clause 7.1.6/ ITU-T Recommendation H.248.1 [3]. The H.248 Multiplex Descriptor is therefore not necessary (see clause 5.6.2). The H.248 Topology Descriptor definition includes individual H.248 Streams, but is also not necessary (see clause 5.7.8).

NOTE: all sessions have unicast media flows. Potential multicast applications are transparent for MG point of view.

### A.2 Relationships between gates and H.248 Streams

The realization of a gate is illustrated in figure A.2.1. There is a unidirectional media flow in that example, and there is a single H.248 Stream per Termination. A **H.248 Stream** covers per definition a single **bidirectional** media flow (clause 7.1.6/ITU-T Recommendation H.248.1 [3]). Media flows are interconnected by using the same **StreamID** (here: StreamID equals to S1 for T1 and T2).

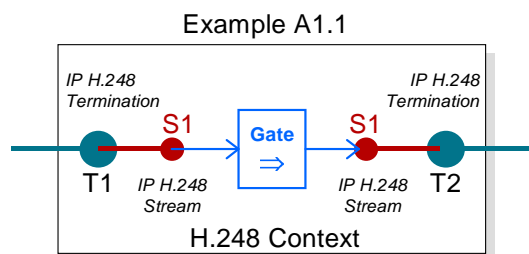


Figure A.2.1: H.248 Context - Illustration of Gate, Stream and Terminations

The uni- or bidirectional application of an H.248 Streams is controlled via usage of Local Descriptor (LD) and Remote Descriptor (RD). Figure A.2.2 shows a bidirectional session. There is again a single H.248 Stream per Termination. Gates are direction-dependent, there are consequently two gates in this example.

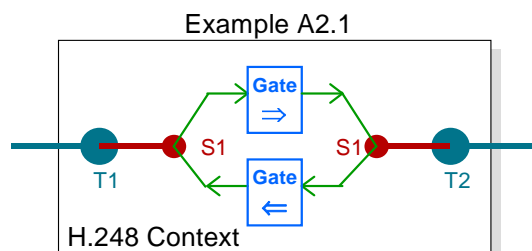


Figure A.2.2: H.248 Context Bidirectional Session using single H.248 Streams

## Annex B (informative): Void

## Annex C (informative): Change history

| Change history |       |           |           |      |   |        |        |  |
|----------------|-------|-----------|-----------|------|---|--------|--------|--|
| Date           | TSG # | TSG Doc.  | CR        | Rev  | Subject/Comment   | Old    | New    |  |
| 2009-12        | CT#46 | CP-090821 |           |      | 3GPP TS Presented for approval in CT#46                                     | 2.0.0  | 9.0.0  |  |
| 2010-03        | CT#47 | CP-100043 | 0006      | 1    | Another Reference Tidy-Up   | 9.0.0  | 9.1.0  |  |
|                |       |           | 0007      | 1    | ServiceChange Correction  |        |        |  |
|                |       |           | 0008      | 1    | Termination Type Alignment  |        |        |  |
|                |       |           | 0009      | 1    | Error Code Additions  |        |        |  |
|                |       |           | 0010      |      | Returned SDP Properties   |        |        |  |
|                |       |           | 0011      | 1    | Package Usage   |        |        |  |
|                |       |           | 0012      | 2    | Call Related Procedures   |        |        |  |
|                |       |           | 0013      | 1    | Non-Call Related Procedures   |        |        |  |
|                |       |           | 0014      | 1    | Clean-up Proposals  |        |        |  |
|                |       |           | 0015      |      | Resolution of Editor's Notes  |        |        |  |
| 2010-06        | CT#48 | CP-100289 | 0016      | 1    | Transport protocol to be indicated to gateway for end-to-end media security | 9.1.0  | 9.2.0  |  |
|                |       |           | CP-100283 | 0017 | 1   |        |        | Handling of Stream mode  |
|                |       |           | CP-100283 | 0018 | 1   |        |        | Package Updates  |
|                |       |           | CP-100283 | 0019 | 1   |        |        | Descriptor Updates   |
| 2010-09        | CT#49 | CP-100460 | 0020      |      | Procedures for Emergency indicator  | 9.2.0  | 9.3.0  |  |
|                |       |           | 0021      |      | Priority indicator  |        |        |  |
| 2011-03        | CT#51 | CP-110274 | 0022      | 10   | ECN Support in Ix Interface   | 9.3.0  | 10.0.0 |  |
|                |       |           | CP-110058 | 0023 | 1   |        |        | Handling of rtcp-fb SDP attribute and SDP attribute for RTCP APP feedback messages |
| 2011-06        | CT#52 | CP-110368 | 0024      |      | ECN Failure improvements  | 10.0.0 | 10.1.0 |  |
|                |       |           | 0026      | 1    | Interworking with Non-3GPP ECN networks                                     |        |        |  |
|                |       |           | 0027      | 1    | Alignment of 3GPP profiles with SG16 ECN package definition                 |        |        |  |
| 2011-09        | CT#53 | CP-110564 | 0028      | 1    | Incorporation of latest ITU-T ECN package and proposed ammendment           | 10.1.0 | 10.2.0 |  |
| 2011-12        | CT#54 | CP-110798 | 0029      | 1    | Adding of stage 3 for ATCF/ATGW function                                    | 10.2.0 | 10.3.0 |  |
|                |       |           | CP-110796 | 0030 |   |        |        | Update of reference to H.248.52  |
|                |       |           | CP-110789 | 0031 | 1   |        |        | ECN Improvements   |
|                |       |           | CP-110789 | 0032 |   |        |        | Missing "rtcp-xr" SDP attribute in Table about Optional SDP Information Elements   |
| 2012-06        | CT#56 | CP-120226 | 0033      | 1    | Reference update: draft-ietf-avtcore-ecn-for-rtp                            | 10.3.0 | 10.4.0 |  |
| 2012-09        | CT#57 | CP-120478 | 0034      | 3    | Support of Multimedia Priority Service (MPS) over Ix Interface – Stage 3    | 10.4.0 | 11.0.0 |  |
| 2012-12        | CT#58 | CP-120723 | 0040      | 1    | Ix interface updates of ECN Support Package                                 | 11.0.0 | 11.1.0 |  |

|         |       |           |      |   |  |        |        |
|---------|-------|-----------|------|---|--|--------|--------|
|         |       | CP-120734 | 0041 | 3 | Support of Multimedia Priority Service (MPS) in Modify over Ix Interface – Stage 3 |        |        |
| 2013-06 | CT#60 | CP-130294 | 0043 | 2 | Replacement of ECN for RTP-over-UDP Support package                                | 11.1.0 | 11.2.0 |
| 2013-09 | CT#61 | CP-130452 | 0048 | 3 | Introduction of support for Coordination of Video Orientation (CVO)                | 11.2.0 | 12.0.0 |
|         |       | CP-130471 | 0049 | 3 | Introduction of support for Generic Image Attribute/signalling of image size       |        |        |
| 2014-03 | CT#63 | CP-140025 | 0050 | 1 | Clarification on CVO handling  | 12.0.0 | 12.1.0 |
|         |       | CP-140037 | 0051 | 1 | Clarification on SIS handling  |        |        |
| 2014-06 | CT#64 | CP-140248 | 0052 | 3 | ICE support in Ix interface  | 12.1.0 | 12.2.0 |
| 2014-09 | CT#65 | CP-140520 | 0053 | 1 | Corrections to Transport Protocol table  | 12.2.0 | 12.3.0 |
|         |       | CP-140520 | 0054 | 1 | TrGW Capability Change   |        |        |



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## History

| <b>Document history</b> |              |             |
|-------------------------|--------------|-------------|
| V12.3.0                 | October 2014 | Publication |
|                         |              |             |
|                         |              |             |
|                         |              |             |
|                         |              |             |