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Technical Specification

3rd Generation Partnership Project;
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H.248 Profile for controlling Trunking Media Gateways;
Protocol specification
(Release 8)

GLOBAL SYSTEM FOR
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Foreword

This Technical Specification (TS) was been produced by ETSI Technical Committee Telecommunications and Internet converged Services and Protocols for Advanced Networking (TISPAN) and originally published as ETSI ES 283 024 [30]. It was transferred to the 3rd Generation Partnership Project (3GPP) in in March 2008.

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

Version x.y.z

where:

x the first digit:

1 presented to TSG for information;

2 presented to TSG for approval;

3 or greater indicates TSG approved document under change control.

y the second digit is incremented for all changes of substance, i.e. technical enhancements, corrections, updates, etc.

z the third digit is incremented when editorial only changes have been incorporated in the document.

1 Scope

The present document defines the profile of the Gateway Control Protocol (ITU-T Recommendation H.248.1 [3]), for controlling Trunking Media Gateways (TMGW) for both the PSTN/ISDN Emulation and IMS Core Subsytems. Thus the scope of this Profile is a subset of the 3GPP profile for the Mn interface defined in TS 129 332 [2].

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*.

Referenced documents which are not found to be publicly available in the expected location might be found at http://docbox.etsi.org/Reference.

NOTE: While any hyperlinks included in this clause were valid at the time of publication ETSI cannot guarantee their long term validity.

[1] ITU-T Recommendation H.248.1 (09/2005): "Gateway control protocol: Version 3".

[2] ETSI TS 129 332: "Universal Mobile Telecommunications System (UMTS); Media Gateway Control Function (MGCF) - IM Media Gateway (IM-MGW) Mn interface; Stage 3 (3GPP TS 29.332 version 6.2.0 Release 6)".

[3] ITU-T Recommendation H.248.1 (05/2002) and Corrigendum 1 for Version 2 (03/2004): "Gateway Control Protocol: Version 2".

[4] ITU-T Recommendation H.248.4 (03/2002): "Gateway control protocol: Transport over Stream Control Transmission Protocol (SCTP)".

[5] ITU-T Recommendation H.248.7 (11/2000): "Gateway control protocol: Generic announcement package".

[6] ITU-T Recommendation H.248.8 (09/2005): "Gateway control protocol: Error code and service change reason description ".

[7] ITU-T Recommendation H.248.10 (07/2001): "Gateway control protocol: Media gateway resource congestion handling package".

[8] ITU-T Recommendation H.248.11 (11/2002): "Gateway control protocol: Media gateway overload control package".

[9] ITU-T Recommendation H.248.14 (03/2002): "Gateway control protocol: Inactivity timer package".

[10] ITU-T Recommendation H.248.45 (05/2006): "Gateway control protocol: MGC information package".

[11] IETF RFC 3551: "RTP Profile for Audio and Video Conferences with Minimal Control".

[12] IETF RFC 3555: "MIME Type Registration of RTP Payload Formats".

[13] IETF RFC 2833: "RTP Payload for DTMF Digits, Telephony Tones and Telephony Signals".

[14] IETF RFC 3389: "Real-time Transport Protocol (RTP) Payload for Comfort Noise (CN)".

[15] IETF RFC 4040: "RTP Payload Format for a 64 kbit/s Transparent Call".

[16] IETF RFC 3556: "Session Description Protocol (SDP) Bandwidth Modifiers for RTP Control Protocol (RTCP) Bandwidth".

[17] IETF RFC 3332: "Signalling System 7 (SS7) Message Transfer Part 3 (MTP3) - User Adaptation Layer (M3UA)".

[18] IETF RFC 2960: "Stream Control Transmission Protocol".

[19] IETF RFC 768: "User Datagram Protocol".

[20] ETSI TS 129 202: "Universal Mobile Telecommunications System (UMTS); Signalling System No. 7 (SS7) signalling transport in core network; Stage 3 (3GPP TS 29.202 version 6.0.0 Release 6)".

[21] ITU-T Recommendation V.152 (01/2005): "Procedures for supporting voice-band data over IP networks".

[22] Corrigendum 1 to ITU-T Recommendation V.152 (09/2005) [21].

[23] IETF RFC 3261: "SIP: Session Initiation Protocol".

[24] ITU-T Recommendations Q.761 to Q.764 (12/1999): "Specifications of Signalling System No.7 ISDN User Part (ISUP)".

[25] ETSI TS 129 232: "Universal Mobile Telecommunications System (UMTS); Media Gateway Controller (MGC) - Media Gateway (MGW) interface; Stage 3 (3GPP TS 29.232) Release 6".

[26] IETF RFC 4234: "Augmented BNF for Syntax Specifications: ABNF".

[27] ETSI TS 129 163: "Digital cellular telecommunications system (Phase 2+); Universal Mobile Telecommunications System (UMTS); Interworking between the IP Multimedia (IM) Core Network (CN) subsystem and Circuit Switched (CS) networks (3GPP TS 29.163 Release 7)".

[28] Corrigendum 1 to ITU-T Recommendation H.248.4 [4] (03/2004).

[29] ITU-T Recommendation H.248.33 (01/2005): "Gateway control protocol: PCM frame spare bit package".

[30] ETSI ES 283 024 V1.1.4: "Protocols for Advanced Networking (TISPAN); H.248 Profile for controlling Trunking Media Gateways; Protocol specification".

3 Definitions and abbreviations

3.1 Definitions

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

IP Port: source and destination port numbers for UDP, SCTP and TCP traffic ("IMS/NGN")

Termination: ephemeral H.248 Termination for RTP/UDP/IP-based media transport

NOTE 1: The different Termination types denoting specific interworking with different NGN subsystems (e.g. IMS, PES, BICN). All Termination types sharing the common bearer technology with UDP/IP for transport and RTP as application level framing protocol (see note 2). This is expressed in the present document in some places by using the term "IMS/NGN" (Termination).

NOTE 2: The specific difference on application level framing protocol itself, - RTP with 3GPP-specific framing protocols or RTP with native framing according IETF RFCs, is not relevant in the scope of the present document.

TMGW Port: single physical interface at a Trunking Media GateWay (TMGW)

NOTE 1: This may be a circuit-oriented interface (e.g. PDH, SDH, SONET), or a packet-oriented interface (e.g. Ethernet) in the scope of this H.248 Profile. There are therefore transmission technology dependent types: e.g. PDH Port, SDH Port, SONET Port, Ethernet Port.

NOTE 2: A "port" relates to **multiple** "H.248 Terminations" in general.

Trunk: See clause 3.10 of ITU-T Recommendation H.248.1 [1].

Trunking GateWay (TGW): See clause 3.11 of ITU-T Recommendation H.248.1 [1].

Trunking Media GateWay (TMGW): H.248 Media Gateway (MGW) part of the TGW

3.2 Abbreviations

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

3GPP	3rd Generation Partnership Project
CAS	Channel Associated Signalling
CN	Core Network
CS	Circuit-Switched
CSN	Circuit-Switched Network
DTMF	Dual Tone Multi Frequency
FFS	For Further Study
IETF	Internet Engineering Task Force
IM	IP Multimedia
IMS	IP Multimedia Subsystem
IP	Internet Protocol
ISDN	Integrated Services Digital Network
ISUP	ISDN User Part (SS7)
MG/MGW	Media GateWay
MGC	Media Gateway Controller
MGCF	MGC Function
NGN	New Generation Networks
PDH	Plesiochronous Digital Hierarchy
PES	PSTN/ISDN Emulation Subsystem
PSTN	Public Switched Telephone Network
PT	Payload Type
R1	(ETSI TISPAN NGN) Release 1
RFC	Request For Comment (IETF)
RTCP	RTP Control Protocol
RTP	Real-Time Transport Protocol
SCTP	Stream Control Transmission Protocol
SDH	Synchronous Digital Hierarchy
SDP	Session Description Protocol
SIP	Session Initiation Protocol
SONET	Synchronous Optical NETwork
SS	Silence Suppression
SS7	Signalling System no. 7
TDM	Time Division Multiplexing
TGW	Trunking GateWay
TISPAN	Telecommunications and Internet converged Services and Protocols for Advanced Networking
TMGW	Trunking MGW
TS	Technical Specification (3GPP, ETSI)
VBD	VoiceBand Data

4 Applicability

4.1 Architecture

Figure 1 illustrates the architecture assumed in the present document. It is assumed that call control signalling on the PSTN/ISDN side is ISUP [24], while the call/session control signalling on the IP side is SIP. The SIP is defined by RFC 3261 [23].
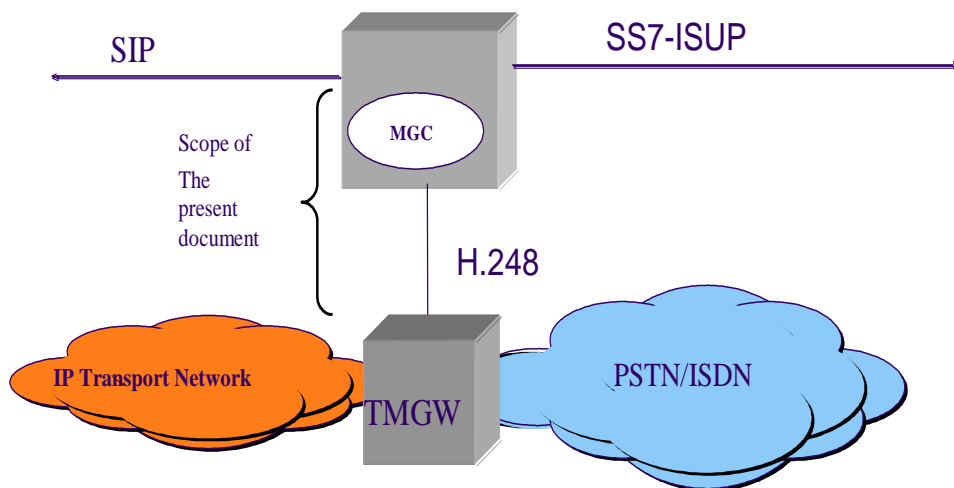
Figure 1: Reference architecture

The reference architecture applies to both PSTN/ISDN Simulation (IMS Architecture; ETSI TISPAN IMS) and Emulation Subsystem (ETSI TISPAN PES).

5 Profile description

5.1 Profile identification

Table 1: Profile version

Profile name	etsi_tgw
Version	1

5.2 Summary

This Profile describes the minimum mandatory settings and procedures required to fulfil the media gateway control requirements for the interworking scenario between NGN subsystems and PSTN/ISDN (i.e. ETSI PES-PSTN/ISDN and ETSI IMS-PSTN/ISDN).

5.3 Gateway control protocol version

ITU-T Recommendation H.248.1 [3] shall be the minimum version supported. Support of this version implies conformance to ITU-T Recommendation H.248.1 [3] and implementation of the corrections available in the latest version of the H.248 Implementors' Guide for Version 2.

The ETSI TISPAN Profile conforms to the Profile Template as specified in ITU-T Recommendation H.248.1 [1] Appendix III. The value ALL specified in the template is according to ITU-T Recommendation H.248.1 [3].

5.4   Connection model

Table 2: Connection Model

Maximum number of contexts	No restrictions
Maximum number of Terminations per context	2
Allowed Terminations type combinations in a Context	TDM and IMS/NGN. Allowed context configurations are - Context [a] (IMS/NGN, TDM), - Context [b] (TDM, TDM) - Context [c] (TDM) - Context [d] (IMS/NGN) (see note)
NOTE: Context configurations with a single termination (either IMS/NGN or TDM) represent transient scenarios that are in line with TS 129 163 [27] procedures.	

5.5   Context attributes

Table 3a: Context Attributes

Context Attribute	Supported	Values Supported
Topology	Optional (see note)	All
Priority Indicator	Yes	0 to 15
Emergency Indicator	Yes	Not Applicable
NOTE: The "Topology" attribute is optional for example support of monitoring. If requested and not supported error code 444 shall be returned.		

Table 3b: AND/OR Context Attributes

AND/OR Context Attribute	No	Not applicable
NOTE: This table is for ITU-T Recommendation H.248.1 [1] only, so it does not apply to ETSI TISPAN Profile but the entry is kept to maintain the template layout.		

5.6   Terminations

5.6.1   Termination names

The Termination ID structure is provisioned in the MGC and MG and is known by the MG and the MGC at or before start up.

The following general structure of TerminationID shall be used:

- ABNF coding:

    TerminationID = "ROOT" / pathName / "$" / "*" ; according to H.248.1 annex B.

5.6.1.1   Termination naming convention for TDM terminations

A hierarchical naming structure is recommended for physical Terminations.

- ABNF coding:

    The PCM system is recommended to follow the following physical and digital signal hierarchy:

        PCMsytem = <unit-type1>_<unit #>/<unit-type2>_<unit #>/...

The <unit-type> identifies the particular hierarchy level.

Some example values of <unit-type> are:

- "s", "su", "stm4", "stm1", "oc3", "ds3", "e3", "ds2", "e2", "ds1", "e1"
  where "s" indicates a slot number and "su" indicates a sub-unit within a slot.

Leading zeroes MUST NOT be used in any of the numbers ("#") above.

The <unit #> is a decimal number which is used to reference a particular instance of a <unit-type> at that level of the hierarchy. Value ranges always starting with one.

The number of levels and naming of those levels is based on the physical hierarchy within the Media Gateway.

Here are some examples of the Termination structure:

1) TDM Terminations at SDH STM-1 ports:

   - tdm/s_<Card ID>/stm1_<STM1 ID>/e1_<E1 ID>/<channel #>

   - e.g. tdm/s_2/stm1_3/e1_17/25

2) TDM Terminations at PDH E1 ports (e.g. for "PCM system" only applications):

   - tdm/s_<Card ID>/e1_<E1 ID>/<channel #>

   - e.g. tdm/s_2/e1_17/25

NOTE 1: This Termination naming convention may be used to align with 3GPP TDM Termination names as defined by TS 129 332 [2] and TS 129 232 [25]. The alignment takes into account the numbering scheme of "<E1 ID>" with the 3GPP "PCM system" field, and the upper level(s) are regarded as prefix ("tdm/s-<Card ID>" versus 3GPP "s" 3-bit codepoint for "TDM").

NOTE 2: See also clause 3 of ITU-T Recommendation H.248.33 [29] concerning "PCM system" definition.

3) TDM Terminations at SONET OC-3 ports:

   - tdm/s_<Card ID>/oc3_<OC3 ID>/ds1_<DS1 ID>/<channel #>

   - e.g. tdm/s_2/oc3_3/ds1_17/22

5.6.1.1.1 Syntactical specification

The syntax specification may be used for the population of valid TDM TerminationID structures for the present document and TS 129 332 [2].

5.6.1.1.1.1 ABNF Grammar for H.248 Text Encoding Mode

ABNF (RFC 4234 [26]) is used for the syntax specification.

ABNF coding:

```
pathName = TDMToken SLASH (PCMsystem / "*")
TDMToken = "tdm"
PCMsystem = 0*(HierarchyLevelHIGHToken SLASH) HierarchyLevelLOWToken
HierarchyLevelHIGHToken = (UnitTypeToken "_" UnitNumber)
HierarchyLevelLOWToken  = (UnitTypeToken "_" Wildcard) / Channel / Wildcard
UnitTypeToken = "ChassisToken" / "SDHToken" / "SONETToken" / "PDHToken"
ChassisToken = "s" / "su"      ; slot, sub-unit within slot
SDHToken     = "stm4" / "stm1"    ; relevant is capacity, but not
                                    electrical or optical interface type
SONETToken   = "oc12" / "oc3"
PDHToken     = "ds3" / "e3" / "ds2" / "e2" /"ds1" / "e1"   ; ANSI & ETSI
UnitNumber = 1*DIGIT
Channel    = %d0-31 / %d0-23    ; value range E1/T1 system
Wildcard   = "*"
```

5.6.1.1.2 Wildcarding

Wildcarding (CHOOSE, ALL) is allowed for number fields ("**<unit #>**").

Examples for wildcarding:

1)   TDM Terminations at SDH STM-1 ports:

- e.g. wildcarding on top level: **tdm/***

- e.g. wildcarding on slot level: **tdm/s_3/***

- e.g. wildcarding on STM-1 level: **tdm/s_3/stm1_4/***

- e.g. wildcarding on E1 level: **tdm/s_2/stm1_4/e1_49/***

2)   TDM Terminations at PDH E1 ports:

- e.g. wildcarding on E1 level: **tdm/s_1/e1_2/***

5.6.1.1.3 Heterogeneous TMGW port configurations

A homogeneous TMGW port configuration relates to an MG with a single port type for physical Terminations. There is therefore a single TDM Termination name structure in use.

Heterogeneous TMGWs may support different port types, either by different signal hierarchies, like SDH/STM-1 and SDH/STM-4, and/or a mix of SDH and PDH interfaces. The number of port types in use is determining the number of TDM Termination name structures. In a heterogeneous TMGW the TDM Termination name structure may be aligned, for instance, by using the "highest common digital signal hierarchy" as highest Termination name hierarchical level. There is consequently a single TDM Termination name structure with a "flatted" hierarchy.

EXAMPLE: TMGW with SDH/STM-1 and PDH/E1 ports. Common denominator is "e1", a selected TDM Termination name might be therefore a common two-level structure with "**tdm/e1_<E1 ID>/<channel #>**". The unit types "s", "su" or "stm1" are not used here.

NOTE: This concept is followed in 3GPP Release 6 for TDM Terminations (see clause 5.2.2 of TS 129 332 [2]).

5.6.1.2 Termination naming convention for IMS/NGN terminations

ABNF coding:

- ephemeral/<string of alphanumeric characters or "/">

- e.g. Ephemeral/1/0/40000

5.6.1.2.1 Syntactical specification

The syntax rules may be used for the population of valid ephemeral TerminationID structures for the present document and TS 129 332 [2].

5.6.1.2.1.1 ABNF Grammar for H.248 text encoding mode

ABNF (RFC 4234 [26]) is used for the syntax specification.

ABNF coding:

```
pathName = EphToken SLASH EPHsystem
EphToken = "Ephemeral" ; so called prefix
```

The maximum length of "pathname" is defined in annex B.2 of ITU-T Recommendation H.248.1 [3].

```
EPHsystem = 0*(HierarchyLevelHIGHToken SLASH) HierarchyLevelLOWToken
HierarchyLevelHIGHToken = 1*alphanum
HierarchyLevelLOWToken  = Individual / Wildcard
alphanum   = ALPHA / DIGIT
Individual = 1*DIGIT
Wildcard   = "$" / "*"
```

5.6.2 Multiplexed Terminations

Table 4: Multiplexed Terminations

Multiplex Terminations supported	No

5.7 Descriptors

5.7.1 Stream Descriptor

Table 5: Stream Descriptors

Maximum number of streams per Termination type	1

5.7.1.1 LocalControl Descriptor

Table 6: LocalControl Descriptor

		Termination Type	Stream Type
Reserve group used	No		
Reserve value used	Yes (see note)	Terminations Toward IMS/NGN	Not Applicable
NOTE: The "Reserve value" parameter is, among others, required for negotiation of multiple payload types, for instance ITU-T Recommendation G.711 (see bibliography), comfort noise (according ITU-T Recommendation G.711 Appendix II), DTMF tone relay (see RFC 2833 [13]).			

Table 7: Stream Mode

Termination Type	Stream Type	Allowed StreamMode Values
TDM	Not Applicable	SendOnly, RecvOnly, SendRecv, Inactive
IMS/NGN; (see note)	Not Applicable	SendOnly, RecvOnly, SendRecv, Inactive
NOTE: Covers both 3GPP IMS and non-3GPP IMS.		

5.7.2 Events Descriptor

Table 8: Events Descriptor

Events settable on Termination Types and Stream Types	Yes		
	Event ID	**Termination Type**	**Stream Type**
	g/sc	TDM	Not Applicable
	ct/cmp	TDM	Not Applicable
	chp/mgcon	ROOT	Not Applicable
	ocp/mg_overload	ROOT	Not Applicable
	it/ito	ROOT	Not Applicable

Table 9: EventBuffer Control

EventBuffer Control used	No

Table 10: Keep active

Keepactive used on events	No

Table 11: Embedded events

Embedded events in an EventsDescriptor	No

Table 12: Embedded signals

Embedded signals in an EventsDescriptor	No

5.7.3 EventBuffer Descriptor

Table 13: Event Buffer Descriptor

Event Buffer descriptor used	No

5.7.4 Signals Descriptor

Table 14: Signals Descriptor

Signals settable dependant on Termination or streams types		Yes Signals on ROOT Termination shall not be supported		
If yes		Signal ID	Termination Type	Stream Type / ID
		cg/rt cg/bt cg/ct	TDM	Not Applicable
		an/apf	ALL except ROOT	Not Applicable
		ct/*	TDM	Not Applicable
		an/apf	TDM	Not Applicable

Table 15: Signal lists

Signals Lists supported	No

Table 16: Signal type and duration

Signal type and duration supported	No

Table 17: Notify completion

Notify completion supported		Yes	
If yes	Signal ID	Type of completion supported	
	an/apf	TO, EV, SD and NC	
RequestID Parameter Supported	No		

Table 18: Signals played simultaneously

Signals played simultaneously	No

Table 19: Keep active

Keepactive used on signals	No

5.7.5 DigitMap Descriptor

Table 20: DigitMap Descriptor

DigitMaps supported	No

5.7.6 Statistics Descriptor

Table 21: Statistics Descriptor

Statistics reported on subtract	No (for TDM Terminations) Yes (for IMS/NGN Terminations)

5.7.7 ObservedEvents Descriptor

Table 22: Observed Events Descriptor

Event detection time supported	No

5.7.8 Topology Descriptor

Table 23: Topology Descriptor

Allowed triples	Optional (All) (see note)
NOTE: If not supported then error code 444 shall be returned.	

5.7.9 Error Descriptor

Table 24: MGC Supported Error Codes sent by MGC

Supported ITU-T Recommendation H.248.8 [6] Error Codes	FFS
Supported Error Codes defined in packages	FFS

Table 25: TMGW Supported Error Codes sent by TMGW

Supported ITU-T Recommendation H.248.8 [6] Error Codes	ALL with exception of· #460 "Unable to set statistic on stream" #518 "Event buffer full" #519 "Out of space to store digit map" #520 "Digit Map undefined in the MG"
Supported Error Codes defined in packages	All error codes defined in supported packages need to be supported.

5.8 Command API

NOTE: It is assumed that an Error Descriptor may be returned in any command reply.

5.8.1 Add

Table 26: Descriptors used by Command Add Request

Descriptors used by Add Request	Events, Signals, Media (LocalControl, Local and Remote), Audit, Topology.

Table 27: Descriptors used by Command Add Reply

Descriptors used by Add Reply	Events, Signals, Media (LocalControl, Local and Remote), Audit, Topology. When command request excludes an Audit Descriptor, the MGW response shall only include descriptors which contained underspecified or overspecified properties in the command request, with the exception of the Error Descriptor. Furthermore, only those properties that were underspecified or overspecified in the request shall be sent in the reply.

5.8.2 Modify

Table 28: Descriptors used by Command Modify Request

Descriptors used by Modify Request	Events, Signals, Media (LocalControl, Local and Remote), Audit, Topology.

Table 29: Descriptors used by Command Modify Reply

Descriptors used by Modify Reply	Events, Signals, Media (LocalControl, Local and Remote), Audit, Topology. When command request excludes an Audit Descriptor, the MGW response shall only include descriptors which contained underspecified or overspecified properties in the command request, with the exception of the Error Descriptor. Furthermore, only those properties that were underspecified or overspecified in the request shall be sent in the reply.

5.8.3 Subtract

Table 30: Descriptors used by Command Subtract Request

Descriptors used by Subtract Request	Audit (empty) or NONE

Table 31: Descriptors used by Command Subtract Reply

Descriptors used by Subtract Reply	None or Statistics When command request contains "Audit(empty)", then no statistics are returned. Otherwise, connection statistics are returned in the Subtract reply dependent on the supported packages (see clause 5.14).

5.8.4 Move

Table 32: Command Move

Move Command used	No

5.8.5 AuditValue

Table 33: AuditValue

Audited Properties	Property Name and Identity	Descriptor
Termination ID	TerminationState -TDM ALL or individual Termination (see note) - Ephemeral individual Termination The ServiceState property within the TerminationState descriptor shall not take the value "Test".	TerminationState Descriptor
	- MGC information (mgcinfo)	LocalControl Descriptor
Termination ID	**For Packages** **- Root**	**Packages Descriptor**
Audited Statistics	None	
Audited Signals	None	
Audited Events	None	
Packages Audit Possible	Yes	
NOTE: The purpose is to audit an individual Termination is to retrieve MGC Information if supported.		

5.8.6 AuditCapabilities

AuditCapabilities command is not supported by the ETSI TISPAN Profile.

Table 34: AuditCapabilities

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

5.8.7 Notify

Table 35: Descriptors Used By Notify

Descriptors used by Notify Request	ObservedEvents

Table 36: Descriptors Used By Notify

Descriptors used by Notify Reply	None

5.8.8 ServiceChange

Table 37: Service Change Methods and Reasons sent by MGC

ServiceChange Methods supported	ServiceChange Reasons supported
Methods (see note) - Graceful - Forced - Restart 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.	900-907, 915
NOTE: No support of handoff relates to a network deployment scenario with "primary H.248 systems only", which translates to no geographic redundancy of the MGC.	

Table 38: ServiceChange Methods and Reasons sent by MGW

ServiceChange Methods supported	ServiceChange Reasons supported
Methods (see note) - Graceful - Forced - Restart - Disconnected 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.	900-908, 910-917
NOTE: No support of handoff relates to a network deployment scenario with "primary H.248 systems only", which translates to no geographic redundancy of the MGC.	

Table 39: Service Change Address

ServiceChangeAddress used	No

Table 40: Service Change Delay

ServiceChangeDelay used	No

Table 41: Service Change Incomplete Flag

ServiceChange Incomplete Flag used	No
NOTE: This parameter is for ITU-T Recommendation H.248.1 [3] only, so it does not apply to ETSI TISPAN Profile but the entry is kept to maintain the profile template sequence.	

Table 42: Service Change Version

Version used in ServiceChangeVersion	2

Table 42a: ServiceChangeProfile Parameter

ServiceChangeProfile parameter	Yes, with ProfileID according to clause 5.1.

Table 43: Profile negotiation

Profile negotiation as per ITU-T Recommendation H.248.8 [6]	No

5.8.9 Manipulating and auditing context attributes

Table 44: Manipulating and auditing context attributes

Context Attributes Manipulated	Topology (Optional)
Context Attributes Audited	None

5.9 Generic command syntax and encoding

Table 45: Encodings

Supported Encodings	Text (see note) The receiver shall support Short Token Notation Long Token Notation
NOTE: Binary encoding is not supported by ETSI TISPAN NGN R1.	

5.10 Transactions

Table 46: Transactions per Message

Maximum number of TransactionRequests / TransactionReplies / TransResponseAcks / Segment Replies per message	2 (see note)
NOTE: When two elements are conveyed in one message, it is recommended that this message comprises a Transaction Request / Transaction Reply / Transaction Pending plus a Transaction Response Ack.	

Table 47: Commands per Transaction Requests

Maximum number of commands per Transaction request	2
NOTE: The limit of 2 commands is per action and only one action will be included per transaction. The only exception is AuditValue command which may be in multiple actions in one transaction.	

Table 48: Commands per Transaction Reply

Maximum number of commands per Transaction reply	2
NOTE: The limit of 2 commands is per action and only one action will be included per transaction. The only exception is AuditValue command which may be in multiple actions in one transaction.	

Table 49: Optional Commands

Commands able to be marked "Optional"	AuditValue

Table 50: Transaction Timers

Transaction Timer	Value
NormalMGExecutionTime	Provisioned, changeable with Base Root Package (clause 5.14.1)
NormalMGCExecutionTime	Provisioned, changeable with Base Root Package (clause 5.14.1)
MGOriginatedPendingLimit	Provisioned, changeable with Base Root Package (clause 5.14.1)
MGCOriginatedPendingLimit	Provisioned, changeable with Base Root Package (clause 5.14.1)
MGProvisionalResponseTimerValue	Provisioned, changeable with Base Root Package (clause 5.14.1)
MGCProvisionalResponseTimerValue	Provisioned, changeable with Base Root Package (clause 5.14.1)

5.11   Messages

It is recommended that MGC and MG names are in the form of fully qualified domain names. For example the domain name of the MGC may be of the form mgc1.whatever.net and the name of the MG may be of the form mg1.whatever.net.The fully qualified domain name will be used by the MGC and MG as part of the "Message Identifier" in the H.248 messages which identifies the originator of the message.

5.12   Transport

Table 51: Transport

Supported Transports	SCTP (recommended - as defined in RFC 2960 [18] and ITU-T Recommendation H.248.4 [4] and Corrigendum 1 to H.248.4 [28]; see note 1), SCTP/M3UA (optional - as defined in RFC 3332 [17] with options detailed in TS 129 202 [20]; see note 2), UDP (optional - as defined in RFC 768 [19] optional)
NOTE 1:	H.248 is "SCTP user" in this case of H.248/SCTP/IP based transport according ITU-T Recommendation H.248.4 [4]. The number of used SCTP Streams for traffic of the H.248 Control Association must be defined, see clause 8 of ITU-T Recommendation H.248.4 [4]. A single SCTP Stream is the default assumption ("Single-Stream Mode") in this Profile. The Single-Stream Mode does correspond to the UDP based (ITU-T Recommendation H.248.1 [3] annex D.1), TCP based (ITU-T Recommendation H.248.1 [1], annex D.2) and M3UA/SCTP based (TS 129 202 [20], annex A and ITU-T Recommendation H.248.4 Corrigendum 1 [28];) from multiplexing point of view. There is a 1:1-relation between the ITU-T Recommendation H.248 Control Association and the underlying transport connection.
NOTE 2:	This is slightly different with regards to SCTP encapsulation. H.248 is "M3UA user" in this case of H.248/M3UA/SCTP/IP based transport. H.248 Messages are corresponding to M3UA user protocol data units. "SCTP multistreaming" may be also applied (see clause 1.4.7 of RFC 3332 [17]). If not then the complete M3UA traffic is mapped on a single SCTP Stream, i.e. the Single-Stream Mode.

SCTP Stream Mapping for SCTP based transport: Support of SCTP multistreaming implies an agreed assignment scheme between MGC and MG, for the mapping of H.248 signalling traffic into SCTP Streams within an SCTP association. There is no recommended assignment scheme provided by ITU-T Recommendation H.248.4 [4], and there is no recommended assignment scheme by this Profile version. This is therefore for further study.

Table 52: Transport Segmentation

Segmentation Supported	No

Table 53: Support of Control Association Monitoring

Control Association Monitoring Supported	Monitoring mechanism is dependent on used H.248 transport (see table 5.12/1): SCTP: 　　　　inherent capability of SCTP SCTP/M3UA: 　　　　inherent capability of SCTP UDP: 　　　　H.248.14 (MG-driven monitoring) Empty Audit Value on ROOT (MGC-driven monitoring)

5.13   Security

Table 54: Security

Supported Security	None

5.14   Packages

Table 55: Mandatory packages

Package Name	Package ID	Version
Base Root Package (see ITU-T Recommendation H.248.1 [3], annex E.2);	root	v2
TDM Circuit Package (see ITU-T Recommendation H.248.1 [3], annex E.13)	tdmc	v1
Basic Continuity Package (see ITU-T Recommendation H.248.1 [3], annex E.10)	ct Only required for TDM Terminations.	v1

Table 56: Optional packages

Package Name	Package ID	Version	Support dependent on
Generic v1 (see ITU-T Recommendation H.248.1 [3], annex E.1)	g	v1	Required for signal completion of announcements.
Generic Announcement Package (see ITU-T Recommendation H.248.7 [5])	an	v1	
Tone Generator Package (see ITU-T Recommendation H.248.1 [3], annex E.3).	tongen	v1	This package is "extension only". It must be supported if extended but shall not be published over the protocol. It is here for information only.
Call Progress Tones Generator Package (see ITU-T Recommendation H.248.1 [3] annex E.7).	cg	v1	
Media Gateway Resource Congestion Handling Package (see ITU-T Recommendation H.248.10 [7]).	chp	v1	ITU-T Recommendation H.248.10 [7] support is supposed for NGN environments with backward compatibility to TS 129 332 [2] Release 6 equipment.
Media Gateway Overload Control Package (see ITU-T Recommendation H.248.11 [8]).	ocp	v1	ITU-T Recommendation H.248.11 [8] is recommend for all other NGN scenarios (without above ITU-T Recommendation H.248.10 [7] support condition).
Inactivity Timer (see ITU-T Recommendation H.248.14 [9])	it	v1	Only applicable for UDP transport.
MGC Information (see ITU-T Recommendation H.248.45 [10])	mgcinfo	v1	This package may be supported as an operator option. For this Profile the information string shall be limited to 32 octets in length.
RTP (ITU-T Recommendation H.248.1 [3], annex E.12) (see note)	rtp	v1	Used by the MG for connections statistics.
NOTE: Support of RTP Package does not require support of Network Package for the ETSI TISPAN TGW Profile.			

Table 57: Package Provisioning Information

Package Provisioning Information		
Package Name	Property, Parameter, Signal, Event ID	Provisioned Value
Generic Announcement (ITU-T Recommendation H.248.7 [5])	Fixed Announcement Play, AV	Provisioned

5.14.1 Base root package

Table 58: Base root Package

Properties	Mandatory/ Optional	Used in command	Supported Values	Provisioned Value
root/maxNumberOfContexts	O	AUDITVALUE	1 and up	-
root/maxTerminationPerContext	O	AUDITVALUE	2	-
root/normalMGExecutionTime	O	MOD	Any integer	Not Applicable
root/normalMGCExecutionTime	O	MOD	Any integer	Not Applicable
root/MGProvisionalResponseTimerValue	O	MOD	Any integer	Not Applicable
root/MGCProvisionalResponseTimerValue	O	MOD	Any integer	Not Applicable
root/MGCOriginatedPendingLimit	O	MOD	Any integer	Not Applicable
root/MGOriginatedPendingLimit	O	MOD	Any integer	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	-			

5.14.2 TDM circuit package

Table 59: TDM circuit Package

Properties	Mandatory/ Optional	Used in command	Supported Values	Provisioned Value
Echo Cancellation, tdmc/ec	M	ADD, MOD	ALL	-
Signals	Mandatory/ Optional	Used in command		Duration Provisioned Value
None	-	-		-
	Signal Parameters	**Mandatory/ Optional**	**Supported Values**	**Duration Provisioned Value**
	-	-	-	-
Events	Mandatory/ Optional	Used in command		
None	-	-		
	Event Parameters	**Mandatory/ Optional**	**Supported Values**	**Provisioned Value**
	-	-	-	-
	ObservedEvent Parameters	Mandatory/ Optional	Supported Values	Provisioned Value
	-	-	-	-
Statistics	**Mandatory/ Optional**	**Used in command**	**Supported Values**	
None	-	-	-	
Error Codes	Mandatory/Optional			
None	-			

5.14.3 Media gateway resource congestion handling package

Table 60: Media gateway resource congestion handling package

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

5.14.4　Media gateway overload control package

Table 61: Media gateway overload control package

Properties	Mandatory/ Optional	Used in command	Supported Values	Provisioned Value
None	-	-	-	-
Signals	**Mandatory/ Optional**	**Used in command**		**Duration Provisioned Value**
None	-	-		-
	Signal Parameters	**Mandatory/ Optional**	**Supported Values**	**Duration Provisioned Value**
	-	-	-	-
Events	**Mandatory/ Optional**	**Used in command**		
MG_Overload ocp/mg_overload	M	MOD, NOTIFY		
	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	-			

5.14.5　Basic continuity package

Table 62: Basic continuity package

Properties	Mandatory/ Optional	Used in command	Supported Values	Provisioned Value
None	-	-	-	-
Signals	**Mandatory/ Optional**	**Used in command**		**Duration Provisioned Value**
Continuity Test, ct/ct	M	ADD, MOD		Default
	Signal Parameters	**Mandatory/ Optional**	**Supported Values**	**Duration Provisioned Value**
Respond, ct/rsp	None	-	-	-
Events	**Mandatory/ Optional**	**Used in command**		
Completion, ct/cmp	M	NOTIFY		
	Event Parameters	**Mandatory/ Optional**	**Supported Values**	**Provisioned Value**
	None	-	-	-
	ObservedEvent Parameters	**Mandatory/ Optional**	**Supported Values**	**Provisioned Value**
	Result, res	M	success, failure	Not Applicable
Statistics	**Mandatory/ Optional**	**Used in command**	**Supported Values**	
None	-	-	-	
Error Codes	**Mandatory/Optional**			
None	-			

5.14.6 Call progress tones generator package

Table 63: Call progress tones generator package

Properties	Mandatory/ Optional	Used in command	Supported Values	Provisioned Value
None	-	-	-	-
Signals	**Mandatory/ Optional**	**Used in command**		**Duration Provisioned Value**
Ringing Tone, cg/rt	M	MOD		Not Applicable
	Signal Parameters	**Mandatory/ Optional**	**Supported Values**	**Duration Provisioned Value**
	-	-	-	-
Busy Tone, cg/bt	O	MOD		Not Applicable
	Signal Parameters	**Mandatory/ Optional**	**Supported Values**	**Duration Provisioned Value**
	-	-	-	-
Congestion Tone, cg/ct	O	MOD		Not Applicable
	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	-			

5.14.7 Inactivity timer package

Table 64: 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**
	-	-	-	-
vents	**Mandatory/ Optional**	**Used in command**		
Inactivity Timeout, it/ito	M	MOD, NOTIFY		
	Event Parameters	**Mandatory/ Optional**	**Supported Values**	**Provisioned Value**
	Maximum Inactivity Time, mit	O	Any integer	Unspecified
	ObservedEvent Parameters	**Mandatory/ Optional**	**Supported Values**	**Provisioned Value**
	None	-	-	-
Statistics	**Mandatory/ Optional**	**Used in command**	**Supported Values**	
None	-	-	-	
Error Codes	**Mandatory/Optional**			
None	-			

5.14.8 MGC information package

Table 65: MGC information package

Properties	Mandatory/ Optional	Used in command	Supported Values	Provisioned Value
Data Block, MGCInfo/db	M	ADD, MOD, AUDITVALUE	A range of 0 to 32 octets	An empty string
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**			

5.14.9   Generic package

Table 66: Generic package

Properties	Mandatory/Optional	Used in command	Supported Values	Provisioned Value
None	-	-	-	-
Signals	**Mandatory/Optional**	**Used in command**		**Duration Provisioned Value**
None	-	-		-
	Signal Parameters	**Mandatory/Optional**	**Supported Values**	**Duration Provisioned Value**
	-	-	-	-
Events	**Mandatory/Optional**	**Used in command**		
Signal Completion, g/sc	M	NOTIFY		
	Event Parameters	**Mandatory/Optional**	**Supported Values**	**Provisioned Value**
	None	-	-	-
	ObservedEvent Parameters	**Mandatory/Optional**	**Supported Values**	**Provisioned Value**
	Signal Identity	M	String indicating the signal	-
	Termination Method	M	"TO" Signal timed out or otherwise completed on its own "EV" Interrupted by event "SD" Halted by new Signals descriptor "NC" Not completed, other cause	-
Statistics	**Mandatory/Optional**	**Used in command**		**Supported Values**
None	-	-		-
Error Codes	Mandatory/Optional			

5.14.10 Generic announcement package

Table 67: Generic announcement package

Properties	Mandatory/ Optional	Used in command	Supported Values	Provisioned Value
None	-	-	-	-
Signals	**Mandatory/ Optional**	**Used in command**		**Duration Provisioned Value**
Fixed Announcement play, an/apf	M	ADD, MOD		-
	Signal Parameters	**Mandatory/ Optional**	**Supported Values**	**Provisioned Value**
	Announcement name, an	M	Enumeration of announcements	Default duration provisioned in the TMGW
	Number of cycles, noc	O	Any integer	Default number of cycles provisioned in the TMGW
	Announcement Variant, av	O	One of the language tags defined in RFC 3066 (bibliography)	-
	Announcement Direction, di	O	Values External,ext Internal, int Both, both	External
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	-			

5.14.11 RTP Package

Table 68: RTP 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**		
None				
Statistics	**Mandatory/ Optional**	**Used in command**	**Supported Values**	
Packets Sent, rtp/ps	M	SUBTRACT REPLY	ALL	
Packets Received, rtp/pr	M	SUBTRACT REPLY	ALL	
Packet Loss, rtp/pl	M	SUBTRACT REPLY	ALL	
Jitter, rtp/jit	M	SUBTRACT REPLY	ALL	
Delay, rtp/delay	M	SUBTRACT REPLY	ALL	
Error Codes	**Mandatory/Optional**			
None	-			

5.15   Mandatory support of SDP and annex C information elements

Table 69: Supported Annex C and SDP information elements

Information element	Annex C support	SDP support
Protocol Version "v=" line	Not Applicable (see note 1)	The value must always be equal to zero: `v=0`

Media "m=" line	Not Applicable (see note 1)	Fields (or SDP values) <media>, <port>, <transport> and <fmt_list> are required. Both static and dynamic RTP payload types shall be supported.
		The MGC may underspecify the <fmt-list> subfield in place of a single dynamic RTP payload type. In this case the mapping between the underspecified RTP payload type and the <encoding name>/<clock rate> shall be provided in the rtpmap attribute, e.g.
		`m=audio <port number> RTP/AVP $`
		`a=rtpmap: $ CLEARMODE/8000`

Connection Information "c=" line	Not Applicable (see note 1)	Fields <network type>, <address type> and <connection address> are required. The network type shall be "IN" for IP-based ephemeral Terminations. The address type may be IPv4 (value "IP4") or IPv6 (value "IP6"). The MGC will fully specify the IP version. The MGC may apply parameter underspecification to the <connection address> sub-field (see note 2)
Attribute(s) "a=" line	Not Applicable (see note 1)	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) (see note 3).
Bandwidth "b=" line	Not Applicable (see note 1)	Bandwidth information shall be supplied by the MGC if the required bandwidth cannot be immediately derived from the information contained in the m= line. If the MGC is using parameter underspecification, the MG shall assume a reasonable default bandwidth value for well-known codecs and shall provide this value in the reply sent to the MGC. The <modifier> field shall be set to "AS". The <bandwidth-value> field shall be set to the maximum bandwidth requirement of the media stream in kilobits per seconds (kbit/s) and shall take into account all protocol headers down to and including the IP layer. The MGC may also supply additional RTCP bandwidth modifiers (i.e., "RR" and "RS") as defined in RFC 3556 [16]. If the RTCP modifiers are not supplied, the bandwidth value for the "AS" modifier shall take into account an extra 5 % bandwidth for RTCP packets.
Origin "o=" line	Not Applicable (see note 1)	The origin line consists of six fields (<username>, <session id>, <version>, <network type>, <address type> and <address>). The MGC is not required to supply this line but shall accept it (see clause 7.1.8 of ITU-T Recommendation H.248.1 [3]). The MG should populate this line as follows, e.g. `o=- 0 0 IN IP4 11.9.19.65` or use the value received from the MGC.
Session Name "s=" line	Not Applicable (see note 1)	The session name "s=" line contains a single field (<session name>). The MGC is not required to supply this line but shall accept it (see clause 7.1.8 of ITU-T Recommendation H.248.1 [3]). The MG should populate this line as follows, e.g. `s=-` or use the value received from the MGC
Time "t=" line	Not Applicable (see note 1)	The time "t=" line consists of two fields (<start time> and <stop time>). The MGC is not required to supply this line but shall accept it (see clause 7.1.8 of ITU-T Recommendation H.248.1 [3]). The MG should populate this line as follows, e.g. `t=0 0` or use the value received from the MGC.

NOTE 1:   Binary encoding is not supported by ETSI TISPAN NGN R1.
NOTE 2:   The address type may be IPv4 or IPv6. The default IP version (i.e. IPv4 or IPv6) may be provisioned in the H.248 MG. The MGC may apply H.248 parameter underspecification. If the MGC does require a different IP version than the provisioned default, then the MGC applies complete H.248 parameter specification.
NOTE 3:   How to specify different ptime values for different codecs when the m= line specifies multiple payload formats is outside the scope of the present document.

5.15.1 Codec parameters

5.15.1.1 AMR Codec

See the description in TS 129 332 [2], clause 10.2.1.

5.15.1.2 G.711 Codec

On IMS/NGN Terminations, G.711 codec is transported according to RFC 3551 [11].

5.15.1.3 DTMF codec

See the description in TS 129 332 [2], clause 10.2.2.

5.15.1.4 Clearmode codec

On IMS/NGN Terminations, Clearmode codec is transported according to RFC 4040 [15].

When the MGC determines that a 64 kbit/s unrestricted bearer service is requested, the clearmode codec shall be used. A Dynamic Payload type with CLEARMODE as encoding name shall be included in both the local and remote descriptor.

The behaviour of the TMGW shall then conform to RFC 4040 [15]. All voice and signal processing functions such as silence suppression, comfort noise insertion and gain adjustment shall be automatically turned off. The MG shall inherit the same QoS objectives as the ISDN bearer service.

5.15.1.5 Silence suppression and comfort noise

Silence Suppression (SS) mode is direction-independent and shall be supported call/bearer individually. Silence suppression mode must be explicitly enabled and disabled. Default shall be a disabled SS mode.

If a codec has built-in support for silence suppression and comfort noise insertion, the activation or deactivation of these features shall be indicated using the a= line according to RFC 3551 [11] and RFC 3555 [12].

If the selected codec does not have built in support for silence suppression and comfort noise (CN) insertion, the CN payload code defined in RFC 3389 [14] may be included in the media description.

E.g. (for ITU-T Recommendation G.711 A-law codec):

```
v=0
c=IN <address type> <connection address>
m=audio <port number> RTP/AVP 8 13
a=ptime: 10
```

If the CN payload is included in the Local Descriptor, the TMGW shall be prepared to receive CN packets during silence periods. This action corresponds to an implicit enabling of the SS mode in receiving direction.

If the CN payload is included in the Remote Descriptor, the TMGW shall send CN packets during silence periods. This action corresponds to an implicit enabling of the SS mode in sending direction.

Comfort noise generation, voice activity detection and discontinuous transmission algorithms are outside the scope of the present document.

5.15.1.6 VBD codec

Voiceband data refers to traffic from facsimile, modem or text telephony applications.

On IMS/NGN Terminations, voiceband data traffic is transported according to ITU-T Recommendation V.152 [21] and [22]. ITU-T Recommendation G.711 (bibliography) must be used as VBD codec. The RTP Payload Type (PT) codepoint, "0" or "8" or a value from the dynamic PT range , is used in the MG.

NOTE 1: Use of "0" or "8" is indicating to the MG that only inband-based VBD stimuli is detected. Both peering MGs are consequently not directly synchronized in their state transitions between "voice" and "VBD" modes.

NOTE 2: Use of "a value from the dynamic PT range" is indicating a VBD RTP packet according to ITU-T Recommendation V.152 [21]. The MG may offer then an enhanced VBD service.

Upon detection of voiceband data traffic, the Media Gateway shall autonomously switch from Audio mode to VBD mode with VBD codec.

Transitioning between Audio mode and VBD mode is possible in both directions. The procedures for transitioning between these two operation modes are described in clause 10 of ITU-T Recommendation V.152 [21]. Any state transition requires the detection of a "VBD stimuli" (see clause 9 of ITU-T Recommendation V.152 [21]).

5.16 Procedures

5.16.1 Call Independent procedures

Call Independent Procedures defined in TS 129 332 [2], clause 14 apply to the ETSI TISPAN Profile.

5.16.2 Call Dependent procedures

5.16.2.1 Procedures for IMS/NGN terminations

5.16.2.1.1 Reserve IMS Connection Point

This procedure is the same as the one defined in TS 129 332 [2], clause 15.1.1 with the addition that connection statistics may be inhibited via the inclusion of an empty Statistics Descriptor.

5.16.2.1.2 Configure IMS/NGN resources

This procedure is the same as the one defined in TS 129 332 [2], clause 15.1.2.

5.16.2.1.3 Reserve IMS/NGN connection point and configure remote resources

This procedure is the same as the one defined in TS 129 332 [2], clause 15.1.3 with the addition that connection statistics may be inhibited via the inclusion of an empty Statistics Descriptor.

5.16.2.1.4 Change IMS/NGN ThroughConnection

This procedure is the same as the one listed in TS 129 332 [2], table 15.1.1.

5.16.2.1.5 Release IMS/NGN termination

This procedure is the same as the one defined in TS 129 332 [2], clause 15.1.4 with the addition that connection statistics may be obtained from the MG. In order to not obtain the statistics, the MGC will implicitly inhibit them via the inclusion of an empty Audit descriptor in a SUBTRACT request. The connection statistics are applicable to the RTP package. This package is optional and thus the MGC shall be tolerant of the absence of statistics in the reply to a SUBTRACT command.

5.16.2.1.6 Detect IMS/NGN RTP Tel Event

Not Required by the ETSI TISPAN Profile.

5.16.2.1.7 Notify IMS/NGN RTP Tel Event

Not Required by the ETSI TISPAN Profile.

5.16.2.1.8 Send IMS/NGN RTP Tel Event

Not Required by the ETSI TISPAN Profile.

5.16.2.1.9 Stop IMS/NGN RTP Tel Event

Not Required by the ETSI TISPAN Profile.

5.16.2.2 Procedures for TDM Terminations

The procedures defined in TS 129 332 [2], clause 16 apply to the ETSI TISPAN Profile.

5.16.2.2.1 Reserve TDM circuit

This procedure is the same as the one defined in TS 129 332 [2], clause 16.1.1.

5.16.2.2.2 Change TDM Through-connection

This procedure is the same as the one listed in TS 129 332 [2], table 16.1.

5.16.2.2.3 Activate TDM voice processing function

This procedure is the same as the one listed in TS 129 332 [2], table 16.1.

5.16.2.2.4 Send TDM Tone

This procedure is the same as the one listed in TS 129 332 [2], table 16.1.

5.16.2.2.5 Stop TDM Tone

This procedure is the same as the one listed in TS 129 332 [2], table 16.1.

5.16.2.2.6 Play TDM announcement

This procedure is the same as the one listed in TS 129 332 [2], table 16.1.

5.16.2.2.7 TDM announcement completed

This procedure is the same as the one listed in TS 129 332 [2], table 16.1.

5.16.2.2.8 Stop TDM announcement

This procedure is the same as the one listed in TS 129 332 [2], table 16.1.

5.16.2.2.9 Continuity check

This procedure is the same as the one listed in TS 129 332 [2], table 16.1.

5.16.2.2.10 Continuity check verify

This procedure is the same as the one listed in TS 129 332 [2], table 16.1.

5.16.2.2.11 Continuity check response

This procedure is the same as the one listed in TS 129 332 [2], table 16.1.

5.16.2.2.12 Release TDM termination

This procedure is the same as the one defined in TS 129 332 [2], clause 16.1.2.

Annex A (informative):
TGW Interconnection on CSN side with non-SS7 equipment

There may be the requirement to interconnect in the PSTN/ISDN domain with network elements, without a SS7-based circuit-switched interface. For instance, CAS based trunking interfaces. The support of non-SS7-based circuit-switched interfaces is for further studies.

Annex B (informative):
Bibliography

ITU-T Recommendation H.248.2: "Facsimile, text conversation and call discrimination packages".

ETSI ES 283 012 (V1.1.1): "Telecommunications and Internet converged Services and Protocols for Advanced Networking (TISPAN); Interworking; Trunking Gateway Control Procedures for interworking between NGN and external CS networks".

IETF RFC 3066: "Tags for the Identification of Languages".

ITU-T Recommendation G.711: "Pulse code modulation (PCM) of voice frequencies".

Annex C (informative):
Change history

Change history							
Date	TSG #	TSG Doc.	CR	Rev	Subject/Comment	Old	New
2006-06					Publication as **ETSI ES 283 024**		1.1.1
2007-04					ETSI membership approval procedure		1.1.3
2007-07					Publication as ETSI ES 283 024		1.1.4
2008-03					Conversion to **3GPP TS 29.424**		1.1.5
2008-03					Technically identical copy as **3GPP TS 29.624** as basis for further development.		1.1.6