

# ETSI TS 129 332 V6.7.0 (2006-09)

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*Technical Specification*

## **Universal Mobile Telecommunications System (UMTS); Media Gateway Control Function (MGCF) - IM Media Gateway (IM-MGW) Mn interface (3GPP TS 29.332 version 6.7.0 Release 6)**



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**Reference**

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# Contents

Intellectual Property Rights .....	2
Foreword.....	2
Foreword.....	6
1 Scope .....	7
2 References .....	7
3 Definitions, symbols and abbreviations .....	8
3.1 Definitions .....	8
3.2 Symbols.....	8
3.3 Abbreviations .....	8
4 UMTS capability set.....	9
4.1 Void.....	9
5 Naming conventions.....	9
5.1 MGCF/IM-MGW naming conventions .....	9
5.2 Termination names .....	9
5.2.1 Termination naming convention .....	9
5.2.2 Termination naming convention for TDM terminations .....	9
6 Topology descriptor .....	9
7 Transaction timers .....	9
8 Transport .....	9
9 Multiple Virtual MG. ....	10
10 Formats and codes .....	10
10.1 Signalling Objects .....	10
10.2 Codec Parameters.....	11
10.2.1 AMR Codec.....	11
10.2.1 DTMF Codec.....	11
11 Mandatory Support of SDP and H.248 Annex C information elements .....	11
12 General on packages and Transactions.....	11
12.1 Profile Details.....	12
13 Void.....	12
14 Call independent H.248 transactions.....	12
15 Transactions towards IM CN Subsystem .....	13
15.1 Procedures related to a termination towards IM CN Subsystem.....	13
15.1.1 Reserve IMS Connection Point .....	14
15.1.2 Configure IMS Resources .....	15
15.1.3 Reserve IMS Connection Point and configure remote resources.....	16
15.1.4 Release IMS Termination .....	17
15.2 IMS packages .....	17
16 Transactions towards ISUP .....	18
16.1 Procedures related to a termination towards ISUP .....	19
16.1.1 Reserve TDM Circuit.....	19
16.1.2 Release TDM Termination .....	19
16.2 ISUP packages.....	19
17 Transactions towards BICC.....	20
17.1 Procedures related to a termination towards BICC .....	20
17.2 BICC packages .....	21

<b>Annex A (Normative):</b>	<b>Profile Description .....</b>	<b>22</b>
A.1	Profile Identification.....	22
A.2	Summary .....	22
A.3	Gateway Control Protocol Version .....	22
A.4	Connection Model .....	22
A.5	Context Attributes .....	23
A.6	Terminations.....	23
A.6.1	Termination Names.....	23
A.6.2	Multiplexed terminations .....	23
A.7	Descriptors .....	23
A.7.1	Stream Descriptor .....	23
A.7.1.1	Local Control Descriptor.....	23
A.7.2	Events Descriptor.....	24
A.7.3	EventBuffer Descriptor.....	25
A.7.4	Signals Descriptor.....	25
A.7.5	DigitMap Descriptor .....	26
A.7.6	Statistics Descriptor .....	26
A.7.7	ObservedEvents Descriptor .....	26
A.7.8	Topology Descriptor .....	26
A.7.9	Error Descriptor .....	26
A.8	Command API.....	26
A.8.1	Add .....	26
A.8.2	Modify .....	27
A.8.3	Subtract.....	27
A.8.4	Move.....	27
A.8.5	Auditvalue.....	28
A.8.6	Auditcapabilities .....	28
A.8.7	Notify.....	28
A.8.8	Service Change .....	29
A.8.9	Manipulating and auditing context attributes.....	30
A.9	Generic command syntax and encoding .....	30
A.10	Transactions .....	30
A.11	Messages .....	30
A.12	Transport .....	31
A.13	Security .....	31
A.14	Packages.....	32
A.14.1	Generic Package .....	33
A.14.2	Base Root Package.....	35
A.14.3	Basic DTMF Generator Package .....	35
A.14.4	Basic DTMF Detection Package.....	36
A.14.5	TDM Circuit Package .....	37
A.14.6	MGW Congestion Package.....	37
A.14.7	Continuity Package .....	38
A.14.8	Announcement Package.....	38
A.14.9	Bearer Characteristics Package.....	39
A.14.10	Generic Bearer Connection Package.....	39
A.14.11	Call Progress Tones Generator Package v1 .....	40
A.14.12	Basic Call Progress Tones Generator with Directionality .....	41
A.14.13	Expanded Call Progress Tones Generator Package .....	42
A.14.14	Basic Services Tones Generation Package .....	42
A.14.15	Bearer Control Tunnelling Package .....	43
A.14.16	Expanded Services Tones Generation Package .....	43
A.14.17	Intrusion Tones Generation Package .....	44
A.14.18	3GUP Package .....	45
A.14.19	Modification of Link Characteristics Bearer Capability .....	46
A.14.20	TFO package.....	46
A.14.21	Tone Generator Package.....	47
A.14.22	Tone Detection Package .....	48
A.15	Mandatory support of SDP and Annex C information elements .....	50
A.16	Optional support of SDP and Annex C information elements.....	51
A.17	Procedures .....	51
A.17.1	Call Independent Procedures .....	51

A.17.2 IMS Terminations Procedures .....51  
A.17.3 TDM Terminations Procedures.....51  
A.17.4 BICC Terminations Procedures .....51  
**Annex B (informative): Change history .....52**  
History .....53

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# 1 Scope

The present document describes the protocol to be used on the Media Gateway Control Function (MGCF) – IM Media Gateway (IM-MGW) interface. The basis for this protocol is the H.248 protocol as specified in ITU-T. The IMS architecture is described in 23.228. The interaction of the MGCF-IM MGW interface signalling procedures in relation to the SIP, and BICC/ISUP signalling at the MGCF are described in 29.163.[4]

This specification describes the application of H.248 on the Mn interface. 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.

The present document is valid for a 3<sup>rd</sup> generation PLMN (UMTS) complying with Release 6 and later.

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# 2 References

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

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

- [1] 3GPP TS 23.228: "IP Multimedia Subsystem (IMS); Stage 2".
- [2] 3GPP TS 29.007: "General requirements on interworking between the Public Land Mobile Network (PLMN) and the Integrated Services Digital Network (ISDN) or Public Switched Telephone Network (PSTN)".
- [3] 3GPP TS 29.205: "Application of Q.1900 series to Bearer Independent CS Network architecture; Stage 3"
- [4] 3GPP TS 29.163: "Interworking between the IM CN subsystem and CS networks – Stage 3".
- [5] 3GPP TS 29.232: "Media Gateway Controller (MGC); Media Gateway (MGW) interface; Stage 3".
- [6] 3GPP TS 26.226: "Cellular Text Telephone Modem; General Description".
- [7] 3GPP TS 26.103: "Speech codec list for GSM and UMTS".
- [8] 3GPP TS 29.202: "Application of Q.1900 series to Bearer Independent CS Network architecture; Stage 3".
- [9] ITU-T Recommendation H.248.1 (05/02): "Gateway Control Protocol: Version 2" including the Corrigendum1 for Version 2 (03/04).
- [10] ITU-T Recommendation H.248.8: "Error Codes and Service Change Reason Description".
- [11] ITU-T Recommendation H.248.2: "Facsimile, text conversation and call discrimination packages".
- [12] ITU-T Recommendation H.248.10: "Media Gateway Resource Congestion Handling Package".
- [13] ITU-T Recommendation T.140: "Text conversation protocol for multimedia application".
- [14] ITU-T Recommendation Q.1950 (12/2002) "Call Bearer Control Protocol".
- [15] IETF RFC 2960: "Stream Control Transmission Protocol".



- [16] IETF RFC 3267: "Real-Time Transport Protocol (RTP) Payload Format and File Storage Format for the Adaptive Multi-Rate (AMR) and Adaptive Multi-Rate Wideband (AMR-WB) Audio Codecs".
- [17] IETF RFC 2327: "SDP: Session Description Protocol".
- [18] IETF RFC 2833: "RTP Payload for DTMF Digits, Telephony Tones and Telephony Signals".
- [20] 3GPP TS 26.236: "Packet switched conversational multimedia applications; Transport protocols".
- [21] 3GPP TS 29.415: "Core Network Nb Interface User Plane Protocols".
- [22] 3GPP TS 23.153: "Out of band transcoder control".
- [23] IETF RFC 768: "User Datagram Protocol".
- [24] IETF RFC 3332: "Signaling System 7 (SS7) Message Transfer Part 3 (MTP3) - User Adaptation Layer (M3UA)".
- [25] 3GPP TS 29.202: "SS7 Signalling Transport in Core Network".
- [26] ITU-T Recommendation H.248.7: "Generic Announcement Package".

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## 3 Definitions, symbols and abbreviations

### 3.1 Definitions

For the purposes of the present document, the [following] terms and definitions [given in ... and the following] apply.

**Context (H.248):** A context is an association between a number of Terminations. The context describes the topology (who hears/sees whom) and the media mixing and/or switching parameters if more than two terminations are involved in the association.

**Package (H.248):** Different types of gateways may implement terminations which have differing characteristics. Variations in terminations are accommodated in the protocol by allowing terminations to have optional properties. Such options are grouped into packages, and a termination may realise a set of such packages.

**Termination (H.248):** A termination is a logical entity on an MGW which is the source and/or sink of media and/or control streams. A termination is described by a number of characterising properties, which are grouped in a set of descriptors which are included in commands. Each termination has a unique identity (TerminationID).

**Termination Property (H.248):** Termination properties are used to describe terminations. Related properties are grouped into descriptors. Each termination property has a unique identity (PropertyID).

### 3.2 Symbols

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

Mn	Interface between the media gateway control function and the IMS media gateway.
Mg	Interface between the MGCF and the CSCF
Mj	Interface between the MGCF and the BGCF

### 3.3 Abbreviations

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

BICC	Bearer Independent Call Control
IM-MGW	IP Multimedia Media Gateway
ISUP	ISDN User Part
MGCF	Media Gateway Control Function
RFC	Request For Comment; this includes both discussion documents and specifications in the IETF domain

SCTP

Stream Control Transmission Protocol

---

## 4 UMTS capability set

The support of the Mn interface capability set shall be identified by the Mn profile and support of this profile shall be indicated in ServiceChange procedure.

The mandatory parts of this capability set shall be used in their entirety whenever it is used within the H.248 profile. Failure to do so will result in a non-standard implementation.

ITU-T Recommendation H.248.1 (05/02) [9] is the basis for this Capability Set. The compatibility rules for packages, signals, events, properties and statistics and the H.248 protocol are defined in ITU-T Recommendation H.248.1 [9]. Their use or exclusion for this interface is clarified in clause 12.

### 4.1 Void

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## 5 Naming conventions

### 5.1 MGCF/IM-MGW naming conventions

The MGCF shall be named according to the naming structure of the underlying transport protocol which carries the H.248 protocol.

### 5.2 Termination names

#### 5.2.1 Termination naming convention

For definition on termination naming convention see 3GPP TS 29.232 [5]

#### 5.2.2 Termination naming convention for TDM terminations

For the definition of TDM terminations see 3GPP TS 29.232[5]

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## 6 Topology descriptor

The Topology Descriptor may be supported by the IM-MGW and MGCF, see Annex A.

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## 7 Transaction timers

All transaction timers specified in H.248 shall be supported in this subset of the protocol.

---

## 8 Transport

Each implementation of the Mn interface should provide SCTP (as defined in IETF RFC2960 [14]). If using SCTP as defined in IETF RFC 2960 [12] the MGW shall always be the node to perform the "Initiation".

An implementation alternative may provide UDP (as defined in IETF RFC 768 [23]). The M3UA layer may also be added to SCTP for pure IP signalling transport (as defined in IETF RFC 3332 [24] with options detailed in 3GPP TS 29.202 [25]).

See also Annex A.

## 9 Multiple Virtual MG.

Not Applicable

## 10 Formats and codes

### 10.1 Signalling Objects

Table 10.1 shows the parameters which are required.

The coding rules applied in ITU-T Recommendation H.248.1 [9] for the applicable coding technique shall be followed for the UMTS capability set.

**Table 10.1: required parameters**

Signalling Object	H.248 Descriptor	Coding
Codec List	Local Descriptor or Remote Descriptor	<fmt list> in a single SDP m-line. For a fixed RTP payload type, the codec type is implied by the RTP payload type. 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 Clause 10.2.
Bearer Service Characteristics	Local Descriptor or Remote Descriptor	As per Q.1950 [14]. For TMR, only values "3.1 kHz audio" or "speech" are required.
Context ID	NA	Binary Encoding: As per ITU-T Recommendation H.248.1 [9] Annex A. Textual Encoding: As per ITU-T Recommendation H.248.1 [9] Annex B.
IP Address	Local Descriptor or Remote Descriptor	<connection address> in SDP "c-line"
Port	Local Descriptor or Remote Descriptor	<port> in SDP m-line. <transport> in SDP m-line shall be set to value "RTP/AVP"
Reserve_Value	Local Control	ITU-T Recommendation H.248.1 [9] Mode property. Binary Encoding: Encoding as per ITU-T Recommendation H.248.1 Annex A "reserveValue" Textual Encoding: Encoding as per ITU-T Recommendation H.248.1 Annex B "reservedValueMode".
RtcpbwRS	Local Descriptor or Remote Descriptor	<bandwidth> in SDP "b:RS"-line.
RtcpbwRR	Local Descriptor or Remote Descriptor	<bandwidth> in SDP "b:RR"-line.
RTPpayload	Local Descriptor or Remote Descriptor	<fmt list> in SDP m-line
Termination ID	NA	Binary Encoding: As per ITU-T Recommendation H.248.1 [9] Annex A. Textual Encoding: As per ITU-T Recommendation H.248.1 [9] Annex B.
Transaction ID	NA	Binary Encoding: As per ITU-T Recommendation H.248.1 [9] Annex A. Textual Encoding: As per ITU-T Recommendation H.248.1 [9] Annex B.
Note	For binary encoding, the SDP equivalents "SDP_V", "SDP_M", "SDP_C", "SDP_A", and SDP_B" in ITU-T Recommendation H.248.1 [9], Annex C.11, shall be used to encode the corresponding SDP lines. Other SDP equivalents may be used, for details see Annex A. The SDP equivalents shall be used in the order specified for the corresponding SDP lines in IETF RFC 2327 [17]. Rules for the usage of SDP in ITU-T Recommendation H.248.1 [9] shall also be applied to the SDP equivalents.	

## 10.2 Codec Parameters

### 10.2.1 AMR Codec

On IMS terminations, the AMR codec is transported according to the IETF AMR RTP profile, IETF RFC 3267 [16]. 3GPP TS 26.236 [20] selects options applicable within 3GPP.

IETF RFC 3267 contains the MIME registration of the IETF AMR RTP profile with media type "audio" and media subtype "AMR". The AMR codec shall be signaled accordingly in the SDP "a=rtpmap"-line and a dynamic RTP payload type shall be used.

The selected options are expressed as MIME parameters in SDP "a=fmtp"-line. The following MIME parameters shall be supported on the Mn interface:

- "mode-set"
- "mode-change-period"

For compatibility with GSM peers, the IM-MGW shall perform mode changes only in every second sent package.

### 10.2.1 DTMF Codec

On IMS terminations, DTMF is transported according to the IETF RFC 2833 [18] "telephone event" format.

IETF RFC 2833[18] contains the MIME registration with media type "audio" and media subtype "telephone-event". DTMF shall be signaled accordingly in the SDP "a=rtpmap"-line and a dynamic RTP payload type shall be used.

An IM-MGW supporting DTMF shall support the default options of the IETF RFC 2833 [18] "telephone event" format. Therefore, a support of optional MIME parameters of "telephone-event" is not required at the Mn interface.

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## 11 Mandatory Support of SDP and H.248 Annex C information elements

This section shall be in accordance with the subclause "Mandatory Support of SDP and ITU-T Recommendation H.248.1 Annex C information elements" in ITU-T Recommendation Q.1950 [14].

For IP the IANA ICP IDI format of the NSAP addressing format as specified in X.213 [33] shall be used. For Ipv4 networks the IPv4 format recommended by X.213 shall be adopted.

For this application the BIR length shall be fixed at 4 Octets and the NSAP length shall be fixed at 20 Octets.

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## 12 General on packages and Transactions

The base root package (0x0002) properties shall be provisioned in the MGW.

H.248 Statistics shall not be audited via the Mn interface.

The use of "Overspecified" (e.g. range of values) and "Underspecified" (e.g. "?") parameter specification shall not be permitted except where explicitly indicated in or referenced by the Mn interface specification.

The use of wildcarding for the Termination Id shall be performed using 1 octet only.

Notifications shall not be sent by the MGW in response to Release Termination procedure.

Commands on ROOT Termination shall only use the NULL Context.

## 12.1 Profile Details

VOID.

NOTE: Profile now defined in Normative Annex A.

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## 13 Void

## 14 Call independent H.248 transactions

Table 14 shows the relationship between each non call-related procedure in 3GPP TS 29.232 [5] and the corresponding procedure defined in 3GPP TS 29.163 [4].

For further description of error codes and service change reasons, refer to ITU-T Recommendation H.248.8 [14].

**Table 14: Non call-related transaction reused from 3GPP TS 29.232 [5]**

Procedure defined in 3GPP TS 29.163 [4]	Procedure defined in 3GPP TS 29.232 [5]	Support	Comment
IM-MGW Out of service	MGW Out of Service	Mandatory	
IM-MGW Communication Up	MGW Communication Up	Mandatory	
IM-MGW Restoration	MGW Restoration	Mandatory	
IM-MGW Register	MGW Register	Mandatory	
IM-MGW Re-register	MGW Re-register	Mandatory	
MGCF Ordered Re-register	(G)MSC Server Ordered Re-register	Mandatory	
MGCF Restoration	(G)MSC Server Restoration	Optional	
MGCF Out of Service	(G)MSC Server Out of Service	Optional	
Termination Out-of-Service	Termination Out-of-Service	Mandatory	
Termination Restoration	Termination Restoration	Mandatory	
Audit Value	Audit Value	Mandatory	Mandatory support only for audit of Termination Service State and for periodic audit of MGW (empty Audit descriptor).
Audit Capability	Audit Capability	Optional	
Command Rejected	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
IM-MGW Capability Change	Capability Update	Optional	
IM-MGW Resource Congestion Handling - Activate	MGW Resource Congestion Handling - Activate	Mandatory	
IM-MGW Resource Congestion Handling - Indication	MGW Resource Congestion Handling - Indication	Mandatory	

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## 15 Transactions towards IM CN Subsystem

### 15.1 Procedures related to a termination towards IM CN Subsystem

Table 1 shows the relationship between each call-related procedure in ITU-T Recommendation Q.1950 [14] (see 3GPP TS 29.205 [3]) or TS 29.232 [5] and the corresponding stage 2 procedure defined in 3GPP TS 29.163 [4].

**Table 15.1.1: Correspondence between ITU-T Recommendation Q.1950 [13] or 29.232 [5] call-related transactions and 3GPP TS 29.163 [4] procedures**

Procedure defined in 3GPP TS 29.163 [4]	Transaction used in Q.1950 [14]	Transaction used in TS 29.232 [5]	Supported	Comment
Reserve IMS Connection point	Not defined	n. a. for reuse	Mandatory	See 13.2.1.1
Configure IMS Resources	Not Defined	n. a. for reuse	Mandatory	See 13.2.1.2
Reserve IMS Connection Point and configure remote resources	Not defined	n. a. for reuse	Mandatory	See 13.2.1.3
Release IMS termination	n. a. for reuse	n. a. for reuse	Mandatory	See 13.2.1.4
Change IMS ThroughConnection	Cut Through	n. a. for reuse	Mandatory	Only the Explicit (MGC Controlled Cut-Through) procedure is supported
Detect IMS RTP Tel Event	Detect Digit	n. a. for reuse	Optional	Only applicable if termination towards IMS is connected with a termination towards a BICC network.
End IMS RTP Tel Event	Detect Digit	n. a. for reuse	Optional	Only applicable if termination towards IMS is connected with a termination towards a BICC network.
Notify IMS RTP Tel Event	Detected digit(BIWF)	n. a. for reuse	Optional	Only applicable if termination towards IMS is connected with a termination towards a BICC network.
Send IMS RTP Tel Event	n.a. for reuse	Send DTMF	FFS	Restrictions defined for minimum interval to follow 3G TS 23.014. Maximum interval shall be controlled by MGW if required by network
Stop IMS RTP Tel Event	n.a. for reuse	Stop DTMF	FFS	The signal descriptor shall not include any signal. The MGW shall ensure the minimum duration timing and minimum interval timing is achieved in accordance with the DTMF timing defined in TS 23.014 [27]. Maximum duration shall also be controlled by the MGW if required by the network
IMS Send Tone	Insert_Tone	Send Tone	Optional	
IMS Stop Tone	Insert Tone	Stop Tone	Optional	
IMS Tone Completed	Signal Completion	Tone Completed	Optional	
IMS Bearer Released	BNC Release	Bearer Released	Mandatory	(NOTE 1)
NOTE: A procedure defined in table 13.2.1 can be combined with another procedure in the same table. This means that they can share the same contextID and termination ID(s) and that they can be combined in the same H.248 command.				
NOTE 1: Termination ID shall be provided in the response.				

### 15.1.1 Reserve IMS Connection Point

When the procedure “Reserve IMS Connection Point” is required the following procedure is initiated:

The MGCF sends an Add.req command with the following information.

1 Add.req (Reserve IMS Connection Point) MGCF to IM-MGW

**Table 15.1.2: Reserve IMS Connection Point Request**

Address Information	Control information	Bearer information
Local Descriptor { Port = ? IP Address = ? }	Transaction ID = z Termination ID = ? <u>If Context Requested:</u> Context ID = ? <u>If Context Provided:</u> Context ID = c1 If Resources for multiple Codecs shall be reserved: Reserve_Value If indication on Bearer Released requested: NotificationRequested (Event ID = x, "BNC Release (Cause)") – as defined in ITU-T Recommendation Q.1950	Local Descriptor { Codec List RTP Payloads RtcpbwRS RtcpbwRR }

When the processing of command (1) is complete, the IM-MGW initiates the following procedure.

2 Add.resp (Reserve IMS Connection Point Ack)

**Table 15.1.3: Reserve IMS Connection Point Acknowledge**

Address Information	Control information	Bearer information
Local Descriptor { Port IP Address }	Transaction ID Termination ID Context ID	Local Descriptor { Codec List RTP Payloads RtcpbwRS RtcpbwRR }

## 15.1.2 Configure IMS Resources

When the procedure "Configure IMS Resources" is required the following procedure is initiated:

The MGCF sends an Mod.req command with the following information.

1 Mod.req (Configure IMS Resources) MGCF to IM-MGW

**Table 15.1.4: Configure IMS Resources Request**

Address Information	Control information	Bearer information
If local resources are modified: Local Descriptor { Port IP Address } If remote resources are modified: Remote Descriptor { Port IP Address }	Transaction ID Termination ID Context ID If Resources for multiple Codecs shall be reserved: Reserve_Value	If local resources are modified: Local Descriptor { Codec List RTP Payloads RtcpbwRS RtcpbwRR } If remote resources are modified: Remote Descriptor { Codec List RTP Payloads RtcpbwRS RtcpbwRR }



When the processing of command (1) is complete, the IM-MGW initiates the following procedure.

## 2 Mod.resp (Configure IMS Resources Ack)

**Table 15.1.5: Configure IMS Resources Acknowledge**

Address Information	Control information	Bearer information
If local resources were provided in request: Local Descriptor { Port IP Address } If remote resources were provided in request: Remote Descriptor { Port IP Address }	Transaction ID Context ID	If local resources were provided in request: Local Descriptor { Codec List RTP Payloads RtcpbwRS RtcpbwRR } If remote resources were provided in request: Remote Descriptor { Codec List RTP Payloads RtcpbwRS RtcpbwRR }

### 15.1.3 Reserve IMS Connection Point and configure remote resources

When the procedure "Reserve IMS Connection Point and configure remote resources" is required the following procedure is initiated:

The MGCF sends a Mod.req command with the following information.

## 1 Add.req (Reserve IMS Connection Point and configure remote resources) MGCF to IM-MGW

**Table 15.1.6: Reserve IMS Connection Point and configure remote resources Request**

Address Information	Control information	Bearer information
Local Descriptor { Port = ? IP Address = ? } Remote Descriptor { Port IP Address }	Transaction ID Termination ID = ? <u>If Context Requested:</u> Context ID = ? <u>If Context Provided:</u> Context ID = c1 If Resources for multiple Codecs shall be reserved: Reserve_Value If indication on Bearer Released requested: NotificationRequested (Event ID = x, "BNC Release (Cause)" – as defined in ITU-T Recommendation Q.1950	Local Descriptor { Codec List RTP Payloads RtcpbwRS RtcpbwRR } Remote Descriptor { Codec List RTP Payloads RtcpbwRS RtcpbwRR }

When the processing of command (1) is complete, the IM-MGW initiates the following procedure.

## 2 Add.resp (Reserve IMS Connection Point and configure remote resources Ack)

**Table 15.1.7: Reserve IMS Connection Point and configure remote resources Acknowledge**

Address Information	Control information	Bearer information
Local Descriptor { Port IP Address } Remote Descriptor { Port IP Address }	Transaction ID Termination ID Context ID	Local Descriptor { Codec List RTP Payloads RtcpbwRS RtcpbwRR } Remote Descriptor { Codec List RTP Payloads RtcpbwRS RtcpbwRR }

### 15.1.4 Release IMS Termination

When the procedure “Release IMS Termination” is required the following procedure is initiated:

The MGCF sends an Sub.req command with the following information.

- 1 Sub.req (Release IMS Termination) MGCF to IM-MGW

**Table 15.1.8: Release IMS Termination Request**

Address Information	Control information	Bearer information
	Transaction ID Termination ID = termination/ALL Context ID = context/ALL	

When the processing of command (1) is complete, the IM-MGW initiates the following procedure.

- 2 Sub.resp (Release IMS Termination) IM-MGW to MGCF

**Table 13.2.9: Release IMS Termination Acknowledge**

Address Information	Control information	Bearer information
	Transaction ID Termination ID Context ID	

## 15.2 IMS packages

None

## 16 Transactions towards ISUP

**Table 16.1: Correspondence between ITU-T Recommendation Q.1950 [13] or 29.232 [5] call-related transactions and 3GPP TS 29.163 [4] procedures related to a termination towards an ISUP network**

Procedure defined in 3GPP TS 29.163 [4]	Transaction used in ITU-T Q.1950 [14]	Transaction used in TS 29.232 [5]	Support	Comment
Reserve TDM Circuit	n. a. for reuse	n. a. for reuse, (NOTE2)	Optional (NOTE 4)	See Clause 13.2.2.1
Change TDM Through-connection	Cut Through (CSM Controlled)	Change Through-connection	Optional (NOTE 4)	only the Explicit (MGC Controlled Cut-Through) procedure is supported
Activate TDM voice-processing function	Echo Canceller	n. a. for reuse	Optional (NOTE 4)	
Send TDM Tone	Insert_Tone	n. a. for reuse	Optional (NOTE 4)	Only H.248 MOD command to an existing termination
Stop TDM Tone	Insert_Tone	n. a. for reuse	Optional (NOTE 4)	Only H.248 MOD command to an existing termination
TDM Tone Completed	Signal Completion	n.a. for reuse	Optional (NOTE 4)	
Play TDM Announcement	Insert_Announcement	n. a. for reuse	Optional (NOTE 4)	Only H.248 MOD command to an existing termination
TDM Announcement Completed	Signal_Completion	n. a. for reuse	Optional (NOTE 4)	(NOTE 5)
Stop TDM Announcement	Insert Announcement	n. a. for reuse	Optional (NOTE 4)	Only H.248 MOD command to an existing termination
Continuity Check	Continuity Check Tone	n. a. for reuse	Optional (NOTE 4)	The addition to "Prepare BNC Notify" defined in Annex B.7.1.1 of Q.1950 [10] shall be applied instead to "Reserve TDM Circuit", as defined in Clause 13.2.2.1
Continuity Check Verify	Continuity Check Verify	n. a. for reuse	Optional (NOTE 4)	
Continuity Check Response	Continuity Check Response	n. a. for reuse	Optional (NOTE 4)	The addition to "Prepare BNC Notify" defined in Annex B.7.1.2 of Q.1950 [10] shall be applied instead to "Reserve TDM Circuit", as defined in Clause 13.2.2.1
Release TDM Termination	n. a. for reuse	n. a. for reuse	Optional (NOTE 4)	See Clause 13.2.2.2
Termination Out Of Service	BIWF_Service_Cancellation_Indication	n. a. for reuse	Optional (NOTE 4)	
Not defined	Not defined	TFO Activation	Optional	
Not defined	Not defined	Codec Modify	Optional	
Not defined	Not defined	Optimal Codec and Distant List_Notify	Optional	
Not defined	Not defined	Distant Codec List	Optional	
Not defined	Not defined	TFO status Notify	Optional	
Not defined	Not defined	TFO status	Optional	
Bearer Released	BNC Release	Bearer Released	Optional (NOTE 4)	(NOTE 5)
<p>NOTE 1: A procedure defined in table 13.2.2 can be combined with another procedure in the same table. This means that they can share the same contextID and termination ID(s) and that they can be combined in the same H.248 command.</p> <p>NOTE 2: The reserve circuit procedure of 29.232 is not to be used only a reduced set of the parameters is required for reserve TDM circuit.</p> <p>NOTE 3: Enhanced to include Camel Prepaid, otherwise same as Q.1950</p> <p>NOTE 4: Necessary for optional terminations towards ISUP</p> <p>NOTE 5: Termination ID shall be provided in the response.</p>				

## 16.1 Procedures related to a termination towards ISUP

### 16.1.1 Reserve TDM Circuit

When the procedure "Reserve TDM Circuit" is required the following procedure is initiated:

The MGCF sends an Add.req command with the following information.

#### 1 Add.req (Reserve TDM Circuit) MGCF to IM-MGW

Address Information	Control information	Bearer information
	Transaction ID Termination ID <u>If Context Requested:</u> Context ID = ? <u>If Context Provided:</u> Context ID = c1 If indication on Bearer Released requested: NotificationRequested (Event ID = x, "BNC Release (Cause)" – as defined in ITU-T Recommendation Q.1950	Bearer Service Characteristics

When the processing of command (1) is complete, the IM-MGW initiates the following procedure.

#### 2 Add.resp (Reserve TDM Circuit) IM-MGW to MGCF

Address Information	Control information	Bearer information
	Transaction ID Termination ID Context ID	

### 16.1.2 Release TDM Termination

When the procedure "Release TDM Termination" is required the following procedure is initiated:

The MGCF sends an Sub.req command with the following information.

#### 1 Sub.req (Release TDM Termination) MGCF to IM-MGW

Address Information	Control information	Bearer information
	Transaction ID Termination ID Context ID	

When the processing of command (1) is complete, the IM-MGW initiates the following procedure.

#### 2 Sub.resp (Release TDM Termination) IM-MGW to MGCF

Address Information	Control information	Bearer information
	Transaction ID Termination ID Context ID	

## 16.2 ISUP packages

None

# 17 Transactions towards BICC

## 17.1 Procedures related to a termination towards BICC

**Table 17.1: Correspondence between ITU-T Recommendation Q.1950 [13] or 3GPP TS 29.232 [5] call-related transactions and 3GPP TS 29.163 [4] procedures related to a termination towards a BICC network**

Procedure defined in 3GPP TS 29.163 [4]	Transaction used in Q.1950 [14]	Transaction used in TS 29.232 [5]	Support	Comment
Establish Bearer	Establish_BNC_Notify +(tunnel)	Establish Bearer (NOTE 1)	Optional (NOTE 5)	
Prepare Bearer	Prepare_BNC_Notify +(tunnel)	Prepare Bearer (NOTE 1), (NOTE 2)	Optional (NOTE 5)	
Change Through-Connection	Cut_Through	Change Through-Connection	Optional (NOTE 5)	only the Explicit (MGC Controlled Cut-Through) procedure is supported
Release Bearer	Cut_BNC (MOD H.248 Command).	Release Bearer	Optional (NOTE 5)	(NOTE 3)
Release Termination	Cut_BNC (SUB H.248 Command).	Release Termination	Optional (NOTE 5)	Statistics about "Ctmbits" are not applicable in Sub.resp
Bearer Established	BNC Established	Bearer Established	Optional (NOTE 5)	(NOTE 3)
Bearer Released	BNC Release	Bearer Released	Optional (NOTE 5)	(NOTE 3)
Send Tone	Insert_Tone	n. a. for reuse	Optional (NOTE 5)	Only H.248 MOD command to an existing termination
Stop Tone	Insert Tone	n. a. for reuse	Optional (NOTE 5)	Only H.248 MOD command to an existing termination
Tone Completed	Signal Completion	n.a. for reuse	Optional (NOTE 5)	
Play Announcement	Insert_Announcement	n. a. for reuse	Optional (NOTE 5)	Only H.248 MOD command to an existing termination
Stop Announcement	Insert Announcement	n. a. for reuse	Optional (NOTE 5)	Only H.248 MOD command to an existing termination
Announcement Completed	Signal Completion	n. a. for reuse	Optional (NOTE 5)	(NOTE 3)
Bearer Modification Support	Not defined	Bearer Modification Support	Optional (NOTE 5)	
Confirm Char	Confirm_Char	Confirm Bearer Characteristics (NOTE 1)	Optional (NOTE 6)	
Modify Bearer Characteristics	Modify Char	Modify Bearer Characteristics (NOTE 1)	Optional (NOTE 6)	
Reserve Char	Reserve_Char_Notify	Reserve Bearer Characteristics (NOTE 1)	Optional (NOTE 6)	
Bearer Modified	BNC Modified	Bearer Modified	Optional (NOTE 6)	
Activate Voice Processing Function	Echo Celler	n. a. for reuse	Optional (NOTE 5)	

Tunnel Information Down	Tunnel (MGC-MGW)	Tunnel Information Down	Optional (NOTE 7)	For IP Transport at BICC termination
Tunnel Information Up	Tunnel (MGW-MGC)	Tunnel Information Up	Optional (NOTE 7)	For IP Transport at BICC termination
Termination Out-of-Service	BIWF Service Cancellation Indication	n. a. for reuse	Optional (NOTE 5)	
Not defined	Not defined	TFO Activation	Optional	
Not defined	Not defined	Codec Modify	Optional	
Not defined	Not defined	Optimal Codec and Distant List_Notify	Optional	
Not defined	Not defined	Distant Codec List	Optional	
Not defined	Not defined	TFO status Notify	Optional	
Not defined	Not defined	TFO status	Optional	
<p>NOTE 1: The procedure is only applicable if the Nb framing protocol is applied at the BICC termination. Only requesting of Observed events defined in the corresponding TS 29.232 and parameters defined in the "3GUP" package of TS 29.232 are applicable in addition the parameters of the corresponding Q.1950 procedure. Those parameters shall be applies as follows: UP mode = Supported mode; UP versions = 2; interface = CN;</p> <p>NOTE 2: Parameters and Observed events defined for Cellular Text telephone Modem Text Transport in the corresponding procedure of TS 29.232 are not applicable.</p> <p>NOTE 3: Termination ID shall be provided in the response.</p> <p>NOTE 4: Enhanced to include Camel Prepaid, otherwise same as Q.1950</p> <p>NOTE 5: Necessary for optional terminations towards BICC</p> <p>NOTE 6: Optional for optional terminations towards BICC</p> <p>NOTE 7: Necessary for optional terminations towards BICC network with IP transport</p>				

## 17.2 BICC packages

This Clause is only applicable for terminations towards BICC Networks. The support of terminations towards BICC networks is optional.

No new packages for terminations towards BICC Networks are defined in the present specification. See Clause 12.1.14 for reused packages from other specifications.

If the Nb framing protocol (see 3GPP TS 29.415 [21]) is applied at the termination towards the BICC network, the following package shall be applied:

3GUP package (see subclause 15.1.1 of 3GPP TS 29.232 [5]); To enable bearer modification at OoBTC capable networks on Nb interface (see 3GPP TS 23.153 [22]) at the termination towards the BICC network, the following package shall be applied:

- Modification of Link Characteristics Bearer Capability (see subclause 15.1.5 of 3GPP TS 29.232 [5]);

## Annex A (Normative): Profile Description

### A.1 Profile Identification

**Table A.1: Profile version**

<b>Profile name:</b>	threegimscsiw
<b>Version:</b>	1

### A.2 Summary

This Profile describes the minimum mandatory settings and procedures required to fulfil the requirements for the IMS-CS interworking gateway control.

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

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

The setting or modification of elements described in the profile under the heading "Used in Command" has the meaning that the property can be set/modified with that command. The property may be present in other commands (in order to preserve its value in accordance with ITU-T H.248.1[9]) when those commands are used for other procedures that affect the same descriptor.

### A.3 Gateway Control Protocol Version

ITU Recommendation H.248.1 Version 2

### A.4 Connection Model

**Table A.4: Connection Model**

<b>Maximum number of contexts:</b>	No restriction
<b>Maximum number of terminations per context:</b>	32
<b>Allowed terminations type combinations in a Context</b>	All

## A.5 Context Attributes

**Table A.5: Context attributes**

Context Attribute	Supported	Values Supported
Topology	Optional	All
Priority Indicator	Yes	0-15
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		

## A.6 Terminations

### A.6.1 Termination Names

See Clause 5.

### A.6.2 Multiplexed terminations

**Table A.6.2: Multiplexed terminations**

<b>MultiplexTerminations Supported</b>	No
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## A.7 Descriptors

### A.7.1 Stream Descriptor

**Table A.7.1: Stream descriptors**

<b>Maximum number of streams per termination type</b>	1
---	---

#### A.7.1.1 Local Control Descriptor

**Table A.7.1.1/1: Local Control Descriptor**

		Termination Type	Stream Type
<b>Reserve group used:</b>	No		
<b>Reserve value used:</b>	Yes (NOTE1)	Terminations Toward IMS	Not Applicable
NOTE1: The "Reserve value" parameter is, inter alia, required for negotiation of multiple payload types, ie G.711, comfort noise, DTMF tone relay (see RFC2833 [18]).			

**Table A.7.1.1/2: Allowed Stream Modes**

Termination Type	Stream Type	Allowed StreamMode Values
TDM	Not Applicable	SendOnly, RecvOnly, SendRecv, Inactive
IMS	Not Applicable	SendOnly, RecvOnly, SendRecv, Inactive
BICC IP	Not Applicable	SendOnly, RecvOnly, SendRecv, Inactive
BICC ATM	Not Applicable	SendOnly, RecvOnly, SendRecv, Inactive



## A.7.2 Events Descriptor

Table A.7.2/1: Events Descriptor

Events settable on termination types and stream types:	Yes		
	Event ID	Termination Type	Stream Type
	Detect_Digit(Digit) (d0 to dd, inclusive)	ALL	Not Applicable
	BNC Established	Terminations towards BICC network	Not Applicable
	BNC Modification Failed	Terminations towards BICC network	Not Applicable
	BNC Modified	Terminations towards BICC network	Not Applicable
	BNC Release	Terminations towards BICC network	Not Applicable
	Tunnel	Terminations towards BICC network with IP transport	Not Applicable
	g/cause	ALL except ROOT	Not Applicable
	g/sc	ALL except ROOT	Not Applicable
	ct/cmp	TDM	Not Applicable
	chp/mgcon	ROOT	Not Applicable
	Start tone detected (tonedet/std)	IMS	Not Applicable
	End Tone detected (tonedet/etd)	IMS	Not Applicable
	Optimal Codec Event (threegtfof/codec_modify)	TDM, BICC	Not Applicable
	Codec List Event (threegtfof/ distant codec_list)	TDM, BICC	Not Applicable
	TFO Status Event (threegtfof/TFO_status)	TDM, BICC	Not Applicable

NOTE: Events for Terminations towards BICC network dependent on option to support such interworking,

Table A.7.2/2: Event Buffer Control

Event Buffer Control used:	No
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Table A.7.2/3: Keep active

Keepactive used on events:	Yes
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Table A.7.2/4: Embedded events

Embedded events in an event descriptor:	No
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Table A.7.2/5: Embedded signals

Embedded signals in an event descriptor:	No
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### A.7.3 EventBuffer Descriptor

Table A.7.3: Event Buffer Descriptor

Event Buffer descriptor used:	No
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### A.7.4 Signals Descriptor

Table A.7.4/1: Signals Descriptor

Signals settable dependant on termination or streams types:		Yes NOTE – "Yes" means any signal not listed below may be played on any termination or stream, except Signals on ROOT termination shall not be supported.	
<i>If yes</i>	Signal ID	Termination Type	Stream Type / ID
	ct/*	TDM	Not Applicable
	gb/*	BICC	Not Applicable
	bt/*	BICC IP	Not Applicable
	cg/rt cg/bt cg/ct	TDM	Not Applicable
	an/apf	ALL except ROOT	Not Applicable

Table A.7.4/2: Signal Lists

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

Table A.7.4/3: Overriding Signal type and duration

Signal type and duration supported:	Optional
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Table A.7.4/4: Notify completion

Notify completion supported:		Yes
<i>If yes</i>	SignalID	Type of completion supported
	ALL	ALL
RequestID Parameter Supported:	NO	

Table A.7.4/5: Signals played simultaneously

Signals played simultaneously:	No
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Table A.7.6/6: Keep active

Keepactive used on signals:	Yes
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## A.7.5 DigitMap Descriptor

**Table A.7.5: DigitMap Descriptor**

<b>Digit Maps supported:</b>	No
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## A.7.6 Statistics Descriptor

**Table A.7.6: Statistics Descriptor**

<b>Statistics reported on subtract:</b>	No
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## A.7.7 ObservedEvents Descriptor

**Table A.7.7: Observed Events Descriptor**

<b>Event detection time supported:</b>	Yes
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## A.7.8 Topology Descriptor

**Table A.7.8: Topology Descriptor**

<b>Allowed triples:</b>	Optional (NOTE) : (T1, T2, isolate) (T1, T2, oneway) (T1, T2, bothway)
NOTE: If not supported then error code 444 shall be returned.	

## A.7.9 Error Descriptor

**Table A.7.9/1: Error Codes Sent by MGCF**

<b>Supported H.248.8 Error Codes:</b>	FFS < list of individual numbers>
<b>Supported Error Codes defined in packages:</b>	All error codes defined in supported packages shall be supported.

**Table A.7.9/2: Error Codes Sent by MGW:**

<b>Supported H.248.8 Error Codes:</b>	FFS< list of individual numbers>
<b>Supported Error Codes defined in packages:</b>	All error codes defined in supported packages shall be supported.

## A.8 Command API

### A.8.1 Add

**Table A.8.1/1: Descriptors used by Command Add Request**

<b>Descriptors used by Add Request:</b>	Events, Signals, Media (LocalControl, Local And Remote), Audit, Topology
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**Table A.8.1/2: Descriptors used by Command Add Reply**

<b>Descriptors used by Add Reply:</b>	Events, Signals, Media (LocalControl, Local And Remote), Error, 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.
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## A.8.2 Modify

**Table A.8.2/1: Descriptors used by Command Modify Request**

<b>Descriptors used by Modify Request:</b>	Events, Signals, Media (LocalControl, Local And Remote), Audit, Topology
--	--

**Table A.8.2/2: Descriptors used by Command Modify Reply**

<b>Descriptors used by Modify Reply:</b>	Events, Signals, Media (LocalControl, Local And Remote), Error, 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.
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## A.8.3 Subtract

**Table A.8.3/1: Descriptor used by Command Subtract Request**

<b>Descriptors used by Subtract Request:</b>	AUDIT (empty)
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**Table A.8.3/2: Descriptor used by Command Subtract Reply**

<b>Descriptors used by Subtract Reply:</b>	None
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## A.8.4 Move

**Table A.8.4/1: Command Move**

<b>Move command used:</b>	Optional(NOTE)
NOTE: If not supported then error code 443 shall be returned.	

**Table A.8.4/2: Descriptors used by Move Request**

<b>Descriptors used by Move Request:</b>	Events, Signals, Media (LocalControl, Local And Remote), Audit, Topology
--	--

**Table A.8.4/3: Descriptors used by Move Reply**

<b>Descriptors used by Move Reply:</b>	Events, Signals, Media (LocalControl, Local And Remote), Error, Audit, Topology
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## A.8.5 Auditvalue

**Table A.8.5: Auditvalue**

<b>Audited Properties:</b>	<b>Property Name and Identity</b>	<b>Descriptor</b>
Termination ID	TerminationState: - TDM: ALL (indicating 1 TDM group) - ATM/IP: individual termination - Root (MGW Audit)  The ServiceState property within the TerminationState descriptor shall not take the value "Test".	TerminationState Descriptor
Termination ID	For Packages: - Root	Packages Descriptor (NOTE1)
Termination ID	None (MGW Audit) : - Root	Audit (empty) Descriptor
<b>Audited Statistics:</b>	None	
<b>Audited Signals:</b>	None	
<b>Audited Events:</b>	FFS<Event name and Identity e.g. Generic Error Event (g/cause, 0x0001/0x0001), ALL or None>	
<b>Packages Audit Possible</b>	FFS<Yes/No>	
NOTE1: Support of this capability is optional.		

## A.8.6 Auditcapabilities

**Table A.8.6: Auditcapabilities**

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

## A.8.7 Notify

**Table A.8.7: Descriptors Used Notify**

<b>Descriptors used by Notify Request or Reply:</b>	<ObservedEvents, Error>
NOTE : The Error Descriptor shall not be used in Notify Request.	

## A.8.8 Service Change

**Table A.8.8/1: Service Change Methods and Reasons Sent By MGCF**

<b>ServiceChange Methods supported:</b>	<b>ServiceChange Reasons supported:</b>
Graceful, Forced, Restart, Handoff(not involving more than 1 MGCF) 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, 915-917

**Table A.8.8/2: Service Change Methods and Reasons Sent By MGW**

<b>ServiceChange Methods supported:</b>	<b>ServiceChange Reasons supported:</b>
Graceful, Forced, Restart, Disconnected, Handoff(not involving more than 1 MGW), Failover (except for 'MG impending failure') 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.	900-910, 913-917

**Table A.8.8/3: Service Change Address**

<b>ServiceChangeAddress used:</b>	No
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**Table A.8.8/4: Service Change Delay**

<b>ServiceChangeDelay used:</b>	No
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**Table A.8.8/5: Service Change Incomplete Flag**

<b>ServiceChange Incomplete Flag used:</b>	No
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**Table A.8.8/6: Service Change Version**

<b>Version used in ServiceChangeVersion:</b>	2
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**Table A.8.8/7: Profile negotiation**

<b>Profile negotiation as per H.248.18:</b>	No
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## A.8.9 Manipulating and auditing context attributes

**Table A.8.9: Manipulating and auditing context attributes**

<b>Context Attributes Manipulated:</b>	Topology (Optional), Emergency, Priority
<b>Context Attributes Audited:</b>	None

## A.9 Generic command syntax and encoding

**Table A.9: Encodings**

<b>Supported Encodings:</b>	Binary (optional) Text (optional)
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## A.10 Transactions

**Table A.10/1: Transactions per Message**

<b>Maximum number of TransactionRequests / TransactionReplies / TransResponseAcks / Segment Replies per message:</b>	2
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**Table A.10/2: Commands per Transaction Requests**

<b>Maximum number of commands per Transaction request:</b>	TBD
--	-----

**Table A.10/3: Commands per Transaction Reply**

<b>Maximum number of commands per Transaction reply:</b>	TBD
--	-----

**Table A.10/4: Optional Commands**

<b>Commands able to be marked "Optional":</b>	None
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**Table A.10/5: Transaction Timers**

<b>Transaction Timer:</b>	<b>Value</b>
normalMGExecutionTime	Provisioned
normalMGCExecutionTime	Provisioned
MGOriginatedPendingLimit	Provisioned
MGCOriginatedPendingLimit	Provisioned
MGProvisionalResponseTimerValue	Provisioned
MGCProvisionalResponseTimerValue	Provisioned

## A.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.

## A.12 Transport

**Table A.12/1: Transport**

<b>Supported Transports:</b>	SCTP(recommended) (NOTE1),, SCTP/M3UA(optional) as defined in IETF RFC 3332 [6] with options detailed in 3GPP TS 29.202 [7] (NOTE2), UDP(optional)
NOTE 1 – H.248 is "SCTP user" in this case of H.248/SCTP/IP based transport according ITU-T Rec. H.248.4. The number of used SCTP Streams for traffic of the H.248 Control Association must be defined, see § 8/H.248.4. A single SCTP Stream is the default assumption ("Single-Stream Mode") in this Profile.	
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 § 1.4.7/RFC 3332). If not then the complete M3UA traffic is mapped on a single SCTP Stream, i.e., the Single-Stream Mode.	

**Table A.12/2: Segmentation**

<b>Segmentation Supported:</b>	No
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## A.13 Security

**Table A.13: Security**

<b>Supported Security:</b>	None
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## A.14 Packages

**Table A.14/1: Mandatory packages**

Package Name	Package ID	Version
Generic (see ITU-T Recommendation H.248.1 [9] Annex E.1);	g, (0x0001)	v1
Base Root Package (see ITU-T Recommendation H.248.1 [9] Annex E.2);	root, (0x0002)	v2
Tone Detection Package (see ITU-T Recommendation H.248.1 [9] Annex E.4);	tonedet, (0x0004) 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.	v1
Basic DTMF Generator Package (see ITU-T Recommendation H.248.1 [9] Annex E.5); Only the DTMF Signal Ids shall be used, not the Tone Ids within the PlayTone Signal Id.	dg, (0x0005)	v1
DTMF Detection Package (see ITU-T Recommendation H.248.1 [9] Annex E.6);	dd, (0x0006)	v1
TDM Circuit Package (see ITU-T Recommendation H.248.1 [9] Annex E.13);	tdmc, (0x000d)	v1
Media Gateway Resource Congestion Handling Package (see ITU-T Recommendation H.248.10 [12]).	chp, (0x0051)	v1
Basic Continuity Package (see ITU-T Recommendation H.248.1 [9] Annex E.10);	ct, (0x000a) Only required for TDM side terminations.	v1

Table A.14/2: Optional packages

Package Name	Package ID	Version	Support dependent on:
Generic Announcement Package (see ITU-T Recommendation H.248.7 [28]). Only Fixed Part is required.	an(0x001d)	v1	3GPP applications
Bearer Characteristics Package (see ITU-T Recommendation Q.1950 [23] annex A.3).	bcp (0x001e)	V2	Terminations Towards BICC
Generic Bearer Connection Package (see ITU-T Recommendation Q.1950 [23] annex A.6).	Gb, (0x0021)	v1	Interworking with BICC
Tone Generator Package (see ITU-T Recommendation H.248.1 [9] Annex E.3);	tongen, (0x0003)	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 [10] annex E.7).	Cg, (0x0007)	v1	
Basic Call Progress Tones Generator with Directionality, (see ITU-T Recommendation Q.1950 [23] annex A.8).	bcb, (0x0023)	v1	Services provided by network
Expanded Call Progress tones Generator Package (see ITU-T Recommendation Q.1950 [23] annex A.9).	xcg, (0x0024)	v1	Services provided by network
Basic Services Tones Generation Package, (see ITU-T Recommendation Q.1950 [23] annex A.10).	srvtn, (0x0025)	v1	Services provided by network
Bearer Control Tunnelling Package (see ITU-T Recommendation Q.1950 [23] annex A.7).	Bt, (0x0022)	v1	Interworking with BICC and IP transport
Expanded Services Tones Generation Package (see ITU-T Recommendation Q.1950 [23] annex A.11).	xsrvtn, (0x0026)	v1	Services provided by network
Intrusion Tones Generation Package (see ITU-T Recommendation Q.1950 [23] annex A.12).	Int, (0x0027)	v1	Services provided by network
3GUP package (see subclause 15.1.1 of 3GPP TS 29.232 [5]);	threegup, (0x002f)	v1	Interworking with BICN PLMN
Modification of Link Characteristics Bearer Capability (see subclause 15.1.5 of 3GPP TS 29.232 [5])	threegmlc, (0x0046)	v1	Interworking with BICN PLMN with Codec Modification
TFO package (see subclause 15.2.2 of 3GPP TS 29.232 [5])	threegtfo, (0x0031)	v2	

Table A.14/3: Package Provisioning Information

Package Name	Property, Parameter, Signal, Event ID	Provisioned Value:
Generic Announcement (H.248.7)	Fixed Announcement Play, AV	Provisioned

## A.14.1 Generic Package

Table A.14.1: Package Usage Information For Generic Package

Properties	Mandatory/Optional	Used in command:	Supported Values:	Provisioned Value:
None	-	-	-	-
Signals	Mandatory/Optional	Used in command:		Duration Provisioned Value:
None	-	-	-	-
	Signal Parameters	Mandatory/Optional	Supported Values:	Duration Provisioned Value:
	-	-	-	-

Events	Mandatory/ Optional	Used in command:		
Cause (g/cause, 0x0001/0x0001)	M	ADD, MOD, NOTIFY		
	<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) Normal Release "UR" (0x0002) Unavailable Resources "FT" (0x0003) Failure, Temporary "FP" (0x0004) Failure, Permanent "IW" (0x0005) Interworking Error "UN" (0x0006) Unsupported	Not Applicable
Failure Cause (FailureCause, 0x0002)	O	Octet String	Not Applicable	
Signal Completion. (g/sc, 0x0001/0x0002)	M	ADD, MOD, MOVE, 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>
	Signal Identity (SigID , 0x0001)	M	pkgdName syntax	Not Applicable
	Termination Method (Meth,0x0002)	M	"TO" (0x0001) Signal timed out or otherwise completed on its own "EV" (0x0002) Interrupted by event "SD" (0x0003) Halted by new Signals descriptor "NC" (0x0004) Not completed, other cause	Not Applicable
Signal List Id	O	Integer	Not Applicable	

## A.14.2 Base Root Package

**Table A.14.2: Package Usage Information For Base Root Package**

Properties	Mandatory/ Optional	Used in command:	Supported Values:	Provisioned Value:
root/maxNumberOfContexts	O	<ADD, MOD, MOVE, AUDITVALUE, AUDITCAP>	<Values / ALL >	<Value / Not Applicable>
root/maxTerminationPerContext	O			
root/normalMGExecutionTime	O			
root/normalMGCExecutionTime	O			
root/MGProvisionalResponseTimerValue	O			
root/MGCProvisionalResponseTimerValue	O			
root/MGCOriginatedPendingLimit	O			
root/MGOOriginatedPendingLimit	O			
<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	-			

## A.14.3 Basic DTMF Generator Package

**Table A.14.3: Package Usage Information For Basic DTMF Generator 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>
DTMF character 0 ,d0	M	ADD, MOD, MOVE		
DTMF character 1	<b>Signal Parameters</b>	<b>Mandatory/ Optional</b>	<b>Supported Values:</b>	<b>Duration Provisioned Value:</b>

d1 DTMF character 2	None	-	-	-				
d2 DTMF character 3								
d3 DTMF character 4								
d4 DTMF character 5								
d5 DTMF character 6								
d6 DTMF character 7								
d7 DTMF character 8								
d8 DTMF character 9								
d9 DTMF character *								
ds DTMF character #								
do DTMF character A								
da DTMF character B								
db DTMF character C								
dc DTMF character D								
dd								
<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	-							

### A.14.4 Basic DTMF Detection Package

Table A.14.4: Package Usage Information For Basic DTMF Generator Package

<b>Properties</b>	<b>Mandatory/ Optional</b>	<b>Used in command:</b>	<b>Supported Values:</b>	<b>Provisioned Value:</b>
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>		
d0, "0" d1, "1" d2, "2" d3, "3" d4, "4" d5, "5"	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>

d6, "6" d7, "7" d8, "8" d9, "9" ds, "*" do, "#" da, "A" or "a" db, "B" or "b" dc, "C" or "c" dd, "D" or "d"	None	-	-	-
<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	-			

### A.14.5 TDM Circuit Package

**Table A.14.5: Package Usage Information For TDM Circuit Package**

Properties	Mandatory/ Optional	Used in command:	Supported Values:	Provisioned Value:
Echo Cancellation, tdm/ec	M	ADD, MOD, MOVE	ALL	Default=Off (False)
Gain Control, tdm/gc	Not Used	-	-	-
<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	-			

### A.14.6 MGW Congestion Package

**Table A.14.6: Package Usage Information For Media Gateway Overload Control 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>
	-	-	-	-

Events	Mandatory/ Optional	Used in command:		
MG Congestion, chp/mgcon(0x0001)	M/	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>
Reduction (0x0001)	M/	0-100	Not Applicable	
<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	-			

## A.14.7 Continuity Package

Table A.14.7: Package Usage Information For Basic Continuity 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>
Continuity Test, ct/ct Respond, ct/rsp	M	ADD, MOD, MOVE		Default
	<b>Signal Parameters</b>	<b>Mandatory/ Optional</b>	<b>Supported Values:</b>	<b>Duration Provisioned Value:</b>
None	-	-	-	-
<b>Events</b>	<b>Mandatory/ Optional</b>	<b>Used in command:</b>		
Completion, ct/cmp(0x0005)	M/	ADD, MOD, MOVE, 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>
result, res(0x0008)	M	success, failure	Not Applicable	
<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	-			

## A.14.8 Announcement Package

Table A.14.8: Package Usage Information For Announcement 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>
Fixed Announcement Play, apf(0x0001)	M	ADD, MOD, MOVE		<Value / Not Applicable>
	<b>Signal Parameters</b>	<b>Mandatory/ Optional</b>	<b>Supported Values:</b>	<b>Duration Provisioned Value:</b>
	Announcement name, an(0x0001)	M	enumeration	<Value / Not Applicable>
	Number Of Cycles, noc(0x0002)	M	Any	-
Announcement Variant, av(0x0003)	O	string	-	

	Announcement Direction, di(0x0004)	M	Internal, External	-
<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	-			

### A.14.9 Bearer Characteristics Package

**Table A.14.9: Package Usage Information For Bearer Characteristics Package**

<b>Properties</b>	<b>Mandatory/ Optional</b>	<b>Used in command:</b>	<b>Supported Values:</b>	<b>Provisioned Value:</b>
BNC Characteristics (BCP/BNCChar,0x001e/0x01)	M	ADD	AAL type 2 / IP/RTP	Not Applicable
<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	-			

### A.14.10 Generic Bearer Connection Package

**Table A.14.10: Package Usage Information For Generic Bearer Connection Package**

<b>Properties</b>	<b>Mandatory/ Optional</b>	<b>Used in command:</b>	<b>Supported Values:</b>	<b>Provisioned Value:</b>
None	-	-	-	-
<b>Signals</b>	<b>Mandatory/ Optional</b>	<b>Used in command:</b>		<b>Duration Provisioned Value:</b>
Establish BNC (GB/EstBNC,0x0021/0x01)	M	ADD, MOD		Not Applicable
	<b>Signal Parameters</b>	<b>Mandatory/ Optional</b>	<b>Supported Values:</b>	<b>Duration Provisioned Value:</b>
	Not Applicable	-	-	Not Applicable



Modify BNC (GB/ModBNC,0x0021/0x02)	O	MOD		Not Applicable
	<b>Signal Parameters</b>	<b>Mandatory/ Optional</b>	<b>Supported Values:</b>	<b>Duration Provisioned Value:</b>
	Not Applicable	-	-	Not Applicable
Release BNC (GB/RelBNC,0x0021/0x03)	M (NOTE)	MOD		Not Applicable
	<b>Signal Parameters</b>	<b>Mandatory/ Optional</b>	<b>Supported Values:</b>	<b>Duration Provisioned Value:</b>
	General cause (Generalcause,0x01)	O	Normal Release/ Unavailable Resources/ Failure Temporary/ Failure Permanent/ Interworking Error/ Unsupported	Not Applicable
	Failure Cause (Failurecause,0x02)	O	OCTET STRING	Not Applicable
	Reset (Reset,0x03)	O	0/ 1	Not Applicable
<b>Events</b>	<b>Mandatory/ Optional</b>	<b>Used in command:</b>		
BNC Change (GB/BNCChange,0x0021/0x01)	M	ADD, MOD, NOTIFY		
	<b>Event Parameters</b>	<b>Mandatory/ Optional</b>	<b>Supported Values:</b>	<b>Provisioned Value:</b>
	Type (Type ,0x01)	M	Bearer Established / Bearer Modified/ Bearer Modification Failure	Not Applicable
	<b>ObservedEvent Parameters</b>	<b>Mandatory/ Optional</b>	<b>Supported Values:</b>	<b>Provisioned Value:</b>
	Type (Type,0x01)	M	Bearer Established / Bearer Modified/ Bearer Modification Failure	Not Applicable
<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	-			
NOTE: Mandatory for BICC ATM Terminations, not used otherwise				

### A.14.11 Call Progress Tones Generator Package v1

**Table A.14.11: Package Usage Information For Call Progress Tones Generator Package**

Properties	Mandatory/ Optional	Used in command:	Supported Values:	Provisioned Value:
<name and Identity e.g. Packets Sent (rtp/ps, 0x00c/0x0004), ALL or None>	<M/O>	<ADD, MOD, MOVE, AUDITVALUE, AUDITCAP>	<Values / ALL >	<Value / Not Applicable>
<b>Signals</b>	<b>Mandatory/ Optional</b>	<b>Used in command:</b>		<b>Duration Provisioned Value:</b>
<name and Identity >	<M/O>	<ADD, MOD, MOVE, AUDITVALUE, AUDITCAP>		<Value / Not Applicable>
	<b>Signal Parameters</b>	<b>Mandatory/ Optional</b>	<b>Supported Values:</b>	<b>Duration Provisioned Value:</b>
<name and Identity>	<M/O>	<Values / ALL>	<Value / Not Applicable>	
<b>Events</b>	<b>Mandatory/ Optional</b>	<b>Used in command:</b>		
<name and Identity >	<M/O>	<ADD, MOD, MOVE, NOTIFY, AUDITVALUE, AUDITCAP>		
	<b>Event Parameters</b>	<b>Mandatory/ Optional</b>	<b>Supported Values:</b>	<b>Provisioned Value:</b>

	<name and Identity>	<M/O>	<Values / ALL>	<Value / Not Applicable>
	<b>ObservedEvent Parameters</b>	<b>Mandatory/ Optional</b>	<b>Supported Values:</b>	<b>Provisioned Value:</b>
	<name and Identity>	<M/O>	<Values / ALL>	<Value / Not Applicable>
<b>Statistics</b>	<b>Mandatory/ Optional</b>	<b>Used in command:</b>		<b>Supported Values:</b>
<name and Identity >	<M/O>	<ADD, MOD, MOVE, SUBTRACT, AUDITVALUE, AUDITCAP>		<Values / ALL >
<b>Error Codes</b>	<b>Mandatory/ Optional</b>			
<number>	<M/O>			

### A.14.12 Basic Call Progress Tones Generator with Directionality

**Table A.14.12: Package Usage Information For Basic Call Progress Tones Generator with Directionality 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>
Dial Tone (bcg/bdt, 0x0023/0x0040)	O	ADD, MOD, MOVE		Value
Ringing Tone (bcg/brt, 0x0023/0x0041)	Signal Parameters Tone Direction (btd, 0x0001)	Mandatory/ Optional M	Supported Values: Internal / External	Duration Provisioned Value: Default=External
Busy Tone (bcg/bbt, 0x0023/0x0042)				
Congestion Tone (bcg/bct, 0x0023/0x0043)				
Special Information Tone (bcg/bsit, 0x0023/0x0044)				
Warning Tone (bcg/bwt, 0x0023/0x0045)				
Payphone Recognition Tone (bcg/bpt, 0x0023/0x0046)				
Call Waiting Tone (bcg/bcw, 0x0023/0x0047)				
Caller Waiting Tone (bcg/bcr, 0x0023/0x0048)				
Pay Tone (bcg/bpy, 0x0023/0x0049)				
<b>Events</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>
	-	-	-	-

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

### A.14.13 Expanded Call Progress Tones Generator Package

**Table A.14.13: Package Usage Information For Expanded 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:			
Comfort Tone (xcg/cmft,0x0024/0x004a)	O	ADD, MOD, MOVE		Value			
Off-hook warning Tone (xcg/roh, 0x0024/0x004b)	Signal Parameters	Mandatory/ Optional	Supported Values:	Duration Provisioned Value:			
Negative Acknowledgement (xcg/nack,0x0024/0x004c)					M	Internal / External	Default=External
Vacant Number Tone (xcg/vac, 0x0024/0x004d)							
Special Conditions Dial Tone (xcg/spec,0x0024/0x004e)							
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	-						

### A.14.14 Basic Services Tones Generation Package

**Table A.14.14: Package Usage Information For Basic Services Tones Generation Package**

Properties	Mandatory/ Optional	Used in command:	Supported Values:	Provisioned Value:			
None	-	-	-	-			
Signals	Mandatory/ Optional	Used in command:		Duration Provisioned Value:			
Recall Dial Tone (srvtn/rdt,0x0025/0x004f)	O	ADD, MOD, MOVE		Value			
Confirmation Tone (srvtn/conf,0x0025/0x0050)	Signal Parameters	Mandatory/ Optional	Supported Values:	Duration Provisioned Value:			
Held Tone (srvtn/ht,0x0025/0x0051)					M	Internal / External	Default=External
Message Waiting Tone (srvtn/mwt,0x0025/0x0052)							
Events	Mandatory/ Optional	Used in command:					
None	-	-					
	Event Parameters	Mandatory/ Optional	Supported Values:	Provisioned Value:			
	-	-	-	-			

	-	-	-	-
	<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	-			

### A.14.15 Bearer Control Tunnelling Package

**Table A.14.15: Package Usage Information For Bearer Control Tunnelling Package**

Properties	Mandatory/ Optional	Used in command:	Supported Values:	Provisioned Value:
Tunneling Options (BT/TunOpt, 0x0022/0x01)	M	ADD, MOD	1 / 2	Not Applicable
<b>Signals</b>	<b>Mandatory/ Optional</b>	<b>Used in command:</b>		<b>Duration Provisioned Value:</b>
Bearer Information Transport (BT/BIT, 0x0022/0x01)	M	ADD, MOD		Not Applicable
	<b>Signal Parameters</b>	<b>Mandatory/ Optional</b>	<b>Supported Values:</b>	<b>Duration Provisioned Value:</b>
	Bearer Information Tunnel (BIT,0x01)	M	Octet String	Not Applicable
<b>Events</b>	<b>Mandatory/ Optional</b>	<b>Used in command:</b>		
Tunnel Indication (BT/TIND, 0x0022/0x01)	M	ADD, MOD, NOTIFY		
	<b>Event Parameters</b>	<b>Mandatory/ Optional</b>	<b>Supported Values:</b>	<b>Provisioned Value:</b>
	Not applicable	-	-	-
	<b>ObservedEvent Parameters</b>	<b>Mandatory/ Optional</b>	<b>Supported Values:</b>	<b>Provisioned Value:</b>
	Bearer Information transport (BIT,0x01)	M	Octet String	Not Applicable
<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	-			

### A.14.16 Expanded Services Tones Generation Package

**Table A.14.16: Package Usage Information For Expanded Services Tones Generation 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>
Call Transfer Dial Tone (xsrvtm/xferdt,0x0026/0x0053)	O	ADD, MOD, MOVE		Value
Call Forward Tone (xsrvtm/cft,0x0026/0x0054)	<b>Signal Parameters</b>	<b>Mandatory/ Optional</b>	<b>Supported Values:</b>	<b>Duration Provisioned Value:</b>
Credit Card service Tone (xsrvtm/ccst,0x0026/0x0055)	Tone Direction (btd, 0x0001)	M	Internal / External	Default=External
Special Recall Dial Tone (xsrvtm/srdt,0x0026/0x0056)				

<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	-			

### A.14.17 Intrusion Tones Generation Package

**Table A.14.17: Package Usage Information For Intrusion Tones Generation Package**

<b>Properties</b>	<b>Mandatory/ Optional</b>	<b>Used in command:</b>	<b>Supported Values:</b>	<b>Provisioned Value:</b>
None	-	-	-	-
<b>Signals</b>	<b>Mandatory/ Optional</b>	<b>Used in command:</b>		<b>Duration Provisioned Value:</b>
Intrusion Pending Tone (int/pend,0x0027/0x0057)	O	ADD, MOD, MOVE		Value
Intrusion Tone (int/int,0x0027/0x0058)	<b>Signal Parameters</b>	<b>Mandatory/ Optional</b>	<b>Supported Values:</b>	<b>Duration Provisioned Value:</b>
Intrusion Reminder Tone (int/rem,0x0027/0x0059)	Tone Direction (btd, 0x0001)	M	Internal / External	Default=External
Toll Break-In Tone (int/tbi,0x0027/0x005a)				
Intrusion Queue Tone (int/intque,0x0027/0x005b)				
Busy Verification Tone (int/bv,0x0027/0x005c)				
<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>
	-	-	-	-

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

## A.14.18 3GUP Package

Table A.14.18: Package Usage Information For 3GUP Package

Properties	Mandatory/ Optional	Used in command:	Supported Values:	Provisioned Value:
UP Mode of operation (threegup/mode, 0x002f/0x0001)	M	ADD, MOD, MOVE	See 3GPP TS 29.232 [5]	See 3GPP TS 29.232 [5]
UP versions (threegup/ upversions, 0x002f/0x0002)	M	ADD, MOD, MOVE	See 3GPP TS 29.232 [5]	See 3GPP TS 29.232 [5]
Delivery of erroneous SDUs (threegup/ delerrsd, 0x002f/0x0003)	M	ADD, MOD, MOVE	See 3GPP TS 29.232 [5]	See 3GPP TS 29.232 [5]
Interface (threegup/ interface, 0x002f/0x0004)	M	ADD, MOD, MOVE	See 3GPP TS 29.232 [5]	See 3GPP TS 29.232 [5]
Initialisation Direction (threegup/ initdir, 0x002f/0x0005)	M	ADD, MOD, MOVE	See 3GPP TS 29.232 [5]	See 3GPP TS 29.232 [5]
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			

## A.14.19 Modification of Link Characteristics Bearer Capability

**Table A.14.19: Package Usage Information For Modification of Link Characteristics 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:		
	<M/O>	<ADD, MOD, MOVE, NOTIFY, AUDITVALUE, AUDITCAP>		
Bearer Modification Support Event.( threegmlc/ mod_link_supp, 0x0046/0x0001)	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				

## A.14.20 TFO package

**Table A.14.20: Package Usage Information For TFO**

Properties	Mandatory/ Optional	Used in command:	Supported Values:	Provisioned Value:
TFO Activity Control (threegtfoc / tfoenable, (0x0031/0x0001)	M	ADD, MOD, MOVE	See 3GPP TS 29.232	See 3GPP TS 29.232
TFO Codec List (threegtfoc / codeclist, (0x0031/0x0002)	M	ADD, MOD, MOVE	See 3GPP TS 29.232	See 3GPP TS 29.232
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:		
	O	ADD, MOD, MOVE, NOTIFY		
Optimal Codec Event (threegtfoc / codec_modify, (0x0031/0x0010)	Event Parameters	Mandatory/ Optional	Supported Values:	Provisioned Value:
	None			
	ObservedEvent Parameters	Mandatory/ Optional	Supported Values:	Provisioned Value:

	Optimal Codec Type	M	See 3GPP TS 29.232	See 3GPP TS 29.232
Codec List Event (threegtfc / distant_codec_list, (0x0031/0x0012)	O	ADD, MOD, MOVE, 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>
	Distant Codec List	M	See 3GPP TS 29.232	See 3GPP TS 29.232
TFO Status Event (threegtfc / TFO_status) (0x0031/0x0014)	O	ADD, MOD, MOVE, 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>
	TFO Status	M	See 3GPP TS 29.232	See 3GPP TS 29.232
<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>			

## A.14.21 Tone Generator Package

Table A.14.21: Package Usage Information For Tone Generator Package

Properties	Mandatory/Optional	Used in command:	Supported Values:	Provisioned Value:
None	-	-	-	-
Signals	Mandatory/Optional	Used in command:		Duration Provisioned Value:
Play Tone (tonegen/pt,0x0003/0x0001)	Not Used	-		-
	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:
	-	-	-	-



<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	-		

## A.14.22 Tone Detection Package

**Table C.14.22: Package Usage Information For Tone Detection Package**

<b>Properties</b>	<b>Mandatory/ Optional</b>	<b>Used in command:</b>	<b>Supported Values:</b>	<b>Provisioned Value:</b>
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>		
Start tone detected (tonedet/std, 0x0004/0x0001)	O	ADD, MOD, MOVE, NOTIFY		
	<b>Event Parameters</b>	<b>Mandatory/ Optional</b>	<b>Supported Values:</b>	<b>Provisioned Value:</b>
	Tone ID List (tl,0x0001)	M	wildcard	Not Applicable
	<b>ObservedEvent Parameters</b>	<b>Mandatory/ Optional</b>	<b>Supported Values:</b>	<b>Provisioned Value:</b>
	Tone ID (tid,0x0003)	M	Value	Not Applicable
<b>Events</b>	<b>Mandatory/ Optional</b>	<b>Used in command:</b>		
End Tone detected (tonedet/etd, 0x0004/0x0002)	M	ADD, MOD, MOVE, NOTIFY		
	<b>Event Parameters</b>	<b>Mandatory/ Optional</b>	<b>Supported Values:</b>	<b>Provisioned Value:</b>
	Tone ID List (tl,0x0001)	M	wildcard	Not Applicable

	<b>ObservedEvent Parameters</b>	<b>Mandatory/Optional</b>	<b>Supported Values:</b>	<b>Provisioned Value:</b>
	Tone ID (tid,0x0003)	M	Value	Not Applicable
	Duration (dur,0x0002)	O	Value	Not Applicable
<b>Events</b>	<b>Mandatory/Optional</b>	<b>Used in command:</b>		
Long Tone detected (tonedet/ltd, 0x0004/0x0003)	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	-			

## A.15 Mandatory support of SDP and Annex C information elements

**Table A.15: Supported Annex C and SDP information elements**

Information Element	Annex C Support	SDP Support
v-line	"SDP_V "	
m-line	"SDP_M "	<port> <transport> and <fmt-list> are required. Both static and dynamic payload types shall be supported.
c-line	"SDP_C "	<connection address> required
a-line	"SDP_A "	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 Clause 10.2.
b-line	"SDP_B "	<p>B:RS and b:RR bandwidth modifiers required            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 response 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 kbit/s and shall take into account all headers down to the IP layer.</p> <p>The MGC may also supply additional RTCP bandwidth modifiers (i.e. RR and RS). 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.</p>
o-line	"SDP_O"	<p>The origin line consists of 6 fields:  <i>o= &lt;user name&gt; &lt;session ID&gt; &lt;version&gt; &lt;network type&gt; &lt;address type&gt; &lt;address&gt;.</i></p> <p>The MGC is not required to supply this line but shall accept it.</p> <p>The MG should populate this line as follows or use the value received from the MGC:</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 RFC 2327 [x]</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:  <i>s= &lt;session-name&gt;.</i></p> <p>The MGC is not required to supply a session name but shall accept one. This line may be used to convey correlation information for use in CDRs.</p> <p>The MG shall use an hyphen "-" as a session name or the value received from the MGC.</p>

t-line	"SDP_T"	<p>The time (t=) line consists of two fields:  <i>t= &lt;start-time&gt; &lt;stop-time&gt;</i>.</p> <p>This line is ignored by both the MGC and the MG if received in local and remote descriptors.</p> <p>The MGC is not required to supply a time description but shall accept one.                  When supplied, this line shall be set to 0 0.</p>
<p>NOTE: SDP or SDP_equivalents are only used for terminations towards the IM CN Subsystem.                  NOTE1: b-line is optional</p>		

## A.16 Optional support of SDP and Annex C information elements

**Table A.16: Optional Supported Annex C and SDP information elements**

Information Element	Annex C Support	SDP Support

### A.17 Procedures

#### A.17.1 Call Independent Procedures

See clause 14.

#### A.17.2 IMS Terminations Procedures

See clause 15.

#### A.17.3 TDM Terminations Procedures

See clause 16.

#### A.17.4 BICC Terminations Procedures

See clause 17.

## Annex B (informative): Change history

Change history							
Date	TSG #	TSG Doc.	CR	Rev	Subject/Comment	Old	New
2004-09	CN#25				Approved in CN#25	2.0.0	6.0.0
2005-03	CN#27	NP-050045	001	1	Introduction Of Formal Profile	6.0.0	6.1.0
			002	1	Corrections to Mn Specification		
2005-06	CT#28	CP-050208	0001	4	Introduction Of Formal Profile	6.1.0	6.2.0
		CP-050208	0005		Inclusion of Insert Digit Procedure at IMS termination		
2005-09	CT#29	CP-050442	0007	3	Alignment of Mn Profile with ITU template and Mc interface decisions	6.2.0	6.3.0
2005-12	CT#30	CP-050619	0009	1	Alignment of Rel6 Mn with Rel7 Changes	6.3.0	6.4.0
		CP-050619	0010	1	Open Mn		
		CP-050619	0016	1	Addition of TFO procedure		
2006-03	CT#31	CP-060066	0029	1	Bearer Released Event to Reserve TDM Circuit procedure	6.4.0	6.5.0
		CP-060066	0031	1	BICC packages in Mn profile		
		CP-060066	0033		Service Change Method "Disconnected" and "Failover" removal from Service Changes sent by MGCF		
2006-06	CT#32	CP-060306	0035	1	Corrections to Mn Specification for Inter Vendor Operability	6.5.0	6.6.0
			0049		Update for packages defined in 29.232 in Mn profile		
			0042		Update for Generic Bearer Connection package in Mn profile		
			0043	1	Adding of Bearer Released Event to Procedures related to a termination towards IM CN Subsystem		
			0045	1	Mode-change-period support on Mn interface		
2006-09	CT#33	CP-060401	0047	1	AuditValue procedure	6.6.0	6.7.0
			0057	2	Corrections to Profile Description: Descriptors		
			0059		Corrections to Profile Description: Command API		
			0061	1	Corrections to Profile Description: Packages		
			0065	1	Definition of the use of mandatory and optional in Mn Profile Template		
			0067		Missing Procedures Towards IMS		

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## History

<b>Document history</b>		
V6.0.0	January 2005	Publication
V6.1.0	March 2005	Publication
V6.2.0	June 2005	Publication
V6.3.0	September 2005	Publication
V6.4.0	December 2005	Publication
V6.5.0	March 2006	Publication
V6.6.0	June 2006	Publication
V6.7.0	September 2006	Publication