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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 6.13.1 Release 6)**



Reference

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Foreword

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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 3rd generation PLMN (UMTS) complying with Release 6 and later.

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".
- [27] IETF RFC 3555: "MIME Type Registration of RTP Payload Formats".
- [28] RFC 3309: "Stream Control Transmission Protocol (SCTP) Checksum Change"

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

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]

6 Topology descriptor

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

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] and as updated by RFC3309 [28]). 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 static RTP payload type, the codec type should be implied by the RTP payload type, if not then each codec type shall be provided in a separate SDP "a=rtpmap"-line and possibly additional SDP "a=fmtp"-line(s). See Clause 10.2 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. |
| BNC Release | EventDescriptor | As for the EventsDescriptor in subclause E.1.2.1/H.248.1 "Cause" |
| BNC Release | ObservedEvent descriptor | As for the ObservedEventsDescriptor in subclause E.1.2.1/H.248.1 "Cause" |
| 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. SDP description types (v=, m=, a= etc.) are not encoded. CR/LF are not encoded. | |

10.2 Codec Parameters

10.2.1 AMR and AMR-WB Codec

On IMS terminations, the AMR and AMR-WB codecs are 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 [16] contains the MIME registration of the IETF AMR RTP profile with media type "audio" and media subtype of "AMR" and "AMR-WB". The AMR and AMR-WB codecs 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"

In addition the following MIME parameters may be supported on the Mn interface:

- "octet-align"
- "mode-change-neighbor" (for IMS this parameter shall be included and set to 1)
- "ptime"
- "maxptime"

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

Example of encoding of AMR codec:

ABNF:

```
Local {
    v=0
    c=IN IP4 $
    m=audio $ RTP/AVP 96
    a=rtpmap:96 AMR/8000
    a=fmtp:96 mode-set=0,2,5,7;mode-change-period=2;mode-change-neighbor=1
    a=maxptime=20
}
```

ASN.1:

```
LocalDescriptor{
    PropertyParams{
        PkgdName=0x000B001          /*SDP_V */
        value= "0"
        PkgdName=0x000B008          /*SDP_C */
        value= "IN IP4 $"
        PkgdName=0x000B00F          /*SDP_M */
        value= "audio $ RTP/AVP 96"
        PkgdName=0x000B00C          /*SDP_A */
        value= "rtpmap:96 AMR/8000"
        PkgdName=0x000B00C          /*SDP_A */
        value= "fmtp:96 mode-set=0,2,5,7;mode-change-period=2;mode-change-neighbor=1"
        PkgdName=0x000B00C          /*SDP_A */
        value= "maxptime=20"
    }
}
```

NOTE: The c-line may be provided after m-line.

10.2.2 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.

10.2.3 Other Codecs

On IMS terminations, other codecs such as ITU-T codecs are transported according to the RTP payload formats in IETF RFC 3555 [27]. 3GPP TS 29.163 [4], clause B.2.5.4, specifies the options applicable within 3GPP.

IETF RFC 3555 [27] contains the MIME registration with media type "audio" and corresponding media subtype.

For dynamic payload type being used the ITU-T codecs shall be signaled accordingly in the SDP "a=rtpmap"-line, where the selected options are expressed as MIME parameters in SDP "a=fmtp"-line.

For static payloads type being used ITU-T codecs shall be allowed to be signaled accordingly in the SDP "a=rtpmap"-line, when the selected options are expressed as MIME parameters in SDP "a=fmtp"-line. Otherwise the codec type is implied by the RTP payload type.

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.

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.

13 Void

14 Call independent H.248 transactions

14.1 Non-call related procedures

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 | |

14.1 Profile registration

The following description is based on H.248.1 profile registration procedure with some clarifications. The reply to the ServiceChange Request containing the SCP parameter indicates if the MGCF supports the requested profile or if it does not support it and wants to propose an alternative profile. The profile (name and version) is only returned in the reply if the MGCF cannot support the specified profile in the ServiceChangeRequest. The returned reply shall indicate the profile and version supported. Upon reception of a profile in the reply, if the IM-MGW supports the indicated profile, it shall issue a new ServiceChange Request with the agreed profile to explicitly confirm the acceptance of the profile to the MGCF ; otherwise, if the IM-MGW does not support the indicated profile, it may continue the registration or re-registration procedure by issuing a new ServiceChange Request with an alternative profile ; until such procedure is successfully completed the IM-MGW shall remain out of service. If the profile is not returned the MGCF shall use the capabilities specified by the Profile indicated in the service change request.

NOTE: It should be observed that the profile registration is not a "cold calling" negotiation; it is expected that the operator will have configured the network to support certain profiles and so the profile registration within the Mn interface permits network upgrade scenarios but otherwise is simply a means to confirm the connection of the profile to be used over the Mn interface between MGCF and IM-MGW.

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 | Not Defined | Mandatory | See 13.2.1.1 |
| Configure IMS Resources | Not Defined | Not Defined | Mandatory | See 13.2.1.2 |
| Reserve IMS Connection Point and configure remote resources | Not defined | Not Defined | Mandatory | See 13.2.1.3 |
| Release IMS termination | n. a. for reuse | Release Termination | Mandatory | |
| Change IMS ThroughConnection | n.a. for reuse | Change Through Connection | Mandatory | Only the Explicit (MGC Controlled Cut-Through) procedure is supported |
| Detect IMS RTP Tel Event | n.a. for reuse | Detect DTMF | Optional | Only applicable if termination towards IMS is connected with a termination towards a BICC network |
| End IMS RTP Tel Event | n.a. for reuse | Stop Detect DTMF | Optional | Only applicable if termination towards IMS is connected with a termination towards a BICC network. |
| Notify IMS RTP Tel Event | n.a. for reuse | Report DTMF | 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 | |
| Stop IMS RTP Tel Event | n.a. for reuse | Stop DTMF | FFS | |
| IMS Send Tone | n,a. for reuse | Send Tone | Optional | |
| IMS Stop Tone | n,a. for reuse | Stop Tone | Optional | |
| IMS Tone Completed | n,a. for reuse | Tone Completed | Optional | |
| IMS Bearer Released | n.a for reuse. | Bearer Released | Mandatory | |
| 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. | | | | |

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 Void

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 | n. a. for reuse | Change Through-connection | Optional (NOTE 4) | only the Explicit (MGC Controlled Cut-Through) procedure is supported |
| Activate TDM voice-processing function | n. a. for reuse | Activate Voice Processing Function | Optional (NOTE 4) | |
| Send TDM Tone | n,a. for re-use | Send Tone | Optional (NOTE 4) | |
| Stop TDM Tone | n,a. for re-use | Stop Tone | Optional (NOTE 4) | |
| TDM Tone Completed | n,a. for re-use | Tone Completed | Optional (NOTE 4) | |
| Play TDM Announcement | n. a. for reuse | Play Announcement | Optional (NOTE 4) | |
| TDM Announcement Completed | n. a. for reuse | Announcement Completed | Optional (NOTE 4) | |
| Stop TDM Announcement | n. a. for reuse | Stop Announcement | Optional (NOTE 4) | |
| 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 | Continuity Check Verify | 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 |
| 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 | n.a. for re-use. | Bearer Released | Optional (NOTE 4) | |
| 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. | | | | |
| 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. | | | | |
| NOTE 3: VOID | | | | |
| NOTE 4: Necessary for optional terminations towards ISUP | | | | |

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 | n.a. for re-use | Change Through-Connection | Optional (NOTE 5) | only the Explicit (MGC Controlled Cut-Through) procedure is supported |
| Release Bearer | n.a. for re-use | Release Bearer | Optional (NOTE 5) | |
| Release Termination | n. a. for reuse | Release Termination | Optional (NOTE 5) | Statistics about "Ctmbits" are not applicable in Sub.resp |
| Bearer Established | n. a. for reuse | Bearer Established | Optional (NOTE 5) | |
| Bearer Released | n. a. for reuse | Bearer Released | Optional (NOTE 5) | |
| Send Tone | n,a. for re-use | Send Tone | Optional (NOTE 5) | |
| Stop Tone | n,a. for re-use | Stop Tone | Optional (NOTE 5) | |
| Tone Completed | n,a. for re-use | Tone Completed | Optional (NOTE 5) | |
| Play Announcement | n. a. for reuse | Play Announcement | Optional (NOTE 5) | |
| Stop Announcement | n. a. for reuse | Stop Announcement | Optional (NOTE 5) | |
| Announcement Completed | n. a. for reuse | Announcement Completed | Optional (NOTE 5) | |
| 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 | n. a. for reuse | Activate Voice Processing Function | 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 |
| 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: VOID</p> <p>NOTE 4: VOID</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

| | |
|----------------------|---------------|
| Profile name: | threegimscsiw |
| Version: | 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

| | |
|--|----------------|
| Maximum number of contexts: | No restriction |
| Maximum number of terminations per context: | 32 |
| Allowed terminations type combinations in a Context | All |

A.5 Context Attributes

Table A.5: Context attributes

| Context Attribute | Supported | Values Supported |
|---|-----------|------------------|
| Topology | Optional | All |
| Priority Indicator | Optional | 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

| | |
|--|----|
| MultiplexTerminations Supported | No |
|--|----|

A.7 Descriptors

A.7.1 Stream Descriptor

Table A.7.1: Stream descriptors

| | |
|---|---|
| Maximum number of streams per termination type | 1 |
|---|---|

A.7.1.1 Local Control Descriptor

Table A.7.1.1/1: Local Control Descriptor

| | | Termination Type | Stream Type |
|---|-------------|-------------------------|----------------|
| Reserve group used: | No | | |
| Reserve value used: | 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 except ROOT | 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 |
| | 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, TDM, BICC | Not Applicable |
| | End Tone detected (tonedet/etd) | IMS, TDM, BICC | Not Applicable |
| | Optimal Codec Event (threegtfo/codec_modify) | TDM, BICC | Not Applicable |
| | Codec List Event (threegtfo/ distant codec_list) | TDM, BICC | Not Applicable |
| | TFO Status Event (threegtfo/TFO_status) | TDM, BICC | Not Applicable |
| NOTE: Events for Terminations towards BICC network dependent on option to support such interworking, | | | |
| NOTE1: BNC Release event is defined in formats and codes table 10.1 and refers to the g/cause event. | | | |

Table A.7.2/2: Event Buffer Control

| | |
|-----------------------------------|----|
| Event Buffer Control used: | No |
|-----------------------------------|----|

Table A.7.2/3: Keep active

| | |
|-----------------------------------|-----|
| Keepactive used on events: | Yes |
|-----------------------------------|-----|

Table A.7.2/4: Embedded events

| | |
|--|----|
| Embedded events in an event descriptor: | No |
|--|----|

Table A.7.2/5: Embedded signals

| | |
|---|----|
| Embedded signals in an event descriptor: | No |
|---|----|

A.7.3 EventBuffer Descriptor

Table A.7.3: Event Buffer Descriptor

| | |
|--------------------------------------|----|
| Event Buffer descriptor used: | No |
|--------------------------------------|----|

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 except ROOT | |
| | 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 |
|--|----------|

Table A.7.4/4: Notify completion

| | | | |
|---|-----------------------------|-------------------------------------|--|
| Notify completion supported: | | Yes | |
| <i>If yes</i> | SignalID | Type of completion supported | |
| | ALL Tones and Announcements | TO, EV, SD and NC | |
| RequestID Parameter Supported: (NOTE) | NO | | |
| NOTE: This field requires support of version 3 of H.248.1 protocol. | | | |

Table A.7.4/5: Signals played simultaneously

| | |
|---------------------------------------|----|
| Signals played simultaneously: | No |
|---------------------------------------|----|

Table A.7.6/6: Keep active

| | |
|------------------------------------|-----|
| Keepactive used on signals: | Yes |
|------------------------------------|-----|

A.7.5 DigitMap Descriptor

Table A.7.5: DigitMap Descriptor

| | |
|------------------------------|----|
| Digit Maps supported: | No |
|------------------------------|----|

A.7.6 Statistics Descriptor

Table A.7.6: Statistics Descriptor

| | |
|---|----|
| Statistics reported on subtract: | No |
|---|----|

A.7.7 ObservedEvents Descriptor

Table A.7.7: Observed Events Descriptor

| | |
|--|-----|
| Event detection time supported: | Yes |
|--|-----|

A.7.8 Topology Descriptor

Table A.7.8: Topology Descriptor

| | |
|---|---|
| Allowed triples: | 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

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

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

| | |
|---|---|
| Supported H.248.8 Error Codes: | FFS< list of individual numbers > |
| Supported Error Codes defined in packages: | 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

| | |
|---|---|
| Descriptors used by Add Request: | Events, Signals, Media (LocalControl, Local And Remote), Audit, Topology |
|---|---|

Table A.8.1/2: Descriptors used by Command Add Reply

| | |
|---------------------------------------|---|
| Descriptors used by Add Reply: | <p>Events, Signals, Media (LocalControl, Local And Remote), Error, Audit, Topology</p> <p>When command request excludes an Audit Descriptor, the MGW response shall only include descriptors which contained underspecified or overspecified properties in the command request Furthermore, only those properties that were underspecified or overspecified in the request shall be sent in the reply. Exceptions to this rule are:</p> <ul style="list-style-type: none"> - The Error Descriptor - SDP properties returned in "Reserve IMS Connection Point" and "Reserve IMS Connection Point and Configure Remote Resources" procedures, as specified in 15.1.1 and 15.1.3 |
|---------------------------------------|---|

A.8.2 Modify

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

| | |
|--|--|
| Descriptors used by Modify Request: | Events, Signals, Media (LocalControl, Local And Remote), Audit, Topology |
|--|--|

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

| | |
|--|---|
| Descriptors used by Modify Reply: | <p>Events, Signals, Media (LocalControl, Local And Remote), Error, Audit, Topology</p> <p>When command request excludes an Audit Descriptor, the MGW response shall only include descriptors which contained underspecified or overspecified properties in the command request. Furthermore, only those properties that were underspecified or overspecified in the request shall be sent in the reply. Exceptions to this rule are:</p> <ul style="list-style-type: none"> - The Error Descriptor - SDP properties returned in "Configure IMS Resources" procedure as specified in 15.1.2. |
|--|---|

A.8.3 Subtract

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

| | |
|--|---------------|
| Descriptors used by Subtract Request: | AUDIT (empty) |
|--|---------------|

Table A.8.3/2: Descriptor used by Command Subtract Reply

| | |
|--|------|
| Descriptors used by Subtract Reply: | None |
|--|------|

A.8.4 Move

Table A.8.4/1: Command Move

| | |
|---|----------------|
| Move command used: | Optional(NOTE) |
| NOTE: If not supported then error code 443 shall be returned. | |

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

| | |
|--|--|
| Descriptors used by Move Request: | 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. |
|--|--|

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

| | |
|--|---|
| Descriptors used by Move Reply: | Events, Signals, Media (LocalControl, Local And Remote), Error, Audit, Topology |
|--|---|

A.8.5 Auditvalue

Table A.8.5: Auditvalue

| Audited Properties: | Property Name and Identity | Descriptor |
|--|---|-----------------------------|
| 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 |
| Audited Statistics: | None | |
| Audited Signals: | None | |
| Audited Events: | FFS<Event name and Identity e.g. Generic Error Event (g/cause, 0x0001/0x0001), ALL or None> | |
| Packages Audit Possible | FFS<Yes/No> | |
| NOTE1: Support of this capability is optional. | | |

A.8.6 Auditcapabilities

Table A.8.6: Auditcapabilities

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

A.8.7 Notify

Table A.8.7: Descriptors Used Notify

| | |
|--|-------------------------|
| Descriptors used by Notify Request or Reply: | <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

| ServiceChange Methods supported: | ServiceChange Reasons supported: |
|---|--|
| Restart (NOTE 1) | "901 Cold Boot" (Optional) "902 Warm Boot" (Optional) |
| Handoff (NOTE 1, NOTE 2) | "903 MGC Directed Change" (Mandatory) |
| Forced (NOTE 1) | "905 Termination Taken Out Of Service" (Optional) |
| Graceful (NOTE 1) | "905 Termination Taken Out Of Service" (Optional) |
| <p>NOTE : When a Service Change command on the Root termination with a method other than Graceful is sent, the command shall always be sent as the only command in a message. The sending node shall always wait for the reply to a Service Change command on the Root termination with a method other than Graceful before sending further command requests. A Service Change command on the Root termination with method Graceful may be combined with other commands in a single message.</p> <p>NOTE 1: ROOT Only.</p> <p>NOTE 2: Not involving more than 1 MGCF. No support of handoff relates to a network deployment scenario with "primary H.248 systems only", which translates to no geographic redundancy of the MGCF.</p> | |

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

| ServiceChange Methods supported: | ServiceChange Reasons supported: |
|---|--|
| Restart | "900 Service Restored" (Mandatory) "901 Cold Boot" (Mandatory) (NOTE 1) "902 Warm Boot" (Mandatory) (NOTE 1) "910 Media Capability Failure "(Optional), ALL except ROOT "913 Signal Capability Failure "(Optional), ALL except ROOT "914 Event Capability Failure "(Optional) ALL except ROOT "916 Packages Change (Optional) "917 Capability Change (Optional) |
| Graceful | "904 Termination Malfunction" ,ALL except ROOT, (Mandatory) "905 Termination Taken Out Of Service", (Mandatory) "906 Loss Of Lower Layer Connectivity" , ALL except ROOT,(Mandatory) "907 Transmission Failure" ALL except ROOT,(Mandatory) "908 MG Impending Failure" ROOT only (Mandatory) |
| Forced | "904 Termination Malfunction" ,ALL except ROOT, (Mandatory) "905 Termination Taken Out Of Service" (Mandatory) "906 Loss Of Lower Layer Connectivity" ALL except ROOT, (Mandatory) "907 Transmission Failure" ALL except ROOT, (Mandatory) "908 MG Impending Failure" ROOT only (Mandatory) |
| Handoff (NOTE 1, NOTE 2) | "903 MGC Directed Change" (Mandatory) |
| Disconnected (NOTE 1) | "900 Service Restored" (Mandatory) "916 Packages Change (Optional) "917 Capability Change (Optional) |
| <p>NOTE : When a Service Change command on the Root termination with a method other than Graceful is sent, the command shall always be sent as the only command in a message. The sending node shall always wait for the reply to a Service Change command on the Root termination with a method other than Graceful before sending further command requests. A Service Change command on the Root termination with method Graceful may be combined with other commands in a single message.</p> <p>NOTE 1: ROOT Only.</p> <p>NOTE 2: In response to a MGC Ordered Re-Register.</p> | |

Table A.8.8/3: Service Change Address

| | |
|-----------------------------------|----|
| ServiceChangeAddress used: | No |
|-----------------------------------|----|

Table A.8.8/4: Service Change Delay

| | |
|---------------------------------|----|
| ServiceChangeDelay used: | No |
|---------------------------------|----|

Table A.8.8/5: Service Change Incomplete Flag

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

Table A.8.8/6: Service Change Version

| | |
|--|---|
| Version used in ServiceChangeVersion: | 2 |
|--|---|

Table A.8.8/7: Profile negotiation

| | |
|---|----|
| Profile negotiation as per H.248.18: | No |
|---|----|

A.8.9 Manipulating and auditing context attributes

Table A.8.9: Manipulating and auditing context attributes

| | |
|--|--|
| Context Attributes Manipulated: | Topology (Optional), Emergency, Priority |
| Context Attributes Audited: | None |

A.9 Generic command syntax and encoding

Table A.9: Encodings

| | |
|--|---|
| Supported Encodings: | Binary (optional) (NOTE 1) Text (optional) |
| NOTE 1: For 3GPP Mn interface binary encoding is strongly recommended if only one encoding is selected to ensure interoperability. | |

A.10 Transactions

Table A.10/1: Transactions per Message

| | |
|--|---|
| Maximum number of TransactionRequests / TransactionReplies / TransResponseAcks / Segment Replies per message: | 2 |
|--|---|

Table A.10/2: Commands per Transaction Requests

| | |
|--|-----|
| Maximum number of commands per Transaction request: | TBD |
|--|-----|

Table A.10/3: Commands per Transaction Reply

| | |
|--|-----|
| Maximum number of commands per Transaction reply: | TBD |
|--|-----|

Table A.10/4: Optional Commands

| | |
|---|------|
| Commands able to be marked "Optional": | None |
|---|------|

Table A.10/5: Transaction Timers

| Transaction Timer: | Value |
|----------------------------------|--------------|
| normalMGExecutionTime | Provisioned |
| normalMGCExecutionTime | Provisioned |
| MGOriginatedPendingLimit | Provisioned |
| MGCOriginatedPendingLimit | Provisioned |
| MGProvisionalResponseTimerValue | Provisioned |
| MGCProvisionalResponseTimerValue | Provisioned |

A.11 Messages

The MGC/MGW may be named according to the naming structure of the underlying transport protocol which carries the H.248 protocol.

It is however 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 "Message Identifier" in the H.248 messages may be used by the MGC and MG to identify the originator of the message.

A.12 Transport

Table A.12/1: Transport

| | |
|------------------------------|---|
| Supported Transports: | 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. |
| NOTE 3 | Checksum calculation for SCTP shall be supported as specified in RFC 3309 [28] instead of the method specified in RFC 2960 [12]. |

Table A.12/2: Segmentation

| | |
|--------------------------------|----|
| Segmentation Supported: | No |
|--------------------------------|----|

A.13 Security

Table A.13: Security

| | |
|---------------------|------|
| Supported Security: | None |
|---------------------|------|

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, (0x0029) | 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). | bcg, (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 | | |
| | Event Parameters | Mandatory/ Optional | Supported Values: | Provisioned Value: |
| | None | - | - | - |
| | ObservedEvent Parameters | Mandatory/ Optional | Supported Values: | Provisioned Value: |
| | General Cause (GeneralCause, 0x0001) | M | "NR" (0x0001) Normal Release "UR" (0x0002) Unavailable Resources "FT" (0x0003) Failure, Temporary "FP" (0x0004) Failure, Permanent "IW" (0x0005) Interworking Error "UN" (0x0006) Unsupported | Not Applicable |
| Failure Cause (FailureCause, 0x0002) | O | Octet String | Not Applicable | |
| Signal Completion. (g/sc, 0x0001/0x0002) | M | ADD, MOD, MOVE, NOTIFY | | |
| | Event Parameters | Mandatory/ Optional | Supported Values: | Provisioned Value: |
| | None | - | - | - |
| | ObservedEvent Parameters | Mandatory/ Optional | Supported Values: | Provisioned Value: |
| | 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 | | | |
| 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.14.3 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 | - | - | - | - |
| Signals | Mandatory/ Optional | Used in command: | | Duration Provisioned Value: |
| DTMF character 0 ,d0 | M | ADD, MOD, MOVE | | |
| DTMF character 1 | Signal Parameters | Mandatory/ Optional | Supported Values: | Duration Provisioned Value: |

| | | | | | |
|------------------------|-------------------------------------|--------------------------------|------------------------------|---------------------------|--|
| 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 | | | | | |
| 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.14.4 Basic DTMF Detection Package

Table A.14.4: Package Usage Information For Basic DTMF Generator 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: | | | | | |
| d0, "0" | M | ADD, MOD, NOTIFY | | | | | |
| d1, "1" | Event Parameters | Mandatory/ Optional | Supported Values: | Provisioned Value: | | | |
| d2, "2" | | | | | None | - | - |
| d3, "3" | ObservedEvent Parameters | Mandatory/ Optional | Supported Values: | Provisioned Value: | | | |
| d4, "4" | | | | | | | |
| d5, "5" | | | | | | | |

| | | | | |
|--|--------------------------------|-------------------------|---|--------------------------|
| 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 | - | - | - |
| Statistics | Mandatory/ Optional | Used in command: | | Supported Values: |
| None | - | - | | - |
| Error Codes | Mandatory/ Optional | | | |
| 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, tdmc/ec | M | ADD, MOD, MOVE | ALL | Default=Off (False) |
| Gain Control, tdmc/gc | Not Used | - | - | - |
| 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.14.6 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 | - | - | - | - |
| 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 Congestion, chp/mgcon(0x0001) | M/ | MOD, NOTIFY | | |
| | Event Parameters | Mandatory/ Optional | Supported Values: | Provisioned Value: |
| | None | - | - | - |
| | ObservedEvent Parameters | Mandatory/ Optional | Supported Values: | Provisioned Value: |
| Reduction (0x0001) | M/ | 0-100 | Not Applicable | |
| Statistics | Mandatory/ Optional | Used in command: | | Supported Values: |
| None | - | - | | - |
| Error Codes | Mandatory/ Optional | | | |
| 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 | - | - | - | - |
| Signals | Mandatory/ Optional | Used in command: | | Duration Provisioned Value: |
| Continuity Test, ct/ct Respond, ct/rsp | M | ADD, MOD, MOVE | | Default |
| | Signal Parameters | Mandatory/ Optional | Supported Values: | Duration Provisioned Value: |
| | None | - | - | - |
| Events | Mandatory/ Optional | Used in command: | | |
| Completion, ct/cmp(0x0005) | M/ | ADD, MOD, MOVE, NOTIFY | | |
| | Event Parameters | Mandatory/ Optional | Supported Values: | Provisioned Value: |
| | None | - | - | - |
| | ObservedEvent Parameters | Mandatory/ Optional | Supported Values: | Provisioned Value: |
| result, res(0x0008) | M | success, failure | Not Applicable | |
| Statistics | Mandatory/ Optional | Used in command: | | Supported Values: |
| None | - | - | | - |
| Error Codes | Mandatory/ Optional | | | |
| 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 | - | - | - | - |
| Signals | Mandatory/ Optional | Used in command: | | Duration Provisioned Value: |
| Fixed Announcement Play, apf(0x0001) | M | ADD, MOD, MOVE | | <Value / Not Applicable> |
| | Signal Parameters | Mandatory/ Optional | Supported Values: | Duration Provisioned Value: |
| | 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 | - |
| 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.14.9 Bearer Characteristics Package

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

| | | | | |
|--|-------------------------------------|--------------------------------|------------------------------|--|
| Properties | Mandatory/ Optional | Used in command: | Supported Values: | Provisioned Value: |
| BNC Characteristics (BCP/BNCChar,0x001e/0x01) | M | ADD | AAL type 2 / IP/RTP | 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 | - | | | |

A.14.10 Generic Bearer Connection Package

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

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

| | | | | |
|---|--------------------------------------|--------------------------------|--|--|
| Modify BNC (GB/ModBNC,0x0021/0x02) | O | MOD | | Not Applicable |
| | Signal Parameters | Mandatory/ Optional | Supported Values: | Duration Provisioned Value: |
| | Not Applicable | - | - | Not Applicable |
| Release BNC (GB/RelBNC,0x0021/0x03) | M (NOTE) | MOD | | Not Applicable |
| | Signal Parameters | Mandatory/ Optional | Supported Values: | Duration Provisioned Value: |
| | 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 |
| Events | Mandatory/ Optional | Used in command: | | |
| BNC Change (GB/BNCChange,0x0021/0x01) | M | ADD, MOD, NOTIFY | | |
| | Event Parameters | Mandatory/ Optional | Supported Values: | Provisioned Value: |
| | Type (Type ,0x01) | M | Bearer Established / Bearer Modified/ Bearer Modification Failure | Not Applicable |
| | ObservedEvent Parameters | Mandatory/ Optional | Supported Values: | Provisioned Value: |
| | Type (Type,0x01) | M | Bearer Established / Bearer Modified/ Bearer Modification Failure | Not Applicable |
| Statistics | Mandatory/ Optional | Used in command: | Supported Values: | |
| None | - | - | - | |
| Error Codes | Mandatory/ Optional | | | |
| 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> |
| Signals | Mandatory/ Optional | Used in command: | | Duration Provisioned Value: |
| <name and Identity > | <M/O> | <ADD, MOD, MOVE, AUDITVALUE, AUDITCAP> | | <Value / Not Applicable> |
| | Signal Parameters | Mandatory/ Optional | Supported Values: | Duration Provisioned Value: |
| <name and Identity> | <M/O> | <Values / ALL> | <Value / Not Applicable> | |
| Events | Mandatory/ Optional | Used in command: | | |
| <name and Identity > | <M/O> | <ADD, MOD, MOVE, NOTIFY, AUDITVALUE, AUDITCAP> | | |
| | Event Parameters | Mandatory/ Optional | Supported Values: | Provisioned Value: |

| | | | | |
|----------------------|---------------------------------|--|--------------------------|---------------------------|
| | <name and Identity> | <M/O> | <Values / ALL> | <Value / Not Applicable> |
| | ObservedEvent Parameters | Mandatory/ Optional | Supported Values: | Provisioned Value: |
| | <name and Identity> | <M/O> | <Values / ALL> | <Value / Not Applicable> |
| Statistics | Mandatory/ Optional | Used in command: | | Supported Values: |
| <name and Identity > | <M/O> | <ADD, MOD, MOVE, SUBTRACT, AUDITVALUE, AUDITCAP> | | <Values / ALL > |
| Error Codes | Mandatory/ Optional | | | |
| <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 | - | - | - | - |
| Signals | Mandatory/ Optional | Used in command: | | Duration Provisioned Value: |
| 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) | | | | |
| Events | | | | |
| 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.14.13 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 Tone Direction (btd, 0x0001) | Mandatory/ Optional M | Supported Values: Internal / External | Duration Provisioned Value: Default=External |
| Negative Acknowledgement (xcg/nack,0x0024/0x004c) | | | | |
| 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 Tone Direction (btd, 0x0001) | Mandatory/ Optional M | Supported Values: Internal / External | Duration Provisioned Value: Default=External |
| Held Tone (srvtn/ht,0x0025/0x0051) | | | | |
| Message Waiting Tone (srvtn/mwt,0x0025/0x0052) | | | | |
| 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.14.15 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 |
| Signals | Mandatory/ Optional | Used in command: | | Duration Provisioned Value: |
| Bearer Information Transport (BT/BIT, 0x0022/0x01) | M | ADD, MOD | | Not Applicable |
| | Signal Parameters | Mandatory/ Optional | Supported Values: | Duration Provisioned Value: |
| | Bearer Information Tunnel (BIT,0x01) | M | Octet String | Not Applicable |
| Events | Mandatory/ Optional | Used in command: | | |
| Tunnel Indication (BT/TIND, 0x0022/0x01) | M | ADD, MOD, NOTIFY | | |
| | Event Parameters | Mandatory/ Optional | Supported Values: | Provisioned Value: |
| | Not applicable | - | - | - |
| | ObservedEvent Parameters | Mandatory/ Optional | Supported Values: | Provisioned Value: |
| | Bearer Information transport (BIT,0x01) | M | Octet String | Not Applicable |
| Statistics | Mandatory/ Optional | Used in command: | Supported Values: | |
| None | - | - | - | |
| Error Codes | Mandatory/ Optional | | | |
| 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 | - | - | - | - |
| Signals | Mandatory/ Optional | Used in command: | | Duration Provisioned Value: |
| Call Transfer Dial Tone (xsrvtm/xferdt,0x0026/0x0053) | O | ADD, MOD, MOVE | | Value |
| Call Forward Tone (xsrvtm/cft,0x0026/0x0054) | Signal Parameters | Mandatory/ Optional | Supported Values: | Duration Provisioned Value: |
| 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) | | | | |

| 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.14.17 Intrusion Tones Generation Package

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

| Properties | Mandatory/ Optional | Used in command: | Supported Values: | Provisioned Value: |
|--|---------------------------------|------------------------|----------------------|--------------------------------|
| None | - | - | - | - |
| Signals | Mandatory/ Optional | Used in command: | | Duration Provisioned Value: |
| Intrusion Pending Tone (int/pend,0x0027/0x0057) | O | ADD, MOD, MOVE | | Value |
| Intrusion Tone (int/int,0x0027/0x0058) | Signal Parameters | Mandatory/ Optional | Supported Values: | Duration Provisioned Value: |
| 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) | | | | |
| 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.14.18 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/ delerrsdus, 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: | | |
| Bearer Modification Support Event.(threegmlc/ mod_link_supp, 0x0046/0x0001) | <M/O> | <ADD, MOD, MOVE, NOTIFY, AUDITVALUE, AUDITCAP> | | |
| | 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: | | |
| Optimal Codec Event (threegtfoc / codec_modify, (0x0031/0x0010) | O | ADD, MOD, MOVE, NOTIFY | | |
| | 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 | | |
| | Event Parameters | Mandatory/Optional | Supported Values: | Provisioned Value: |
| | None | | | |
| | ObservedEvent Parameters | Mandatory/Optional | Supported Values: | Provisioned Value: |
| | 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 | | |
| | Event Parameters | Mandatory/Optional | Supported Values: | Provisioned Value: |
| | None | | | |
| | ObservedEvent Parameters | Mandatory/Optional | Supported Values: | Provisioned Value: |
| | TFO Status | M | See 3GPP TS 29.232 | See 3GPP TS 29.232 |
| Statistics | Mandatory/Optional | Used in command: | | Supported Values: |
| None | | | | |
| Error Codes | Mandatory/ Optional | | | |
| | | | | |

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: |
| - | - | - | - | - |

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

A.14.22 Tone Detection Package

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

| | | | | |
|---|-------------------------------------|--------------------------------|------------------------------|--|
| Properties | Mandatory/ Optional | Used in command: | Supported Values: | Provisioned Value: |
| None | - | - | - | - |
| Signals | Mandatory/ Optional | Used in command: | | Duration Provisioned Value: |
| None | - | - | | - |
| | Signal Parameters | Mandatory/ Optional | Supported Values: | Duration Provisioned Value: |
| | - | - | - | - |
| Events | Mandatory/ Optional | Used in command: | | |
| Start tone detected (tonedet/std, 0x0004/0x0001) | O | ADD, MOD, MOVE, NOTIFY | | |
| | Event Parameters | Mandatory/ Optional | Supported Values: | Provisioned Value: |
| | Tone ID List (tl,0x0001) | M | wildcard | Not Applicable |
| | ObservedEvent Parameters | Mandatory/ Optional | Supported Values: | Provisioned Value: |
| | Tone ID (tid,0x0003) | M | Value | Not Applicable |
| Events | Mandatory/ Optional | Used in command: | | |
| End Tone detected (tonedet/etd, 0x0004/0x0002) | M | ADD, MOD, MOVE, NOTIFY | | |
| | Event Parameters | Mandatory/ Optional | Supported Values: | Provisioned Value: |
| | Tone ID List (tl,0x0001) | M | wildcard | Not Applicable |

| | | | | |
|---|---------------------------------|---------------------------|--------------------------|---------------------------|
| | ObservedEvent Parameters | Mandatory/Optional | Supported Values: | Provisioned Value: |
| | Tone ID (tid,0x0003) | M | Value | Not Applicable |
| | Duration (dur,0x0002) | O | Value | Not Applicable |
| Events | Mandatory/Optional | Used in command: | | |
| Long Tone detected (tonedet/ltd, 0x0004/0x0003) | Not Used | - | | |
| | Event Parameters | Mandatory/Optional | Supported Values: | Provisioned Value: |
| | - | - | - | - |
| | ObservedEvent Parameters | Mandatory/Optional | Supported Values: | Provisioned Value: |
| | - | - | - | - |
| Statistics | Mandatory/Optional | Used in command: | Supported Values: | |
| None | - | - | - | |
| Error Codes | Mandatory/ Optional | | | |
| None | - | | | |

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: o= <user name> <session ID> <version> <network type> <address type> <address>.</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"> - <user name> should contain an hyphen - <session ID> and <version> should contain one or more digits as described in RFC 2327 [x] - <network type> shall be set to IN - <address type> shall be set to IP4 or IP6 The Address Type shall be set to "IP4" or "IP6" depending on the addressing scheme used by the network to which the MG is connected. - <address> should contain the fully qualified domain name or IP address of the gateway. |
| s-line | "SDP_S" | <p>The session name (s=) line contains a single field: s= <session-name>.</p> <p>The MGC is not required to supply 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= <start-time> <stop-time></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 | | |
| 2006-12 | CT#34 | CP-060725 | 0070 | 1 | Profile registration procedure | 6.7.0 | 6.8.0 |
| | | | 0072 | 2 | Rules for SDP equivalents | | |
| | | | 0076 | 3 | Codec Parameters | | |
| 2007-06 | CT#36 | CP-070315 | 0090 | | RFC 3309 for SCTP checksum | 6.8.0 | 6.9.0 |
| 2007-09 | CT#37 | CP-070525 | 0093 | 3 | Service Change Methods and Reasons | 6.9.0 | 6.10.0 |
| | | | 0096 | | Correction to Package Ids | | |

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|---------|-------|-----------|------|---|--|---------------|
| | | | 0098 | | Priority Indicator in Context Attributes | |
| | | | 0100 | | H.248 Message Encoding | |
| | | | 0102 | 2 | Correction to Re-use of Procedures | |
| | | | 0104 | 1 | Correction to Signals Descriptor | |
| | | | 0106 | 1 | Correction to Events Descriptor | |
| | | | 0108 | 1 | Clarification of Message Identifier | |
| 2007-10 | | | | | Editorial correction to cover page date and to previous history box entry. | 6.10.0 6.10.1 |
| 2007-12 | CT#38 | CP-070742 | 0122 | 1 | Properties returned in commands | 6.10.1 6.11.0 |
| 2008-03 | CT#39 | CP-080012 | 0127 | 1 | Correction on the Mn profile: BNC Release event | 6.11.0 6.12.0 |
| 2008-04 | | | | | Correction to history table | 6.12.0 6.12.1 |
| 2008-09 | CT#41 | CP-080454 | 0132 | | Service Change Reason in (G)MSC Server Out of Service | 6.12.1 6.13.0 |
| 2008-10 | | | | | Correction to history table | 6.13.0 6.13.1 |

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