3GPP TSG CN Plenary Meeting #27 **NP-050045**
9th – 11th March 2005 Tokyo, JAPAN.

Source: TSG CN WG4

Title: Corrections on Mn-interface

Agenda item: 9.16

Document for: APPROVAL

Doc-2nd-Level	Spec	CR	Rev	Phase	Subject	Cat	Ver_C
N4-050419	29.332	1	1	Rel-6	Formal Profile Of Mn Interface	B	6.0.0
N4-050465	29.332	2	2	Rel-6	Corrections to Mn Specification	F	6.0.0

3GPP TSG-CN WG4 Meeting #26 **N4-050419**
Sydney, AUSTRALIA. 14th to 18th February 2005.

CR-Form-v7.1

CHANGE REQUEST

⌘ **29.332** **CR** **01** ⌘ **rev** **1** ⌘ Current version: **6.0.0** ⌘

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Proposed change affects: UICC apps⌘ ☐ ME ☐ Radio Access Network ☐ Core Network ☒

Title:	⌘	Introduction Of Formal Profile
Source:	⌘	CN4
Work item code:	⌘	IMS2-Mn
Date:	⌘	6/10/2004
Category:	⌘	**B**
Release:	⌘	Rel6

Use one of the following categories:
F *(correction)*
A *(corresponds to a correction in an earlier release)*
B *(addition of feature),*
C *(functional modification of feature)*
D *(editorial modification)*
Detailed explanations of the above categories can be found in 3GPP TR 21.900.

Use one of the following releases:

Ph2	*(GSM Phase 2)*
R96	*(Release 1996)*
R97	*(Release 1997)*
R98	*(Release 1998)*
R99	*(Release 1999)*
Rel-4	*(Release 4)*
Rel-5	*(Release 5)*
Rel-6	*(Release 6)*
Rel-7	*(Release 7)*

Reason for change:	⌘	In order to ensure differentiation between this profile, the Mc profile and other future defined profiles the Mn profile should register a formal profile name with IANA.
Summary of change:	⌘	Formal Profile Name defined
Consequences if not approved:	⌘	No formal profile identification defined.

Clauses affected:	⌘	1, 2, 4			
Other specs affected:	⌘	**Y**	**N**		
			X	Other core specifications	⌘
			X	Test specifications	
			X	O&M Specifications	
Other comments:	⌘				

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3) With "track changes" disabled, paste the entire CR form (use CTRL-A to select it) into the specification just in front of the clause containing the first piece of changed text. Delete those parts of the specification which are not relevant to the change request.

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~~/MEGACO~~ protocol as specified in ITU-T ~~and IETF~~. 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~~/MEGACO~~ on the Mn interface. Required extensions use the H.248~~/MEGACO~~ 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.
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[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)".

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[4] 3GPP TS 29.163: "Interworking between the IM CN subsystem and CS networks – Stage 3".

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[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".

[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".

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 ~~is~~ capability set shall be used in their~~its~~ entirety whenever it is used within the~~an~~ H.248 profile. Failure to do so will result in a non-standard implementation.

ITU-T Recommendation H.248.1 (05/02) ~~(formerly referred to as H.248 version 2~~ [9] is the basis for ~~supported by~~ 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 Profile Identification

Profile name:	threegimscsiw
Version:	1

3GPP TSG-CN WG4 Meeting #26 **N4-050465**
Sydney, AUSTRALIA. 14th to 18th February 2005.

CR-Form-v7.1

CHANGE REQUEST

⌘ **29.332** **CR** **02** ⌘ **rev** **2** ⌘ Current version: **6.0.0** ⌘

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Proposed change affects: UICC apps⌘ ☐ ME ☐ Radio Access Network ☐ Core Network ☒

Title:	⌘	Corrections to Mn Specification
Source:	⌘	CN4
Work item code:	⌘	IMS2-Mn
Date:	⌘	6/10/2004
Category:	⌘	**F**
Release:	⌘	Rel6

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Rel-5	*(Release 5)*
Rel-6	*(Release 6)*
Rel-7	*(Release 7)*

Reason for change:	⌘	The main changes are to align the Mc profile restrictions to improve open interoperability. Further some parts of the specification are clarified.
Summary of change:	⌘	Clause 12 added with restrictions to use of H.248 that are not needed for the Mn profile. Some general editorial corrections and clarification to the tables for procedures toward ISUP and BICC networks.
Consequences if not approved:	⌘	Incomplete/incorrect specification.

Clauses affected:	⌘	1, 2, 3, 4, 6, 9, 10,12, 13, 16,17			
Other specs affected:	⌘	**Y**	**N**		
			X	Other core specifications	⌘
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[25] 3GPP TS 29.202: "SS7 Signalling Transport in Core Network".

[xx] ITU-T Recommendation H.248.7: "Generic Announcement Package".

3 Definitions, symbols and abbreviations

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SCTP Stream Control Transmission Protocol

4 UMTS capability set

This capability set shall be used in its entirety whenever it is used within an H.248 profile. Failure to do so will result in a non-standard implementation.

ITU-T Recommendation H.248.1 (05/02) ~~(formerly referred to as H.248 version 2~~ [9] is the basis for ~~supported by~~ 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.

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 shall be supported by the IM-MGW and MGCF. ~~FFS~~

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]). 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]).

9 Multiple Virtual MG.

~~FFS~~Not Applicable

10 Formats and codes

10.1 Signalling Objects

Table 10.1 shows the parameters which are required.

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

Table 10.1: required parameters

Signalling Object	H.248 Descriptor	Coding
Codec List	Local Descriptor or Remote Descriptor	<fmt list> in a single SDP m-line. For a fixed RTP payload type, the codec type is implied by the RTP payload type. For a dynamic RTP payload type, for each codec information on the codec type shall be provided in a separate SDP “a=rtpmap”-line and possibly additional SDP “a=fmtp”-line(s). See Clause 10.2.
Bearer Service Characteristics	Local Descriptor or Remote Descriptor	As per Q.1950 [14]. For TMR, only values “3.1 kHz audio” or “speech” are required.
Context ID	NA	Binary Encoding: As per ITU-T Recommendation H.248.1 [9] Annex A. Textual Encoding: As per ITU-T Recommendation H.248.1 [9] Annex B.
IP Address	Local Descriptor or Remote Descriptor	<connection address> in SDP “c-line”
Port	Local Descriptor or Remote Descriptor	<port> in SDP m-line. <transport> in SDP m-line shall be set to value “RTP/AVP”
Reserve_Value	Local Control	ITU-T Recommendation H.248.1 [9] Mode property. Binary Encoding: Encoding as per ITU-T Recommendation H.248.1 Annex A "reserveValue" Textual Encoding: Encoding as per ITU-T Recommendation H.248.1 Annex B "reservedValueMode".
RtcpbwRS	Local Descriptor or Remote Descriptor	<bandwidth> in SDP “b:RS”-line.
RtcpbwRR	Local Descriptor or Remote Descriptor	<bandwidth> in SDP “b:RR”-line.
RTPpayload	Local Descriptor or Remote Descriptor	<fmt list> in SDP m-line
Termination ID	NA	Binary Encoding: As per ITU-T Recommendation H.248.1 [9] Annex A. Textual Encoding: As per ITU-T Recommendation H.248.1 [9] Annex B.
Transaction ID	NA	Binary Encoding: As per ITU-T Recommendation H.248.1 [9] Annex A. Textual Encoding: As per ITU-T Recommendation H.248.1 [9] Annex B.
Note	For binary encoding, the SDP equivalents “SDP_V”, “SDP_M”, “SDP_C”, “SDP_A”, and SDP_B” in ITU-T Recommendation H.248.1 [9], Annex C.11, shall be used to encode the corresponding SDP lines. Other SDP equivalents shall not be used. The SDP equivalents shall be used in the order specified for the corresponding SDP lines in IETF RFC 2327 [17]. Rules for the usage of SDP in ITU-T Recommendation H.248.1 [9] shall also be applied to the SDP equivalents.	

10.2 Codec Parameters

10.2.1 AMR Codec

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

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

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

- "mode-set"

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

10.2.1 DTMF Codec

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

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

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

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].

12 General on packages and Transactions

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

Event Buffering shall not be supported.

DigitMaps shall not be supported.

H.248 Statistics shall not be audited via the Mc interface and shall be suppressed in the replies to Subtract commands, except where specific 3GPP packages define their use.

Embedded Signals or Embedded Events shall not be supported on the Mc interface.

Only a single media stream per Termination shall be supported.

The use of "Overspecified" (e.g. range of values) and "Underspecifed" (e.g. "?") parameter specification shall not be permitted except where explicitly indicated in or referenced by the Mc interface specification.~~None~~

13 H.248 standard packages

The following H.248 packages are used by this UMTS Capability Set:

- Generic v~~1~~2 (see ITU-T Recommendation H.248.1 [9] Annex E.1);
- Base Root Package v1 (see ITU-T Recommendation H.248.1 [9] Annex E.2);
- Tone Generator Package v1 (see ITU-T Recommendation H.248.1 [9] Annex E.3);
- Tone Detection Package v1 (see ITU-T Recommendation H.248.1 [9] Annex E.4);
- Basic DTMF Generator Package v1 (see ITU-T Recommendation H.248.1 [9] Annex E.5);
- DTMF Detection Package v1 (see ITU-T Recommendation H.248.1 [9] Annex E.6);
- Call Progress Tones Generator Package v1 (see ITU-T Recommendation H.248.1 [9] Annex E.7);
- Generic Announcement Package v1 (see ITU-T Recommendation H.248.7~~1 [6] Annex K~~);
- TDM Circuit Package v1 (see ITU-T Recommendation H.248.1 [9] Annex E.13);
- Media Gateway Resource Congestion Handling Package v1 (see ITU-T Recommendation H.248.10 [12]) ;
- Basic Continuity Package v1 (see ITU-T Recommendation H.248.1 [9] Annex E.10);

14 Call independent H.248 transactions

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

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

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

Procedure defined in 3GPP TS 29.163 [4]	Procedure defined in 3GPP TS 29.232 [5]	Comment
IM-MGW Out of service	MGW Out of Service	
IM-MGW Communication Up	MGW Communication Up	
IM-MGW Restoration	MGW Restoration	
IM-MGW Register	MGW Register	
IM-MGW Re-register	MGW Re-register	
MGCF Ordered Re-register	(G)MSC Server Ordered Re-register	
MGCF Restoration	(G)MSC Server Restoration	
MGCF Out of Service	(G)MSC Server Out of Service	
Termination Out-of-Service	Termination Out-of-Service	
Termination Restoration	Termination Restoration	
Audit Value	Audit Value	
Audit Capability	Audit Capability	
Command Rejected	Command Rejected	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	
IM-MGW Resource Congestion Handling - Activate	MGW Resource Congestion Handling - Activate	
IM-MGW Resource Congestion Handling - Indication	MGW Resource Congestion Handling - Indication	

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]	Comment
Reserve IMS Connection point	Not defined	n. a. for reuse	See 13.2.1.1
Configure IMS Resources	Not Defined	n. a. for reuse	See 13.2.1.2
Reserve IMS Connection Point and configure remote resources	Not defined	n. a. for reuse	See 13.2.1.3
Release IMS termination	n. a. for reuse	n. a. for reuse	See 13.2.1.4
Change IMS ThroughConnection	Cut Through	n. a. for reuse	
Detect IMS RTP Tel Event	Detect Digit	n. a. for reuse	Only applicable if termination towards IMS is connected with a termination towards a BICC network.
Notify IMS RTP Tel Event	Detected digit(BIWF)	n. a. for reuse	Only applicable if termination towards IMS is connected with a termination towards a BICC network.
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 = ?
	If Context Requested:
	Context ID = ?
	If Context Provided:
	Context ID = c1
	If Resources for multiple Codecs shall be reserved:
	Reserve_Value
		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 = ?
	If Context Requested:
	Context ID = ?
	If Context Provided:
	Context ID = c1
	If Resources for multiple Codecs shall be reserved:
	Reserve_Value
		Local Descriptor {
		Codec List
		RTP Payloads
		RtcpbwRS
		RtcpbwRR
		}
		Remote Descriptor {
		Codec List
		RTP Payloads
		RtcpbwRS
		RtcpbwRR
		}

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

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

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

Address Information	Control information	Bearer information

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

15.1.4 Release IMS Termination

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

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

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

Table 15.1.8: Release IMS Termination Request

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

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

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

Table 13.2.9: Release IMS Termination Acknowledge

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

15.2 IMS packages

None

16 Transactions towards ISUP

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

Procedure defined in 3GPP TS 29.163 [4]	Transaction used in ITU-T Q.1950 [14]	Transaction used in TS 29.232 [5]	Comment
Reserve TDM Circuit	n. a. for reuse	n. a. for reuse, (NOTE2)	See Clause 13.2.2.1
Change TDM Through-connection	Cut Through (CSM Controlled)	Change Through-connection	
Activate TDM voice-processing function	Echo Canceller	n. a. for reuse	
Send TDM Tone	Insert_Tone	n. a. for reuse (NOTE3)	Only H.248 MOD command to an existing termination
Stop TDM Tone	Insert_Tone	~~n. a. for reuse~~Stop Tone	Only H.248 MOD command to an existing termination
Play TDM Announcement	Insert_Announcement	~~n. a. for reuse~~Play Announcement	Only H.248 MOD command to an existing termination
TDM Announcement Completed	Signal_Completion	~~n. a. for reuse~~Announcement Completed	
Stop TDM Announcement	Insert Announcement	~~n. a. for reuse~~Stop Announcement	Only H.248 MOD command to an existing termination
Continuity Check	Continuity Check Tone	n. a. for reuse	The addition to "Prepare BNC Notify" defined in Annex B.7.1.1 of Q.1950 [10] shall be applied instead to "Reserve TDM Circuit", as defined in Clause 13.2.2.1
Continuity Check Verify	Continuity Check Verify	n. a. for reuse	
Continuity Check Response	Continuity Check Response	n. a. for reuse	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	See Clause 13.2.2.2
Termination Out Of Service	BIWF_Service_Cancellation_Indication	n. a. for reuse	

NOTE1: 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.
NOTE2: 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.
NOTE3: Enhanced to include Camel Prepaid, otherwise same as Q.1950

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 If Context Requested: Context ID = ? If Context Provided: Context ID = c1	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]	Comment
Establish Bearer	Establish_BNC_Notify +(tunnel)	Establish Bearer (NOTE 1)	
Prepare Bearer	Prepare_BNC_Notify +(tunnel)	Prepare Bearer (NOTE 1), (NOTE 2)	
Change Through-Connection	Cut_Through	Change Through-Connection	
Release Bearer	Cut_BNC (MOD H.248 Command).	Release Bearer	(NOTE 3)
Release Termination	Cut_BNC (SUB H.248 Command).	Release Termination	Statistics about “Ctmbits” are not applicable in Sub.resp
Bearer Established	BNC Established	Bearer Established	(NOTE 3)
Bearer Released	BNC Release	Bearer Released	(NOTE 3)
Send Tone	Insert_Tone	n. a. for reuse(NOTE4)	Only H.248 MOD command to an existing termination
Stop Tone	Insert Tone	~~n. a. for reuse~~Stop Tone	Only H.248 MOD command to an existing termination
Play Announcement	Insert_Annoucement	~~n. a. for reuse~~ Play Announcement	Only H.248 MOD command to an existing termination
Stop Announcement	Insert Announcement	~~n. a. for reuse~~Stop Announcement	Only H.248 MOD command to an existing termination
Announcement Completed	Signal Completion	~~n. a. for reuse~~Announcement Comleted	(NOTE 3)
Bearer Modification Support	Not defined	Bearer Modification Support	
Confirm Char	Confirm_Char	Confirm Bearer Characterictics (NOTE 1)	Optional
Modify Bearer Characteristics	Modify Char	Modify Bearer Characteristics (NOTE 1)	Optional
Reserve Char	Reserve_Char_Notify	Reserve Bearer Characteristics (NOTE 1)	Optional
Bearer Modified	BNC Modified	Bearer Modified	Optional
Activate Voice Processing Function	Echo Canceller	~~n. a. for reuse~~Activate VPF	
Tunnel Information Down	Tunnel (MGC-MGW)	Tunnel Information Down	Conditional: For IP Transport at BICC termination
Tunnel Information Up	Tunnel (MGW-MGC)	Tunnel Information Up	Conditional: For IP Transport at BICC termination
Termination Out-of-Service	BIWF Service Cancellation Indication	~~n. a. for reuse~~Termination Out Of Service	

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;
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.
NOTE 3: Resp in Q1950 contains no terminationID. However, according to H248.1, terminationID is mandatory! Therefore, termination ID shall be provided.
NOTE4: Enhanced to include Camel Prepaid, otherwise same as Q.1950

17.2 BICC packages

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

The following BICC packages shall be supported:

- Bearer Characteristics Package (see ITU-T Recommendation Q.1950 [23] annex A.3).
- Bearer Network Connection Cut Through Package (see ITU-T Recommendation Q.1950 [23] annex A.4).Generic Bearer Connection Package (see ITU-T Recommendation Q.1950 [23] annex A.6).

The following BICC packages shall be supported as required by the network services deployed in the network:

- Basic Call Progress Tones Generator with Directionality, (see ITU-T Recommendation Q.1950 [23] annex A.8).
- Expanded Call Progress tones Generator Package (see ITU-T Recommendation Q.1950 [23] annex A.9).
- Basic Services Tones Generation Package, (see ITU-T Recommendation Q.1950 [23] annex A.10).
- Bearer Control Tunnelling Package (see ITU-T Recommendation Q.1950 [23] annex A.7).
- Expanded Services Tones Generation Package (see ITU-T Recommendation Q.1950 [23] annex A.11).
- Intrusion Tones Generation Package (see ITU-T Recommendation Q.1950 [23] annex A.12).
- Business Tones Generation Package (see ITU-T Recommendation Q.1950 [23] annex A.13).

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]);