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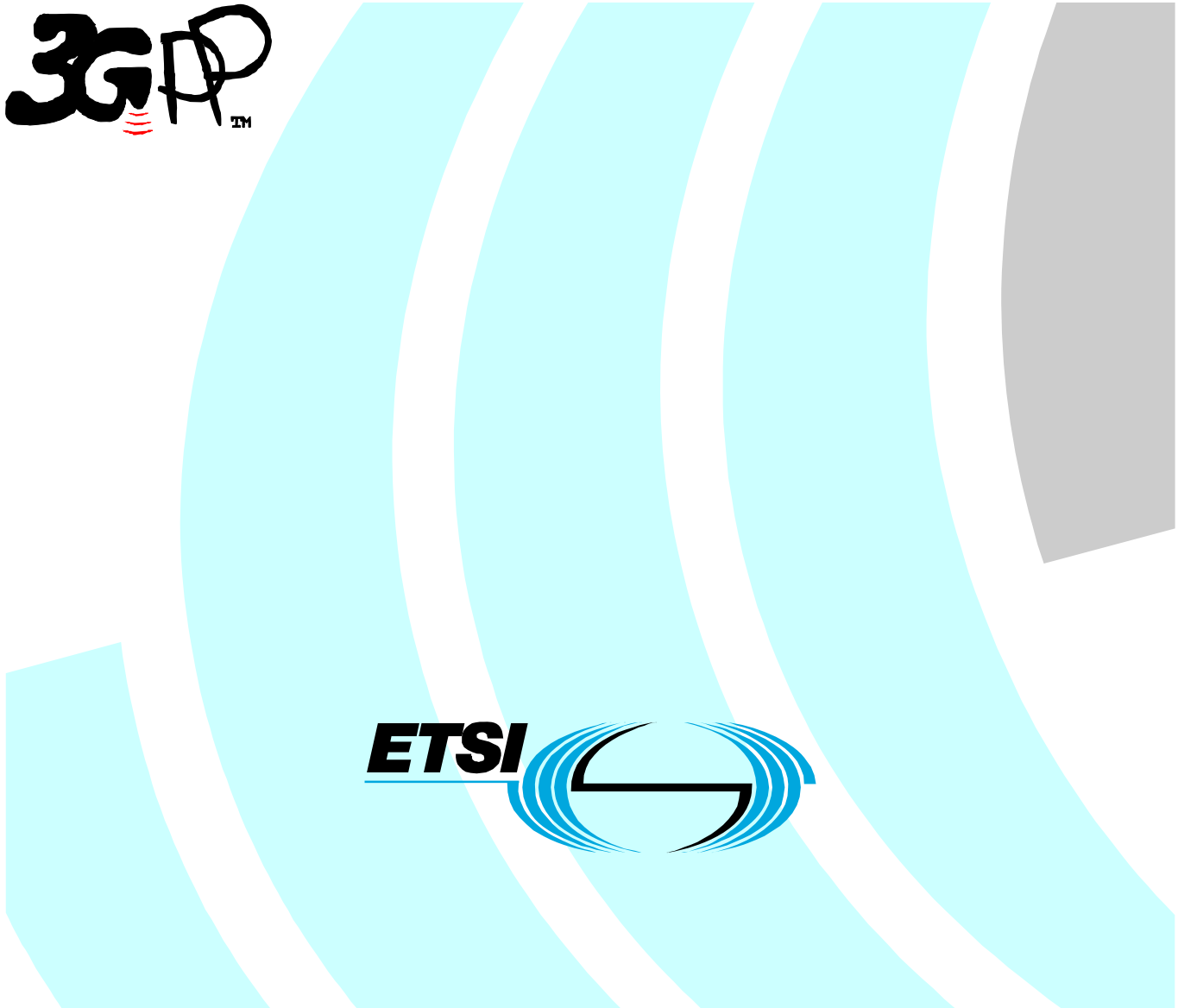
Technical Specification

Universal Mobile Telecommunications System (UMTS); Multimedia Resource Function Controller (MRFC) - Multimedia Resource Function Processor (MRFP) Mp interface; Stage 3 (3GPP TS 29.333 version 7.0.0 Release 7)



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Foreword

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Contents

Foreword

This Technical Specification has been produced by the 3rd Generation Partnership Project (3GPP).

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

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- x the first digit:
  - 1 presented to TSG for information;
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1 Scope

The present document describes the protocol to be used on the Multimedia Resource Function Controller (MRFC) – Multimedia Resource Function Processor (MRFP) interface (Mp interface). The IMS architecture is described in 3GPP TS 23.228 [1], the functional requirements are described in 3G TS 23.333 [25]

This specification defines a profile of the Gateway Control Protocol (H.248.1), for controlling Multimedia Resource Function Processor supporting in-band user interaction, conferencing and transcoding for multimedia-services.

The present document is valid for a 3rd generation PLMN (UMTS) complying with Release 7 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 23.002: "Network architecture".

[3] ITU-T Recommendation H.248.1 (05/2002), Gateway control protocol: Version 2 + Corrigendum 1 (03/2004).

[4] ITU-T Recommendation H.248.4 (11/2000), Gateway control protocol: Transport over Stream Control Transmission Protocol (SCTP) + Corrigendum 1 (03/2004).

[5] ITU-T Recommendation H.248.7 (03/2004), Gateway control protocol: Generic announcement package.

[6] ITU-T Recommendation H.248.9 (03/2002), Gateway control protocol: Advanced media server package.

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

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

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

[10] ITU-T Recommendation H.248.16 (11/2002), Gateway control protocol: Enhanced digit collection packages and procedures + Corrigendum 1 (03/2004).

[11] ITU-T Recommendation H.248.19 (03/2004) Gateway control protocol: Decomposed Multipoint Control Unit, Audio, Video and Data Conferencing package

[12] ITU-T Recommendation H.248.27 (07/2003), Gateway control protocol: Supplemental Tones package

[13] ITU-T Recommendation Q.1950 (12/2002), Bearer independent call bearer control protocol.

[14] ITU-T Recommendation G.711 (11/1988), Pulse code modulation (PCM) of voice frequencies.

[15] ITU-T Recommendation G.711 Appendix I (09/1999), A high quality low-complexity algorithm for packet loss concealment with G.711.

[16] ITU-T Recommendation G.711 Appendix I (09/1999), A comfort noise payload definition for ITU-T G.711 use in packet-based multimedia communication systems.

[17] ITU-T Recommendation E.180 (03/1998), Technical characteristics of tones for the telephone service.

[18] TS 183 022: Telecommunication and Internet converged Services and Protocols for Advanced Networking (TISPAN); MGC Information Package.

[19] ES 201 970 Access and Terminals (AT); Public Switched Telephone Networks (PSTN); Harmonized specification of physical and electrical characteristics at a 2-wire analogue presented Network Temination Point (NTP).

[20] IETF RFC 2327 (1998), SDP: Session Description Protocol.

[21] IETF RFC 3551(2003), RTP Profile for Audio and Video Conferences with Minimal Control.

[22] IETF RFC 2833 (2000), RTP Payload for DTMF Digits, Telephony Tones and Telephony Signals.

[23] IETF RFC 4040 (2005), RTP payload format for a 64 kbit/s transparent call.

[24] IETF RFC 3555 (2003), MIME Type Registration of RTP Payload Formats.

[25] 3GPP TS 23.333: "Multimedia Resource Function Controller (MRFC) – Multimedia Resource Function Processor (MRFP) Mp interface: Procedures Descriptions."

[26] ITU-T Recommendation H.248.9a1 (03/2007), "Gateway control protocol: Advanced media server package (draft work in progress)".

[27] 3GPP TS 29.163: "Interworking between the IM CN subsystem and CS networks – Stage 3".

[28] W3C Recommendation (September 2004): "Speech Synthesis Markup Language (SSML) Version 1.0".

[29] W3C Recommendation (September 2004): "Speech Recognition Grammar Specification (SRGS) Version 1.0".

3 Definitions and symbols

3.1 Definitions

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

Media Gateway: See Recommendation H.248.1 [3].

Media Gateway Controller: See Recommendation H.248.1 [3].

MultiMedia Resource Function Controller: See 3GPP TS 23.002 [2].

MultiMedia Resource Function Processor: See 3GPP TS 23.002 [2].

3.2 Symbols

None.

4. Abbreviations

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

CDR	Call Data Record
CN	Comfort Noise
CRC	Cyclic Redundancy Check
DNS	Domain Name System
DTMF	Dual Tone Multi Frequency
FEC	Forward Error Correction
IP	Internet Protocol
IPsec	IP Security
MGC	Media Gateway Controller
MGW	Media Gateway MID Message Identifier
MRFC	MultiMedia Resource Function Controller
MRFP	MultiMedia Resource Function Processor
OAM	Operation, Administration and Maintenance
OoS	Out of Service
PLC	Packet Loss Concealment
PT	Payload Type
QoS	Quality of Service
SCTP	Stream Control Transmission Protocol
SDP	Session Description Protocol
SPNE	Signal Processing Network Equipment
SSRC	Synchronisation Source
TCP	Transmission Control Protocol
TLS	Transport Layer Security
TTL	Time To Live
UDP	User Datagram Protocol
VBD	Voiceband Data

5 Profile Description

Editor's Note: this is a draft version of the profile and the settings within the profile have not been fully agreed, further approval is required.

5.1 Profile Identification

The name and version of the profile that is sent in the service change command are:

Table 5.1.1: Profile Identification

Profile name:	MRF
Version:	1

5.2 Summary

The profile defined in the present document enables the control of media resource function processors (MRFP) supporting in-band user interaction, conferencing and transcoding for multimedia services.

This Profile describes the minimum mandatory settings and procedures required to fulfil the Media Gateway control requirements for the MRF.

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.

5.3 Gateway Control Protocol Version

Version 2 shall be the minimum version supported. Support of this version implies conformance to ITU-T Recommendation H.248 Version 2 [3].

5.4 Connection Model

Media Resource Function Processors shall support ephemeral terminations that sink and source IP traffic. This type of H.248 Termination is denoted IP in the following clauses.

Table 5.4.1: Connection Model

Maximum number of contexts:	Provisioned (NOTE 1)
Maximum number of terminations per context:	Unspecified(NOTE 2)
Allowed terminations type combinations in a context:	Not Applicable
NOTE 1: The actual number of supported contexts can be audited by the MRFC using the MaxNrOfContexts property defined in the Base Root Package. NOTE 2: Support of 1 termination in a context is the basic requirement for the MRFP e.g. for voice record. 2 terminations in a context is required for transcoding or any inband media detection or insertion whilst an unspecified number terminations may be required if conferencing is supported.	

5.5 Context Attributes

Table 5.5.1: Context Attributes

Context Attribute	Supported	Values Supported
Topology	Yes	See § 5.7.8
Priority Indicator	TBD	0-15
Emergency Indicator	No	Not Applicable

5.6 Terminations

5.6.1 Termination Names

5.6.1.1 General

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

With ephemeral IP endpoint bearer types the internal structure of Termination ID is irrelevant for MRFC and MRFP and therefore Termination ID is only a numeric identifier for the termination.

5.6.1.2 ASN.1 encoding

The following general structure of TerminationID shall be used:

4 octets shall be used for the termination ID. The following defines the general structure for the termination ID:

Table 5.6.1.2.1: Termination ID

Termination type	X

Termination type:

Length 3 bits

Values:

000 Reserved

001 Ephemeral termination

011 - 110 Reserved

111 Reserved for ROOT termination Id (ROOT Termination Id = 0xFFFFFFFF)

X:

Length 29 bits.

For IP termination, its usage is un-specified.

5.6.1.3 ABNF encoding

The following general structure of termination ID shall be used:

TerminationID = "ROOT" / pathName / "$" / "*" ; according to ITU-T H.248.1 [xx] Annex B.

5.6.2 Multiplexed Terminations

Table 5.6.2.1: Multiplexed Terminations

Multiplex Terminations Supported?	NO

5.7 Descriptors

5.7.1 Stream Descriptor

Table 5.7.1.1: Stream Descriptor

Maximum number of streams per termination type	ALL	Unspecified (NOTE)
NOTE: At least 1 stream for each media (e.g. video+audio = 2 streams). If only one stream is applicable, then the MRFC may omit the Stream Descriptor and the MRFP shall assume that StreamID =1.		

5.7.1.1 LocalControl Descriptor

The following tables specify the level of support required with regard to the properties in the local control descriptor.

Table 5.7.1.1.1: Reserve Group and Reserve Value

		Termination Type	Stream Type
Reserve group used:	NO (NOTE)	-	-
Reserve value used:	YES(NOTE1)	IP	Audio, Video
NOTE: Support of Reserve Group in case of multiple p-time values requires further studies NOTE1: Used for audio streams where RFC2833 is also specified and for conference where participants are invited to join the conference.			

Table 5.7.1.1.2: Stream Mode

Termination Type	Stream Type	Allowed StreamMode Values
ALL except ROOT	Any	Send, Receive, Send and Receive, Inactive

5.7.2 Events Descriptor

Table 5.7.2.1: Events Descriptor

Events settable on termination types and stream types:	Yes		
If yes	**Event ID**	**Termination Type**	**Stream Type**
	g/*	IP	Audio, Video
	nt/*l	IP	Audio, Video
	rtp/*	IP	Audio, Video
	aasrec/*	IP	Audio, Video
	aasb/*	IP	Audio, Video
	dd/d0-dd	IP	Audio
	it/*	ROOT	Not Applicable
	ocp/mg_overload	ROOT	Not Applicable
	aastts/*	IP	Audio
	asr/*	IP	Audio
	mrp/*	IP	Audio
	mpp/*	IP	Audio
	vavsp/*	IP	Audio, Video

Table 5.7.2.2: Event Buffer Control

Event Buffer Control used:	No

Table 5.7.2.3: Keep Active

Keepactive used on events:	Yes

Table 5.7.2.4: Embedding in event

Embedded events in an event descriptor:	No
Embedded signals in an event descriptor:	No

Table 5.7.2.5: Notify Behaviour

NotifyBehaviour used on events:		NO
If yes,	**Supported values**	Not Applicable

5.7.3 EventBuffer Descriptor

Table 5.7.3.1: Event Buffer

Event Buffer descriptor used:	No	

5.7.4 Signals Descriptor

Table 5.7.4.1: Signals dependant on termination or streams

Signals settable dependant on termination or streams types:	Yes		
If yes	**Signal ID**	**Termination Type**	**Stream Type / ID**
	cg/*	IP	Audio
	srvtn/*	IP	Audio
	xcg/*	IP	Audio
	an/apf	IP	Audio, Video
	int/*	IP	Audio
	biztn/*	IP	Audio
	aasrec/*	IP	Audio, Video
	Aasdc	IP	Audio, Video
	aasb/*	IP	Audio, Video
	conftn/*	All except ROOT	Audio
	Tonegen/*	IP	Audio
	bcg/*	IP	Audio
	aastts/*	IP	Audio
	asr/*	IP	Audio
	mrp/*	IP	Audio, video
	mpp/*	IP	Audio, video

Table 5.7.4.2: Signal Lists

Signals Lists supported:	Yes	
If yes	**Termination Type Supporting Lists**	IP
	Stream Type Supporting lists	Audio, Video
	Maximum number of signals per signal list	Provisioned

Table 5.7.4.3: Signal type and duration

Signal type and duration supported?	Yes	
If yes	**Signal ID**	**Type or duration override**
	ALL	Both

Table 5.7.4.4: Signal Direction

Signal Direction supported:	No

Table 5.7.4.5: Notify completion

Notify completion supported:	Yes	
If yes	**Signal ID**	**Type of completion supported**
	, svrtn/*, xcg/*, an/*, int/*, biztn/*, conftn/* , tonegen/*, bcg/*, aasb/*	ALL

Table 5.7.4.6: RequestID Parameter

RequestID Parameter Supported:	Yes

Table 5.7.4.7: Signals played simultaneously

Signals played simultaneously:	No	
If yes	**Signal Ids that can be played simultaneously:**	-

Table 5.7.4.8: Keep Active

Keepactive used on signals:	Yes

5.7.5 DigitMap Descriptor

Table 5.7.5.1: DigitMap Descriptor

DigitMaps supported:	NO		
If yes	**DigitMap Name**	**Structure**	**Timers**

5.7.6 Statistics Descriptor

Table 5.7.6.1: Statistics Descriptor

Statistics supported on:	NONE

Table 5.7.6.2: Statistics reported on Subtract

Statistics reported on Subtract:		No	
If yes	**Statistic IDs Reported**	**Termination Type**	**Stream Type**

5.7.7 ObservedEvents Descriptor

.

Table 5.7.7.1: ObservedEvents Descriptor

Event detection time supported:	Yes

5.7.8 Topology Descriptor

Table 5.7.8.1: Topology Descriptor

Allowed triples:	(T1,T2, isolate) (T1,T2, oneway) (T1,T2, bothway)

5.7.9 Error Descriptor

Table 5.7.9.1: Error codes sent by the MRFC

Supported H.248.8 Error Codes:	400-403, 406, 410, 411, 421, 422, 430, 431, 442, 443, 446 501-506, 533
Supported Error Codes defined in packages:	All error codes defined in supported packages are supported.

Editor's note: the error codes listed in the above table may need further amendments or additions before completion of this work.

Table 5.7.9.2: Error codes sent by the MRFP

Supported H.248.8 Error Codes:	400-411, 412, 421,422,430, 431, 432-435,440,441,442-, 471, 500-517, 522-539.
Supported Error Codes defined in packages:	All error codes defined in supported packages are supported.

Editor's note: the error codes listed in the above table may need further amendments or additions before completion of this work.

5.8 Command API

5.8.1 Add

Table 5.8.1.1: Descriptors used by Add request

Descriptors used by Add request:	Events, Signals, Media (TerminationState, LocalControl, Local and Remote)

Table 5.8.1.2: Descriptors used by Add reply

Descriptors used by Add reply:	Events, Signals, Media (TerminationState, LocalControl, Local and Remote)Error

5.8.2 Modify

Table 5.8.2.1: Descriptors used by Modify request

Descriptors used by Modify request:	Events, Signals, Media (TerminationState, LocalControl, Local and Remote)

Table 5.8.2.2: Descriptors used by Modify reply

Descriptors used by Modify reply:	Events, Signals, Media (TerminationState, LocalControl, Local and Remote),Error

5.8.3 Subtract

Table 5.8.3.1: Descriptors used in Subtract request

Descriptors used by Subtract request:	Audit (empty) or None

Table 5.8.3.2: Descriptors used in Subtract reply

Descriptors used by Subtract reply:	None

5.8.4 Move

Table 5.8.4.1: Command Move

Move command used:	Yes

Table 5.8.4.2: Descriptor used by Move command

Descriptors used by Move Request:	Events, Signals, Media (TerminationState, LocalControl, Local and Remote)
Descriptors used by Move Reply:	Events, Signals, Media (TerminationState, LocalControl, Local and Remote), Error

5.8.5 AuditValue

Table 5.8.5.1: Auditvalue

Audited Properties:	**Property Name and Identity**	**Descriptor**
Termination ID	individual termination - Root (MGW Audit) The ServiceState property within the TerminationState descriptor shall not take the value "Test".	Termination State Descriptor
Termination ID	ALL	Media Descriptor
Termination ID	MGC information (mgcinfo)	LocalControl Descriptor
Termination ID	For Packages: - Root -individualtermination (NOTE1)	Packages Descriptor (NOTE2)
Termination ID	None (MGW Audit) : - Root	Audit (empty) Descriptor
Audited Statistics:	None	
Audited Signals:	ALL	
Audited Events:	ALL	
Package Audit possible:	Yes	
NOTE1: The purpose to audit an individual Termination is to retrieve MGC Information if supported or to determine whether the Hanging Termination Detection package is supported. NOTE2: Optional		

5.8.6 AuditCapabilities

Table 5.8.6.1: AuditCapabilities

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

5.8.7 Notify

Table 5.8.7.1: Notify

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

5.8.8 ServiceChange

:

Table 5.8.8.1: Service Change Methods and Reason sent by MRFC

Service Change Methods Supported:	ServiceChange Reasons supported:
Restart	"900 Service Restored" "901 Cold Boot", "902 Warm Boot".
Graceful (NOTE 2)	"908 MG Impending Failure "
Forced	"905 Termination Taken Out Of Service"
Handoff (NOTE 1, NOTE 2)	"903 MGC Directed Change"
NOTE 1: Not involving more than 1 MRFC. No support of handoff relates to a network deployment scenario with "primary H.248 systems only", which translates to no geographic redundancy of the MRFC. NOTE 2: ROOT only. 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.	

Table 5.8.8.2: Service Change Methods and Reason sent by MRFP:

Service Change Methods Supported:	ServiceChange Reasons supported:
Restart	"900 Service Restored", "901 Cold Boot", "902 Warm Boot".
Graceful (NOTE 2)	"908 MG Impending Failure "
Forced	"905 Termination Taken Out Of Service"
Handoff (NOTE 1, NOTE 2)	"903 MGC Directed Change"
Failover (NOTE 2)	"909 MGC Impending Failure"
Disconnected (NOTE 2)	"900 Service Restored"
NOTE 1: Not involving more than 1 MRFP. No support of handoff relates to a network deployment scenario with "primary H.248 systems only", which translates to no geographic redundancy of the MGW. NOTE 2: ROOT only. 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	

Table 5.8.8.3: Service Change Address

ServiceChangeAddress used:	No

Table 5.8.8.4: Service Change Delay

ServiceChangeDelay used:	No	
If yes	**Valid time period:**	-

Table 5.8.8.5: Service Change Incomplete Flag

ServiceChange Incomplete Flag used:	No

Table 5.8.8.6: Service Change Version

Version used in ServiceChangeVersion:	2

Table 5.8.8.7: Profile negotiation

Profile negotiation as per H.248.18:	No

5.8.9 Manipulating and Auditing Context Attributes

Table 5.8.9.1: Manipulating and Auditing Context Attributes

Context Attributes Manipulated:	ALL supported attributes (See table 5.5/1.)
Context Attributes Audited:	ALL supported attributes (See table 5.5/1)

5.9 Generic Command Syntax and Encoding

Table 5.9.1: Encoding

Supported Encodings:	Binary (optional) Text (optional) The receiver shall support: • Short Token Notation • Long Token Notation

5.10 Transactions

Table 5.10.1: Transactions

Maximum number of Transaction Requests / Replies / TransResponseAcks / Segment Replies per message:	10
NOTE : When more than one element are conveyed in one message, it is recommended that this message comprises a Transaction Request / Transaction Reply / Transaction Pending plus a Transaction Response Ack.	

Table 5.10.2: Segmentation

Segmentation Supported:	UDP : No SCTP : Inherent in transport
NOTE: The H.248 Segmentation Package according Annex E.14 of H.248.1 Version 3 is intended for H.248 transport technologies without the capability of automatic message segmentation. This method is not required for UDP- or SCTP-based H.248 signalling transport in this Profile.	

Table 5.10.3: Commands per Transaction Request

Maximum number of commands per Transaction request:	Unlimited

Table 5.10.4: Commands per Transaction Reply

Maximum number of commands per Transaction reply:	Unlimited

.

Table 5.10.5: Optional Commands

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

Table 5.10.6: Transaction Timers

Transaction Timer:	**Value**
NormalMGExecutionTime	Provisioned
NormalMGCExecutionTime	Provisioned
MGOriginatedPendingLimit	Provisioned
MGCOriginatedPendingLimit	Provisioned
MGProvisionalResponseTimerValue	Provisioned
MGCProvisionalResponseTimerValue	Provisioned

5.11 Messages

It is recommended that MRFP and MRFC names are in the form of fully qualified domain name. For example the domain name of the MRFC may be of the form MRFC1.whatever.net and the name of the MRFP may be of the form mg1.whatever.net.

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

The MRFC domain name is provisioned in the MRFP or retrieved from the DNS using SRV records.

The use of a domain name provides the following benefits:

- MRFPs and MRFCs are identified by their domain name, not their network addresses. Several addresses can be associated with a domain name. If a command cannot be forwarded to one of the network addresses, implementations shall retry the transmission using another address.

- MRFPs and MRFCs may move to another platform. The association between a logical name (domain name) and the actual platform are kept in the Domain Name Service (DNS). MRFP and MRFC shall keep track of the record's time-to-live read from the DNS. They shall query the DNS to refresh the information if the time-to-live has expired.

The domain name may be used by MRFC/MRFP for authentication purposes.

5.12 Transport

Table 5.12.1: Transport

Supported Transports:	Transport over UDP shall be supported. Support of SCTP is optional and shall conform to Recommendation H.248.4 [4]. Choosing one option or the other is a network operator's decision, based on the network configuration. • SCTP(recommended) (NOTE1). • UDP(optional).
NOTE: If using SCTP as defined in IETF RFC 2960 [8], the MRFP shall always be the node to perform the "Initiation". NOTE1: 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.	

Table 5.12.2: Segmentation

Segmentation Supported:	No

Table 5.12.3: Control Association Monitoring

Control Association Monitoring Supported:	Monitoring mechanism is dependent on used H.248 transport • **SCTP**: inherent capability of SCTP (NOTE) • **UDP**: 1. H.248.14 (MRFP-driven monitoring) 2. Empty AuditValue on ROOT (MRFC-driven monitoring)
NOTE: Use of H.248.14 for this is FFS.	

5.13 Security

Table 5.13.1: Security

Supported Security:	None
NOTE: Both the MRFC and MRFP are assumed to be within a secure IP zone of a single operator.	

5.14 Packages

Editor's Note: the following mandatory and optional packages are not finalised.

5.14.1 Mandatory Packages

Table 5.14.1: Mandatory packages

Mandatory Packages		
Package Name / Reference	**Package ID**	**Version**
Generic (H.248.1, [3])	g	1
Base Root (H.248.1, [3])	root	2
Network (H.248.1, [3])	nt	1

5.14.2 Optional Packages

Table 5.14.2: Optional packages

Optional Packages			
Package Name / Reference	**Package ID**	**Version**	**Support dependent on:**
DTMF Detection Package (see ITU-T Recommendation H.248.1 [9] Annex E.6);	dd, (0x0006)	**1**	Support is mandatory if DTMF Detection is supported.
Call Progress Tones Generator (H.248.1,3])	cg	1	If CS type Services provided by network
Basic Services Tones Generator (Q.1950, [13])	srvtn	1	If CS type Services provided by network
Expanded Call Progress Tones Generator (Q.1950, [13])	xcg	1	If CS type Services provided by network
Basic Announcement Syntax (H.248.9, [6])	bannsyx	1	Support is optional if playing announcement is supported.
Voice Variable Syntax (H.248.9, [6])	vvsyx	1	Support is optional if playing announcement is supported.
Announcement Set Syntax (H.248.9, [6])	setsyx	2	Support is optional if playing announcement is supported.
General text Variable type (H.248.9, [6])	phrsyx	2	Support is optional if playing announcement is supported.
Advanced Audio Server Base ((H.248.9 a1,[26])	aasb	2	Support is optional if playing announcement is supported.
AAS Recording package (H.248.9, [6])	aasrec	1	Support is optional if Audio Record is supported.
AAS segment management (H.248.9, [6])	aassm	1	
Generic Announcement (H.248.7, [5])	an	2	Support is mandatory if playing announcement is supported.
Intrusion Tones Generation (Q.1950, [13])	int	1	If CS type Services provided by network
Business Tones Generation (Q.1950, [13])	biztn	1	If CS type Services provided by network
Conferencing Tones Generation (H.248.27, [12])	conftn	1	Support is optional and may be used if Audio Conference is supported.
Inactivity Timer (H.248.14, [9])	it	1	Support is mandatory if UDP transport is enabled for H.248 messages.
MGC Information (TS 183 022, [18])	MGC Info	1	This package may be supported as an operator option. For this profile the information string shall be limited to 32 octets in length.
Advanced audio server base package for TTS enhancement (H.248.9 a1 [26])	aastts	1	Support is mandatory if Text to Speech is supported.
ASR package(H.248.9 a1,[26])	asr	1	Support is mandatory if Automatic Speech Recognition is supported.
Multimedia Recording Package (H.248.9 a1 [26])	mrp	1	Support is mandatory if Multimedia recording is supported.
multimedia play package(H.248.9 a1,[26])	Mpp	1	Support is mandatory if Multimedia announcement file is supported.
Overload Control Package (H.248.11, [6])	ocp	1	
RTP Package (H.248.1, [3])	rtp	1	

5.14.3 Package Usage Information

5.14.3.1 Generic Package

Table 5.14.3.1.1: 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" Normal Release (0x0001) "UR" Unavailable Resources (0x0002) "FT" Failure, Temporary (0x0003) "FP" Failure, Permanent (0x0004) "IW" Interworking Error (0x0005) "UN" Unsupported (0x0006)	-
	Failure Cause (FailureCause, 0x0002)	O	Octet String	-
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	-
	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	-
	Signal List Id	O	Integer	Not Applicable
	Request ID, RID	O	String indicating the Request ID	-

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

5.14.3.2 Base Root Package

Table 5.14.3.2.1: Package Usage Information for Base Root Package

Properties	Mandatory/ Optional	Used in command:	Supported Values:	Provisioned Value:
maxNumberOfContexts (root/maxNumberOfContexts, 0x0002/0x0001)	M	AuditValue	1 and up	Implementation Specific
maxTerminationPerContext (root/maxTerminationsPerContext, 0x0002/0x0002)	O	AuditValue	See 5.4	Implementation Specific
normalMGExecutionTime (root/normalMGExecutionTime, 0x0002/0x0003)	O	AuditValue	Integer	Operator Defined
normalMGCExecutionTime (root/normalMGCExecutionTime, 0x0002/0x0004)	O	AuditValue	Integer	Operator Defined
MGProvisionalResponseTimerValue（root/ MGProvisionalResponseTimerValue, 0x0002/0x0005）	O	AuditValue	Integer(NormalMGExecutionTime + networkdelay)	Operator Defined
MGCProvisionalResponseTimerValue (root/ MGCProvisionalResponseTimerValue, 0x0002/0x0006)	O	AuditValue	Integer (initially NormalMGCExecutionTime + networkdelay)	Operator Defined
MGCOriginatedPendingLimit (root/ MGCOriginatedPendingLimit, 0x0002/0x0007)	O	AuditValue	Integer	Operator Defined
MGOriginatedPendingLimit (root/ MGOriginatedPendingLimit, 0x0002/0x0008)	O	AuditValue	Integer	Operator Defined
Signals	**Mandatory/ Optional**	**Used in command:**		**Duration Provisioned Value:**
None	**-**	**-**		**< -**
	Signal Parameters	**Mandatory/ Optional**	**Supported Values:**	**Duration Provisioned Value:**
	-	-	-	-
Events	**Mandatory/ Optional**	**Used in command:**		
None	-	-		
	Event Parameters	**Mandatory/ Optional**	**Supported Values:**	**Provisioned Value:**
	-	-	-	-
	ObservedEvent Parameters	**Mandatory/ Optional**	**Supported Values:**	**Provisioned Value:**
	>-	-	-	-
Statistics	**Mandatory/ Optional**	**Used in command:**	**Supported Values:**	
None	-	-	-	
Error Codes	**Mandatory/ Optional**			
None	-			

5.14.3.3 Overload Control Package

Table 5.14.3.3.1: Package Usage Information for Overload Control Package

Properties	**Mandatory/ Optional**	**Used in command:**	**Supported Values:**	**Provisioned Value:**
None	-	-	-	
Signals	**Mandatory/ Optional**	**Used in command:**		**Duration Provisioned Value:**
None	-	-		-
	Signal Parameters	**Mandatory/ Optional**	**Supported Values:**	**Duration Provisioned Value:**
	-	-	-	-
Events	**Mandatory/ Optional**	**Used in command:**		
MG_Overload. (ocp/ mg_overload, 0x0051/0x0001)	M	ADD, MOD, NOTIFY		
	Event Parameters	**Mandatory/ Optional**	**Supported Values:**	**Provisioned Value:**
	-	-	-	-
	ObservedEvent Parameters	**Mandatory/ Optional**	**Supported Values:**	**Provisioned Value:**
	-	-	-	-
Statistics	**Mandatory/ Optional**	**Used in command:**		**Supported Values:**
None	-	-		-
Error Codes	**Mandatory/ Optional**			
None	-			

5.14.3.4 Network Package

Table 5.14.3.4.1: Package Usage Information for Network Package

Properties	**Mandatory/ Optional**	**Used in command:**	**Supported Values:**	**Provisioned Value:**
Maximum Jitter Buffer (nt /jit, 0x000b/0x0007)	M	ADD, MOD, MOVE	ALL	-
Signals	**Mandatory/ Optional**	**Used in command:**		**Duration Provisioned Value:**
None	-	-		-
	Signal Parameters	**Mandatory/ Optional**	**Supported Values:**	**Duration Provisioned Value:**
	-	-	-	-
Events	**Mandatory/ Optional**	**Used in command:**		
network failure(nt / netfail, 0x000b/0x0005)	M	ADD, MOD, MOVE, NOTIFY		
	Event Parameters	**Mandatory/ Optional**	**Supported Values:**	**Provisioned Value:**
	none	-	-	-
	ObservedEvent Parameters	**Mandatory/ Optional**	**Supported Values:**	**Provisioned Value:**
	cause(cs,0x0001)	M	ALL	-
quality alert (nt / qualert, 0x000b/0x0006)	M	ADD, MOD, MOVE, NOTIFY		
	Event Parameters	**Mandatory/** Optional	**Supported** Values:	Provisioned Value:
	Threshold(th,0x0001)	M	0 to 99	
	ObservedEvent Parameters	**Mandatory/** Optional	**Supported** Values:	Provisioned Value:
	Threshold(th,0x0001)	M	0 to 99	

Statistics	Mandatory/ Optional	Used in command:	Supported Values:
Duration(nt / dur, 0x000b/0x0001)	M	AUDITVALUE	ALL
Octets Sent (nt / os, 0x000b/0x0002)	M	AUDITVALUE	ALL
Octets Received(nt / or, 0x000b/0x0003)	M	AUDITVALUE	ALL
Error Codes	**Mandatory/ Optional**		
-	-		

5.14.3.5 RTP Package

Table 5.14.3.5.1: Package Usage Information for RTP 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> 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 > None	<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 > Payload Transition, (rtp/pltrans, 0x000C/0x0001)	<M	<ADD, MOD, MOVE, NOTIFY		
	Event Parameters	**Mandatory/ Optional**	**Supported Values:**	**Provisioned Value:**
	<name and Identity>None	<M/O>-	<Values / ALL>-	<Value / Not Applicable>-
	ObservedEvent Parameters	**Mandatory/ Optional**	**Supported Values:**	**Provisioned Value:**
	<name and Identity> rtppayload (rtppltype, 0x0001)	<M	<Values / ALL> A valid encoding name	<Value / Not Applicable>-

Statistics	Mandatory/ Optional	Used in command:	Supported Values:
Packets Sent, (rtp/ps, 0x000C/0x0004)	O	AUDITVALUE, SUBTRACT REPLY	ALL
Packets Received, (rtp/pr, 0x000C/0x0005)	O	AUDITVALUE , SUBTRACT REPLY	ALL
Packet Loss, (rtp/pl, 0x000C/0x0006)	O	AUDITVALUE , SUBTRACT REPLY	ALL
Jitter, (rtp/jit, 0x000C/0x0007)	O	AUDITVALUE , SUBTRACT REPLY	ALL
Delay, (rtp/delay, 0x000C/0x0008)	O	AUDITVALUE , SUBTRACT REPLY	ALL
Error Codes	**Mandatory/ Optional**		
None	-		

5.14.3.6 DTMF Detection Package

Table 5.14.3.6.1: Package Usage Information for DTMF 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:**		
DTMF character 0 (dd/d0,0x0006/0x0010)	M	ADD, MOD, NOTIFY		
DTMF character 1 (dd/d1,0x0006/0x0011)	**Event Parameters**	**Mandatory/ Optional**	**Supported Values:**	**Provisioned Value:**
	-	-	-	-
DTMF character 2 (dd/d2,0x0006/0x0012)	**ObservedEvent Parameters**	**Mandatory/ Optional**	**Supported Values:**	**Provisioned Value:**

DTMF character 3 (dd/d3,0x0006/0x0013) DTMF character 4 (dd/d4,0x0006/0x0014) DTMF character 5 (dd/d5,0x0006/0x0015) DTMF character 6 (dd/d6,0x0006/0x0016) DTMF character 7 (dd/d7,0x0006/0x0017) DTMF character 8 (dd/d8,0x0006/0x0018) DTMF character 9 (dd/d9,0x0006/0x0019) DTMF character * (dd/ds,0x0006/0x0020) DTMF character # (dd/do,0x0006/0x0021) DTMF character A (dd/da,0x0006/0x001a) DTMF character B (dd/db,0x0006/0x001b) DTMF character C (dd/dc,0x0006/0x001c) DTMF character D (dd/dd,0x0006/0x001d)	-	-	-	-
Statistics	**Mandatory/ Optional**	**Used in command:**		**Supported Values:**
None	-	-		-
Error Codes	**Mandatory/ Optional**			
None	-			

5.14.3.7 Call Progress Tones Generator Package

Table 5.14.3.7.1: Package Usage Information for 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:**
Dial Tone, (cg/dt, 0x0007/0x030)	M	ADD, MOD, MOVE		Value
	Signal Parameters	**Mandatory/ Optional**	**Supported Values:**	**Duration Provisioned Value:**

Ringing Tone, (cg/rt, 0x0007/0x031) Busy Tone, (cg/bt, 0x0007/0x032) Congestion Tone, (cg/ct, 0x0007/0x033) Special Information Tone, (cg/sit, 0x0007/0x034) Warning Tone, (cg/wt, 0x0007/0x035) Payphone Recognition Tone, (cg/pt, 0x0007/0x036) Call Waiting Tone, (cg/cw, 0x0007/0x037) Caller Waiting Tone, (cg/cr, 0x0007/0x038)	-	-	-	-
Events	**Mandatory/ Optional**	**Used in command:**		
None	-	-		
	Event Parameters	**Mandatory/ Optional**	**Supported Values:**	**Provisioned Value:**
	-	-	-	-
	ObservedEvent Parameters	**Mandatory/ Optional**	**Supported Values:**	**Provisioned Value:**
	-	-	-	-
Statistics	**Mandatory/ Optional**	**Used in command:**	**Supported Values:**	
None	-	-	-	
Error Codes	**Mandatory/ Optional**			
None	-			

5.14.3.8 Basic Services Tones Generator Package

Table 5.14.3.8.1: Package Usage Information for Basic Services Tones Generator 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) Confirmation Tone (srvtn/conf,0x0025/0x0050) Held Tone (srvtn/ht,0x0025/0x0051) Message Waiting Tone (srvtn/mwt,0x0025/0x0052)	**O**	**ADD, MOD, MOVE**		**Value**
	Signal Parameters	**Mandatory/ Optional**	**Supported Values:**	**Duration Provisioned Value:**
	Tone Direction (btd, 0x0001)	M	Internal / External	Default=External
Events	**Mandatory/ Optional**	**Used in command:**		

None	-	-		
	Event Parameters	**Mandatory/ Optional**	**Supported Values:**	**Provisioned Value:**
	-	-	-	-
	ObservedEvent Parameters	**Mandatory/ Optional**	**Supported Values:**	**Provisioned Value:**
	-	-	-	-
Statistics	**Mandatory/ Optional**	**Used in command:**		**Supported Values:**
None	-	-		-
Error Codes	**Mandatory/ Optional**			
None	-			

5.14.3.9 Expanded Call Progress Tones Generator Package

Table 5.14.3.9.1: 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) Off-hook warning Tone (xcg/roh, 0x0024/0x004b) Negative Acknowledgement (xcg/nack,0x0024/0x004c) Vacant Number Tone (xcg/vac, 0x0024/0x004d) Special Conditions Dial Tone (xcg/spec,0x0024/0x004e)	O	ADD, MOD, MOVE		Value
	Signal Parameters	**Mandatory/ Optional**	**Supported Values:**	**Duration Provisioned Value:**
	Tone Direction (btd, 0x0001)	M	Internal / External	Default=External
Events	**Mandatory/ Optional**	**Used in command:**		
None	-	-		
	Event Parameters	**Mandatory/ Optional**	**Supported Values:**	**Provisioned Value:**
	-	-	-	-
	ObservedEvent Parameters	**Mandatory/ Optional**	**Supported Values:**	**Provisioned Value:**
	-	-	-	-
Statistics	**Mandatory/ Optional**	**Used in command:**		**Supported Values:**
None	-	-		-
Error Codes	**Mandatory/ Optional**			
None	-			

5.14.3.10 Basic Announcement Syntax Package

Table 5.14.3.10.1: Package Usage Information for Basic Announcement Syntax Package

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

	-	-	-	-
Events	**Mandatory/ Optional**	**Used in command:**		
None	-	-		
	Event Parameters	**Mandatory/ Optional**	**Supported Values:**	**Provisioned Value:**
	-	-	-	-
	ObservedEvent Parameters	**Mandatory/ Optional**	**Supported Values:**	**Provisioned Value:**
	-	-	-	-
Statistics	**Mandatory/ Optional**	**Used in command:**	**Supported Values:**	
None	-	-	-	
Error Codes	**Mandatory/ Optional**			
None	-			

5.14.3.11 Voice Variable Syntax Package

Table 5.14.3.11.1: Package Usage Information for Voice Variable Syntax Package

Properties	**Mandatory/ Optional**	**Used in command:**	**Supported Values:**	**Provisioned Value:**
None	-	-	-	-
Signals	**Mandatory/ Optional**	**Used in command:**		**Duration Provisioned Value:**
None	-	-		-
	Signal Parameters	**Mandatory/ Optional**	**Supported Values:**	**Duration Provisioned Value:**
	-	-	-	-
Events	**Mandatory/ Optional**	**Used in command:**		
None	-	-		
	Event Parameters	**Mandatory/ Optional**	**Supported Values:**	**Provisioned Value:**
	-	-	-	-
	ObservedEvent Parameters	**Mandatory/ Optional**	**Supported Values:**	**Provisioned Value:**
	-	-	-	-
Statistics	**Mandatory/ Optional**	**Used in command:**	**Supported Values:**	
None	-	-	-	
Error Codes	**Mandatory/ Optional**			
None	-			

5.14.3.12 Announcement Set Syntax Package

Table 5.14.3.12.1: Package Usage Information for Announcement Set Syntax Package

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

	ObservedEvent Parameters	Mandatory/ Optional	Supported Values:	Provisioned Value:
	-	-	-	-
Statistics	**Mandatory/ Optional**	**Used in command:**		**Supported Values:**
None	-	-		-
Error Codes	**Mandatory/ Optional**			
None	-			

5.14.3.13 General Text Variable Type Package

Table 5.14.3.13.1: Package Usage Information for General Text Variable Type Package

Properties	**Mandatory/ Optional**	**Used in command:**	**Supported Values:**	**Provisioned Value:**
None	-	-	-	-
Signals	**Mandatory/ Optional**	**Used in command:**		**Duration Provisioned Value:**
None	-	-		-
	Signal Parameters	**Mandatory/ Optional**	**Supported Values:**	**Duration Provisioned Value:**
	-	-	-	-
Events	**Mandatory/ Optional**	**Used in command:**		
None	-	-		
	Event Parameters	**Mandatory/ Optional**	**Supported Values:**	**Provisioned Value:**
	-	-	-	-
	ObservedEvent Parameters	**Mandatory/ Optional**	**Supported Values:**	**Provisioned Value:**
	-	-	-	-
Statistics	**Mandatory/ Optional**	**Used in command:**		**Supported Values:**
None	-	-		-
Error Codes	**Mandatory/ Optional**			
None	-			

5.14.3.14 Advanced Audio Server Base Package

Table 5.14.3.14.1: Package Usage Information for Advanced Audio Server Base Package

Properties	**Mandatory/ Optional**	**Used in command:**	**Supported Values:**	**Provisioned Value:**
None	-	-	-	-
Signals	**Mandatory/ Optional**	**Used in command:**		**Duration Provisioned Value:**
Play (aasb/play, 0x0033/0x0001)	M	ADD, MOD, MOVE, AUDITVALUE,		-
	Signal Parameters	**Mandatory/ Optional**	**Supported Values:**	**Duration Provisioned Value:**
	Announcement (an, 0x0001)	M	ALL	-
	Iterations (it,0x0002)	O	ALL	1
	Interval(iv,0x0003)	O	0 upwords	-
	Announcement Direction(di,0x0006)	M	Ext (0x01) Int (0x02)	Default=External
Events	**Mandatory/ Optional**	**Used in command:**		
Audio operation failure (aasb/audfail, 0x0033 /0x0001)	M	NOTIFY		
	Event Parameters	**Mandatory/ Optional**	**Supported Values:**	**Provisioned Value:**
	-	-	-	-

	ObservedEvent Parameters	Mandatory/ Optional	Supported Values:	Provisioned Value:
	Return Code(rc, 0x0001)	M	FFS	-
Statistics	**Mandatory/ Optional**	**Used in command:**		**Supported Values:**
None	-	-		-
Error Codes	**Mandatory/ Optional**			
None	-			

5.14.3.15 Basic Call Progress Tones Generator with Directionality

Table 5.14.3.15.1: 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) Ringing Tone (bcg/brt,0x0023/0x0041) 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)	O	ADD, MOD, MOVE		Value
	Signal Parameters	**Mandatory/ Optional**	**Supported Values:**	**Duration Provisioned Value:**
	Tone Direction (btd, 0x0001)	M	Internal / External	Default=External
Events	**Mandatory/ Optional**	**Used in command:**		
None	-	-		
	Event Parameters	**Mandatory/ Optional**	**Supported Values:**	**Provisioned Value:**
	-	-	-	-
	ObservedEvent Parameters	**Mandatory/ Optional**	**Supported Values:**	**Provisioned Value:**
	-	-	-	-
Statistics	**Mandatory/ Optional**	**Used in command:**		**Supported Values:**
None	-	-		-
Error Codes	**Mandatory/ Optional**			
None	-			

5.14.3.16 AAS Recording Package

Table 5.14.3.16.1: Package Usage Information for AAS Recording Package

Properties	**Mandatory/ Optional**	**Used in command:**	**Supported Values:**	**Provisioned Value:**
Maximum temporary record life (aasrec/maxtrl 0x0035/0x0003)	M	ADD, MOD, MOVE	ALL	-
Signals	**Mandatory/ Optional**	**Used in command:**		**Duration Provisioned Value:**
PlayRecord (aasrec/playrec, 0x0035/0x0002)	M	ADD, MOD, MOVE		-
	Signal Parameters	**Mandatory/ Optional**	**Supported Values:**	**Duration Provisioned Value:**
	Record Length Timer(rlt, 0x0008)	O	ALL	-
	Recording Identifier (rid, 0x0009)	M	ALL	-
	EndInputKey(eik, 0x0010)	M	ALL	-
Make persistent (aasrec/makepers, 0x0035/0x0003)	O	ADD, MOD, MOVE		-
	Signal Parameters	**Mandatory/ Optional**	**Supported Values:**	**Duration Provisioned Value:**
	Recording Identifier (rid, 0X0001)	M	ALL	-
Events	**Mandatory/ Optional**	**Used in command:**		
Audio operation failure (aasrec/audfail, 0x0035/0x0001)	M	NOTIFY		
	Event Parameters	**Mandatory/ Optional**	**Supported Values:**	**Provisioned Value:**
	None	-	-	-
	ObservedEvent Parameters	**Mandatory/ Optional**	**Supported Values:**	**Provisioned Value:**
	Return Code(rc, 0x0001)	M	ALL	-
PlayRecord success(aasrec/precsucc, 0x0035/0x0002))	M	NOTIFY		
	Event Parameters	**Mandatory/ Optional**	**Supported Values:**	**Provisioned Value:**
	None	-	-	-
	ObservedEvent Parameters	**Mandatory/ Optional**	**Supported Values:**	**Provisioned Value:**
	Recording result (res,0x0003)	M	ALL	-
	Recording id (ri, 0x0004))	M	ALL	-
	Record duration (rdur,0x0005)	M	ALL	-
Statistics	**Mandatory/ Optional**	**Used in command:**	**Supported Values:**	
None	-	-	-	
Error Codes	**Mandatory/ Optional**			
None	-			

5.14.3.17 Multimedia Play Package

Table 5.14.3.17.1: Package Usage Information for Multimedia Play Package

Properties	**Mandatory/ Optional**	**Used in command:**	**Supported Values:**	**Provisioned Value:**
None	-	-	-	-
Signals	**Mandatory/ Optional**	**Used in command:**		**Duration Provisioned Value:**
Play (mpp/play, 0x00a9/0x0001)	M	ADD, MOD, MOVE		-
	Signal Parameters	**Mandatory/ Optional**	**Supported Values:**	**Duration Provisioned Value:**
	Announcement (an,0x0001)	M	ALL	-
	Interations (it,0x0002)	M	ALL	-
	Interval (iv,0x0003)	O	ALL	-
	Announcement Direction (di, 0x0006)	M	Ext (0x01) Int (0x02)	Default=External
Events	**Mandatory/ Optional**	**Used in command:**		
None	-	-		
	Event Parameters	**Mandatory/ Optional**	**Supported Values:**	**Provisioned Value:**
	-	-	-	-
	ObservedEvent Parameters	**Mandatory/ Optional**	**Supported Values:**	**Provisioned Value:**
	-	-	-	-
Statistics	**Mandatory/ Optional**	**Used in command:**	**Supported Values:**	
None	-	-	-	
Error Codes	**Mandatory/ Optional**			
None	-			

5.14.3.18 Generic Announcement Package

Table 5.14.3.18.1: Package Usage Information for Generic Announcement Package

Properties	**Mandatory/ Optional**	**Used in command:**	**Supported Values:**	**Provisioned Value:**
None	-	-	-	-
Signals	**Mandatory/ Optional**	**Used in command:**		**Duration Provisioned Value:**
Fixed: Announcement play (an/apf, x001d/0x0001)	M	ADD, MOD, MOVE		-
	Signal Parameters	**Mandatory/ Optional**	**Supported Values:**	**Duration Provisioned Value:**
	Announcement name (an ,0x0001)	<M	ALL	-
	Number of cycles (noc ,0x0002)	O	Any	-
	Announcement Variant (av ,0x0003)	O	ALL	-
	Announcement Direction (di ,0x0004)	M	Ext (0x01) Int (0x02)	Default=External

Events	Mandatory/ Optional	Used in command:		
None	-	-		
	Event Parameters	Mandatory/ Optional	Supported Values:	Provisioned Value:
	-	-	-	-
	ObservedEvent Parameters	Mandatory/ Optional	Supported Values:	Provisioned Value:
	-	-	-	-
Statistics	**Mandatory/ Optional**	**Used in command:**	**Supported Values:**	
None	-	-	-	
Error Codes	**Mandatory/ Optional**			
None	-			

5.14.3.19 Intrusion Tones Generator Package

Table 5.14.3.19.1: Package Usage Information for Intrusion Tones Generator 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) Intrusion Tone (int/int,0x0027/0x0058) Intrusion Reminder Tone (int/rem,0x0027/0x0059) Toll Break-In Tone (int/tbi,0x0027/0x005a) Intrusion Queue Tone (int/intque,0x0027/0x005b) Busy Verification Tone (int/bv,0x0027/0x005c)	O	ADD, MOD, MOVE		Value
	Signal Parameters	**Mandatory/ Optional**	**Supported Values:**	**Duration Provisioned Value:**
	Tone Direction (btd, 0x0001)	M	Internal / External	Default=External
Events	**Mandatory/ Optional**	**Used in command:**		
None	-	-		
	Event Parameters	**Mandatory/ Optional**	**Supported Values:**	**Provisioned Value:**
	-	-	-	-
	ObservedEvent Parameters	**Mandatory/ Optional**	**Supported Values:**	**Provisioned Value:**
	-	-	-	-
Statistics	**Mandatory/ Optional**	**Used in command:**	**Supported Values:**	
None	-	-	-	
Error Codes	**Mandatory/ Optional**			
None	-			

5.14.3.20 Business Tones Generation Package

Table 5.14.3.20.1: Package Usage Information for Business Tones Generation Package

Properties	**Mandatory/ Optional**	**Used in command:**	**Supported Values:**	**Provisioned Value:**
None	-	-	-	-
Signals	**Mandatory/ Optional**	**Used in command:**		**Duration Provisioned Value:**
Off-Hook Queuing Tone (biztn/ofque,0x0028/0x005d) Expensive Route Warning Tone (biztn/erwt,0x0028/0x005e) Distinctive Dial Tone (biztn/ddt,0x0028/0x005f) Internal Dial Tone (biztn/idt,0x0028/0x0060)	O	ADD, MOD, MOVE		Value
	Signal Parameters	**Mandatory/ Optional**	**Supported Values:**	**Duration Provisioned Value:**
	Tone Direction (btd, 0x0001)	M	Internal / External	Default=External
Events	**Mandatory/ Optional**	**Used in command:**		
None	-	-		
	Event Parameters	**Mandatory/ Optional**	**Supported Values:**	**Provisioned Value:**
	-	-	-	-
	ObservedEvent Parameters	**Mandatory/ Optional**	**Supported Values:**	**Provisioned Value:**
	-	-	-	-
Statistics	**Mandatory/ Optional**	**Used in command:**		**Supported Values:**
None	-	-		-
Error Codes	**Mandatory/ Optional**			
None	-			

5.14.3.21 Conferencing Tones Generation Package

Table 5.14.3.21.1: Package Usage Information for Conferencing Tones Generation Package

Properties	**Mandatory/ Optional**	**Used in command:**	**Supported Values:**	**Provisioned Value:**
None	-	-	-	-
Signals	**Mandatory/ Optional**	**Used in command:**		**Duration Provisioned Value:**
Conf. Entrance Tone (conftn/enter, 0x0038/0x0061) Conf. Exit Tone (conftn/exit, 0x0038/0x0062) Conf. Lock Tone (conftn/lock, 0x0038/0x0063) Conf. Unlock Tone (conftn/unlock, 0x0038/0x0064) Time Limit Warning Tone (conftn/timelim, 0x0038/0x0065)	O	ADD, MOD, MOVE		Value
	Signal Parameters	**Mandatory/ Optional**	**Supported Values:**	**Duration Provisioned Value:**
	Tone Direction (btd, 0x0001)	M	Internal / External	Default=External
Events	**Mandatory/ Optional**	**Used in command:**		
None	-	-		
	Event Parameters	**Mandatory/ Optional**	**Supported Values:**	**Provisioned Value:**

	-	-	-	-
	ObservedEvent Parameters	**Mandatory/ Optional**	**Supported Values:**	**Provisioned Value:**
	-	-	-	-
Statistics	**Mandatory/ Optional**	**Used in command:**		**Supported Values:**
None	-	-		-
Error Codes	**Mandatory/ Optional**			
None	-			

5.14.3.22 Inactivity Timer Package

Table 5.14.3.22.1: Package Usage Information for Inactivity Timer Package

Properties	**Mandatory/ Optional**	**Used in command:**	**Supported Values:**	**Provisioned Value:**
None	-	-	-	-
Signals	**Mandatory/ Optional**	**Used in command:**		**Duration Provisioned Value:**
None	-	-		-
	Signal Parameters	**Mandatory/ Optional**	**Supported Values:**	**Duration Provisioned Value:**
	-	-	-	-
Events	**Mandatory/ Optional**	**Used in command:**		
Inactivity Timeout(it/ito, 0x0045/0x0001)	M	MOD, NOTIFY		
	Event Parameters	**Mandatory/ Optional**	**Supported Values:**	**Provisioned Value:**
	Maximum Inactivity Time(mit, 0x0001)	M	Any integer	-
	ObservedEvent Parameters	**Mandatory/ Optional**	**Supported Values:**	**Provisioned Value:**
	None	-	-	-
Statistics	**Mandatory/ Optional**	**Used in command:**		**Supported Values:**
None	-	-		-
Error Codes	**Mandatory/ Optional**			
None	-			

5.14.3.23 MGC Information Package

Table 5.14.3.23.1: Package Usage Information for MGC Information Package

Properties	**Mandatory/ Optional**	**Used in command:**	**Supported Values:**	**Provisioned Value:**
Data Block(MGCInfo /db, 0x00a0/0x0001)	M	ADD, MOD, AUDITVALUE	A range of 0 to 32 octets	An empty string
Signals	**Mandatory/ Optional**	**Used in command:**		**Duration Provisioned Value:**
None	-	-		-
	Signal Parameters	**Mandatory/ Optional**	**Supported Values:**	**Duration Provisioned Value:**
	-	-	-	-
Events	**Mandatory/ Optional**	**Used in command:**		
None	-	-		
	Event Parameters	**Mandatory/ Optional**	**Supported Values:**	**Provisioned Value:**

	-	-	-	-
	ObservedEvent Parameters	**Mandatory/ Optional**	**Supported Values:**	**Provisioned Value:**
	-	-	-	-
Statistics	**Mandatory/ Optional**	**Used in command:**		**Supported Values:**
None	-	-		-
Error Codes	**Mandatory/ Optional**			
None	-			

5.14.3.24 Advanced audio server base package for TTS enhancement

Table 5.14.3.24.1: Package Usage Information for TTS enhancement package

Properties	**Mandatory/ Optional**	**Used in command:**	**Supported Values:**	**Provisioned Value:**
None	-	-	-	-
Signals	**Mandatory/ Optional**	**Used in command:**		**Duration Provisioned Value:**
Play Segment Identifier (aastts/playsid, 0x00a8/0x0001)	M	ADD, MOD, MOVE		-
	Signal Parameters	**Mandatory/ Optional**	**Supported Values:**	**Duration Provisioned Value:**
	Announcement (an,0x0001)	M	ALL	-
	Iterations (it, 0x0003)	M	ALL	-
	Interval (iv,0x0004)	O	ALL	-
	Direction (di,0x0005)	M	Ext (0x01) Int(0x02)	Default=External
Play script (aastts/playscript, 0x00a8/0x0002)	M	ADD, MOD,MOVE		-
	Signal Parameters	**Mandatory/ Optional**	**Supported Values:**	**Duration Provisioned Value:**
	Script (script,0x0001)	M	(NOTE 1)	-
	Iterations (it,0x0003)	M	ALL	-
	Interval (iv, 0x0004)	O	ALL	-
	Direction (di,0x0005)	M	Ext (0x01) Int(0x02)	Default=External
Events	**Mandatory/ Optional**	**Used in command:**		
TTS operation failure(aastts/ttsfail, 0x00a8/0x0001)	M	ADD, MOD, NOTIFY		
	Event Parameters	**Mandatory/ Optional**	**Supported Values:**	**Provisioned Value:**
	None	-	-	-
	ObservedEvent Parameters	**Mandatory/ Optional**	**Supported Values:**	**Provisioned Value:**
	Return Code (rc ,0x0001)	M	ALL	-
Statistics	**Mandatory/ Optional**	**Used in command:**		**Supported Values:**
None	-	-		-
Error Codes	**Mandatory/ Optional**			
None	-			
NOTE 1: The value shall comply with the Annex X : "The W3C SSML Profile for TTS function".				

5.14.3.25 ASR Package

Table 5.14.3.25.1: Package Usage Information for ASR Package

Properties	**Mandatory/ Optional**	**Used in command:**	**Supported Values:**	**Provisioned Value:**
None	-	-	-	-
Signals	**Mandatory/ Optional**	**Used in command:**		**Duration Provisioned Value:**
ASR recognition with grammar script(asr/asrwgs, 0x00a6/0x0001)	M	ADD, MOD,MOVE		-
	Signal Parameters	**Mandatory/ Optional**	**Supported Values:**	**Duration Provisioned Value:**
	grammar file (rgsf, 0x0002)	M	(NOTE 1)	-
	Recognition grammar script format (rgsf, 0x0004)	M	ABNF (0x0001) XML (0x0002)	-
	recognition mode (rm, 0x0005)	M	Normal (0x0001) Hotword (0x0002)	-
	End Input Key (eik, 0x0006)	M	ALL	-
ASR recognition with grammar identifier(asr/asrid, 0x00a6/0x0002)	M	ADD, MOD,MOVE		-
	Signal Parameters	**Mandatory/ Optional**	**Supported Values:**	**Duration Provisioned Value:**
	Recognition grammar identifier (rgid, 0x0002)	M	ALL	-
	Recognition grammar script type (rgst, 0x0003)	M	SRGS (0x0001)	-
	Recognition grammar script format (rgsf, 0x0004)	M	ABNF (0x0001) XML (0x0002)	-
	recognition mode (rm, 0x0005)	M	Normal (0x0001) Hotword (0x0002)	-
	End Input Key (eik, 0x0006)	M	ALL	-
Events	**Mandatory/ Optional**	**Used in command:**		
ASR failure (asr/asrfail, 0x00a6/0x0001)	M	ADD, MOD, NOTIFY		
	Event Parameters	**Mandatory/ Optional**	**Supported Values:**	**Provisioned Value:**
	None	-	-	-
	ObservedEvent Parameters	**Mandatory/ Optional**	**Supported Values:**	**Provisioned Value:**
	Return Code (rc,0x0001)	M	ALL	-
ASR success(asr/asrsucc, 0x00a6/0x0002)	M	ADD, MOD, NOTIFY		
	Event Parameters	**Mandatory/ Optional**	**Supported Values:**	**Provisioned Value:**
	None	-	-	-
	ObservedEvent Parameters	**Mandatory/ Optional**	**Supported Values:**	**Provisioned Value:**
	ASR result (asrr, 0x0001)	M	ALL	-
Statistics	**Mandatory/ Optional**	**Used in command:**	**Supported Values:**	
None	-	-	-	
Error Codes	**Mandatory/ Optional**			
None	-			
NOTE 1: The value shall comply with Annex X. "the W3C SRGS Profile for ASR function".				

5.14.3.26 Multimedia Recording Package

Table 5.14.3.26.1: Package Usage Information for Multimedia Recording Package

Properties	**Mandatory/ Optional**	**Used in command:**	**Supported Values:**	**Provisioned Value:**
None	-	-	-	-
Signals	**Mandatory/ Optional**	**Used in command:**		**Duration Provisioned Value:**
PlayRecord (mrp/playrec, 0x00??/0x0002)	M	ADD, MOD, MOVE		-
	Signal Parameters	**Mandatory/ Optional**	**Supported Values:**	**Duration Provisioned Value:**
	Record Length Timer(rlt, 0x0008)	M	ALL	-
	Recording Identifier (rid, 0x0009)	M	ALL	-
	record direction (rd,0x0011)	M	Ext□0x0001□, Int(0x0002)	-
Events	**Mandatory/ Optional**	**Used in command:**		
none	-	-		
	Event Parameters	**Mandatory/ Optional**	**Supported Values:**	**Provisioned Value:**
	-	-	-	-
	ObservedEvent Parameters	**Mandatory/ Optional**	**Supported Values:**	**Provisioned Value:**
	-	-	-	-
Statistics	**Mandatory/ Optional**	**Used in command:**	**Supported Values:**	
None	-	-	-	
Error Codes	**Mandatory/ Optional**			
None	-			

5.15 Mandatory Support of SDP and Annex C Information Elements

The v=, o=, s=, m=, c=, t=, a= and b= lines of the SDP [20] syntax shall be supported. All other lines should be ignored if received.

Table 5.15.1

Supported Annex C and SDP information elements:		
Information Element	**Annex C Support**	**SDP Support**

Protocol version (v=)	"SDP_V "	The protocol version (v=) line contains a single field: *v= <version>* and shall be used in accordance with RFC 2327 [20] (i.e. v=0).
Origin (o=)	"SDP_O "	The origin line consists of 6 fields: *o= <user name> <session ID> <version> <network type> <address type> <address>.* The MRFC is not required to supply this line but shall accept it. The MRFP should populate this line as follows or use the value received from the MRFC: - <user name> should contain an hyphen - <session ID> and <version> should contain one or mode digits as described in RFC 2327 [20] - <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 MRFP is connected. - <address> should contain the fully qualified domain name of the gateway.
Session Name (s=)	"SDP_S"	The session name (s=) line contains a single field: *s= <session-name>.* The MRFC 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. The MRFP shall use an hyphen "-" as a session name or the value received from the MRFC.
Connection data (c=)	"SDP_C "	The connection data line consists of 3 fields: *c= <network-type> <address-type> <connection-address>* - The <network-type> shall be set to "IN". - The <address-type> shall be set to "IP4" or "IP6" depending on the addressing scheme used by the network to which the MRFP is connected. - The <connection-address> sent by the MRFC in the remote descriptor is the address to which the MRFP shall send the media flows. - The <connection-address> sent by the MRFC in local descriptors may be a unicast IPv4 or IPv6 address or it may be wildcarded to allow the MRFP to choose an address. In the second case, MGs shall fill this field with a unicast IP address at which they will receive the media stream. Thus a TTL value shall not be present and a "number of addresses" value shall not be present. The field shall not be filled with a fully-qualified domain name instead of an IP address. When the <connection address> is wildcarded (i.e. choose wildcard) by the MRFC, the MRFP allocates an IP address based on the address type. The addressing space for which this address is taken may depend on the termination ID supplied by the MRFC.
Media announcements (m=)	"SDP_M "	Media Announcements (m=) lines consist of 3 fields: *m= <media> <port> <transport> <format>* - The <media> field shall be set to "audio"or "video" - The <port> field in remote descriptors is provided by the MRFC and represents the port to which the MRFP shall send the media flows. - The <port> field in local descriptors may be provided by the MRFC or wildcarded (i.e. choose wildcard) to allow the MRFP to choose a value for the port on which it wishes to receive the

		media stream - The <transport> field shall be set to "RTP/AVP". - The <format> field may be explicitly supplied by the MRFC, wildcarded or overspecified. If the MRFC wishes to request the MRFP to choose which media formats it wishes to use for the call then the MRFC shall provide a "$" wildcard. If the MRFC wishes to suggest that the MRFP selects a media format from a list of possible media formats then it shall provide a list of appropriate media types in accordance with SDP. All conforming gateways shall support at least format "8" for RTP/AVP (i.e. G.711 A-Law). Dynamic payloads shall not be used when a static RTP/AVP payload value is defined in RFC 3551[21].
Bandwidth (b=)	"SDP_B "	The Bandwitdh (b=) line consists of 2 fields: *b= <modifier>: <bandwidth-value>* Bandwidth information shall be supplied by the MRFC if the required bandwidth cannot be immediately derived from the information contained in the m= line. If absent, the MRFP shall assume a reasonable default bandwidth value for well-known codecs and shall provide this value in the response sent to the MRFC. 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. The bandwidth value shall take into account all headers down to the IP layer, including a 5% bandwidth for RTCP packets.
Time (t=)	"SDP_T "	The time (t=) line consists of two fields: *t= <start-time> <stop-time>.* This line is ignored by both the MRFC and the MRFP if received in local and remote descriptors. The MRFC is not required to supply a time description but shall accept one. When supplied, this line shall be set to 0 0.
Attributes (a=)	"SDP_A "	Attributes (a=) lines consist of two fields: *a= <attribute>: <value>* One or more of the "a" attribute lines specified below may be included, depending on the payload type. An attribute line not specified below should not be used. Only the following attributes are understood by the MRFP. Other attributes are ignored. *a= rtpmap: <payload type> <encoding name>/<clock rate> [/<encoding parameters>]* *a= fmtp:<format> <format specific parameters>* *a= ptime: <time>*

5.16 Optional support of SDP and Annex C information elements

Specifies what SDP attributes and Annex C information elements may be supported.

Table 5.16.1:

Optional Annex C and SDP information elements:			
Information Element	**Annex C Support**	**SDP Support**	**Support Dependent on:**
<name>	<Annex C property>	<Describe>	<Describe>

5.17 Procedures

Editor's Note: This section shall contain stage 3 protocol procedures to perform the functions as required by 3G TS 23.333.

5.17.1 Formats and Codes

Table 5.17.1.1 shows the parameters which are required for the procedures defined in the following clauses.

The coding rules applied in ITU-T Recommendation H.248.1 [10] for the applicable coding technique shall be followed for the UMTS capability set.

The binary encoding rules which are applicable to the defined Abstract Syntaxes are the Basic Encoding Rules for Abstract Syntax Notation One, defined in ITU-T Recommendation X.690 [41]. Specifically in accordance with ITU-T Recommendation X.690 [41] section 7.3, alternative encodings based on the definite and indefinite form of length are permitted by the basic encoding rules as a sender's option. Receivers shall support both alternatives.

Unsupported values of parameters or properties may be reported by the MGW and shall be supported by the MSC as such by using H.248.1 error code #449 " Unsupported or Unknown Parameter or Property Value ". **Error Text in the error Descriptor**: The unsupported or unknown value is included in the error text in the error descriptor.

Table 5.17.1.1: Information Elements Used in Procedures

Signalling Object	H.248 Descriptor	Coding
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.
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" for voice service
Mediatype	Local Descriptor or Remote Descriptor	<media> in sdp m-line "audio" for voice service, and "image" for T.38 service.
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.
Stream Number	Stream	Encoding as per ITU-T Recommendation H.248.1 Annex B "Stream"/"ST". For a single stream, this may be omotted by the MRFC.
Tone Identity	Signal	Encoding as per ITU-T Recommendation H.248.1 Annex B and the package which defines the tone (Tone Signal Ids only).
Iterations		
Announcement Cause		
DTMFTrigger		
SSML		
Record file Identifier		
Record File Format		
Maximum Record Time		
Digit	Observed Events	Encoding as per ITU-T Recommendation H.248.1 Annex B. Digits are reported individually by the MRFP.
ASR Cause		
Recognition Result		
Text Token		
Result Interpretation		
Confidence Score		
Input Time		
Multimedia file format		

5.17.2 Call Related Procedures

5.17.2.1 General

This section describes the various call related procedures performed by the MRFP, which are listed in table 15.17.2.1.

Table 5.17.2.1.1: MRFP Call Related Procedures

Transaction defined in 3GPP TS 23.333 [25]	Transaction used from TS 29.163 [xx]	Supported	Comment
Reserve IMS Connection point	Reserve IMS Connection point	Mandatory	See 5.17.2.2
Configure IMS Resources	Configure IMS Resources	Mandatory	See 5.17.2.3
Reserve IMS Connection Point and configure remote resources	Reserve IMS Connection Point and configure remote resources	Mandatory	See 5.17.2.4
Release IMS termination	Release IMS termination	Mandatory	See 5.17.2.5
Detect DTMF	Detect IMS RTP Tel Event	Optional	See 5.17.2.5
Stop DTMF Detection	End IMS RTP Tel Event	Optional	See 5.17.2.5
Report DTMF	Notify IMS RTP Tel Event	Optional	See 5.17.2.5
Start Playing Multimedia	n.a for re-use		
Stop Playing Multimedia	n.a for re-use		
Playing Multimedia Completed	n.a for re-use		
Send Tone	n.a for re-use	Optional	See 5.17.2.5
Stop Tone	IMS Stop Tone	Optional	See 5.17.2.5
Tone Completed	IMS Tone Completed	Optional	See 5.17.2.5
Start Announcement	n.a for re-use		
Stop Announcement	Stop Announcement		
Announcement Completed	Announcement Completed		
Start Audio Record	n.a for re-use		
Stop Audio Record	n.a for re-use		
Audio Record Complete	n.a for re-use		
Start Multimedia Record	n.a for re-use		
Stop Multimedia Record	n.a for re-use		
Multimedia Record Completed	n.a for re-use		
Start TTS	n.a for re-use		
Stop TTS	n.a for re-use		
TTS Completed	n.a for re-use		
Start ASR	n.a for re-use		
Stop ASR	n.a for re-use		
ASR Completed	n.a for re-use		

NOTE 1: A procedure defined in this table can be combined with another procedure in the 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.

5.17.2.2 Reserve IMS Termination

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

Table 5.17.2.2.1: Reserve IMS Termination Request

Address Information	Control information	Bearer information

Local Descriptor {
Port = $
IP Address = $
}
	Transaction ID = x
	Context ID= $
	Termination ID = $
	If Stream Number specified:-
	Stream Number
	If Resources for multiple Codecs required:
	Reserve_Value
		Local Descriptor {
		Codec List
		RTP Payloads
		}

On reserving the IMS termination, the MRFP responds as in Table 5.17.2.2.2.

Table 5.17.2.2.2: Reserve IMS Termination Request Acknowledge

Address Information	Control information	Bearer information

Local Descriptor {
Port
IP Address
}
	Transaction ID = x
	Context ID = C1
	Termination ID = T1
	Stream Number
		Local Descriptor {
		Codec List
		RTP Payloads
		}

5.17.2.3 Configure Remote IMS Resources

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

Table 5.17.2.3.1: Configure Remote 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 = x
	Context ID = C1
	Termination ID = T1
	
	If Stream Number specified:
	Stream Number
	
	If Resources for multiple Codecs required:
	Reserve_Value
		If local resources are modified:
		Local Descriptor {
		Codec List
		RTP Payloads
		}
		If remote resources are modified:
		Remote Descriptor {
		Codec List
		RTP Payloads
		}

The MRFP responds as in 5.17.2.3.2.

Table 5.17.2.3.2: Configure Remote IMS Resources Request Acknowledge

Address Information	Control information	Bearer information

If local resources were provided in request:
Local Descriptor {
Port
IP Address
}
	Transaction ID = x
	Context ID = C1
	Termination ID = T1
	
	If Stream Number Specified:
	Stream Number
		If local resources were provided in request:
		Local Descriptor {
		Codec List
		RTP Payloads
		}

5.17.2.4 Reserve IMS Termination & Configure Remote IMS Resources

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

Table 5.17.2.4.1: 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 = x
	Context ID = $
	Termination ID = $
	
	If Stream Number Specified:
	Stream Number
	If Resources for multiple Codecs shall be reserved:
	Reserve_Value
		Local Descriptor {
		Codec List
		RTP Payloads
		}
		Remote Descriptor {
		Codec List
		RTP Payloads
		}

The MRFP responds as in Table 5.17.2.4.2.

Table 5.17.2.4.2: Reserve IMS Termination & Configure Remote IMS Resources Request Acknowledge

Address Information	Control information	Bearer information

Local Descriptor {
Port
IP Address
}
	Transaction ID = x
	Context ID = C1
	Termination ID = T1
	Stream Number
		Local Descriptor {
		Codec List
		RTP Payloads
		}

5.17.2.5 Release IMS Termination

The MRFC sends a SUBTRACT command as in Table 5.17.2.5.1.

Table 5.17.2.5.1: Release IMS Termination Request

Address Information	Control information	Bearer information
	Transaction ID = x Context ID= C1 Termination ID = T1	

On releasing the IMS termination, the MRFP responds as in Table 5.17.2.5.2

Table 5.17.2.5.2: Release IMS Termination Request Acknowledge

Address Information	Control information	Bearer information
	Transaction ID = x Context ID = C1 Termination ID = T1	

5.17.2.6 Send Tone

This procedure is used to play a tone.

The MRFC sends an ADD or MODIFY command as in table 5.17.2.6.1.

Table 5.17.2.6.1: Send Tone

Address information	Control information	Bearer information
	Transaction ID = x If context already exists: Context ID = C1 Else Context = $ If Termination exists: Termination ID = T1 Else Termination ID = $ If Stream Number specified: Stream Number Signal ID = Tone Identity If override Signal Direction Direction = Signal Direction If DTMF override Override = DTMFTrigger If MRFC wishes to override the default tone duration: Tone Duration If MRFC requires to be informed of the end of the tone :- Request End Of Signal Notification	
NOTE1: Signal Direction shall be either "internal" or "external". NOTE2: Only the Tone Signal Ids shall be used, not the Tone Ids within the PlayTone Signal Id.		

The MRFP responds as shown in Table 5.17.2.6.2.

Table 5.17.2.6.2: SendTone Acknowledge

Address information	Control information	Bearer information
	Transaction ID = x Context ID = C1 Termination ID = T1 If local resources were provided in request: Stream Number	

5.17.2.7 Stop Tone

This procedure is used to stop a tone. This procedure is the same as the procedure Start Tone however the signal descriptor shall not include the started tone signal. Note that a tone may also be stopped by releasing the IMS termination.

5.17.2.8 Tone Completed

This procedure is used to report that a tone has ended.

The MRFP sends a NOTIFY to the MRFC as shown in table 5.17.2.q.1.

Table 5.17.2.8.1: Tone Completed

Address information	Control information	Bearer information
	Transaction ID = x Context ID = C1 Termination ID = T1 End Of Signal Notification = Tone Completed Cause	

The MRFC responds as shown in Table 5.17.2.8.2.

Table 5.17.2.8.2: Tone Completed Ack

Address information	Control information	Bearer information
	Transaction ID = x Context ID = C1 Termination ID = T1	

5.17.2.9 Start Announcement

This procedure is used to play an announcement, which may be fixed or variable.

The MRFC sends an ADD or MODIFY command as in Table 5.17.2.9.1.

Table 5.17.2.9.1: Start Announcement

Address information	Control information	Bearer information

	Transaction ID = x
	If context already exists:
	  Context ID = C1
	Else
	  Context = $
	If Termination exists:
	  Termination ID = T1
	Else
	  Termination ID = $
	
	If Stream number specified:
	  Stream Number
	
	Announcement Identity
	If override Signal Direction
	  Direction = Signal Direction
	
	If DTMF override
	  Override = DTMFTrigger
	
	If MRFC wishes to override the default number of cycles:
	  Announcement Cycles
	
	If MRFC wishes to override the	

	default announcement variant: Announcement Variant If MRFC requires to be informed of the end of the fixed announcement :- Request End Of Signal Notification	
NOTE1: Signal Direction shall be either "internal" or "external". NOTE2: Stream mode may be maintained as for the ongoing call or may be changed be restricted to "send only". NOTE3: Signal Lists shall be supported.		

The MRFP responds as shown in Table 5.17.2.9.2.

Table 5.17.2.9.2: Start Announcement Acknowledge

Address information	Control information	Bearer information
	Transaction ID = x Context ID = C1 Termination ID = T1 If local resources were provided in request: Stream Number	

5.17.2.10 Stop Announcement

This procedure is used to stop an announcement. This procedure is the same as the procedure Start Announcement however the signal descriptor shall not include the started announcement signal. Note that an announcement may also be stopped by releasing the IMS termination.

5.17.2.11 Announcement Completed

This procedure is used to report that an announcement has ended.

The MRFP sends a NOTIFY to the MRFC as shown in table 5.17.2.11.1.

Table 5.17.2.11.1: Announcement Completed

Address information	Control information	Bearer information
	Transaction ID = x Context ID = C1 Termination ID = T1 End Of Signal Notification = Announcement Completed Cause = Announcement Cause	

The MRFC responds as shown in Table 5.17.2.11.2.

Table 5.17.2.11.2: Announcement Completed Ack

Address information	Control information	Bearer information
	Transaction ID = x Context ID = C1 Termination ID = T1	

5.17.2.12 Play TTS

This procedure is used to play out a text file as speech.

The MRFC sends an ADD or MODIFY command as in Table 5.17.2.12.1.

Table 5.17.2.12.1: Play TTS request

Address information	Control information	Bearer information
	Transaction ID = x If context already exists: Context ID = C1 Else Context = $ If Termination exists: Termination ID = T1 Else Termination ID = $ If Stream number specified: Stream Number If override Direction TTS Direction = Signal Direction If DTMF override DTMF Stop TTS =DTMFTrigger Text Block = SSML If MRFC requires to be informed of the end of TTS:- Request End Of Signal Notification	

The MRFP responds as shown in Table 5.17.2.12.2.

Table 5.17.2.12.2: Play TTS Acknowledge

Address information	Control information	Bearer information
	Transaction ID = x Context ID = C1 Termination ID = T1 If local resources were provided in request: Stream Number	

5.17.2.13 Stop TTS

This procedure is used to stop TTS play. This procedure is the same as the procedure Start TTS however the signal descriptor shall not include the started TTS signal. Note that an TTS play may also be stopped by releasing the IMS termination.

5.17.2.14 TTS Completed

This procedure is used to report that an TTS play has ended.

The MRFP sends a NOTIFY to the MRFC as shown in table 5.17.2.14.1.

Table 5.17.2.14.1: TTS Completed

Address information	Control information	Bearer information
	Transaction ID = x Context ID = C1 Termination ID = T1 End Of Signal Notification = TTS Completed Cause	

The MRFC responds as shown in Table 5.17.2.14.2.

Table 5.17.2.14.2: TTS Completed Ack

Address information	Control information	Bearer information
	Transaction ID = x Context ID = C1 Termination ID = T1	

5.17.2.15 Start Audio Record

This procedure enables a caller to leave/record a voice message (e.g. in a voice mail application).

The MRFC sends an ADD or MODIFY command as in table 5.17.2.15.1.

Table 5.17.2.15.1: Start Audio Record

Address information	Control information	Bearer information
	Transaction ID = x If context already exists: Context ID = C1 Else Context = $ If Termination exists: Termination ID = T1 Else Termination ID = $ If Stream Number specified: Stream Number If specific record file Recording File Identity = Record File Identifier If request record file indentity Recording File Identity = ? If maximum record time Maxmum Recording Length = Maximum Record Time If MRFC requires to be informed of the end of the recording :- End Of Recording Notification	

The MRFP responds as shown in table 5.17.2.15.2.

Table 5.17.2.15.2: Start Audio Record acknowledge

Address information	Control information	Bearer information
	Transaction ID = x Context ID = C1 Termination ID = T1 If local resources were provided in request: Stream Number If requested record file indentity Recording File Identity = Record File Identifier	

5.17.2.16 Stop Audio Record

This procedure is used to stop recording of audio. Note that Audio Record may also be stopped by releasing the IMS termination.

Table 5.17.2.16.1: Stop Audio Record

Address information	Control information	Bearer information
	Transaction ID = x Context ID = C1 Termination ID = T1 Stop Audio Record Indication If End of Audio Record Notification previously requested : Stop End of Record Notification If requesting recording identity Recording Identity = ?	

The MRFP responds as shown in Table 5.17.2.16.2.

Table 5.17.2.16.2: Stop Audio Record Response

Address information	Control information	Bearer information
	Transaction ID = x Context ID = C1 Termination ID = T1 If requested record file indentity Recording File Identity = Record File Identifier	

5.17.2.17 Audio Record Complete

This procedure enables the MRFP to inform the MRFC when an audio recording is complete.

The MRFP sends a NOTIFY command as in table 5.17.2.17.1.

Table 5.17.2.17.1: Audio Record Complete

Address information	Control information	Bearer information
	Transaction ID = x Context ID = C1 Termination ID = T1 End Of Recording Notification	

Address information	Control information	Bearer information
	If requested record file indentity Recording File Identity = Record File Identifier	

The MRFC responds as shown in table 5.17.2.17.2.

Table 5.17.2.17.2: Audio Record Complete Acknowledge

Address information	Control information	Bearer information
	Transaction ID = x Context ID = C1 Termination ID = T1	

5.17.2.18 Detect DTMF

This procedure is used to collect DTMF digits.

The MRFP applies the procedures defined in RFC 4733 [22] to receive DTMF digits at the user plane, however only complete single digits shall be reported, i.e. the MRFP shall wait until E-bit is set to 1 before reporting the digit to the MRFC.

The MRFC sends an ADD or MODIFY command as in Table 5.17.2.18.1.

Table 5.17.2.18.1: Detect DTMF

Address information	Control information	Bearer information
	Transaction ID = x If context already exists: Context ID = C1 Else Context = $ If Termination exists: Termination ID = T1 Else Termination ID = $ If Stream Number specified: Stream Number NotificationRequested (Event ID = x, "Report_DTMF (Digit,Timing)")	
NOTE1: Only "end tone detected" shall be requested by the MRFC. NOTE2: All digits shall be requested i.e. ToneId shall be wildcarded.		

The MRFP responds as shown in Table 5.17.2.18.2.

Table 5.17.2.18.2: Detect DTMF acknowledge

Address information	Control information	Bearer information
	Transaction ID = x Context ID = C1 Termination ID = T1 If local resources were provided in request: Stream Number	

5.17.2.19 Report DTMF

This procedure is used to notify the MRFC of detected DTMF digits.

The MRFP sends a NOTIFY command as in Table 5.17.2.19.1.

Table 5.17.2.19.1: Report DTMF

Address information	Control information	Bearer information
	Transaction ID = x Context ID = C1 Termination ID = T1 Digit Notification = digit	

The MRFC responds as shown in Table 5.17.2.19.2.

Table 5.17.2.19.2: Report DTMF Digit Acknowledge

Address information	Control information	Bearer information
	Transaction ID = x Context ID = C1 Termination ID = T1	

5.17.2.20 Stop DTMF Detection

This procedure is used to stop DTMF digit detection.

The MRFC sends a MODIFY command as in Table 5.17.2.20.1.

Table 5.17.2.20.1: Stop DTMF Detection

Address information	Control information	Bearer information
	Transaction ID = x Context ID = C1 Termination ID = T1 Stop DTMF Digit Collection	

The MRFP responds as shown in Table 5.17.2.20.2.

Table 5.17.2.20.2: Stop DTMF Digit Detection acknowledge

Address information	Control information	Bearer information
	Transaction ID = x Context ID = C1 Termination ID = T1	

5.17.2.21 ASR Request

This procedure enables the MRFC to request the MRFP to perform automatic speech recognition; an advanced interaction with the user involving guidance announcements and collection of user input via speech and also possibly DTMF. In turn, the MRFP attempts to recognize and match the detected speech to the specified grammar file and report this to the MRFC.

The MRFC sends an ADD or MODIFY command as in table 5.17.2.21.1.

Table 5.17.2.21.1: ASR request

Address information	Control information	Bearer information
	Transaction ID = x If context already exists: Context ID = C1 Else Context = $ If Termination exists: Termination ID = T1 Else Termination ID = $ If Stream Number specified: Stream Number ASR Grammar File = SRGS grammar If MRFC requires to be informed of the end of the ASR :- NotificationRequested (Event ID = x, "Notify ASR Completion (ASR Cause, recognition result, text token, result interpretation, confidence score, input time)")	

The MRFP responds as shown in table 5.17.2.21.2.

Table 5.17.2.21.2: ASR request acknowledge

Address information	Control information	Bearer information
	Transaction ID = x Context ID = C1 Termination ID = T1 If local resources were provided in request: Stream Number	

5.17.2.22 ASR Completed

This procedure enables the MRFP to inform the MRFC of the result of an ASR request.

The MRFP sends a NOTIFY command as in table 5.17.2.22.1.

Table 5.17.2.22.1: ASR Completed

Address information	Control information	Bearer information
	Transaction ID = x Context ID = C1	

Address information	Control information	Bearer information
	Termination ID = T1 ASR Cause Optionally: recognition result text token, result interpretation confidence score input time	

The MRFP responds as shown in table 5.17.2.22.2.

Table 5.17.2.22.2: ASR Completed acknowledge

Address information	Control information	Bearer information
	Transaction ID = x Context ID = C1 Termination ID = T1	

5.17.2.23 Stop ASR

This procedure is used to stop the ASR procedure.

The MRFC sends a MODIFY command as in Table 5.17.2.23.1.

Table 5.17.2.23.1: Stop ASR

Address information	Control information	Bearer information
	Transaction ID = x Context ID = C1 Termination ID = T1 Stop ASR	

The MRFP responds as shown in Table 5.17.2.23.2.

Table 5.17.2.23.2: Stop ASR acknowledge

Address information	Control information	Bearer information
	Transaction ID = x Context ID = C1 Termination ID = T1	

5.17.2.24 Start Playing Multimedia

This procedure enables a caller to be connected to a playback of previously recorded multimedia segments. This procedure is similar to that of 5.17.2.9 with the difference that multiple H.248 streams will be used to reflect the multimedia content to be played out.

The MRFC sends an ADD or MODIFY command as in Table 5.17.2.24.1.

Table 5.17.2.24.1: Start Playing Multimedia

Address information	Control information	Bearer information
	Transaction ID = x If context already exists: Context ID = C1 Else Context = $ If Termination exists: Termination ID = T1 Else Termination ID = $ If multiple media sources Stream NumberX: Media IdentifierX Stream numberY: Media IdentifierY Else Stream NumberX, Stream NumberY: Media Identifier If override multimedia format Format = Multimedia File Format If override Signal Direction Direction = Signal Direction If DTMF override Multimedia Override = DTMFTrigger If MRFC wishes to override the default number of cycles: play Cycles= iteration If MRFC wishes to override the default announcement variant: Announcement Variant If MRFC requires to be informed of the end of the multimedia play Request End Of Signal Notification	
NOTE1: Signal Direction shall be either "internal" or "external". NOTE2: Stream mode may be maintained as for the ongoing call or may be changed be restricted to "send only". NOTE3: Signal Lists shall be supported		

The MRFP responds as shown in Table 5.17.2.24.2.

Table 5.17.2.24.2: Start Playing Multimedia Acknowledge

Address information	Control information	Bearer information
	Transaction ID = x Context ID = C1 Termination ID = T1 If local resources were provided in request: Stream Number	

5.17.2.25 Stop Playing Multimedia

This procedure is used to stop an announcement. This procedure is the same as the procedure Start Playing Multimedia however the signal descriptor shall not include the started multimedia signal. Note that playing multimedia may also be stopped by releasing the IMS termination.

5.17.2.26 Playing Multimedia Completed

This procedure is used to report that a playing multimedia has ended.

The MRFP sends a NOTIFY to the MRFC as shown in table 5.17.2.26.1.

Table 5.17.2.26.1: Playing Multimedia Completed

Address information	Control information	Bearer information
	Transaction ID = x Context ID = C1 Termination ID = T1 End Of Signal Notification = Playing Multimedia Completed Cause = Announcement Cause	

The MRFC responds as shown in Table 5.17.2.26.2.

Table 5.17.2.26.2: Playing Multimedia Completed Ack

Address information	Control information	Bearer information
	Transaction ID = x Context ID = C1 Termination ID = T1	

5.17.2.27 Start Multimedia Record

This procedure enables a caller to leave/record a multimedia message. This procedure is similar to that of Audio Record (5.17.2.15) with the difference that multiple H.248 streams will be used and both audio and video codecs are specified for each participant in the conference. Any prompting "announcements" are played out in the appropriate format by the MRFP based on the fact that multimedia codecs are specified by the MRFC in the Remote Descriptor. Similarly, the MRFP records all received media streams that are consistent with the Local Descriptor of the termination.

The MRFC sends an ADD or MODIFY command as in table 5.17.2.27.1.

Table 5.17.2.27.1 – Start Multimedia Record

Address information	Control information	Bearer information

	Transaction ID = x
	If context already exists:
	  Context ID = C1
	Else
	  Context = $
	If Termination exists:
	  Termination ID = T1
	Else
	  Termination ID = $
	
	If Stream Number specified:
	  Stream Number
	
	If specific record file
	  Recording File Identity =
	Record File Identifier
	
	If override multimedia format	

Address information	Control information	Bearer information
	Format = Multimedia File Format If maximum record time Maxmum Recording Length = Maximum Record Time If MRFC requires to be informed of the end of the recording :- End Of Recording Notification If request record file indentity Recording File Identity = ?	

The MRFP responds as shown in table 5.17.2.27.2.

Table 5.17.2.27.2: Start Multimedia Record acknowledge

Address information	Control information	Bearer information
	Transaction ID = x Context ID = C1 Termination ID = T1 If local resources were provided in request: Stream Number If requested record file indentity Recording File Identity = Record File Identifier	

5.17.2.28 Stop Multimedia Record

This procedure is used to stop recording of multimedia. Note that Audio Record may also be stopped by releasing the IMS termination.

Table 5.17.2.28.1: Stop Audio Record

Address information	Control information	Bearer information
	Transaction ID = x Context ID = C1 Termination ID = T1 Stop Audio Record Indication If End of Audio Record Notification previously requested : Stop End of Record Notification If requesting recording identity Recording Identity = ?	

The MRFP responds as shown in Table 5.17.2.28.2.

Table 5.17.2.28.2: Stop Multimedia Record Response

Address information	Control information	Bearer information
	Transaction ID = x Context ID = C1 Termination ID = T1 If requested record file indentity Recording File Identity = Record File Identifier	

5.17.2.29 Multimedia Record Completed

This procedure enables the MRFP to inform the MRFC when multimedia recording is complete.

The MRFP sends a NOTIFY command as in table 5.17.2.29.1.

Table 5.17.2.29.1: Multimedia Record Completed

Address information	Control information	Bearer information
	Transaction ID = x Context ID = C1 Termination ID = T1 End Of Recording Notification If requested record file indentity Recording File Identity = Record File Identifier	

The MRFC responds as shown in table 5.17.2.29.2.

Table 5.17.2.29.2: Multimedia Record Completed Acknowledge

Address information	Control information	Bearer information
	Transaction ID = x Context ID = C1 Termination ID = T1	

5.17.2.30 Adhoc Audio Conference

This includes support for N-party conferences plus the support of audio transcoding. In this case, up to N ephemeral terminations may be placed in a context and appropriate audio transcoding performed by the MRFP between any codec differences between the terminations. In terms of the media mixing, the MRFP mixes audio from terminations N-1, N-2 etc plays to termination N and so forth.

This procedure consists of the creation of the first ephemeral termination of a conference within a context using procedure "Reserve IMS Connection Point and configure remote resources" and then subsequent parties are added using procedures "Reserve IMS Connection Point" and "Configure IMS Resources".

5.17.2.31 Multi-Media Conferencing

This is similar to audio conferencing (5.17.2.y) with the difference that multiple H.248 streams will be used and both audio and video codecs are specified for each participant in the conference. The MRFP shall only trancsode and mix between streams of the same media type.

5.17.3 Non Call Related Procedures

5.17.3.1 General

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

Table 5.17.3.1.1: MRFP Non-Call Related Procedures

Transaction defined in 3GPP TS 23.333 [25]	Support	Comment
MRFP Out of service	Mandatory	5.17.3.2
MRFP Communication Up	Mandatory	5.17.3.3
MRFP Restoration	Mandatory	5.17.3.4
MRFP Register	Mandatory	5.17.3.5
MRFP Re-register	Mandatory	5.17.3.6
MRFC Ordered Re-register	Mandatory	5.17.3.7
MRFC Restoration	Optional	5.17.3.8
MRFC Out of Service	Optional	5.17.3.9
Audit Value	Mandatory	5.17.3.10
Audit Capability	Optional	5.17.3.11
Capability Update	Optional	5.17.3.12
MRFP Resource Congestion Handling – Activate	Mandatory	5.17.3.13
MRFP Resource Congestion Handling – Indication	Mandatory	5.17.3.14
Command Rejected	Mandatory	5.17.3.14 The "Command Rejected" procedure may be used in response both to call-related and non-call-related ITU-T Recommendation H.248 Commands

5.17.3.2 MRFP Out Of Service

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

Table 5.17.3.2.1: MRFP Out Of Service Request

Address Information	Control information	Bearer information
	Transaction ID = x Context ID= - Termination ID = ROOT SC Method = FORCED or GRACEFUL SC Reason = 905 or 908	

The MRFC responds as in table 5.17.3.2.2.

Table 5.17.3.2.2: MRFP Out Of Service Request Ack

Address Information	Control information	Bearer information
	Transaction ID = x Context ID = - Termination ID = ROOT	

5.17.3.3 MRFP Communication Up

The MRFP sends a SERVICE CHANGE request command as in Table 5.17.3.3.1 to the MRFC address to which the control linkassociation was previously established.

Table 5.17.3.3.1: MRFP Communication Up

Address Information	Control information	Bearer information
	Transaction ID = x Context ID= - Termination ID = ROOT SC Method = DISCONNECTED SC Reason = 900	

The MRFC may respond as in table 5.17.3.3.2. If a response is received, the control link association is re-established and the inactivity timer would be restarted.

Table 5.17.3.3.2: Disconnected Request Ack

Address Information	Control information	Bearer information
	Transaction ID = x Context ID = - Termination ID = ROOT	

5.17.3.4 MRFP Register

The MRFP sends a SERVICE CHANGE request command as in Table 5.17.3.4.1.

Table 5.17.3.4.1: MRFP Register

Address Information	Control information	Bearer information
	Transaction ID = x Context ID= - Termination ID = ROOT SC Method = RESTART SC Reason = 900 or 902 H248 Profile Identity H248 Protocol Version	

The MRFC responds as in table 5.17.3.4.2.

Table 5.17.3.4.2: MRFP Re-Register Ack

Address Information	Control information	Bearer information
	Transaction ID = x Context ID = - Termination ID = ROOT H248 Protocol Version If applicable:- H248 Profile Identity	

5.17.3.5 MRFC Restoration

When the MRFC has recovered, the MRFP sends a SERVICE CHANGE as in Table 5.17.3.3.1,

The MRFC may respond as in Table 5.17.3.3.2.

The MRFC sends a SERVICE CHANGE as in Table 5.17.3.5.1

Table 5.17.3.5.1: MRFC Restoration

Address Information	Control information	Bearer information
	Transaction ID = x Context ID= - Termination ID = ROOT SC Method = RESTART SC Reason = 901 OR 902	

The MRFP responds as in table 5.17.3.5.2.

Table 5.17.3.5.2: MRFC Restoration Ack

Address Information	Control information	Bearer information
	Transaction ID = x Context ID = - Termination ID = ROOT	

5.17.3.6 MRFP Re-register

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

Table 5.17.3.6.1: Re-Registration

Address Information	Control information	Bearer information
	Transaction ID = x Context ID= - Termination ID = ROOT SC Method = RESTART SC Reason = 900 or 902 H248 Profile Identity H248 Protocol Version	

The MRFC responds as in table 5.17.3.6.2.

Table 5.17.3.6.2: Re-Registration Ack

Address Information	Control information	Bearer information
	Transaction ID = x Context ID = - Termination ID = ROOT H248 Protocol Version If applicable:- H248 Profile Identity	

5.17.3.7 MRFC Ordered Re-register

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

Table 5.17.3.7.1: MRFC Ordered Re-Register

Address Information	Control information	Bearer information
	Transaction ID = x Context ID= - Termination ID = ROOT SC Method = RESTART SC Reason = 901	

The MRFP responds as in table 5.17.3.7.2.

Table 5.17.3.7.2: MRFC Ordered Re-Register Ack

Address Information	Control information	Bearer information
	Transaction ID = x Context ID = - Termination ID = ROOT	

The MRFP then performs an MRFP REGISTER procedure according to Clause 5.17.3.5..

5.17.3.8 Audit Value

The MRFC sends an AUDIT VALUE request command as in Table 5.17.3.8.1.

Table 5.17.3.8.1: Audit Value

Address Information	Control information	Bearer information
	Transaction ID = x Context ID= - Termination ID = ROOT Audit Packages	

The MRFP responds as in table 5.17.3.8.2.

Table 5.17.3.8.2: Audit Value Ack

Address Information	Control information	Bearer information
	Transaction ID = x Context ID = - Termination ID = ROOT Packages List	

5.17.3.9 Audit Capabilities

The MRFC sends an AUDIT CAPABILITY request command as in Table 5.17.3.9.1.

Table 5.17.3.9.1: Audit Capability Request

Address Information	Control information	Bearer information
	Transaction ID = x Context ID= - Termination ID = ROOT Audited Capabilities	

The MRFP responds as in table 5.17.3.9.2.

Table 5.17.3.8.2.2: Audit Capability Ack

Address Information	Control information	Bearer information
	Transaction ID = x Context ID = - Termination ID = ROOT Capabilities	

5.17.3.10 Capability Update

The MRFP sends a SERVICE CHANGE request command as in Table 5.17.3.10.1.

Table 5.17.3.10.1: Capability Update

Address Information	Control information	Bearer information
	Transaction ID = x Context ID= - Termination ID = ROOT SC Method = RESTART SC Reason = 917 H248 Profile Identity H248 Protocol Version	

The MRFC responds as in table 5.17.3.10.2.

Table 5.17.3.10.2 Capability Update Ack

Address Information	Control information	Bearer information
	Transaction ID = x Context ID = - Termination ID = ROOT	

5.17.3.11 MRFC Out of Service

The MRFC sends a SERVICE CHANGE request command as in Table 5.17.3.11.1.

Table 5.17.3.11.1: MRFC Out Of Service

Address Information	Control information	Bearer information
	Transaction ID = x Context ID= - Termination ID = ROOT SC Method = FORCED or GRACEFUL SC Reason = 905	

The MRFP responds as in table 5.17.3.11.2.

Table 5.17.3.11.2: MRFC Out Of Service Ack

Address Information	Control information	Bearer information
	Transaction ID = x Context ID = - Termination ID = ROOT	

5.17.3.12 MRFP Resource Congestion Handling – Activate

The MRFC sends a MODIFY request command as in Table 5.17.3.12.1.

Table 5.17.3.12.1: MRFP Resource Congestion Handling – Activate

Address Information	Control information	Bearer information
	Transaction ID = x Context ID= - Termination ID = ROOT If required : Set Inactivity Timer Request Overload Notification	

The MRFP responds as in table 5.17.3.12.2.

Table 5.17.3.12.2: MRFP Resource Congestion Handling – Activate Ack

Address Information	Control information	Bearer information
	Transaction ID = x Context ID = - Termination ID = ROOT	

5.17.3.13 MRFP Resource Congestion Handling – Indication

The MRFP sends a NOTIFY request command as in Table 5.17.3.13.1.

Table 5.17.3.13.1: MRFP Resource Congestion Handling – Indication

Address Information	Control information	Bearer information
	Transaction ID = x Context ID= - Termination ID = ROOT Overload Notification	

The MRFC responds as in table 5.17.3.13.2.

Table 5.17.3.13.2: MRFP Resource Congestion Handling – Indication Ack

Address Information	Control information	Bearer information
	Transaction ID = x Context ID = - Termination ID = ROOT	

5.17.3.14 Command Rejected

When the procedure "Command Reject" is required the following procedure is initiated:

The MGW/MGC sends .resp to any command.req with the following information.

Table 5.17.3.14.1: NYcommand.resp (command reject) MRFP/MRFC to MRFC/MRFP

Address Information	Control information	Bearer information
	Transaction ID = z Context ID = c1 or no context Reason=Error	

Annex A (normative): The W3C SSML Profile for TTS function

A.1 Introduction

This annex contains a profile to the W3C Speech Synthesis Markup Language (SSML) specification [28].The SSML specification is a W3C Recommendation, and is designed to provide a rich, XML-based markup language for assisting the generation of synthetic speech in Web and other applications. The essential role of the markup language is to provide authors of synthesizable content a standard way to control aspects of speech such as pronunciation, volume, pitch, rate, etc. across different synthesis-capable platforms.

This annex provides a profile for SSML according to the stage 2 specification of the Mp interface. This profile is referenced by the advanced audio server base package for TTS enhancement.

A.2 TTS Profile

Table A.2.1: The profile of SSML

Element or attribute	Description	Support
speak	This is the root element that can contain text to be rendered and the following elements: **audio, break, emphasis, lexicon, mark, meta, metadata, p, phoneme, say-as, sub, s, voice**	Mandatory.
xml:lang	This attribute defines the language that applied to the element, subelements and its attributes. The **phoneme, emphasis, break, p,** and **s** elements are language specific dependent	Mandatory
xml:base	This attribute defines the base URI for resolving relative URI that may be used for the following elements: - The optional **src** attribute of **audio** element - The **uri** attribute of **lexicon** element	Optional
lexicon	An SSML document may reference one or more external pronunciation documents, the **lexicon** element is used to identified the URI of this external document. A lexicon document contains pronunciation for tokens that can appear in a text to be spoken. A **lexicon** element shall contain an uri.	Mandatory
meta and metadata	The **metadata** and **meta** elements are containers in which information about the document can be placed	Optional
p and s	A **p** element represents a paragraph and **s** element represents a sentence. The use of **p** and **s** elements is optional. Where text occurs without an enclosing p or s element the synthesis processor should attempt to determine the structure using language-specific knowledge of the format of plain text. The **p** element can only contain text to be rendered and the following elements: **audio, break, emphasis, mark, phoneme, prosody, say-as, sub, s, voice.** The **s** element can only contain text to be rendered and the following elements: **audio, break, emphasis, mark, phoneme, prosody, say-as, sub, voice**.	Optional

say-as	The **say-as** element allows the author to indicate information on the type of text construct contained within the element and to help specify the level of detail for rendering the contained text. For example for English when "$200" appears in a document it may be spoken as "two hundred dollars", similarly, "1/2" may be spoken as "half", "one of two".. Defining a comprehensive set of text format types is difficult because of the variety of languages that have to be considered and because of the innate flexibility of written languages. SSML only specifies the **say-as** element, its attributes, and their purpose. It does not enumerate the possible values for the attributes. The Working Group expects to produce a separate document that will define standard values and associated normative behavior for these values. The **say-as** element has three attributes: interpret-as, format and detail The **say-as** element can only contains text to be rendered	Optional
phoneme	The phoneme element provides a phonemic/phonetic pronunciation for the contained text. The **ph** attribute is a required attribute that specifies the phoneme/phone string. The **alphabet** attribute is an optional attribute that specifies the phonemic/phonetic alphabet. An alphabet in this context refers to a collection of symbols to represent the sounds of one or more human languages. The only valid values for this attribute are "**ipa**" (see the next paragraph) and vendor-defined strings of the form "**x-organization**" or "**x-organization-alphabet**". Example: <phoneme alphabet="ipa" ph="təmei̥ɾou̥"> tomato </phoneme>	Optional
sub	The **sub** element is employed to indicate that the text in the alias attribute value replaces the contained text for pronunciation. The required alias attribute specifies the string to be spoken instead of the enclosed string. The sub element can only contain text (no elements). Example: _{W3C}	Optional
Voice	The **voice** element indicates the characteristics of the voice rendering. The **voice** element is commonly used to change the language The following attributes are used: - gender: male, female or neutral - age - variant: indicates a preferred variant of the other voice characteristics - name indicates the processor-specific voice name	Optional
emphasis	The **emphasis** element requests that the contained text be spoken with emphasis (also referred to as prominence or stress). the optional level attribute indicates the strength of emphasis to be applied. Defined values are "strong", "moderate", "none" and "reduced". The **emphasis** element can only contain text to be rendered and the following elements: audio, break, emphasis, mark, phoneme, prosody, say-as, sub, voice.	Optional
break	The **break** element is an empty element that controls the pausing or other prosodic boundaries between words. The **break** element is most often used to override the typical automatic behaviour	Optional

of a synthesis processor.

The following attributes are used on the break element:

- **strength: "none", "x-weak", "weak" "medium", "strong", or "x-strong"**. It indicates the strength of the prosodic break in the speech output. For example, the breaks between paragraphs are typically much stronger than the breaks between words within a sentence.
- **Time**: the time attribute is an option attribute indicating the duration of a pause to be inserted in the output in seconds or milliseconds e.g. "250ms", "3s"

prosody	The **prosody** element permits control of the pitch, speaking rate and volume of the speech output, the optional attributes are: - **pith**: this attribute indicates the baseline pitch. legal value are: a number followed by "Hz", a relative change (+10Hz or +5st, a semitone is half of a tone on the standard diatonic scale), or a "x-low", "low", "medium", high", x-high", or "default". The exact meaning of baseline pitch may vary across synthesis processors - **pitch contour**: the pitch contour is a set of the form (time position,target), the first value is a percentage of the period of the contained text (a number followed by "%") and the second value is the value of the pitch attribute. e.g. (20%,"+10Hz) (40%, "+20Hz) means increase the pitch of 10Hz at 20% of the period of the contained text and 20Hz at 40% of the text duration. - **Range**: the pitch range although the exact meaning may vary across synthesis processor. The same value as for pitch are legal value from SSML. - **Rate**: change the speaking rate. Legal values are: a relative change or **"x-slow", "slow", "medium", "fast", "x-fast" or "default"**. - **Duration**: a value in seconds or milliseconds for the desired time to take to read the element contents. - **Volume**: the volume for the contained text in the range 0.0 to 100.0. Legal values are: a number, a relative change or **"silent", "x-soft", "soft", "medium", "loud", "x-loud", or "default".**	Optional
audio	The **audio** element supports the insertion of recorded audio files.	Optional
Mark	The **mark** element is an empty element that places a marker into the text/tag sequence that the environment will be informed to detect the corresponding position within the rendered output and may report an event when encountered. This element has a **name** attribute.	Optional
Desc	The **desc** element can only occur within the content of the audio element. It describes the textual content of the audio source that may be used when text-only output is being produced by the synthesis processor.	Optional

Annex B (normative): The W3C SRGS Profile for ASR function

B.1 Introduction

This annex contains a profile to the W3C Speech Recognition Grammar Specification (SRGS) [29]. The SGRS are intended for use by speech recognizers and other grammar processors so that developers can specify the words and patterns of words to be listened for by a speech recognizer.

This annex provides a profile for SRGS according to the stage 2 specification of the Mp interface. This profile is referenced by the ASR Package.

B.2 SRGS Profile

Table B.2.1: The profile of SRGS

Declaration Item	Description	Support or not
Language	The **language** declaration of a grammar provides the language identifier that indicates the primary language contained by the document and optionally indicates a country or other variation. Additionally, any legal rule expansion may be labeled with a language identifier. The language declaration is required for all speech recognition grammars.	Mandatory
Mode	The mode of a grammar indicates the type of input that the user agent should be detecting. The default mode is "**voice**" for speech recognition grammars. An alternative input mode is "**dtmf**" input. For the Mp interface, only voice mode is supported.	Mandatory
Root rule	Both the XML Form and ABNF Form permit the grammar header to optionally declare a single rule to be the root rule of the grammar. The rule declared as the root rule must be defined within the scope of the grammar. The rule declared as the root rule may be scoped as either **public** or **private**.	Mandatory
Tag format	The **tag-format** declaration is an optional declaration of a tag-format identifier that indicates the content type of all rule tags and header tags contained within a grammar. The tag-format identifier is a URI. It is recommended that the tag format identifier indicate both the content type and a version. Tags typically contain content for a semantic interpretation processor and in such cases the identifier, if present, should indicate the semantic processor to use. Tag-format identifier values beginning with the string "semantics/x.y" (where x and y are digits) are reserved for use by the W3C Semantic Interpretation for Speech Recognition specification [SEM] or future	Mandatory

versions of the specification.

Base URI	Relative URIs are resolved according to a base URI, which may come from a variety of sources. The base URI declaration allows authors to specify a document's base URI explicitly. The path information specified by the base URI declaration only affects URIs in the document where the element appears. The base URI declaration is permitted but optional in both the XML Form and the ABNF Form.	Optional
Pronounciation lexicon	A grammar may optionally reference one or more external pronunciation lexicon documents. A lexicon document is identified by a URI with an optional media type. The pronunciation information contained within a lexicon document is used only for tokens defined within the enclosing grammar. The W3C Voice Browser Working Group is developing the Pronunciation Lexicon Markup Language [LEX]. The specification will address the matching process between tokens and lexicon entries and the mechanism by which a speech recognizer handles multiple pronunciations from internal and grammar-specified lexicons. Pronunciation handling with proprietary lexicon formats will necessarily be specific to the speech recognizer. Pronunciation lexicons are necessarily language-specific. Pronunciation lookup in a lexicon and pronunciation inference for any token may use an algorithm that is language-specific. (See Section 2.1 for additional information on token handling and pronunciations.)	Mandatory
Metadata	Grammar documents let authors specify metadata — information about a document rather than document content — in a number of ways. A **meta** declaration in either the ABNF Form or XML Form may be used to express metadata information in both XML Form and ABNF Form grammars or to reference metadata available in an external resource. The XML Form also supports a **metadata** element that provides a more general and powerful treatment of metadata information than **meta**. Since **metadata** requires an XML metadata schema which cannot be expressed in ABNF, there is no equivalent of **metadata** in the ABNF Form of grammars.	Not Applicable
Tag	A grammar may optionally specify one or more **tag** declarations in the header. The content of a **tag** in the header, just like a tag in rule expansions, is an arbitrary string which may be used for semantic interpretation.	Mandatory

Annex C (informative): Change history

Change history							
Date	**TSG #**	**TSG Doc.**	**CR**	**Rev**	**Subject/Comment**	**Old**	**New**
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History

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