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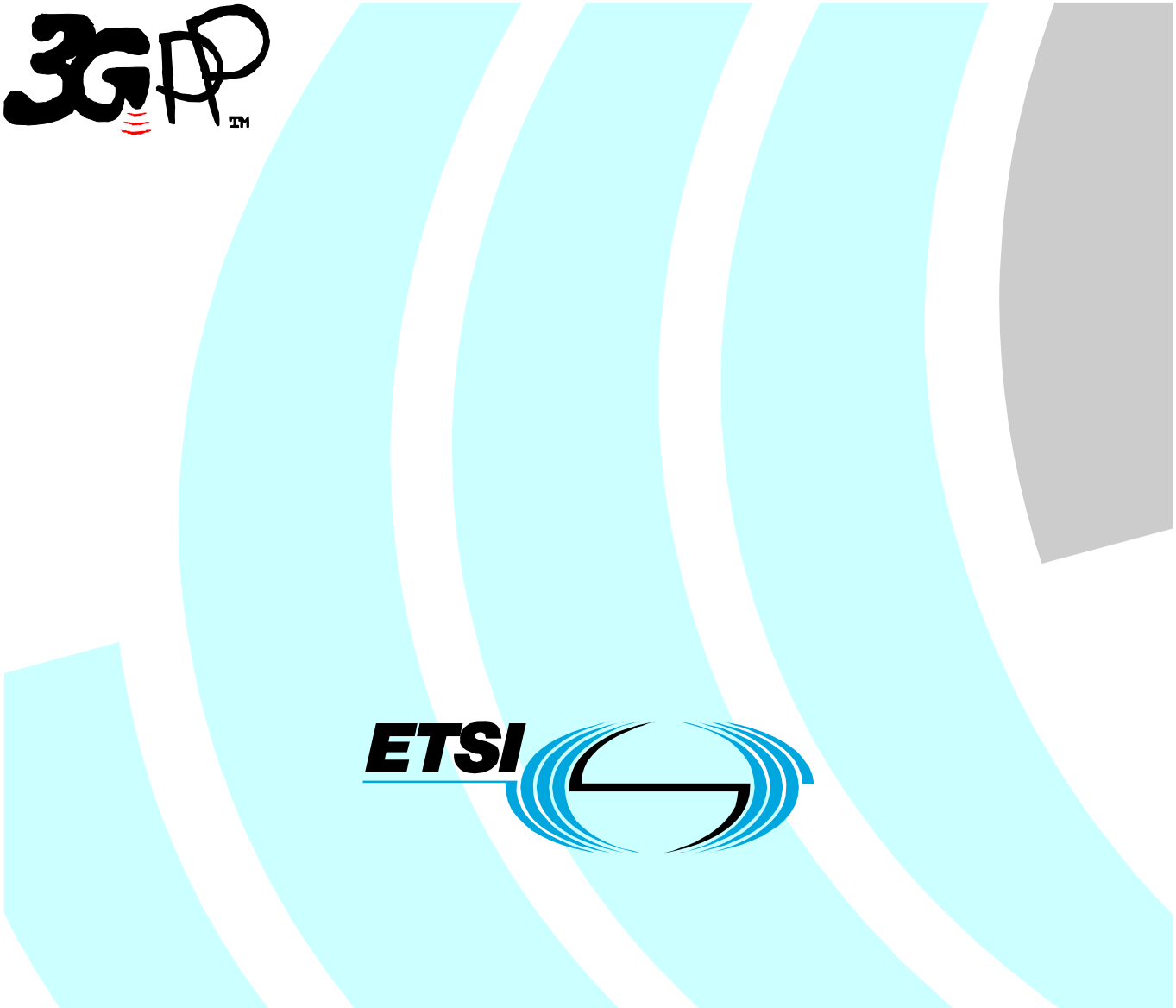
Technical Specification

Universal Mobile Telecommunications System (UMTS);
Multimedia Resource Function Controller (MRFC) -
Multimedia Resource Function Processor (MRFP)
Mp interface;
Procedures descriptions
(3GPP TS 23.333 version 7.2.0 Release 7)



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650 Route des Lucioles
F-06921 Sophia Antipolis Cedex - FRANCE

Tel.: +33 4 92 94 42 00 Fax: +33 4 93 65 47 16

Siret N° 348 623 562 00017 - NAF 742 C
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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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1 Scope

This specification describes the functional requirements and information flows that generate procedures between the Multimedia Resource Function Controller (MRFC) and the Multimedia Resource Function Processor (MRFP), the Mp Interface.

This specification is limited to information flows relevant to the Mp Interface; in order to define these procedures and make the functional requirements clear some triggers from an external interface may be described; these may be specified within the Mr interface for example or within an AS in which the MRFC function resides. However for the overall stage 2 procedures of IMS see 3GPP TS 23.228 [1].

The protocol on the Mp interface is defined to comply with ITU-T H.248.1 Gateway Control Protocol; see [3].The goal of this specification is to provide the input to defining a formal Profile within the H.248 protocol toolbox specifically for the Mp application.

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] 3GPP TS 24.147 "Conferencing using the IP Multimedia (IM) Core Network (CN) subsystem; Stage 3".

[5] 3GPP TS 26.244: "Transparent end-to-end packet switched streaming service (PSS); 3GPP file format (3GP) ".

[6] 3GPP TR 21.905: "Vocabulary for 3GPP Specifications".

[7] 3GPP TS 23.205: "Bearer independent circuit-switched core network; Stage 2".

[8] 3GPP TS 26.235: "Packet switched conversational multimedia applications; Default codecs".

[9] 3GPP TS 29.163: "Interworking between the IP Multimedia (IM) Core Network (CN) subsystem and Circuit Switched (CS) networks"

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

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

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

[13] W3C Recommendation (September 2005): "Extensible MultiModal Annotation markup language (EMMA) (draft work in progress)"

[14] 3GPP TS 32.260: "Telecommunication management; Charging management; IP Multimedia Subsystem (IMS) charging".

[15] W3C Recommendation (November 2000): "Natural Language Semantics Markup Language (NLSML) for the Speech Interface Framework "

[16] 3GPP TS 29.333: " Multimedia Resource Function Controller (MRFC) – Multimedia Resource Function Processor (MRFP) Mp Interface - Stage 3 "

3 Definitions, symbols and abbreviations

3.1 Definitions

For the purposes of the present document, the terms and definitions given in 3GPP TR 21.905 [6] and the following apply. A term defined in the present document takes precedence over the definition of the same term, if any, in 3GPP TR 21.905 [6].

Media Gateway: See Recommendation H.248.1 [3].
Media Gateway Controller: See Recommendation H.248.1 [3].
Multimedia Resource Function Controller: See 3GPP TS 23.228 [1].
Multimedia Resource Function Processor: See 3GPP TS 23.228 [1].

3.2 Symbols

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

Mr Interface between the MRFC and S-CSCF
Mp Interface between the MRFC and MRFP
Mb Interface between MRFP and the other bearer entity

3.3 Abbreviations

For the purposes of the present document, the abbreviations given in 3GPP TR 21.905 [6] and the following apply. An abbreviation defined in the present document takes precedence over the definition of the same abbreviation, if any, in 3GPP TR 21.905 [6].

ASR Automatic Speech Recognition
DTMF Dual Tone Multi Frequency
EMMA Extensible MultiModal Annotation markup language
IP Internet Protocol
MGW Media Gateway
MGC Media Gateway Controller
MRFC Multimedia Resource Function Controller
MRFP Multimedia Resource Function Processor
NLSML Natural Language Semantics Markup Language
SDP Session Description Protocol
SIP Session Initiation Protocol
SRGS Speech Recognition Grammar Specification
SSML Speech Synthesis Markup Language
TTS Text to Speech
VXML Voice Extensible Markup Language

4 Architecture

The architecture concerning the Multimedia Resource Function is presented in Figure 4.1 below.

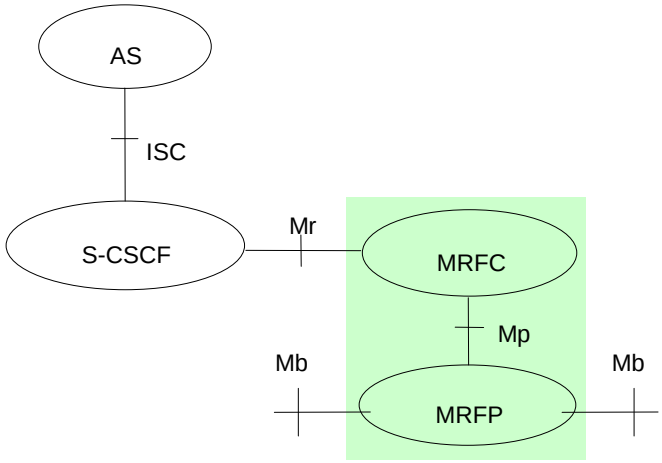

Figure 4.1: Architecture of MRF

The scope of this specification is limited to the area shown within the green shading.

The MRF is split into Multimedia Resource Function Controller (MRFC) and Multimedia Resource Function Processor (MRFP).

Tasks of the MRFC may consist of the following:

- Control the media stream resources in the MRFP.
- Interpret information coming from an AS and S-CSCF (e.g. session identifier) and control MRFP accordingly.
- Generation of CDRs.

Tasks of the MRFP may consist of the following:

- Control of the bearer on the Mb reference point.
- Provide resources to be controlled by the MRFC.
- Mixing of incoming media streams (e.g. for multiple parties).
- Media stream source (e.g. for multimedia announcements).
- Media stream processing (e.g. audio transcoding, media analysis).

The Mp reference point allows an MRFC to control media stream resources provided by an MRFP.

5 Functional Requirements

5.1 General

All functions are optional. Within a given function some components and procedures might be optional to still support the function but some will be required. Normative text in the following sections thus describes requirements for support within an optional feature where it is desired to differentiate between optional and mandatory parts of the feature.

5.2 Play Tone

The MRFC shall request the MRFP to send tones to one, one of several, multiple or all parties connected in a call/session with a given tone identifier for each specific tone.

The MRFC may request the tone to be played continuously until requested to be stopped.

The MRFC may include in the request the length of time that the tone shall be played; the duration may be provisioned.

The MRFC may then request a notification from the MRFP when the tone is completed.

The MRFC may request DTMF detection while playing a tone.

The MRFC may request that upon DTMF detection the MRFP stops playing a tone.

5.3 Play Announcement

The function of playing announcement is to play audio media streams to the subscriber. The function can be used in services such as audio announcements, mail box services, play back recorded audio etc.

The MRFC shall request the MRFP to play announcements to one, one of several, multiple or all parties connected in a call/session.

The announcement may be referenced by identifiers that may be pre-configured, or dynamically obtained from the same MRFP for example due to Audio Record.

The MRFC shall request sequences of predefined fixed announcements within one request to the MRFP.

The MRFC may request announcements to be played in a loop until it commands the MRFP to stop.

The MRFC may request the MRFP to play an announcement for a fixed number of times.

The MRFC may request DTMF detection while playing an announcement.

The MRFC may request the MRFP to stop playing an announcement when a DTMF digit is detected.

The MRFC may request the MRFP to add the following variants to the announcements:

- Date/Day/Month
- Time
- Digits (the announcement may contain a number of digits to be controlled by the MRFC for example a telephone number)
- Money (currency)
- Integer (a value within the announcement that is controlled by the MRFC, e.g. "you are caller number 3 in the queue")
- Variants may have predefined default values for a given network.

The MRFC may request the MRFP to indicate when a specific announcement previously requested has been played successfully.

The MRFP shall indicate error cases such as announcement not played successfully.

5.4 Text to Speech

TTS (Text To Speech) is the process of automatic generation of speech output from text or annotated text input.

The MRFC shall request the MRFP to play the text to one, one of several, multiple or all parties connected in a call/session.

The text format shall comply with the SSML format as specified in [11].

The MRFC shall extract the SSML script from the VXML or other format XML script if received

If the received text is another format than SSML, the MRFC shall generate a SSML script that may include the basic SSML text and the language type.

The MRFC shall indicate to the MRFP the text-to-speech, by sending the SSML script or sending an URI reference to this SSML script.

If the MRFC indicates the SSML script to the MRFP, the SSML text is sent inline in a H.248 command of Mp; the size shall be limited to avoid the segmentation in the Mp interface. The MRFC may remove unnecessary elements, such as the comments element, from the SSML document, providing that the result is a Conforming Speech Synthesis Markup Language Fragment as described in section 2.2.1 of SSML ref [11]. This is however outside the scope of the current Mp specification work. If the SSML script size pre-processed results in segmentation in the Mp interface, the URI reference should be used.

When the MRFC indicates the SSML script using an URI reference to the MRFP, two options can exist:

- the file (referenced by the URI) is located in the MRFP and it is a SSML text, hence the MRFP should play the text;
- the file (referenced by the URI) is located outside the MRFP; the MRFP may fetch the text and play it to the user otherwise the MRFP indicates an error.

The MRFP shall execute the basic SSML elements and may ignore the SSML elements not supported. The basic SSML elements include the root element "speak", language type and spoken text.

The MRFC may request the MRFP to play a text in a loop until it commands the MRFP to stop.

The MRFC may request the MRFP to play a text for a fixed number of times.

The MRFC may request DTMF detection while playing a text.

The MRFC may request the MRFP to stop playing a text when a DTMF digit is detected.

The MRFC may request the MRFP to indicate when a text has been played successfully.

The MRFP shall indicate error cases such as text not played successfully. Ignoring a non-supported SSML element shall not result in an error.

5.5 Audio Record

The function requirement of audio record is to record the audio media stream(s) and store it into a file. The function can be used in some services, such as the voice mail box service, conference service, etc.

The MRFC shall request the MRFP to start the audio record from one or all parties connected in a call/session. If it is to record one party in a call/session, only the input stream of the party is recorded. If it is to record all parties in a call/session, the mixed stream of all parties is recorded.

The MRFP file format shall comply with the 3GPP multimedia file formats as specified in the 3GPP TS 26.244[5].

The MRFC may request the MRFP to detect the DTMF digit while recording an audio.

The MRFC may request the MRFP to stop recording and still retain the recording file.

The MRFC may indicate to the MRFP the file format and the URI to store the recorded file or request the MRFP to return the record file URI.

The MRFC may indicate to the MRFP the maximum record time.

The MRFC shall request the MRFP to indicate the result and the cause of record completion when an audio has been recorded successfully.

The MRFP shall indicate error cases such as audio not recorded successfully.

The MRFC may indicate the MRFP to execute other functions, such as playing an announcement, when the MRFP is recording audio.

5.6 DTMF Collection

The MRFC shall request the MRFP to detect and report the DTMF digits.

The MRFP shall report DTMF Digits detected as RTP Telephony Events (see IETF RFC 2833 [10]) if the Telephony Event for DTMF Payload Type has been assigned to that interface. The MRFP shall report only single DTMF Digits.

5.7 Automatic Speech Recognition

ASR (Automatic Speech Recognition) function is that the recognizer processes the user input voice and may match that input against a target data to produce a recognition result that represents the detected input. In the IMS, the MRFP acts as the recognizer that is under control of the MRFC and finish the function of recognition.

The MRFC shall request the MRFP to start the automatic speech recognition.

The MRFC shall extract the SRGS recognition grammar script or URI from the VXML script if received or other format XML script if received.

The grammar format shall comply with the SRGS format as specified in W3C Recommendation [12].

The MRFC shall indicate the SRGS script or the SRGS URI to the MRFP using H.248 packages. If the SRGS script is sent inline,. the size of the SRGS script shall be limited to avoid segmentation in the Mp interface.

The MRFC may indicate to the MRFP the recognition mode: Normal Recognition Mode or Hotword Recognition Mode.

- If the MRFC indicates the Normal Recognition Mode to the MRFP, the MRFP shall attempt to match all of the speech against a recognition grammar and returns a no-match status if the input fails to match or the method times out.
- If the MRFC indicates the Hot-word Recognition Mode to the MRFP, the MRFP shall look for a match against specific speech grammar and ignores speech that does not match. The recognition completes only for a successful match of the recognition grammar or if the subscriber cancels the request or if the recognition time elapses.

The MRFP shall execute the recognition against the SRGS grammar and may ignore SRGS elements which are not supported.

The MRFC may request DTMF detection while executing ASR.

The MRFC may request the MRFP to stop ASR when a DTMF digit is detected.

The MRFC may request the MRFP to indicate when a specific ASR has been completed successfully.

When ASR is completed successfully, the MRFP may notify the MRFC the recognition result.

The recognition result shall comply with a single recognition format (e.g. the EMMA format as specified in W3C Recommendation [13] or the NLSML format as specified in W3C Recommendation [15]).

NOTE: The mandatory recognition result format may be defined in Stage 3 specification 3GPP TS 29.333 [16].The MRFP may notify the MRFC multiple recognition results that are mutually exclusive. Each result may be structured by multiple parts in time sequence with the input time, may include the text token that the value will correspond to tokens as defined by the SRGS grammar, may include the interpretation of application specific markup, may include the confidence score that represents the recognition quality.

The MRFP shall indicate error cases such as ASR not executed successfully.

5.8 Play Multimedia

The function of playing multimedia is to play synchronized audio and video media streams to the subscriber. The function can be used in the services, such as multimedia announcement, multimedia mail box service, etc.

The MRFC shall request MRFP to play multimedia to one, one of several, multiple or all parties connected in a call/session.

The multimedia to be played may be referenced by pre-configured identifiers or by reference to a file (location).

The MRFC shall request sequences of predefined fixed multimedia announcements within one request to the MRFP.

The MRFP multimedia file format shall comply with the 3GPP multimedia file formats as specified in the 3GPP TS 26.244[5].

The MRFP may transcode the input codec into the session codec, if the multimedia file provides a different audio or video codec with the session codec.

The MRFC may request MRFP to play multimedia in a loop until it commands the MRFP to stop.

The MRFC may request the MRFP to play multimedia for a fixed number of times.

The MRFC may request DTMF detection while playing multimedia.

The MRFC may request the MRFP to stop playing multimedia when a DTMF digit is detected.

The MRFC may indicate to the MRFP the multimedia file identifier and file format.

The MRFC may request the MRFP to indicate when a specific multimedia previously requested has been played successfully.

The MRFC may be able to decouple the play audio and play video request to the MRFP via separate sources for each media.

The MRFP shall indicate error cases such as multimedia not played successfully.

5.9 Multimedia Record

The function of the multimedia record is to record the synchronized audio and video media stream(s) and store into a multimedia file. The multimedia record function can be used in the services, such as multimedia mail box service, multimedia conference, etc.

The MRFC shall request the MRFP to start the multimedia record to one or all parties connected in a call/session. If it is to record one party in a call/session, only the input stream of the party shall be recorded.

If it is to record all parties in a call/session, the mixed stream of all parties shall be recorded.The MRFC may request the MRFP to detect the digit while recording a multimedia.

The MRFP multimedia file format shall comply with the 3GPP multimedia file formats as specified in the 3GPP TS 26.244[5].

The MRFC may request the MRFP to detect DTMF digits while recording multimedia.

The MRFC may request the MRFP to stop recording and still retain the recording file .

The MRFC may indicate to the MRFP the file format and URI to store the recorded file or request the MRFP to return the URI.

The MRFC may indicate to the MRFP the maximum record time.

The MRFC may request the MRFP to indicate the result and the cause of record completion when a multimedia has been recorded successfully.

The MRFP shall indicate error cases such as multimedia not recorded successfully.

The MRFC may indicate the MRFP to execute other functions, such as playing an announcement, when the MRFP is recording multimedia.

5.10 Audio Conference

Audio conferences allow users participating in the conference to communicate with all other participants simultaneously.

The details for conferencing within the IP Multimedia Core Network subsystem (IMS) are specified in 3GPP TS 24.147 [4].

NOTE: Floor Control is out of the scope of this release of Mp interface.

The conference mixer is located in the MRFP.

The MRFC shall request the MRFP to create resources for an audio conference.

The MRFC may indicate the maximum number of parties in the conference; this solution is FFS.

The MRFC shall create resources for users to join an existing conference, and to release resources for users to leave an existing conference.

The MRFC may request the MRFP to collect DTMF (according to clause5.5), play tones (according to clause 5.1) or announcements (according to clause 5.2), or record the audio during the conference (according to 5.4).

The MRFP may support transcoding between different users

5.11 Multimedia Conference

Multimedia conferences allow users participating in the conference to communicate with all other participants simultaneously using voice and video.

The details for conferencing within the IP Multimedia Core Network subsystem (IMS) are specified in 3GPP TS 24.147 [4].

NOTE: Floor Control is out of the scope of this release of Mp Interface.

The conference mixer is located in the MRFP.

The MRFC shall request the MRFP to create resources for a multimedia conference.

The MRFC may indicate the maximum number of parties in the conference; this solution is FFS.

The MRFC shall create resources for users to join an existing conference, and to release resources for users to leave an existing conference.

The MRFC may indicate to the MRFP to collect the DTMF (according to clause 5.5), play multimedia (according to clause 5.7), or record the multimedia (according to clause 5.8) during the conference.

The MRFP may support audio transcoding between different users.

The MRFP may support video transcoding between different users.

The MRFC may indicate to the MRFP to modify the media attribute, including:

- To create the video stream or close the video stream.
- To modify the codec of audio or video.

5.12 Audio Transcoding

The MRFP shall support audio transcoding between streams of two Terminations within the same context where the streams are encoded differently, in accordance with standard H.248.1 principles, see ITU-T H.248.1 [3]. As minimum

requirement the MRFP shall support the default 3GPP audio codec AMR (narrowband), and optionally any other audio codecsas specified in 3GPP TS 26.235 [8].

5.13 Video Transcoding

The MRFP shall support video transcoding between streams of two Terminations within the same context where the streams are encoded differently, in accordance with standard H.248 principles, see ITU-T H.248.1 [3]. As minimum

requirement the MRFP shall support the default 3GPP video codec H.263, and optionally any other video codecs as specified in 3GPP TS 26.235 [8].

6 MRFC-MRFP Procedures

6.1 Non-Call Related Procedures

6.1.1 General

The non-call related procedures are based on corresponding procedures of 3GPP TS 23.205[7] when the MRFC takes the place of the MSC server and the MRFP takes the place of the MGW.

6.1.2 MRFP Unavailable

The MRFC recognises that the MRFP is unavailable in the following 4 cases:

1. The signalling connection is unavailable

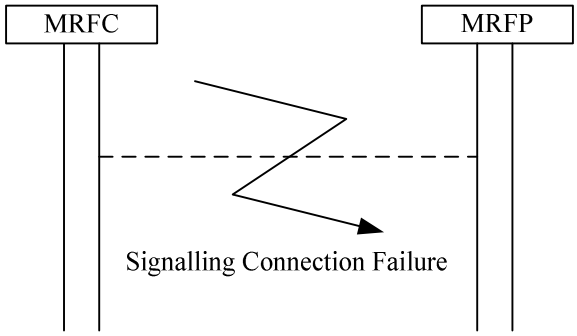

Figure 6.1.2.1: Signalling connection failure

2. The MRFP indicates the failure condition to all connected MRFCs

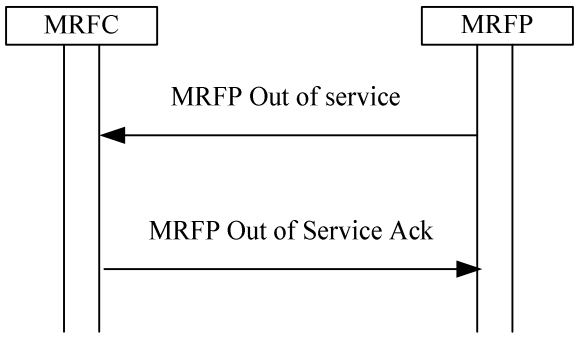

Figure 6.1.2.2: MRFP indicates the Failure/Maintenance locking

The failure indication indicates that the MRFP will soon go out of service and that no new connections should be established using this MRFP. The MRFP can choose between the "graceful" and the "forced" method. In the graceful method the connections are cleared when the corresponding calls are disconnected. In the forced method all connection are cleared immediately.

3. The MRFC recognises that the MRFP is not functioning correctly, e.g. because there is no reply on periodic sending of Audits. The periodic sending of Audits by MRFC should persist.

4. The MRFP indicates the maintenance locking condition to all concerned MRFCs.

The maintenance locking indication indicates that the MRFP is locked for new calls and that no new connections shall be established using this MRFP. The MRFP can choose between the "graceful" and the "forced" method. In the graceful method the connections are cleared when the corresponding calls are disconnected. In the forced method all connection are cleared immediately

In all of the above cases the MRFC shall prevent the usage of the MRFP until the MRFP has recovered or the communication with the MRFP is restored.

6.1.3 MRFP Available

The MRFC discovers that the MRFP is available when it receives an MRFP Communication Up message or an MRFP Restoration message. When the MRFC discovers that the MRFP is available the following shall occur:

1. Signalling recovery

The MRFP indicates to all connected MRFCs that the signalling connection is restored.

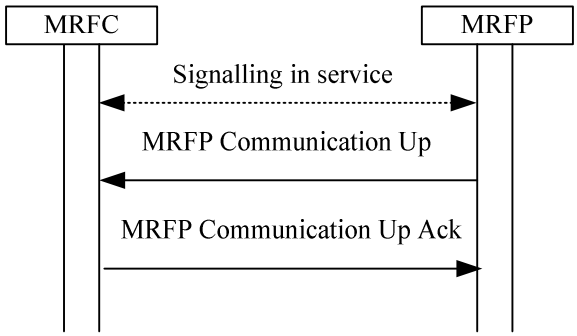

Figure 6.1.3.1: Communication goes up

2. MRFP restoration/maintenance unlocking indication.

The MRFP indicates to all connected MRFCs that normal operation has resumed.

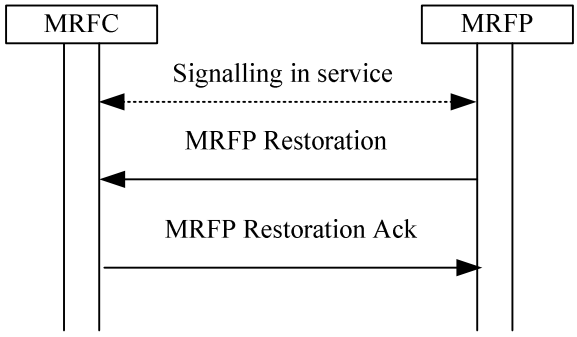

Figure 6.1.3.2: MRFP indicates recovery from a failure/or maintenance unlocking

NOTE: This procedure may be used after recovery from a signalling failure.

3. The MRFC recognises that the MRFP is now functioning correctly, e.g. because there is a reply on periodic sending of Audits.

After this the MRFC can use the MRFP. If none of 1,2, or 3 happens the MRFC can initiate the MRFC Ordered Re-register procedure**.**

6.1.4 MRFP Recovery

If the MRFP recovers from a failure, is maintenance unlocked, or it has been restarted, it registers to its known MRFCs using the MRFP Restoration procedure or the MRFP Registration procedure. The MRFP can indicate whether the Service has been restored or whether it has restarted with a cold or warm boot. The response sent to the MRFP indicates a signalling address to be used by the MRFP.

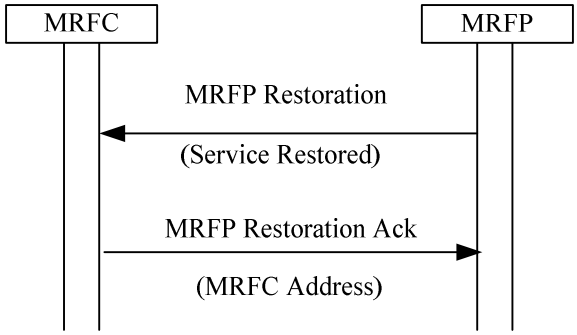

Figure 6.1.4.1: MRFP Restoration

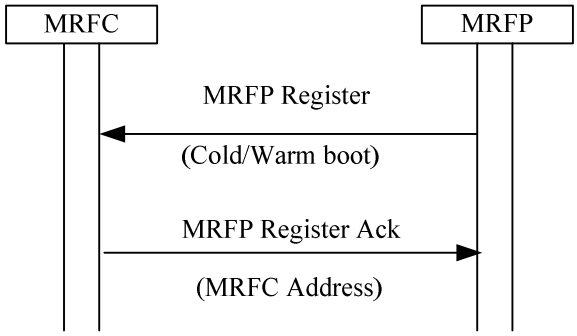

Figure 6.1.4.2 MRFP Registration

After the recovery the MRFC can use the MRFP.

6.1.5 MRFC Recovery

6.1.5.1 General

If an MRFP-unavailable condition is provoked by a failure/recovery action, the MRFC recovery sequence will, from an information flow point of view, look like MRFP unavailable and then MRFP available. If an MRFP-unavailable condition is not provoked, the MRFC recovery sequence will look like MRFP available.

After the information flow, the terminations affected by the recovery action are released.

6.1.5.2 MRFC Restoration

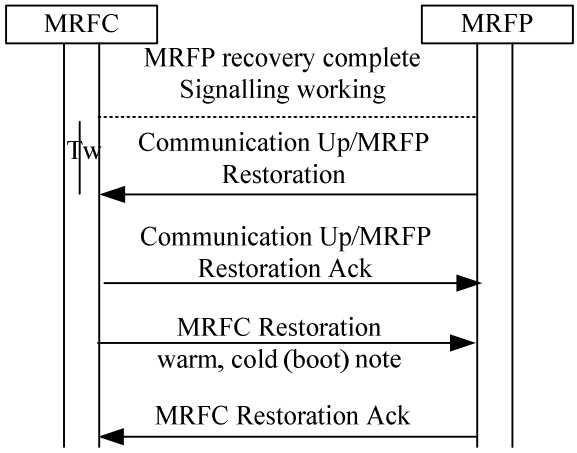

Figure 6.1.5.2.1: MRFC Restoration

NOTE: Normal release procedure may also be initiated.

After the recovery action is complete and it is possible to signal to the MRFP the MRFC starts a timer Tw. If recovery indications are not received (MRFP Communication Up or MRFP Restoration) from the MRFP during Tw an Audit is sent. If the MRFC receives a recovery indication or MRFP communication up indication, it shall acknowledge the indication before the MRFC Restoration may be sent or the release procedure is initiated.

6.1.6 MRFP Re-register

When the MRFC requests an MRFP to perform a registration (see clause 6.1.7), the MRFP performs a re-registration to the MRFC which is defined in the MRFC address.

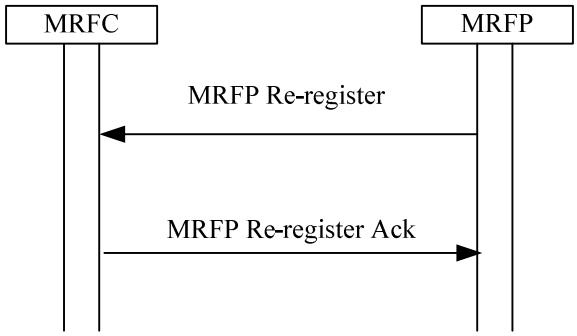

Figure 6.1.6.1: Re-registration of an MRFP

6.1.7 MRFP Re-registration Ordered by MRFC

If the MRFC knows that communication is possible, but the MRFP has not registered, the MRFC can order re-registration of the MRFP.

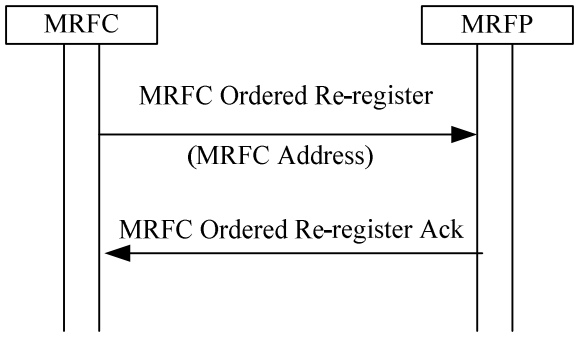

Figure 6.1.7.1: Re-registration ordered by the MRFC

If the re-registration request is accepted the MRFP uses the MRFP Re-register procedure to register with the MRFC.

6.1.8 Audit of MRFP

6.1.8.1 Audit of Value

The MRFC may request the MRFP to report the current values assigned to distinct objects in the MRFP.

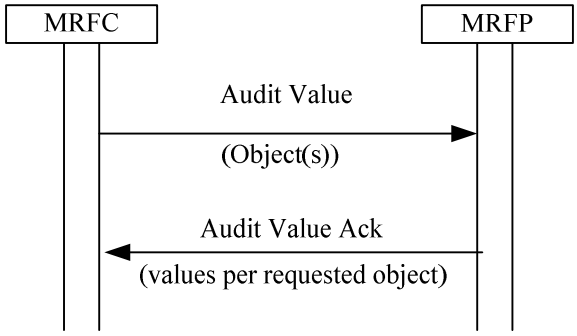

Figure 6.1.8.1.1: Audit Value

6.1.8.2 Audit of Capability

The MRFC may request the MRFP to report the capabilities of distinct objects in the MRFP.

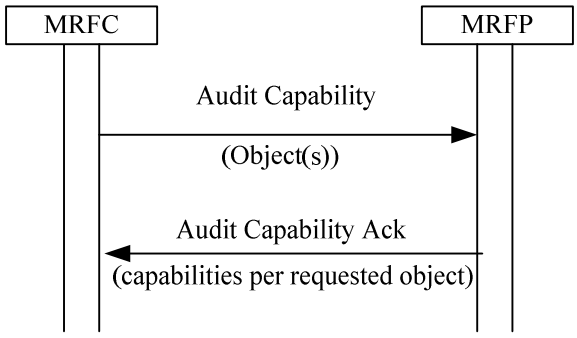

Figure 6.1.8.2.1: Audit Capability

6.1.9 MRFP Capability Change

The MRFP reports a change of capability of distinct objects in the MRFP.

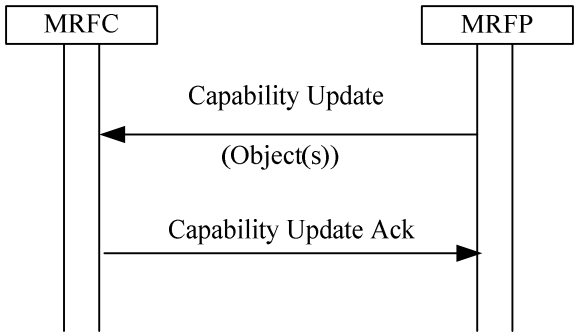

Figure 6.1.9.1: Capability Update

The MRFC can use the Audit Value and/or Audit Capability procedures to obtain further information, about the objects whose capabilities have changed.

6.1.10 MRFC Out of service

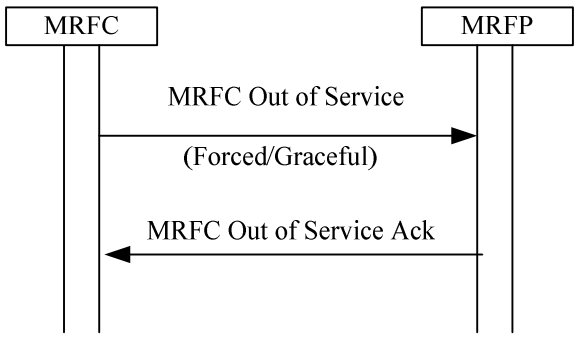

Figure 6.1.10.1: MRFC Out of Service

If an MRFC discovers that it wants to go out of service it starts an MRFC Out of Service procedure. The MRFC can indicate whether it requires the context to be cleared immediately (forced) or cleared when all terminations are released.(Graceful)

6.1.11 MRFP Resource Congestion Handling – Activate

When the MRFC requires that an MRFP congestion notification mechanism be applied in the MRFP, the MRFC shall use the MRFP Resource Congestion Handling - Activate procedure towards the MRFP.

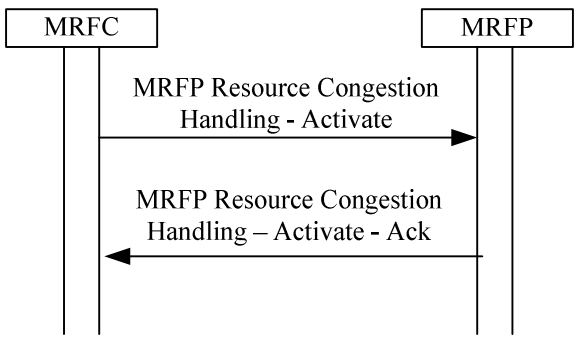

Figure 6.1.11.1: MRFP Resource Congestion Handling - Activate

6.1.12 MRFP Resource Congestion Handling -Indication

When the MRFC receives a load reduction notification from the MRFP via the MRFP Resource Congestion Handling - Indication procedure, the MRFC tries to reduce the processing load that the MRFC creates on the MRFP. The MRFP shall decide the actual level of traffic reduction.

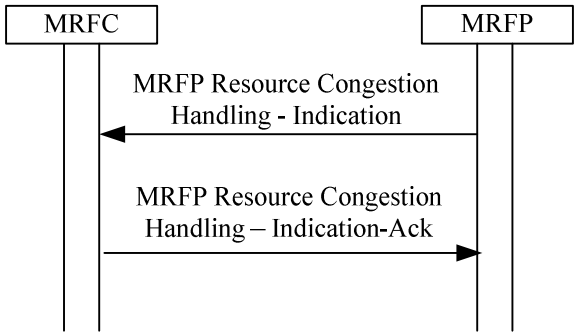

Figure 6.1.12.1: MRFP Resource Congestion Handling - Indication

6.2 Call Related Procedures

6.2.1 Play Tone Procedure

6.2.1.1 General

The following procedure assumes the IMS session has been established and the bearer is through-connected and the MRFC has received a trigger to play a tone and the MRFP selected for the call has the capabilities to provide tones.

NOTE: This procedure may also be ordered in combination with the session establishment procedure.

6.2.1.2 Send tone

After reception of a trigger to play a tone, the MRFC shall initiate the Send tone procedure. The MRFC may request the MRFP to send tone to one, multiple or all terminations in a context simultaneously with the tone identifier. The tone identifier may be a pre-configured identifier.

The MRFC may request the MRFP to send tone continuously until requested to be stopped. Alternatively, duration may be indicated or provisioned in the MRFP. When the duration elapses, the tone shall be stopped.

The MRFC may request the MRFP to detect DTMF digits, and may request the MRFP to stop sending tone when a DTMF digit is detected. For the second case, only the tone completion event is notified.

The MRFC may request the MRFP to detect the tone completion, and notify the completion event and cause to the MRFC. The tone is completed when either of the following has occurred;

- the duration has elapsed or:
- a DTMF digit is detected by the MRFP or:
- the sending tone is not successful.

6.2.1.3 Stop tone

On receipt of a trigger to stop a tone, the MRFC shall request the MRFP to stop the tone.

6.2.1.4 Tone completed

When a tone is completed, if the MRFC has requested the MRFP to notify the tone completion, the MRFP shall notify the tone completion event and the cause to the MRFC. The cause that the tone is completed may be that the duration has

elapsed, a DTMF digit is detected by the MRFP, or that the tone is not successful. Then the MRFC may indicate to the AS that the tone has been stopped.

6.2.1.5 Message sequence chart

Figure 6.2.1.1 shows the message sequence chart example for sending tone.

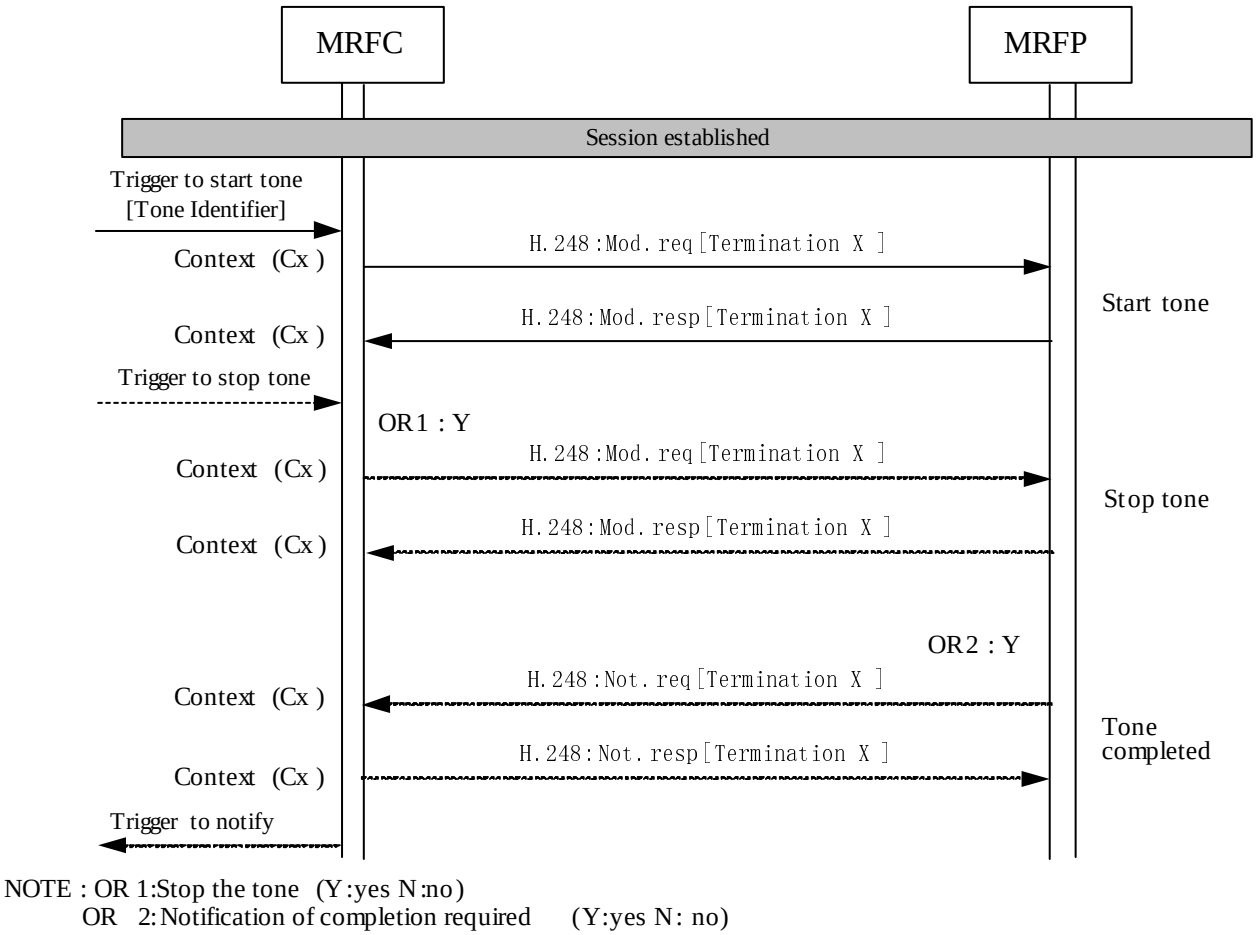

Figure 6.2.1.1 Sending tone (message sequence chart)

6.2.2 Play Announcement Procedure

6.2.2.1 General

The following procedure assumes the IMS session has been established and the bearer is through-connected, and the MRFC has received a trigger to play announcement, and the MRFP selected for the call has the capabilities to provide announcement.

NOTE: This procedure may also be ordered in combination with the session establishment procedure.

6.2.2.2 Start announcement

After reception of a trigger to play the announcement, the MRFC should initiate the Start announcement procedure. The MRFC shall request the MRFP to play announcement to one, multiple or all terminations in a context with the announcement identifier. The announcement identifier may be a pre-configured identifier (such as a number).

If it is a sequence of announcements, the MRFC shall request the MRFP to play all the announcements with one request. The MRFC may request the MRFP to play the announcement in a loop continuously until requested to be

stopped or in a loop with a fixed number of times. For the second case, if the fixed number of times is exhausted, the announcement is completed successfully.

If it is a variable announcement, the MRFC may indicate to the MRFP the following variants to the announcements:

- Date: A date variant is made up of three components: day, month and year. The MRFC shall indicate the date value and the date format to the MRFP, such as " day-month-year" or "year-month-day".
- Time: A time variant is made up of two components: hour and minute, The MRFC shall indicate the time value and the time format to the MRFP, such as "12-hours format" or "24-hours format".
- Digits (the announcement may contain a number of digits to be controlled by the MRFC for example a telephone number): a digits variant is made up of a sequence digit.
- Money (currency).
- Integer (a value within the announcement that is controlled by the MRFC, e.g. "you are caller number 3 in the queue"): an integer variant may be spoken as a cardinal or ordinal value. The MRFC shall indicate to the MRFP the value and type to be spoken.

The MRFC may request the MRFP to detect DTMF digit while playing an announcement, and may request the MRFP to stop playing an announcement when a DTMF digit is detected. For the latter case, only the announcement completion event is notified.

The MRFC may request the MRFP to detect the announcement completion, and notify the completion event and cause to the MRFC. The announcement is completed when either of the following has occurred;

- the announcement has been completed successfully or:
- a DTMF digit is detected by the MRFP or:
- the playing announcement is not successful.

6.2.2.3 Stop announcement

On receipt of a trigger to stop the announcement, the MRFC shall request the MRFP to stop the announcement.

6.2.2.4 Announcement completed

When an announcement is completed, if the MRFC has requested the MRFP to notify the announcement completion, the MRFP shall notify the announcement completion event and the cause to the MRFC. The cause that the announcement is completed may be the announcement has been completed successfully, or a DTMF digit is detected by the MRFP, or the playing announcement is not successful. Then the MRFC may indicate to the AS that the announcement has been stopped.

6.2.2.5 Message sequence chart

Figure 6.2.2.1 shows the message sequence chart example for playing announcement.

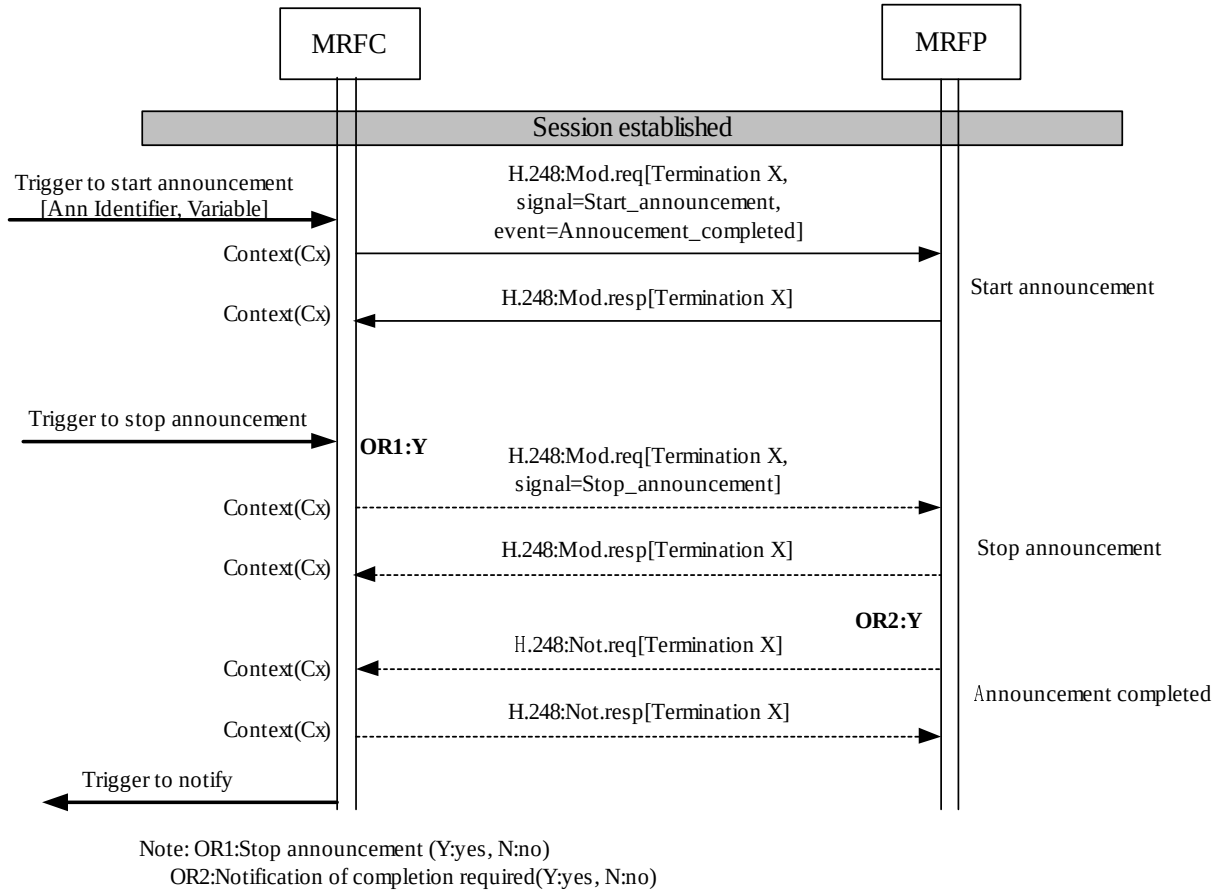

Figure 6.2.2.1 Playing announcement (message sequence chart)

6.2.3 Text to Speech Procedure

6.2.3.1 General

The following procedure assumes the IMS session has been established and the bearer is through-connected, and the MRFC has received a trigger to play TTS, and the MRFP selected for the call has the capabilities to provide TTS.

NOTE: This procedure may also be ordered in combination with the session establishment procedure.

6.2.3.2 Start TTS

After reception of a trigger to play TTS, the MRFC should initiate the Start TTS procedure.

If the MRFC receives a VXML script, the MRFC shall extract the SSML script or the SSML file identifier from the VXML script. If the MRFC receives plain text, the MRFC shall generate a SSML script that includes this plain text (<speak>) and the language type (xml:lang) used the basic SSML format. If the size of the SSML script is larger than the transport capability of the Mp interface, the MRFC shall stop the Start TTS procedure and return error.

Then the MRFC shall indicate to the MRFP the SSML script or the SSML file identifier to play the SSML text to one, one of many, multiple or all terminations in a context. If the MRFP does not support an element of the SSML, the MRFP may ignore the element.

The MRFC may request the MRFP to play the TTS in a loop continuously until requested to be stopped or in a loop with a fixed number of times. For the second case, if the fixed number of times is exhausted, the TTS is completed successfully.

The MRFC may request the MRFP to detect DTMF digit while playing a TTS, and may request the MRFP to stop TTS when a DTMF digit is detected. For the second case, only the TTS completion event is notified.

The MRFC may request the MRFP to detect the TTS completion and notify the completion event and cause to the MRFC. The TTS is completed when either of the following has occurred;

- the TTS has been completed successfully or:
- a DTMF digit is detected by the MRFP or:
- the playing TTS is not successful.

6.2.3.3 Stop TTS

On receipt of a trigger to stop TTS, the MRFC shall request the MRFP to stop the TTS.

6.2.3.4 TTS Completed

When a TTS is completed, if the MRFC has requested the MRFP to notify the TTS completion, the MRFP shall notify the TTS completion event and the cause to the MRFC. The cause that the TTS is completed may be the TTS has been completed successfully, or a DTMF digit is detected by the MRFP, or the playing TTS is not successful. Then the MRFC may indicate to the AS that the TTS has been stopped.

6.2.3.5 Message sequence chart

Figure 6.2.3.5.1 shows the message sequence chart example for playing TTS.

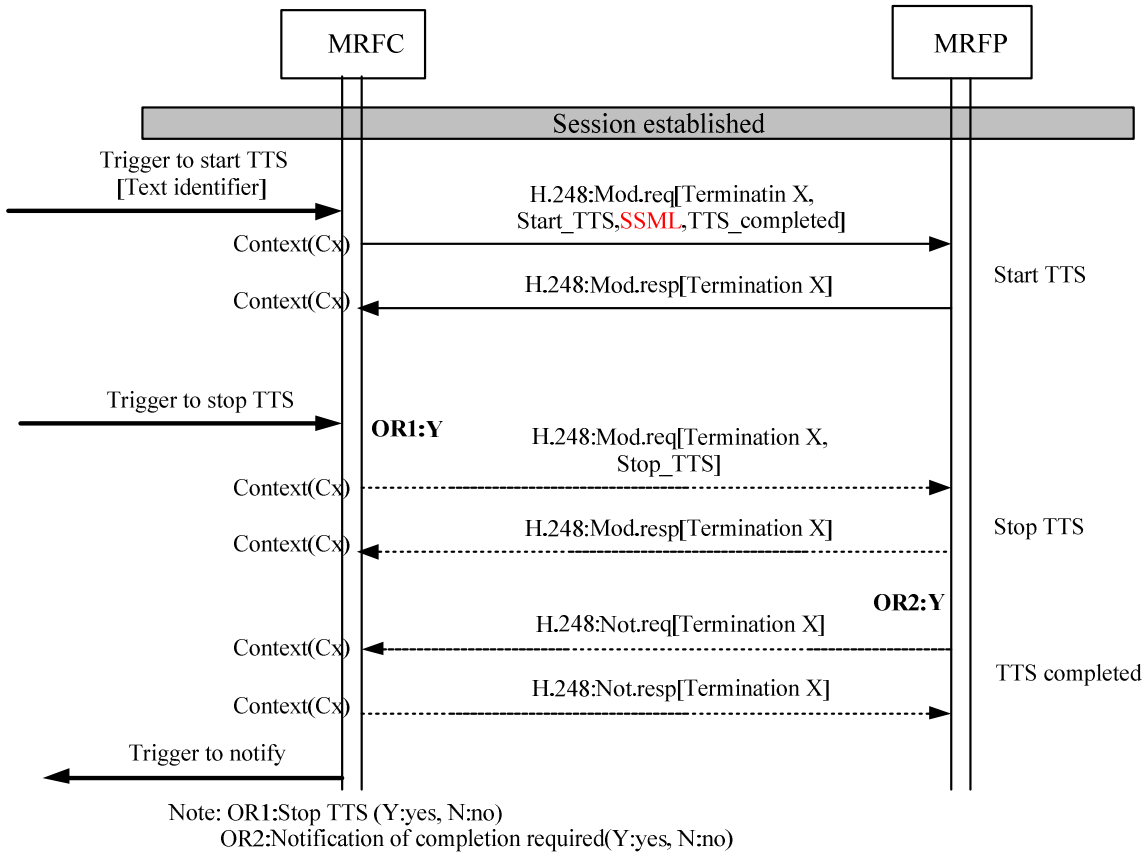

Figure 6.2.3.5.1 Playing TTS (message sequence chart)

6.2.4 Audio Record Procedure

6.2.4.1 General

The following procedure assumes the IMS session has been established and the bearer is through-connected, and the MRFC has received a trigger to record audio, and the MRFP selected for the call has the capabilities to provide audio record.

NOTE: This procedure may also be ordered in combination with the session establishment procedure.

6.2.4.2 Start audio record

After reception of a trigger to record audio, the MRFC should initiate the Start audio record procedure. The MRFC shall request the MRFP to record audio from one or all terminations in a context with the record file URI and record file format. If it is to record one party, only the input stream of the party is recorded. If it is to record all parties, the mixed stream of all parties is recorded.

When recording audio from all terminations in a context for two parties session or a conference, the MRFC may request the MRFP to assign a new termination to record the audio in the context, and the new termination shall be connected to the other terminations by unidirectional topology.

The record file URI can be generated by the AS/MRFC or by the MRFP. For the second case, the MRFC shall indicate the MRFP to generate the URI and return the generated URI to the MRFC. The record file format is the 3GPP multimedia file format, defined in the 3GPP TS 26.244[5], and only the audio track is used for the audio recording. The MRFC may indicate the maximum record time to the MRFP. When the maximum record time has elapsed, the MRFP shall stop the audio recording.

The MRFC may request the MRFP to detect the audio recording completion, and notify the completion event and cause to the MRFC. The audio recording is completed when either of the following has occurred;

- the maximum time period of audio recording has elapsed,
- no input is detected,
- DTMF digits are detected by the MRFP where the DTMF key sequenceshall stop or cancel the audio recording ,
- the MRFC requests the MRFP to stop the audio recording, or:
- the audio recording is not successful.

6.2.4.3 Stop audio record

After reception of a trigger to stop audio record, the MRFC shall request the MRFP to stop the audio recording. If the audio recording termination is added, the MRFC shall request the MRFP to subtract it.

6.2.4.4 Audio record completed

When an audio recording is completed, if the audio recording is successful, the MRFP shall save the record file URI. If the audio recording is not successful, the MRFP shall delete the record file. If the MRFC has requested the MRFP to notify the audio recording completion, the MRFP shall notify the audio recording completion event and the cause to the MRFC. The cause of the audio recording completed may be no voice has been input during a specific period, the maximum record time has elapsed, a DTMF digit that represents to finish or cancel the audio recording is detected by the MRFP, or the audio recording is not successful. Then the MRFC may indicate to the AS that the audio record has been stopped.

6.2.4.5 Message sequence chart

Figure 6.2.4.1 shows the message sequence chart example for audio recording.

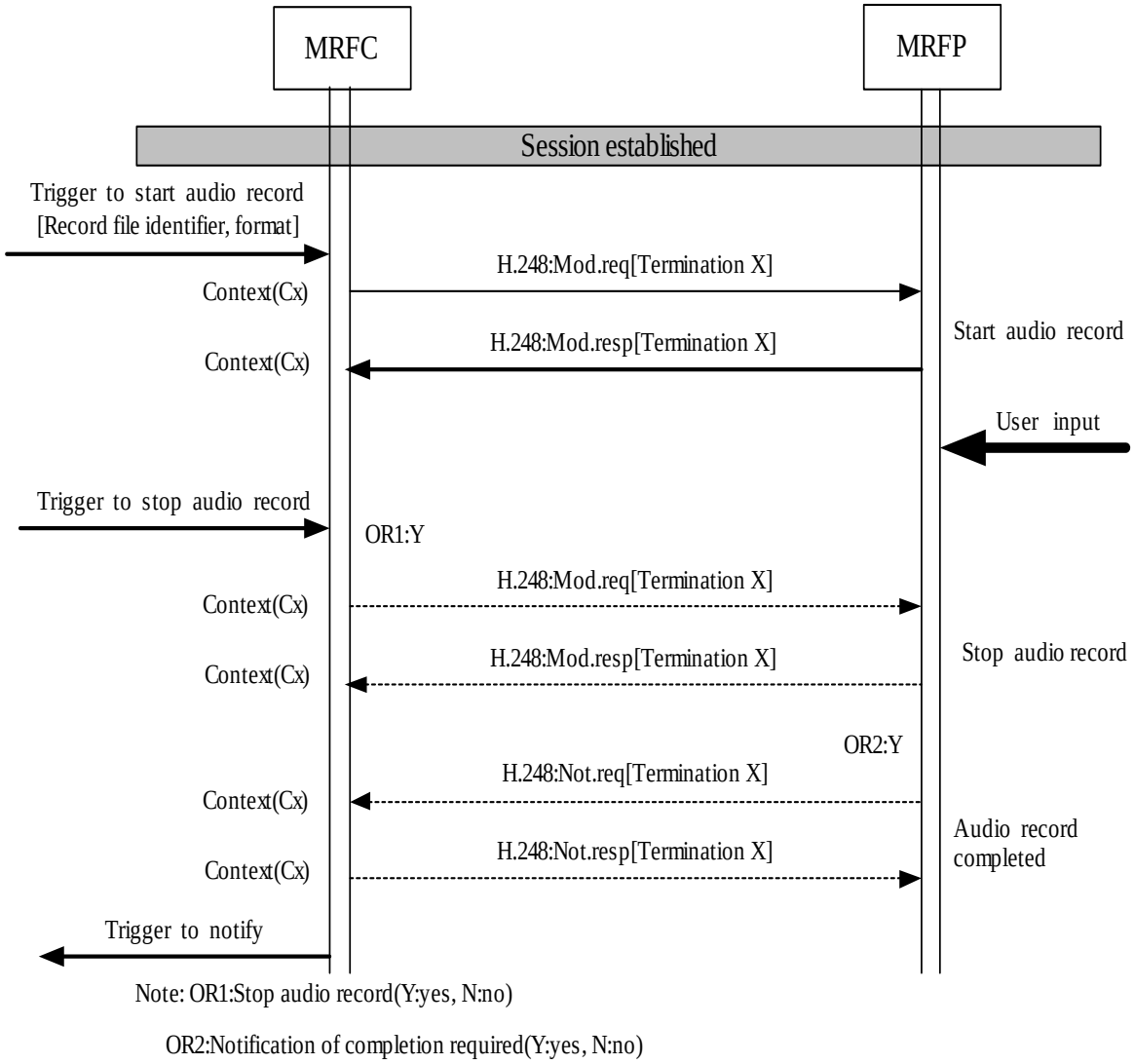

Figure 6.2.4.1 Audio record (message sequence chart)

6.2.5 DTMF Collection Procedure

On receipt of a request to detect DTMF Digits, the MRFC may command the MRFP to report DTMF Digits as defined in the Detect DTMF Procedure.

MRFC shall assign the RTP Payload Type for DTMF Telephony Events. When a DTMF Digit has been detected by the MRFP it shall report it to the MRFC.

When requested to detect DTMF the MRFP shall not forward the reported digit toward another connection.

An example sequence is shown in Figure 6.2.5.1.

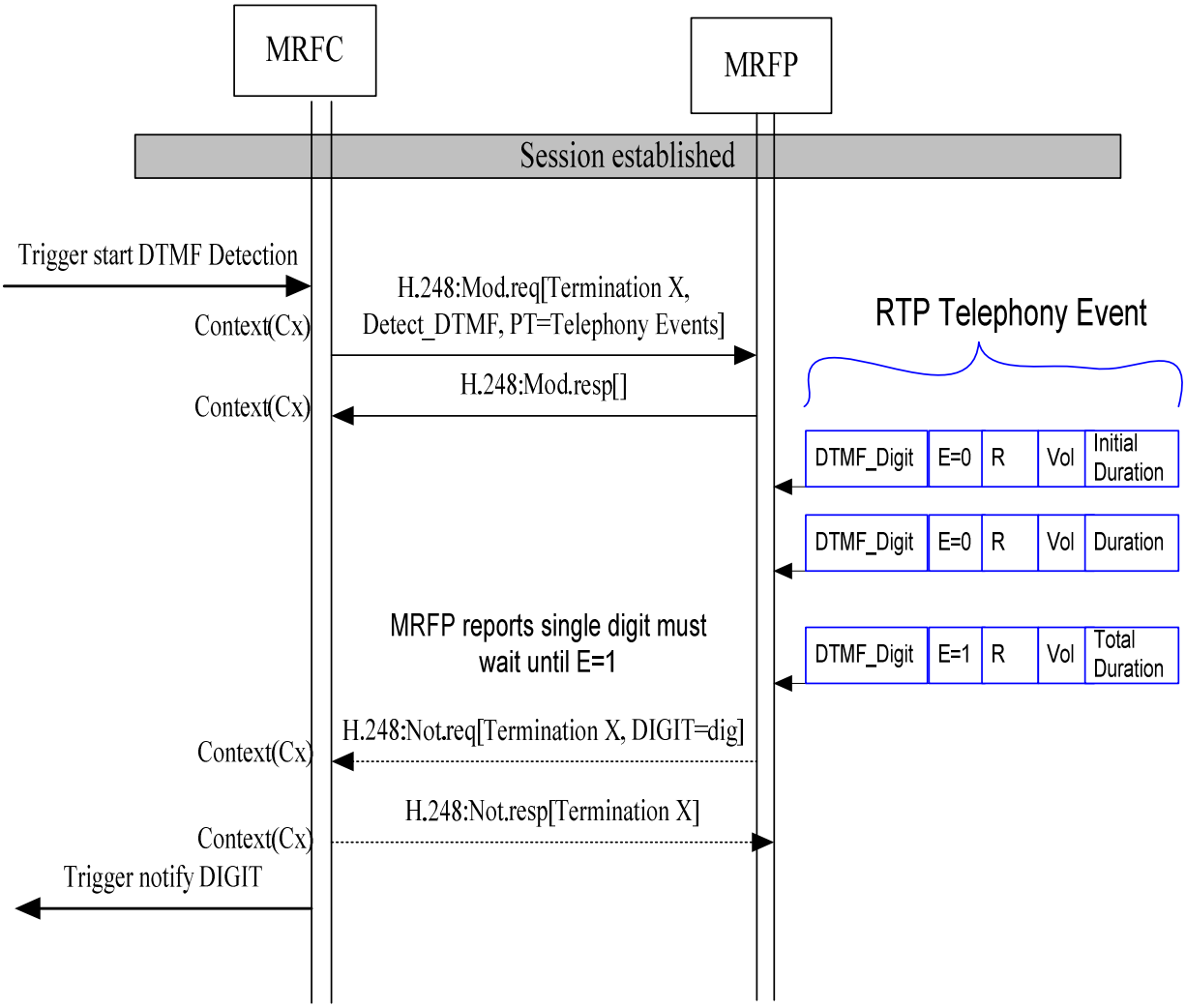

Figure 6.2.5.1 DTMF Telephony Event Detection

DTMF digit detection may be stopped by the MRFC sending the procedure Stop DTMF Detection. The MFRP, once it has acknowledged this request will no longer check for DTMF digits or report them to the MRFC.

6.2.6 Automatic Speech Recognition Procedure

6.2.6.1 General

The following procedure assumes the IMS session has been established and the bearer is through-connected, and the MRFC has received a trigger to play ASR, and the MRFP selected for the call has the capabilities to provide Automatic Speech Recognition.

NOTE: This procedure may also be ordered in combination with the session establishment procedure.

6.2.6.2 Start ASR

If the MRFC receives a request to initiate ASR, the MRFC shall extract the SRGS script or the SRGS URI from the received script.

If the size of the SRGS script is larger than the transport capability of the Mp interface, the MRFC shall terminate ASR procedure and return error.

Otherwise the MRFC initiates the Start ASR procedure; the MRFC shall indicate to the MRFP the SRGS script or the SRGS URI to play ASR to one termination in a context.

The MRFC may indicate to the MRFP the recognition mode: Normal Recognition Mode, Hotword Recognition Mode. If the MRFC indicate the Normal Recognition Mode to the MRFP, the MRFP shall match all of the speech against a recognition grammar and returns a no-match status if the input fails to match or the method times out. If the MRFC indicates the Hot-word Recognition Mode to the MRFP, the MRFP shall look for a match against specific speech grammar and ignores speech that does not match. The recognition completes only for a successful match of the recognition grammar or if the client cancels the request or if the recognition time elapses.

The MRFP shall recognize the subscriber"s input speech stream according to the SRGS grammar, and output the result as the EMMA format.

If the MRFP does not support an element of the SRGS, the MRFP may ignore the element.

The MRFC may request the MRFP to detect DTMF digit while executing ASR, and may request the MRFP to stop ASR when a DTMF digits is detected. For the latter case, only the ASR result is notified.

The MRFC may request the MRFP to detect the ASR completion and notify the completion event and cause to the MRFC. The ASR is completed when either of the following has occurred;

- the ASR has been completed successfully,
- a DTMF digit is detected by the MRFP or:
- the executing of ASR is not successful.

6.2.6.3 Stop ASR

On receipt of a trigger to stop ASR, the MRFC shall request the MRFP to stop the ASR.

6.2.6.4 ASR Completed

When an ASR is completed, if the MRFC has requested the MRFP to notify the ASR completion, the MRFP shall notify the ASR result and the cause to the MRFC. The cause of the ASR completed may be that the ASR has been completed successfully, a DTMF digit is detected by the MRFP, or the executing ASR is not successful.

The MRFP shall generate the ASR result as the EMMA format. The EMMA result may include multiple recognition results that are mutually exclusive. Each result may be structured by multiple parts in time sequence with the input time. Each result may include the text token that the value will correspond to tokens as defined by the SRGS grammar. Each result may include the interpretation of application specific markup. Each result may include the confidence score that represents the recognition quality.

If the size of the EMMA script is larger than the transport capability of the Mp interface, the MRFP shall return the MRFC the ASR is not successful.

Then the MRFC may indicate to the AS that the ASR has been stopped and the ASR result.

6.2.6.5 Message sequence chart

Figure 6.2.6.5.1 shows the message sequence chart example for executing ASR.

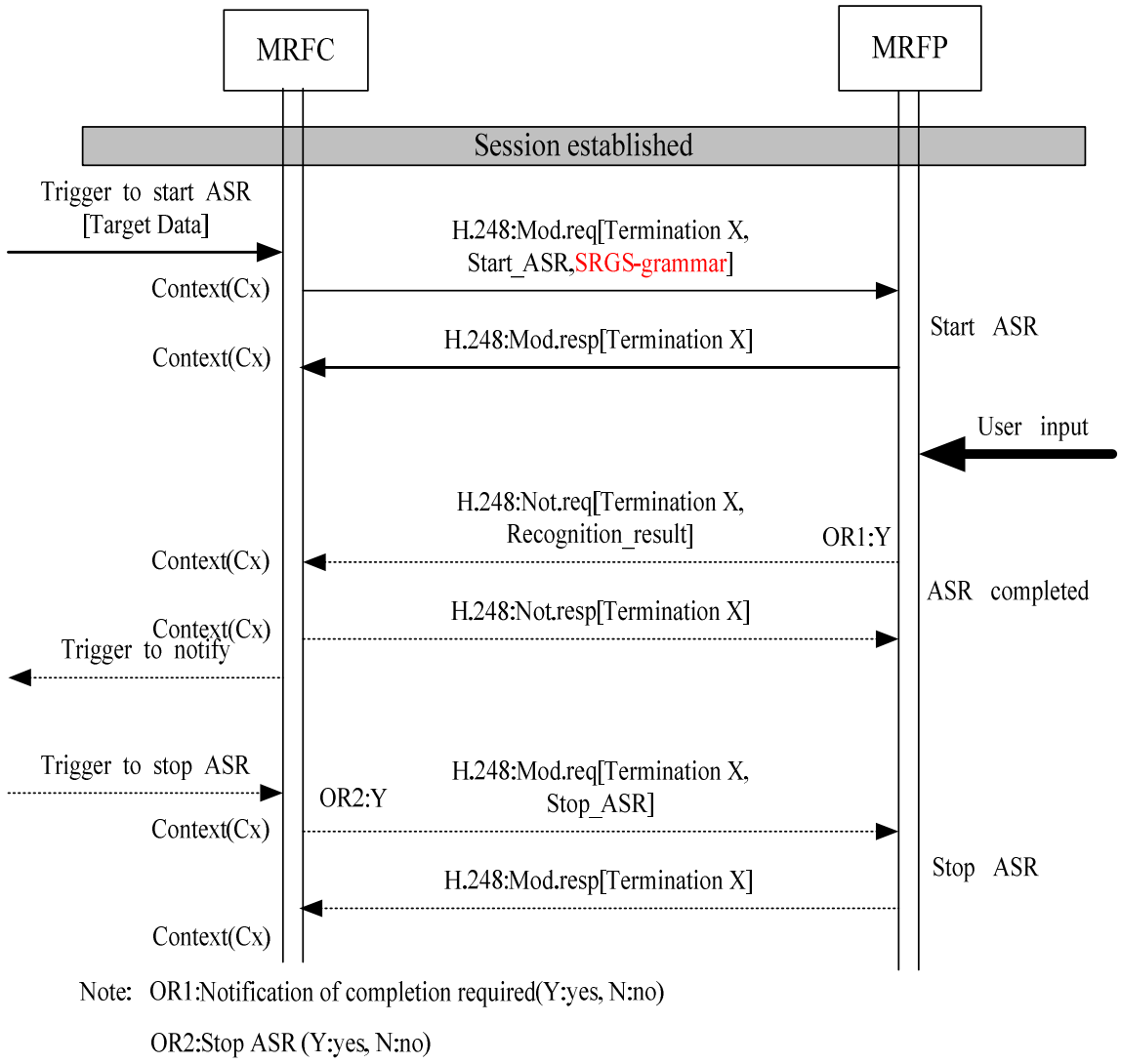

Figure 6.2.6.5.1 ASR (message sequence chart)

6.2.7 Play Multimedia Procedure

6.2.7.1 General

The following procedure assumes the IMS session has been established and the bearer is through-connected, and the MRFC has received a trigger to play multimedia, and the MRFP selected for the call has the capabilities to provide playing multimedia.

NOTE: This procedure may also be ordered in combination with the session establishment procedure.

6.2.7.2 H.248 context model

The figure 6.2.7.1 shows the H.248 context model for playing multimedia. There shall be two streams in the termination that is used for playing multimedia, one is the audio stream, and the other is the video stream. The H.248 command can be processed in the termination to play multimedia and detect the playing multimedia completed event.

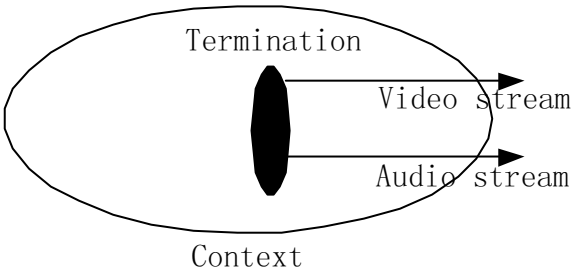

Figure 6.2.7.1: Playing Multimedia H.248 context model

6.2.7.3 Start playing multimedia

After reception of a trigger to play multimedia, the MRFC shall initiate the Start playing multimedia procedure.

If it is to play multimedia to one party, the multimedia shall be played in the external direction of the existing termination.

The MRFC shall indicate to the MRFP the multimedia identifier which may be a single identifier or list of identifiers. The MRFC may use a single identifier or separate identifiers per stream. If it is multiple identifiers, the MRFC shall request the MRFP to play all media in one request. If the identifier references a file, the file format shall be indicated.The multimedia file format is the 3GPP multimedia file format in current version. If the multimedia file provides different audio or video codec than the session codec, the MRFP shall transcode the input codec into the session codec.

The MRFC may request the MRFP to play the multimedia in a loop continuously until requested to be stopped or in a loop with a fixed number of times. For the latter case, if the fixed number of times is exhausted, the playing multimedia is completed successfully.

The MRFC may request the MRFP to detect DTMF digit while playing multimedia, and may request the MRFP to stop playing multimedia when DTMF digits is detected. For the latter case, only the multimedia completion is notified.

The MRFC may request the MRFP to detect the multimedia completion, and notify the completion event and cause to the MRFC. The play multimedia is completed when either of the following has occurred;

- the multimedia has been completed successfully,
- a DTMF digit is detected by the MRFP or:
- the playing multimedia is not successful.

6.2.7.4 Stop playing multimedia

After reception of a trigger to stop playing multimedia, the MRFC shall request the MRFP to stop playing multimedia.

6.2.7.5 Playing multimedia completed

When a playing multimedia is completed, if the MRFC has requested the MRFP to notify the playing multimedia completion, the MRFP shall notify the multimedia completion event and the cause to the MRFC. The cause of the playing multimedia completion may be the playing multimedia has been completed successfully, or a DTMF digit is detected by the MRFP, or the playing multimedia is not successful. Then the MRFC may indicate to the AS that the playing multimedia has been stopped.

6.2.7.6 Message sequence chart

Figure 6.2.7.2 shows the message sequence chart example for playing multimedia.

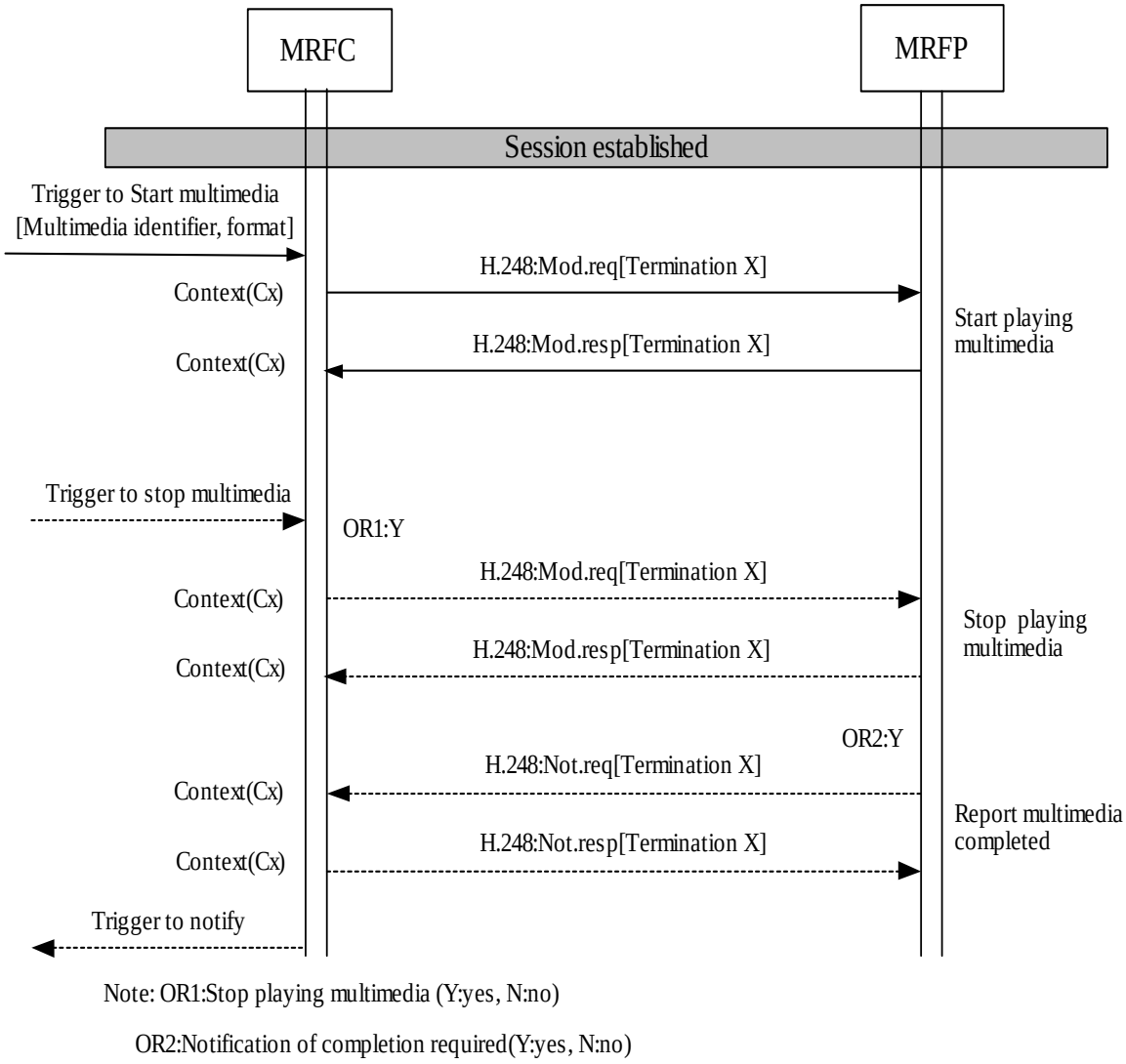

Figure 6.2.7.2 Play multimedia (message sequence chart)

6.2.8 Multimedia Record Procedure

6.2.8.1 General

The following procedure assumes the IMS session has already been established and the bearer is through-connected, and the MRFC has received a trigger to record multimedia, and the MRFP selected for the call has the capabilities to provide multimedia record.

NOTE: This procedure may also be ordered in combination with the session establishment procedure.

6.2.8.2 H.248 context model

The figure 6.2.8.1 shows the H.248 context model for the multimedia record. The termination used for recording may at least have two streams, and one is audio stream, and the other is video stream. The H.248 command can be processed in the termination to record multimedia and detect the record multimedia completed event.

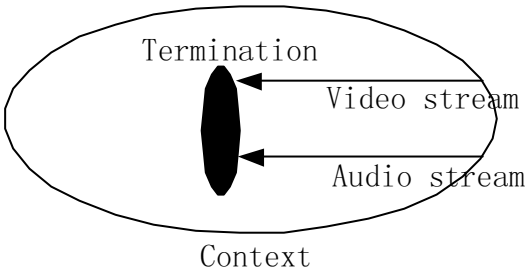

Figure 6.2.8.1: Multimedia Record Context Model

6.2.8.3 Start multimedia Record

After reception of a trigger to record multimedia, the MRFC shall initiate the Start multimedia record procedure.

If it is to record one party, only the input stream of the party is recorded. If it is to record all parties, the mixed stream of all parties is recorded.

When recording multimedia from all terminations in a context for two parties session or a conference, the MRFC may request the MRFP to assign a new termination to record the multimedia in the context, and the new termination shall be connected to all the other terminations by unidirectional topology.

The MRFC shall indicate the record file URI and the record file format to the MRFP. The record file URI can be generated by the AS/MRFC or by the MRFP. For the second case, the MRFC shall indicate the MRFP to generate the URI and return the generated URI to the MRFC. The record file format is the 3GPP multimedia file format, defined in the 3GPP TS 26.244[5]. The MRFC may indicate the maximum record time to the MRFP, when this time has elapsed, the MRFP shall stop the multimedia recording.

The MRFC may request the MRFP to detect the multimedia recording completion, and notify the completion event and cause to the MRFC. The multimedia recording is completed when either of the following occurs;

- the maximum time period of multimedia recording has elapsed,
- a DTMF digit is detected by the MRFP where the DTMF key sequence shall stop or cancel the multimedia recording,
- DTMF digits are detected by the MRFP where the DTMF key sequence shall stop or cancel the audio recording,
- the MRFC requests the MRFP to stop the audio recording, or
- the media recording is not successful.

6.2.8.4 Stop multimedia record

After reception of a trigger to stop multimedia record, the MRFC shall request the MRFP to stop the multimedia recording. If the multimedia recording termination is added, the MRFC shall request the MRFP to subtract it.

6.2.8.5 Multimedia record Completed

When a multimedia recording is completed, if the multimedia recording is successful, the MRFP shall save the recorded content to the specified URI. If the multimedia recording is not successful, the MRFP shall discard the recorded content. If the MRFC has requested the MRFP to notify the multimedia recording completion, the MRFP shall notify the multimedia recording completion event to the MRFC. The cause of the multimedia recording completion may be that the maximum record time has elapsed, a DTMF digit that represents to finish or cancel the multimedia recording is detected by the MRFP, or the multimedia recording is not successful. Then the MRFC may indicate to the AS that the multimedia record has been stopped.

6.2.8.6 Message sequence chart

Figure 6.2.8.2 shows the message sequence chart example for multimedia record.

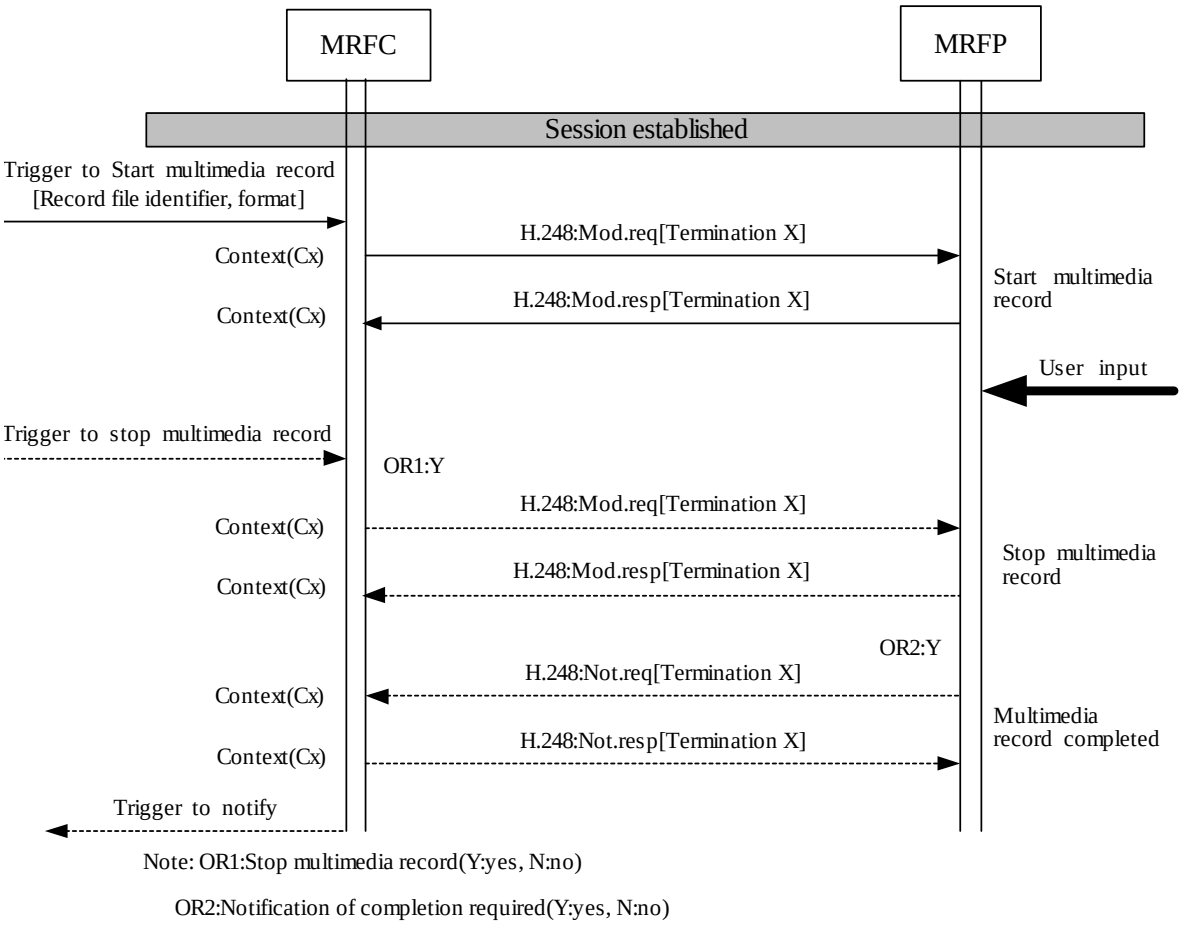

Figure 6.2.8.2 Multimedia record (message sequence chart)

6.2.9 Audio Conference Procedure

6.2.9.1 Context Model

A conference consists of one context with terminations representing each user. The MRFP shall consider the context to represent an ad-hoc conference when three or more terminations have been through-connected.

6.2.9.2 Ad-hoc Conferences

6.2.9.2.1 General

An ad-hoc conference starts without any prior booking or reservation when a user initiates the conference, for further definition of ad-hoc conference, see 3GPP TS 24.147 [4]. Further participants can then be added to the conference without any prior reservation of resources, through either a method of "dial-out" where the conference calls the participant, or by a "dial-in" scenario where the end user calls the conference.

6.2.9.2.2 Create Ad-hoc Audio Conference Procedure

The MRFC receives a trigger to create an ad-hoc conference. The MRFC then initiates the "Reserve IMS Connection Point and Configure Remote Resources" procedure as specified in subclause 8.20.

The MRFC:

Requests a new context and a new bearer termination including the Remote Connection Address.

The MRFP:

Creates a new context

Adds a new termination to the context and returns the Local Connection Address.

The MRFC:

Notifies the new user about the Local Connection Address.

Figure 6.2.9.1 shows the message sequence chart example for creating conference procedure.

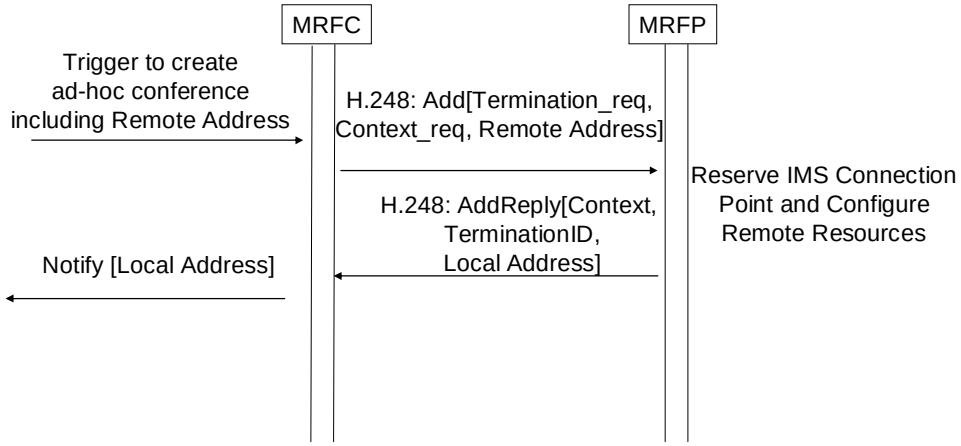

Figure 6.2.9.1 Create Ad-hoc conference

6.2.9.2.3 Closure of Audio Conference Procedure

The MRFP will in accordance with the general rules of H.248.1 delete the context when the last termination has been subtracted from the context.

6.2.9.2.4 Add Subsequent User to Conference; Dial-out

The MRFC receives a trigger to add a new bearer termination. The trigger does not contain connection address nor resources that the new participant can use. The MRFC adds a new bearer termination by initiating the "Reserve IMS connection point" procedure as specified in subclause 8.21.

The MRFC:

Requests a bearer termination to be added to the existing context.

The MRFP:

Adds a bearer termination to the existing context and notifies the MRFC about its reserved resources and connection address.

The MRFC:

Sends a notification to the new user about the MRFP"s resources and connection address.

The MRFC will then receive a trigger containing the new user"s address and resources. The MRFC initiates the "Configure IMS resources" procedure as specified in subclause 8.22.

The MRFC:

Requests that remote address and resources be configured to the termination

The MRFP:

Modifies the termination using the received data and confirms the action

The MRFC:

Notifies the new participant about the result

Figure 6.2.9.2 shows the message sequence chart example for dial-out procedure.

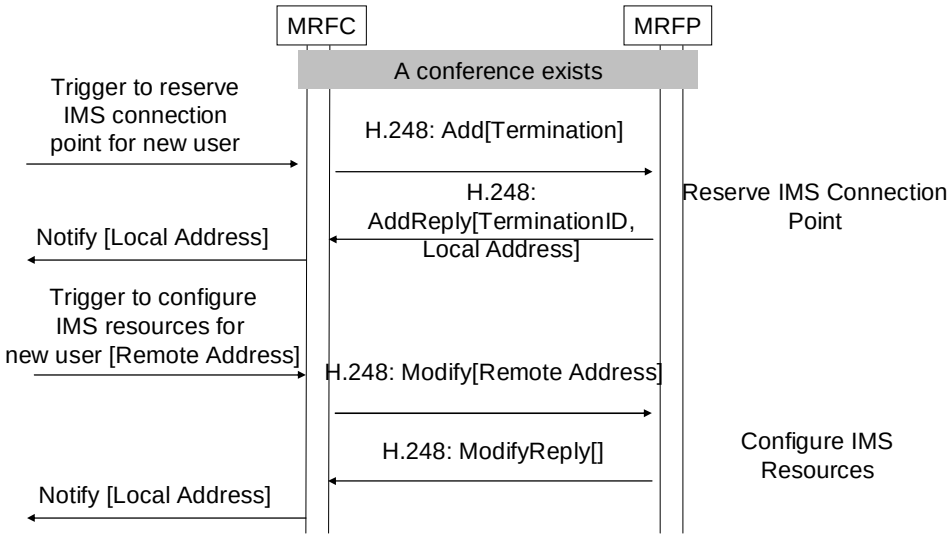

Figure 6.2.9.2 Procedure to add user in Dial-out scenario

6.2.9.2.5 Add subsequent user to conference; Dial-in

Precondition is that a conference exists. The MRFC receives a trigger to add a new user including Remote Connection Address. The MRFC then initiates the "Reserve IMS Connection Point and Configure Remote Resources" procedure as specified in subclause 8.20.

The MRFC:

Requests a new bearer termination, including the Remote Connection Address, to be added to the existing context.

The MRFP:

Adds a new termination to the existing context and returns the Local Connection Address.

The MRFC notifies the new user about the Local Connection Address.

Figure 6.2.9.3 shows the message sequence chart example for dial-in procedure.

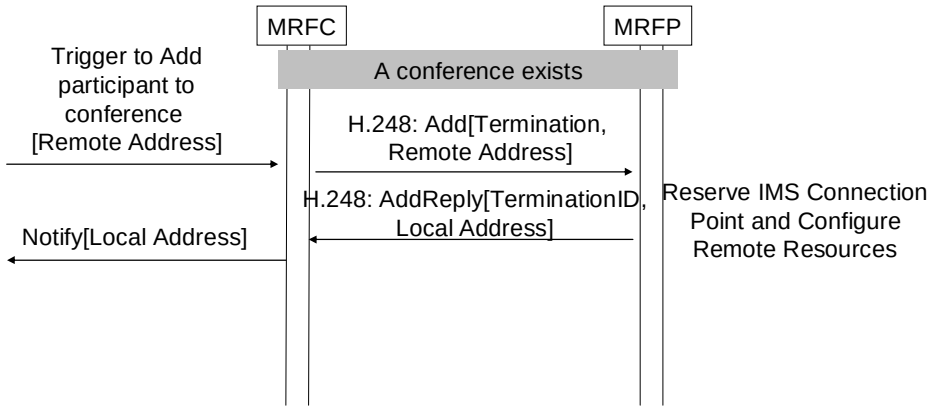

Figure 6.2.9.3 Procedure to add user in Dial-in scenario

6.2.9.2.6 Remove Conference Participant Procedure

When the MRFC receives a trigger that a user has left the conference, it initiates the "Release IMS termination" procedure as specified in subclause 8.23.

The MRFC:

Requests that the termination is released.

The MRFP:

Releases the termination and informs the MRFC about the result.

Figure 6.2.9.4 shows the message sequence chart example for removing conference participant procedure.

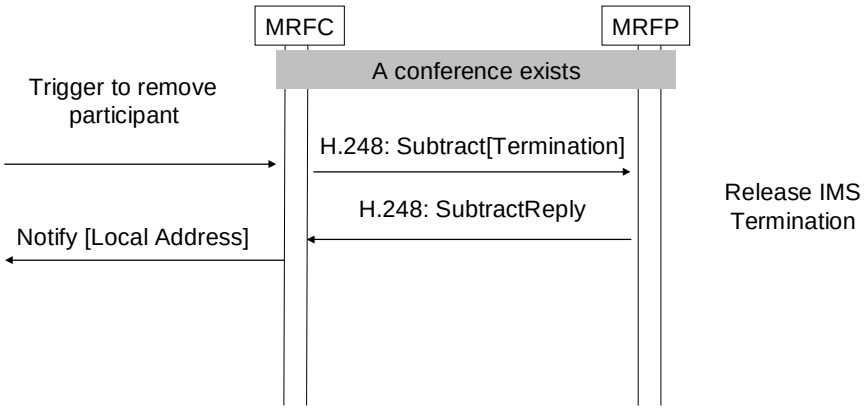

Figure 6.2.9.4 Procedure to remove conference participant

6.2.10 Multimedia Conference Procedures

6.2.10.1 Context Model

A conference consists of one context with terminations representing connections to the participants. Each termination shall support up to two streams, one for audio and one for video. The MRFP shall consider the context to represent an ad-hoc conference when a three or more terminations have been through-connected.

It is possible for a user supporting only one media, represented by one stream, to join a conference. The user will then only participate in the part of the conference that is using the supported stream.

6.2.10.2 Ad-hoc Conferences

6.2.10.2.1 General

An ad-hoc conference starts without any prior booking or reservation when a user initiates the conference, for further definition of ad-hoc conference, see 3GPP TS 24.147 [4]. Further participants can then be added to the conference without any prior reservation of resources, through either a method of "dial-out" where the conference calls the participant, or by a "dial-in" scenario where the end user calls the conference.

6.2.10.2.2 Create Ad-hoc Multimedia Conference Procedure

The MRFC receives a trigger to create an ad-hoc conference. The MRFC then initiates the "Reserve IMS Connection Point and Configure Remote Resources" procedure as specified in subclause 8.20, where the connection address and resources shall have multiple values for speech and video.

The MRFC:

Requests a new context and a new bearer termination including the Remote Connection Addresses.

The MRFP:

Creates a new context

Adds a new termination to the context and returns the Local Connection Address.

The MRFC:

Notifies the new user about the Local Connection Address.

Figure 6.2.10.1 shows the message sequence chart example for creating multimedia conference procedure.

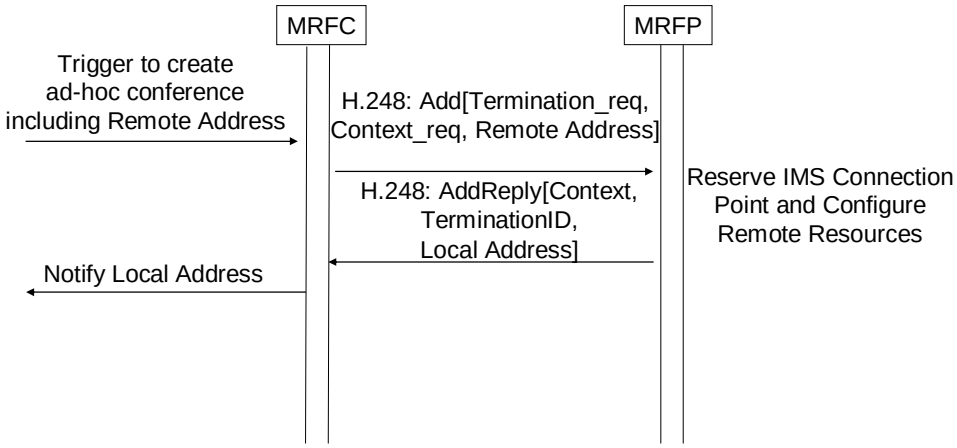

Figure 6.2.10.1 Create Ad-hoc conference

6.2.10.2.3 Closure of Multimedia Conference Procedure

The MRFP will in accordance with the general rules of H.248.1 delete the context when the last termination has been subtracted from the context..

6.2.10.2.4 Add Subsequent User to Conference; Dial-out

Precondition for this procedure is that a conference exists. The MRFC receives a trigger to add a new bearer termination. The trigger does not contain connection address nor resources that the new participant can use. The MRFC adds a new bearer termination by initiating the "Reserve IMS connection point" procedure as specified in subclause 8.21 where the connection address and resources may have multiple values for speech and video.

The MRFC:

Requests a bearer termination to be added to the existing context.

The MRFP:

Adds a bearer termination to the existing context and notifies the MRFC about its reserved resources and connection address.

The MRFC:

Sends a notification to the new user about the MRFP"s resources and connection address.

The MRFC will then receive a trigger containing the new user"s address and resources. The MRFC initiates the "Configure IMS resources" procedure as specified in subclause 8.22 where the connection address and resources may have multiple values for speech and video.

The MRFC:

Requests that remote address and resources be configured to the termination

The MRFP:

Modifies the termination using the received data and confirms the action

The MRFC:

Notifies the new participant about the result

Figure 6.2.10.2 shows the message sequence chart example for dial-out procedure of multimedia conference.

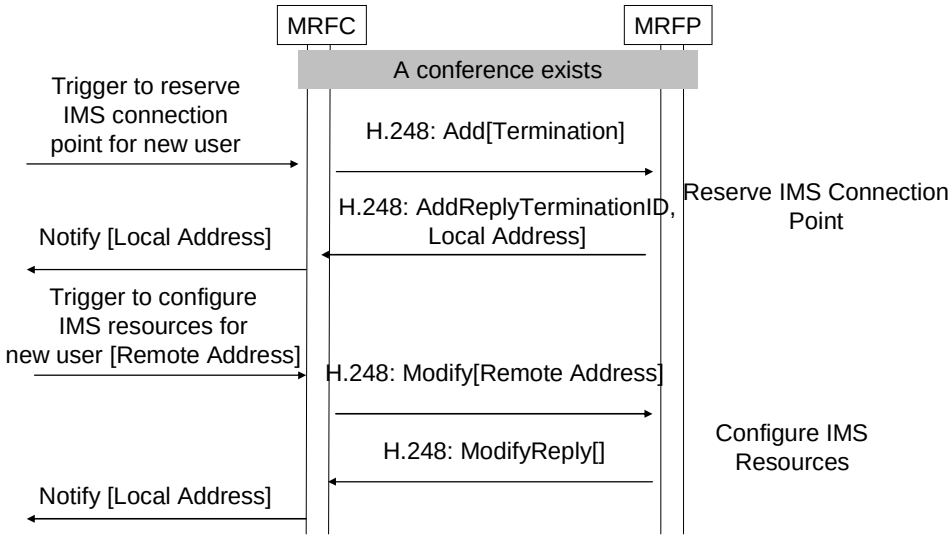

Figure 6.2.10.2 Procedure to add user in Dial-out scenario

6.2.10.2.5 Add subsequent user to conference; Dial-in

Precondition is that a conference exists. The MRFC receives a trigger to add a new user including Remote Connection Address. The MRFC then initiates the "Reserve IMS Connection Point and Configure Remote Resources" procedure as specified in subclause 8.20 where the connection address and resources may have multiple values for speech and video.

The MRFC:

Requests a new bearer termination, including the Remote Connection Address, to be added to the existing context.

The MRFP:

Adds a new termination to the existing context and returns the Local Connection Address.

The MRFC notifies the new user about the Local Connection Address.

Figure 6.2.10.3 shows the message sequence chart example for dial-in procedure of multimedia conference.

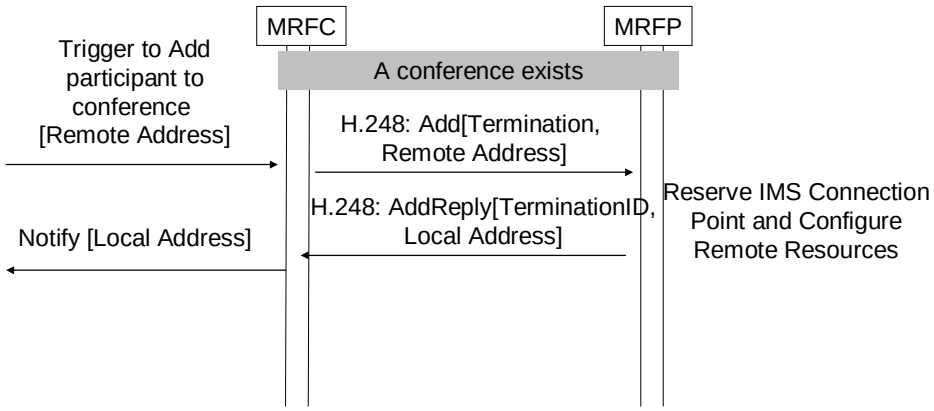

Figure 6.2.10.3 Procedure to add user in Dial-in scenario

6.2.10.2.6 Remove Conference Participant Procedure

When the MRFC receives a trigger that a user has left the conference, it initiates the "Release IMS termination" procedure as specified in subclause 8.23.

The MRFC:

Requests that the termination is released.

The MRFP:

Releases the termination and informs the MRFC about the result.

Figure 6.2.10.4 shows the message sequence chart example for removing multimedia conference participant procedure.

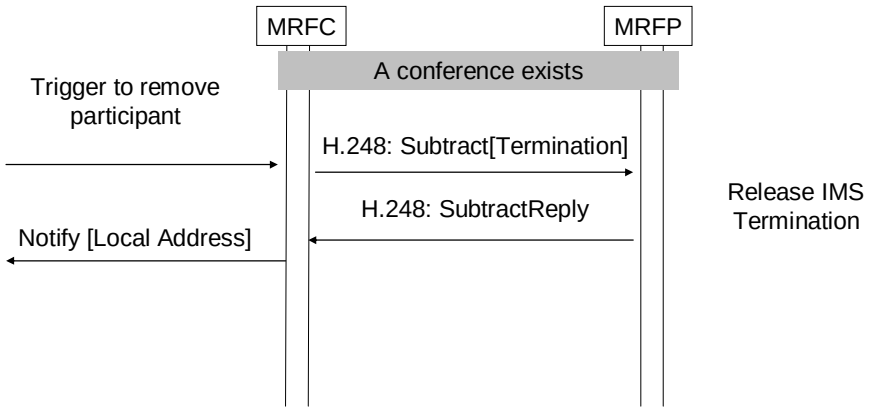

Figure 6.2.10.4 Procedure to remove conference participant

6.2.11 Audio Transcoding Procedure

As transcoding is considered a basic feature of a MGW, the MRFC does not explicitly request transcoding. It is expected that the MRFP determines when transcoding is applied, for example, when the MRFC specifies the audio codec to be applied for a given stream in a context, if there are any other audio terminations in the context and the stream modes permit data flow between these terminations and where the source encodings are not compatible then the MRFP transcodes the stream between these terminations.

6.2.12 Video Transcoding Procedure

As transcoding is considered a basic feature of an MGW the MRFC does not explicitly request transcoding. It is expected that the MRFP determines when transcoding is applied, for example, when the MRFC specifies the video codec to be applied for a given stream in a context, if there are any other terminations supporting video in the context and the stream modes permit data flow between these terminations and where the source encodings are not compatible then the MRFP transcodes the stream between these terminations.

7 Charging

The charging is specified in 3GPP TS 32.260[14]; no requirements are identified for the Mp interface.

8 Messages/Procedures and contents

8.1 General

This clause describes logical signalling procedures between the MRFC and MRFP. The procedures within this clause are intended to be implemented using the standard H.248 procedure as defined in ITU recommendation H.248.1 [3] with appropriate parameter combinations.

8.2 Send tone

This procedure is used to send a tone.

Table 8.2.1: Procedures between MRFC and MRFP: Send Tone

Procedure	Initiated	Information element name	Information element required	Information element description
Send Tone	MRFC	Context	M	This information element indicates the context for the bearer termination.
		Bearer Termination/Bearer Termination Request	M	This information element indicates the existing bearer termination or requests a new bearer termination where the tone is sent.
		Tone	M	This information element indicates the tone to be generated.
		Notify Tone Completion	O	This information element requests a notification of a completed tone.
		Tone Direction	O	This information element indicates the tone direction in the bearer termination.
		Tone Timing	O	This information element indicates the time for the tone.
		DTMF trigger	O	This information element indicates the MRFP to detect the DTMF and the MRFP should stop the tone when a DTMF digit is detected.
Send Tone Ack	MRFP	Context	M	This information element indicates the context where the command was executed.
		Bearer Termination	M	This information element indicates the bearer termination where the command was executed.

NOTE This procedure may be combined with other procedures such as to ADD bearer connections.

8.3 Stop tone

This procedure is used to stop the tone.

Table 8.3.1: Procedures between MRFC and MRFP: Stop Tone

Procedure	Initiated	Information element name	Information element required	Information element description
Stop Tone	MRFC	Context	M	This information element indicates the context for the bearer termination.
		Bearer Termination	M	This information element indicates the bearer termination where the tone is stopped.
		Stop Tone	M	This information element requests that tone generation is stopped.
Stop Tone Ack	MRFP	Context	M	This information element indicates the context where the command was executed.
		Bearer Termination	M	This information element indicates the bearer termination where the command was executed.

8.4 Tone completed

This procedure is used to notify the completed tone.

Table 8.4.1: Procedures between MRFC and MRFP: Tone Completed

Procedure	Initiated	Information element name	Information element required	Information element description
Tone Completed	MRFP	Context	M	This information element indicates the context for the bearer termination.
		Bearer Termination	M	This information element indicates the bearer termination where the tone was completed.
		Tone Completed	M	This information element indicates completion of the tone.
		Cause	M	This information element indicates the cause of tone completion.
Tone Completed Ack	MRFC	Context	M	This information element indicates the context where the command was executed.
		Bearer Termination	M	This information element indicates the Bearer Termination where the command was executed.

8.5 Start announcement

This procedure is used to request to start announcement.

Table 8.5.1: Procedures between MRFC and MRFP: Start announcement

Procedure	Initiated	Information element name	Information element required	Information element description
Start announcement	MRFC	Context	M	This information element indicates the context for the bearer termination.
		Bearer Termination/Bearer Termination Request	M	This information element indicates the existing bearer termination or requests a new bearer termination where the announcement is sent.
		Announcement identifier	M	This information element indicates the announcement or announcement list to be played.
		Audio file format	O	This information element indicates the audio file type, such as the 3GPP file type.
		Direction	O	This information element indicates the announcement direction in the bearer termination.
		Iterations	O	This information element indicates the number of times the announcement shall be played
		Variable List	O	This information element indicates the variable or variable list to be played.
		Notify Announcement Completed	O	This information element requests a notification of a completed announcement.
		DTMF stop announcement	O	This information element indicates whether the MRFP should stop the announcement when a DTMF digit is detected.
Start announcement Ack	MRFP	Context	M	This information element indicates the context where the command was executed.
		Bearer Termination	M	This information element indicates the bearer termination where the command was executed.

NOTE This procedure may be combined with other procedures such as to ADD bearer connections.

8.6 Stop Announcement

This procedure is used to stop the announcement.

Table 8.6.1: Procedures between MRFC and MRFP: Stop Announcement

Procedure	Initiated	Information element name	Information element required	Information element description
Stop Announcement	MRFC	Context	M	This information element indicates the context for the bearer termination.
		Bearer Termination	M	This information element indicates the bearer termination where the announcement is stopped.
		Stop Announcement	M	This information element requests that announcement playing is stopped.
Stop Announcement Ack	MRFP	Context	M	This information element indicates the context where the command was executed.
		Bearer Termination	M	This information element indicates the bearer termination where the command was executed.

8.7 Announcement Completed

This procedure is used to notify the completed announcement.

Table 8.7.1: Procedures between MRFC and MRFP Announcement Completed

Procedure	Initiated	Information element name	Information element required	Information element description
Announcement Completed	MRFP	Context	M	This information element indicates the context for the bearer termination.
		Bearer Termination	M	This information element indicates the bearer termination where the announcement was completed.
		Announcement Completed	M	This information element indicates completion of the announcement.
		Cause	M	This information element indicates the cause of announcement completion.
Announcement Completed Ack	MRFC	Context	M	This information element indicates the context where the command was executed.
		Bearer Termination	M	This information element indicates the Bearer Termination where the command was executed.

8.8 Start audio record

This procedure is used to start the audio record.

Table 8.8.1: Procedures between MRFC and MRFP: Start audio record

Procedure	Initiated	Information element name	Information element required	Information element description
Start audio record	MRFC	Context	M	This information element indicates the context for the bearer termination.
		Bearer Termination/Bearer Termination Request	M	This information element indicates the existing bearer termination or requests a new bearer termination where the audio is recorded.
		Record file Identifier	M	This information element indicates the record file Identifier or a request to the MRFP to create the record file Identifier.

		Record file Format	O	This information element indicates the audio record file format.
		Maximum Record Timer	O	This information element indicates the maximum allowable length of the recording
		Notify audio record Completed	O	This information element requests a notification of a completed audio record.
Start audio record Ack	MRFP	Context	M	This information element indicates the context where the command was executed.
		Bearer Termination	M	This information element indicates the bearer termination where the command was executed.
		Record File identifier	O	This information element indicates the file identifier created by the MRFP if the MRFC request to create a file URI.

NOTE This procedure may be combined with other procedures such as to ADD bearer connections.

8.9 Stop audio record

This procedure is used to stop the audio record.

Table 8.9.1: Procedures between MRFC and MRFP: Stop audio record

Procedure	Initiated	Information element name	Information element required	Information element description
Stop audio record	MRFC	Context	M	This information element indicates the context for the bearer termination.
		Bearer Termination	M	This information element indicates the bearer termination where the audio record is stopped.
		Stop audio record	M	This information element requests that audio record is stopped.
Stop audio record Ack	MRFP	Context	M	This information element indicates the context where the command was executed.
		Bearer Termination	M	This information element indicates the bearer termination where the command was executed.

8.10 Audio record completed

This procedure is used to report the audio record completed.

Table 8.10.1: Procedures between MRFC and MRFP: Report audio record completed

Procedure	Initiated	Information element name	Information element required	Information element description
Audio Record Completed	MRFP	Context	M	This information element indicates the context for the bearer termination.
		Bearer Termination	M	This information element indicates the bearer termination where the audio record was completed.
		audio record Completed	M	This information element indicates the audio record completed.
		Cause	M	This information element indicates the return code of audio record.
Audio record Completed Ack	MRFC	Context	M	This information element indicates the context where the command was executed.
		Bearer Termination	M	This information element indicates the Bearer Termination where the command was executed.

8.11 Detect DTMF

This procedure is used to request detection of a DTMF digit.

Table 8.11.1: Procedures between MRFC and MRFP: Detect DTMF

Procedure	Initiated	Information element name	Information element required	Information element description
Detect DTMF	MRFC	Context	M	This information element indicates the context for the bearer termination.
		Bearer Termination/Bearer Termination Request	M	This information element indicates the existing bearer termination or requests a new bearer termination where the DTMF digit detection is requested.
		Start_DTMF_Detection	M	This information element requests MRFP to detect a DTMF digit.
Detect DTMF Ack	MRFP	Context	M	This information element indicates the context where the command was executed.
		Bearer Termination	M	This information element indicates the bearer termination where the command was executed.

NOTE This procedure may be combined with other procedures such as to ADD bearer connections.

8.12 Stop DTMF Detection

This procedure is used to stop detection of the DTMFdigit.

Table 8.12.1: Procedures between MRFC and MRFP: Stop DTMF Detection

Procedure	Initiated	Information element name	Information element required	Information element description
Stop DTMF Detection	MRFC	Context	M	This information element indicates the context for the bearer termination.
		Bearer Termination	M	This information element indicates the bearer termination where the DTMF digit detection is stopped.
		Stop DTMF Detection	M	This information element requests that DTMF digit detection is stopped.
Stop DTMF Detection Ack	MRFP	Context	M	This information element indicates the context where the command was executed.
		Bearer Termination	M	This information element indicates the bearer termination where the command was executed.

8.13 Report DTMF

This procedure is used to report a detected DTMF digit.

Table 8.13.1: Procedures between MRFP and MRFC: Report DTMF

Procedure	Initiated	Information element name	Information element required	Information element description
Report DTMF	MRFP	Context	M	This information element indicates the context for the bearer termination.
		Bearer Termination	M	This information element indicates the bearer termination where the DTMF digit was detected.
		Digit	M	This information element reports the detected DTMF digit.
Report DTMF Ack	MRFC	Context	M	This information element indicates the context where the command was executed.
		Bearer Termination	M	This information element indicates the Bearer Termination where the command was executed.

8.14 Start playing multimedia

This procedure is used to start playing multimedia.

Table 8.14.1: Procedures between MRFC and MRFP: start playing multimedia

Procedure	Initiated	Information element name	Information element required	Information element description
Start playing multimedia	MRFC	Context	M	This information element indicates the context for the bearer termination.
		Bearer Termination/Bearer Termination Request	M	This information element indicates the existing bearer termination or requests a new bearer termination where the multimedia is sent.
		Multimedia identifier	M	This information element indicates the multimedia or list of multimedia to be played. This may be a single identifier or one identifier per media type.
		Multimedia file format	O	This information element indicates the multimedia file type, such as the 3GP file type.
		Iterations	O	This information element indicates the number of times the multimedia shall be played
		Direction	O	This information element indicates the direction of the multimedia to be sent.
		Notify multimedia completed	O	This information element requests a notification when the playing multimedia is completed.
		DTMF stop multimedia	O	This information element indicates the MRFP to detect the DTMF digits and stop the playing multimedia when a pre-defined DTMF digit is detected.
Start playing multimedia Ack	MRFP	Context	M	This information element indicates the context where the command was executed.
		Bearer Termination	M	This information element indicates the bearer termination where the command was executed.

NOTE This procedure may be combined with other procedures such as to ADD bearer connections.

8.15 Stop playing multimedia

This procedure is used to stop playing multimedia.

Table 8.15.1: Procedures between MRFC and MRFP: Stop playing multimedia

Procedure	Initiated	Information element name	Information element required	Information element description
Stop playing multimedia	MRFC	Context	M	This information element indicates the context for the bearer termination.
		Bearer Termination	M	This information element indicates the existing bearer termination.
		Stop playing multimedia	M	This information element requests that multimedia playing is stopped.
stop playing multimedia Ack	MRFP	Context	M	This information element indicates the context where the command was executed.
		Bearer Termination	M	This information element indicates the bearer termination where the command was executed.

8.16 Playing multimedia completed

This procedure is used to report the playing multimedia completed.

Table 8.16.1: Procedures between MRFC and MRFP: Report playing multimedia completed

Procedure	Initiated	Information element name	Information element required	Information element description
Report playing multimedia completed	MRFP	Context	M	This information element indicates the context for the bearer termination.
		Bearer Termination	M	This information element indicates the existing bearer termination.
		Playing Completed	M	This information element indicates completed of the multimedia play.
		Cause	M	This information element indicates the return code of playing multimedia.
Report playing multimedia completed ACK	MRFC	Context	M	This information element indicates the context where the command was executed.
		Bearer Termination	M	This information element indicates the bearer termination where the command was executed.

8.17 Start multimedia record

This procedure is used to start the multimedia record.

Table 8.17.1: Procedures between MRFC and MRFP: Start multimedia record

Procedure	Initiated	Information element name	Information element required	Information element description
Start multimedia Record	MRFC	Context	M	This information element indicates the context for the bearer termination.
		Bearer Termination/Bearer Termination Request	M	This information element indicates the existing bearer termination or requests a new bearer termination where the multimedia is recorded.
		Multimedia file identifier	M	This information element indicates the multimedia record file identification or a request to the MRFP to create a file identifier.

		Multimedia file Format	O	This information element indicates the multimedia record file format.
		Maximum Record Timer	O	This information element indicates the maximum allowable length of the recording
		Notify multimedia record Completed	O	This information element requests a notification of a completed multimedia record.
Start multimedia record Ack	MRFP	Context	M	This information element indicates the context where the command was executed.
		Bearer Termination	M	This information element indicates the bearer termination where the command was executed.
		File identifier	O	This information element indicates the file identification created by the MRFC if the MRFC request to create a file identifier.

NOTE This procedure may be combined with other procedures such as to ADD bearer connections.

8.18 Stop multimedia record

This procedure is used to stop the multimedia record.

Table 8.18.1: Procedures between MRFC and MRFP: Stop multimedia record

Procedure	Initiated	Information element name	Information element required	Information element description
Stop Multimedia Record	MRFC	Context	M	This information element indicates the context for the bearer termination.
		Bearer Termination	M	This information element indicates the existing bearer termination.
		Stop multimedia record	M	This information element requests that multimedia record is stopped.
Stop Multimedia record Ack	MRFP	Context	M	This information element indicates the context where the command is executed.
		Bearer Termination	M	This information element indicates the bearer termination where the command is executed.

8.19 Multimedia record completed

This procedure is used to report the multimedia record completed.

Table 8.19.1: Procedures between MRFC and MRFP: Report multimedia record completed

Procedure	Initiated	Information element name	Information element required	Information element description
Report multimedia record completed	MRFP	Context	M	This information element indicates the context for the bearer termination.
		Bearer Termination	M	This information element indicates the existing bearer termination.
		Multimedia record Completed	M	This information element indicates the multimedia record completed.
		Cause	M	This information element indicates the return code of multimedia record.
Report multimedia record completed ACK	MRFC	Context	M	This information element indicates the context where the command is executed.
		Bearer Termination	M	This information element indicates the bearer termination where the command is executed.

8.20 Reserve IMS Connection Point and Configure Remote Resources

This procedure is used to reserve multimedia-processing resources for an Mp interface connection; it is based on the procedure of the same name defined in 3GPP TS 29.163 [9].

Table 8.20.1: Procedures between MRFC and MRFP: Reserve IMS Connection Point and Configure Remote Resources

Procedure	Initiated	Information element name	Information element required	Information element description
Reserve IMS Connection Point and Configure Remote Resources	MRFC	Context/Context Request	M	This information element indicates the existing context or requests a new context for the bearer termination.
		IMSTermination Request	M	This information element indicates the existing bearer termination or requests a new IMS termination for the bearer to be established.
		Local IMS Resources	M	This information element indicates the resource(s) (i.e. codecs) for which the MRFP shall be prepared to receive user data. For terminations supporting video this IE shall contain 2 streams with separate resources per stream.
		ReserveValue	O	This information element indicates if multiple local IMS resources are to be reserved
		Remote IMS Resources	M	This information element indicates the resource(s) (i.e. codecs) for which the MRFP shall send data. For terminations supporting video this IE shall contain 2 streams with separate resources per stream.
		Local Connection Address Request	M	This information element requests an IP address and port number on the MRFP that the remote end can send user plane data to. For terminations supporting video this may contain multiple addresses per stream.
		Remote Connection Address	M	This information element indicates the remote IP address and port numbers that the MRFP can send user plane data to. For terminations supporting video this may contain multiple addresses per stream.
		Notify Released Bearer	O	This information element requests a notification of a released bearer.
Reserve IMS Connection Point and Configure Remote Resources Ack	MRFP	Context	M	This information element indicates the context where the command was executed.
		IMSTermination	M	This information element indicates the Bearer Termination where the command was executed.

		Local IMS Resources	M	This information element indicates the resource(s) (i.e. codecs) for which the MRFP shall be prepared to receive user data. For terminations supporting video this IE shall contain 2 streams with separate resources per stream.
		Remote IMS Resources	M	This information element indicates the resource(s) (i.e. codecs) for which the MRFP shall send data. For terminations supporting video this IE shall contain 2 streams with separate resources per stream.
		Local Connection Address	M	This information element indicates the IP address and port numbers the MRFP shall receive user plane data from IMS. For terminations supporting video this may contain multiple addresses per stream.
		Remote Connection Address	M	This information element indicates the remote IP address and port numbers that the MRFP can send user plane data to. For terminations supporting video this may contain multiple addresses per stream.

8.21 Reserve IMS Connection Point Procedure

This procedure is used to reserve local connection addresses and local resources in MRFP; it is based on the procedure of the same name defined in 3GPP TS 29.163 [9].

Table 8.21.1: Procedures between MRFC and MRFP: Reserve IMS Connection Point

Procedure	Initiated	Information element name	Information element required	Information element description
Reserve IMS Connection Point	MRFC	Context /Context Request	M	This information element indicates the existing context or requests a new context for the bearer termination.
		IMS Termination Request	M	This information element requests a new bearer termination
		Local IMS Resources	M	This information element indicates the resource(s) (i.e. codecs) for which the MRFP shall be prepared to receive user data. For terminations supporting video this IE shall contain 2 streams with separate resources per stream.
		ReserveValue	O	This information element indicates if multiple local IMS resources are to be reserved.
		Local Connection Address Request	M	This information element requests an IP address and port numbers on the MRFP that the remote end can send user plane data to. For terminations supporting video this may contain multiple addresses per stream.
		Notify Released Bearer	O	This information element requests a notification of a released bearer.
Reserve IMS Connection Point Ack	MRFP	Context	M	This information element indicates the context where the command was executed.
		Bearer Termination	M	This information element indicates the Bearer Termination where the command was executed.
		Local IMS Resources	M	This information element indicates the resource(s) (i.e. codecs) for which the MRFP shall be prepared to receive user data For terminations supporting video this IE shall contain 2 streams with separate resources per stream.
		Local Connection Address	M	This information element indicates the IP address and port numbers the MRFP shall receive user plane data from IMS. For terminations supporting video this may contain multiple addresses per stream.

8.22 Configure IMS Resources Procedure

This procedure is used to select multimedia-processing resources for an Mp interface connection; it is based on the procedure of the same name defined in 3GPP TS 29.163 [9].

Table 8.22.1: Procedures between MRFC and MRFP: Configure Remote Resources Procedure

Procedure	Initiated	Information element name	Information element required	Information element description
Configure IMS Resources	MRFC	Context	M	This information element indicates the context for the bearer termination.
		IMS Termination	M	This information element indicates the existing bearer termination.
		Local IMS Resources	O	This information element indicates the resource(s) (i.e. codecs) for which the MRFP shall be prepared to receive user data. For terminations supporting video this IE shall contain 2 streams with separate resources per stream.
		Remote IMS Resources	M	This information element indicates the resource(s) (i.e. codecs) for which the MRFP shall send data. For terminations supporting video this IE shall contain 2 streams with separate resources per stream.
		Local Connection Address	O	This information element indicates the IP address and port on the IM-MGW that the IMS user can send user plane data to. For terminations supporting video this may contain multiple addresses per stream.
		Remote Connection Address	M	This information element indicates the remote IP address and port numbers that the MRFP can send user plane data to. For terminations supporting video this may contain multiple addresses per stream.
Configure IMS Resources Ack	MRFP	Context	M	This information element indicates the context where the command was executed.
		IMS Termination	M	This information element indicates the Bearer Termination where the command was executed.
		Local IMS Resources	O	This information element indicates the resource(s) (i.e. codecs) for which the MRFP shall be prepared to receive user data For terminations supporting video this IE shall contain 2 streams with separate resources per stream.
		Remote IMS Resources	M	This information element indicates the resource(s) (i.e. codecs) for which the MRFP shall send data. For terminations supporting video this IE shall contain 2 streams with separate resources per stream.

		Local Connection Address	O	This information element indicates the IP address and port on the IM-MGW that the IMS user can send user plane data to. For terminations supporting video this may contain multiple addresses per stream.
		Remote Connection Address	M	This information element indicates the remote IP address and port numbers that the MRFP can send user plane data to. For terminations supporting video this may contain multiple addresses per stream.

8.23 Release IMS Termination

This procedure is used to release a termination towards the IMS and free all related resources; it is based on the procedure of the same name defined in 3GPP TS 29.163 [9].

Table 8.23.1: Procedures between MRFC and MRFP: Release IMS Termination

Procedure	Initiated	Information element name	Information element required	Information element description
Release IMS Termination	MRFC	Context	M	This information element indicates the existing context for the bearer termination.
		Bearer Termination	M	This information element indicates the bearer termination to be released.
Release IMS Termination Ack	MRFP	Context	M	This information element indicates the context where the command was executed.
		Bearer Termination	M	This information element indicates the Bearer Termination where the command was executed.

8.24 Start TTS

This procedure is used to request to start TTS.

Table 8.24.1: Procedures between MRFC and MRFP: Start TTS

Procedure	Initiated	Information element name	Information element required	Information element description
Start TTS	MRFC	Context	M	This information element indicates the context for the bearer termination.
		Bearer Termination/Bearer Termination Request	M	This information element indicates the existing bearer termination or requests a new bearer termination where the TTS is sent.
		Direction	O	This information element indicates the direction of the TTS to be sent.
		Notify TTS Completed	O	This information element requests a notification of a completed TTS.
		DTMF stop TTS	O	This information element indicates the MRFP to detect the DTMF digits and stop the TTS when a pre-defined DTMF digit is detected.
		SSML	M	This information element indicates the text to be spoken as SSML script.

Start TTS Ack	MRFP	Context	M	This information element indicates the context where the command was executed.
		Bearer Termination	M	This information element indicates the bearer termination where the command was executed.

NOTE This procedure may be combined with other procedures such as to ADD bearer connections.

8.25 Stop TTS

This procedure is used to stop TTS.

Table 8.25.1: Procedures between MRFC and MRFP: Stop TTS

Procedure	Initiated	Information element name	Information element required	Information element description
Stop TTS	MRFC	Context	M	This information element indicates the context for the bearer termination.
		Bearer Termination	M	This information element indicates the bearer termination where the TTS is stopped.
		Stop TTS	M	This information element requests that TTS is stopped.
Stop TTS Ack	MRFP	Context	M	This information element indicates the context where the command was executed.
		Bearer Termination	M	This information element indicates the bearer termination where the command was executed.

8.26 TTS Completed

This procedure is used to report the TTS result.

Table 8.26.1: Procedures between MRFC and MRFP: TTS Completed

Procedure	Initiated	Information element name	Information element required	Information element description
TTS Completed	MRFP	Context	M	This information element indicates the context for the bearer termination.
		Bearer Termination	M	This information element indicates the bearer termination where the TTS is requested.
		TTS Completed	M	This information element indicates completed of the TTS.
		Cause	M	This information element indicates the return code of TTS.
TTS Completed Ack	MRFC	Context	M	This information element indicates the context where the command was executed.
		Bearer Termination	M	This information element indicates the Bearer Termination where the command was executed.

8.27 Start ASR

This procedure is used to request to start ASR.

Table 8.27.1: Procedures between MRFC and MRFP: Start ASR

Procedure	Initiated	Information element name	Information element required	Information element description
Start ASR	MRFC	Context	M	This information element indicates the context for the bearer termination.

		Bearer Termination/Bearer Termination Request	M	This information element indicates the existing bearer termination or requests a new bearer termination where the ASR is requested.
		Recognition Mode	O	This information element indicates the recognition mode: Normal Recognition Mode, Hotword Recognition Mode.
		Notify ASR completion	O	This information element requests a notification of a completed ASR.
		DTMF stop ASR	O	This information element indicates the MRFP to detect the DTMF digits and stop the ASR when a pre-defined DTMF digit is detected.
		SRGS Grammar	M	This information element indicates the SRGS format grammar as script or URI.
Start ASR Ack	MRFP	Context	M	This information element indicates the context where the command was executed.
		Bearer Termination	M	This information element indicates the bearer termination where the command was executed.

NOTE This procedure may be combined with other procedures such as to ADD bearer connections.

8.28 Stop ASR

This procedure is used to stop ASR.

Table 8.28.1: Procedures between MRFC and MRFP: Stop ASR

Procedure	Initiated	Information element name	Information element required	Information element description
Stop ASR	MRFC	Context	M	This information element indicates the context for the bearer termination.
		Bearer Termination	M	This information element indicates the bearer termination where the ASR is stopped.
		Stop ASR	M	This information element requests that ASR is stopped.
Stop ASR Ack	MRFP	Context	M	This information element indicates the context where the command was executed.
		Bearer Termination	M	This information element indicates the bearer termination where the command was executed.

8.29 ASR completed

This procedure is used to report the ASR result.

Table 8.29.1: Procedures between MRFC and MRFP: ASR completed

Procedure	Initiated	Information element name	Information element required	Information element description
ASR completed	MRFP	Context	M	This information element indicates the context for the bearer termination.
		Bearer Termination	M	This information element indicates the bearer termination where the ASR is requested.
		ASR Completed	M	This information element indicates completed of the ASR.
		Cause	M	This information element indicates the return code of ASR.
		Recognition Result	O	This information element reports the ASR result.
		Text Token	O	This information element indicates a text token correspond to tokens as defined by the SRGS grammar. The ASR may return multiple results.
		Result Interpretation	O	This information element indicates interpretation of application specific for each result.

		Confidence Score	O	This information indicates the quality of the input for each result. The confidence score is a number in the range from 0.0 to 1.0 inclusive.
		Input Time	O	This information indicates the time of the speech input for each result.
ASR completed Ack	MRFC	Context	M	This information element indicates the context where the command was executed.
		Bearer Termination	M	This information element indicates the Bearer Termination where the command was executed.

8.30 MRFP Out-of-Service or Maintenance Locked

This procedure is used to indicate that the MRFP will go out of service or is maintenance locked.

Table 8.30.1: Procedures between MRFC and MRFP: MRFP Out-of-Service

Procedure	Initiated	Information element name	Information element required	Information element description
MRFP Out-of-Service	MRFP	Context	M	This information element indicates the context for the command.
		Root Termination	M	This information element indicates the root termination for the command.
		Reason	M	This information element indicates the reason for service change.
		Method	M	This information element indicates the method for service change.
MRFP Out-of-Service Ack	MRFC	Context	M	This information element indicates the context where the command was executed.
		Root Termination	M	This information element indicates the root termination where the command was executed.

8.31 MRFP Communication Up

This procedure is used to indicate that the MRFP is back in service.

Table 8.31.1: Procedures between MRFC and MRFP: MRFP Communication Up

Procedure	Initiated	Information element name	Information element required	Information element description
MRFP Communication Up	MRFP	Context	M	This information element indicates the context for the command.
		Root Termination	M	This information element indicates the root termination for the command.
		Reason	M	This information element indicates the reason for service change.
		Method	M	This information element indicates the method for service change.
MRFP Communication Up Ack	MRFC	Context	M	This information element indicates the context where the command was executed.
		Root Termination	M	This information element indicates the root termination where the command was executed.

8.32 MRFP Restoration

This procedure is used to indicate the MRFP failure or recovery.

Table 8.32.1: Procedures between MRFC and MRFP: MRFP Restoration

Procedure	Initiated	Information element name	Information element required	Information element description
MRFP Restoration	MRFP	Context	M	This information element indicates the context for the command.
		Root Termination	M	This information element indicates the root termination for the command.
		Reason	M	This information element indicates the reason for the service change.
		Method	M	This information element indicates the method for service change.
MRFP Restoration Ack	MRFC	Context	M	This information element indicates the context where the command was executed.
		Root Termination	M	This information element indicates the root termination where the command was executed.

8.33 MRFC Restoration

This procedure is used to indicate the MRFC failure or recovery.

Table 8.33.1: Procedures between MRFC and MRFP: MRFC Restoration

Procedure	Initiated	Information element name	Information element required	Information element description
MRFC Restoration	MRFC	Context	M	This information element indicates the context for the command.
		Root Termination	M	This information element indicates the root termination for the command.
		Reason	M	This information element indicates the reason for the service change.
		Method	M	This information element indicates the method for service change.
MRFC Restoration Ack	MRFP	Context	M	This information element indicates the context where the command was executed.
		Root Termination	M	This information element indicates the root termination where the command was executed.

8.34 MRFP Re-register

This procedure is used to re-register the MRFP.

Table 8.34.1: Procedures between MRFC and MRFP: MRFP Re-register

Procedure	Initiated	Information element name	Information element required	Information element description
MRFP Re-register	MRFP	Context	M	This information element indicates the context for the command.
		Root Termination	M	This information element indicates the root termination for the command.
		Reason	M	This information element indicates the reason for the service change.
		Method	M	This information element indicates the method for service change.
		Protocol Version	M	This information element indicates the protocol version for Mp interface requested by the MRFP.
		Service Change Profile	M	This information element indicates the profile for the Mp interface requested by the MRFP.
MRFP Re-register Ack	MRFC	Context	M	This information element indicates the context where the command was executed.
		Root Termination	M	This information element indicates the root termination where the command was executed.
		Protocol Version	O	This information element indicates the protocol version for Mp interface supported by the MRFC.
		Service Change Profile	O	This information element indicates the profile for the Mp interface supported by the MRFC.

8.35 MRFC Re-registration Ordered by MRFC

This procedure is used by the MRFC to request the MRFP to register itself.

Table 8.35.1: Procedures between MRFC and MRFP: MRFC Ordered Re-register

Procedure	Initiated	Information element name	Information element required	Information element description
MRFC Ordered Re-register	MRFC	Context	M	This information element indicates the context for the command.
		Root Termination	M	This information element indicates the root termination for the command.
		Reason	M	This information element indicates the reason for the service change.
		MRFC Address	O	This information element indicates the MRFC signalling address.
MRFC Ordered Re-register Ack	MRFP	Context	M	This information element indicates the context where the command was executed.
		Root Termination	M	This information element indicates the root termination where the command was executed.

8.36 Audit Value

This procedure is used to audit values of different object(s).

Table 8.36.1: Procedures between MRFC and MRFP: Audit Value

Procedure	Initiated	Information element name	Information element required	Information element description
Audit Value	MRFC	Context	M	This information element indicates the context for the command.
		Bearer Termination	M	This information element indicates the bearer termination(s) for the command.
		Object(s)	M	This information element indicates the object(s) to be audited.
Audit Value Ack	MRFP	Context	M	This information element indicates the context where the command was executed.
		Bearer Termination	M	This information element indicates the bearer termination where the command was executed.
		Value(s)	M	This information element indicates the value(s) of the object(s).

8.37 Audit Capability

This procedure is used to audit capabilities of different object(s).

Table 8.37.1: Procedures between MRFC and MRFP: Audit Capability

Procedure	Initiated	Information element name	Information element required	Information element description
Audit Capability	MRFC	Context	M	This information element indicates the context for the command.
		Bearer Termination	M	This information element indicates the bearer termination(s) for the command.
		Object(s)	M	This information element indicates the object(s) which capability is requested.
Audit Capability Ack	MRFP	Context	M	This information element indicates the context where the command was executed.
		Bearer Termination	M	This information element indicates the bearer termination where the command was executed.
		Capabilities(s)	M	This information element indicates the capabilities of the object(s).

8.38 Capability Update

This procedure is used to indicate update of an object capability.

Table 8.38.1: Procedures between MRFC and MRFP: Capability Update

Procedure	Initiated	Information element name	Information element required	Information element description
Capability Update	MRFP	Context	M	This information element indicates the context for the command.
		Bearer Termination	M	This information element indicates the bearer termination(s) for the command.
		Reason	M	This information element indicates the reason for service change.
		Method	M	This information element indicates the method for service change.
Capability Update Ack	MRFC	Context	M	This information element indicates the context where the command was executed.
		Bearer Termination	M	This information element indicates the bearer termination where the command was executed.

8.39 MRFC Out of Service

This procedure is used to indicate that MRFC has gone out of service.

Table 8.39.1: Procedures between MRFC and MRFP: MRFC Out of Service

Procedure	Initiated	Information element name	Information element required	Information element description
MRFC Out of Service	MRFC	Context	M	This information element indicates the context for the command.
		Root Termination	M	This information element indicates the root termination for the command.
		Reason	M	This information element indicates the reason for the service change.
		Method	M	This information element indicates the method for service change.
MRFC Out of Service Ack	MRFP	Context	M	This information element indicates the context where the command was executed.
		Root Termination	M	This information element indicates the root termination where the command was executed.

8.40 MRFP Resource Congestion Handling - Activate

This procedure is used to activate the congestion handling mechanism.

Table 8.40.1: Procedures between MRFC and MRFP: MRFP Resource Congestion Handling - Activate

Procedure	Initiated	Information element name	Information element required	Information element description
MRFP Resource Congestion Handling – Activate	MRFC	Context	M	This information element indicates that all context are applicable for the root termination.
		Root Termination	M	This information element indicates that root termination is where the congestion mechanism is activated.
		Congestion Activate	M	This information element requests to activate the congestion mechanism.
MRFP Resource Congestion Handling - Activate Ack	MRFP	Context	M	This information element indicates that all context are where the command was executed.
		Root Termination	M	This information element indicates that root termination is where the command was executed.

8.41 MRFP Resource Congestion Handling - Indication

This procedure is used to inform the MRFC that traffic restriction is advised.

Table 8.41.1: Procedures between MRFC and MRFP: MRFP Resource Congestion Handling - Indication

Procedure	Initiated	Information element name	Information element required	Information element description
MRFP Resource Congestion Handling - Indication	MRFP	Context	M	This information element indicates all context are applicable for the root termination.
		Root Termination	M	This information element indicates that root termination is where the congestion mechanism was activated.
		Reduction	M	This information element indicates the load percentage to be reduced.
MRFP Resource Congestion Handling - Indication Ack	MRFC	Context	M	This information element indicates all context are where the command was executed.
		Root Termination	M	This information element indicates that root termination is where the command was executed.

8.42 Command Reject

This command is used to reject the received command request. It may be used as response to any of the procedures.

Table 8.42.1: Procedures between (G)MSC server and MGW: Command Reject

Procedure	Initiated	Information element name	Information element required	Information element description
Command Reject	Both	Context	M	This information element indicates the context where the command was rejected.
		Bearer Termination	M	This information element indicates the bearer termination where the command was rejected.
		Error	M	This information element indicates the error that caused command rejection.

Annex A (informative): Change history

Change history							
Date	**TSG #**	**TSG Doc.**	**CR**	**Rev**	**Subject/Comment**	**Old**	**New**
2006-05	CT4#31				Draft Skeleton	0.0.0	0.1.0
2006-07	CT4#31				Approval of the ad-hoc meeting TDs: C4-060934, C4-060935, C4-060938, C4-060939, C4-060940, C4-060963, C4-060964, C4-060965, C4-060966, C4-060967, C4-060968.	0.1.0	0.2.0
2006-09	CT4#32				Approval of the meeting TDs: C4-061324,C4-061474,C4-601475,C4-061476, C4-061477,C4-061478	0.2.0	0.3.0
2006-11	CT4#33				Approval of the meeting TDs: C4-061797, C4-061798, C4-061799, C4-061801, C4-061802, C4-061804, C4-061805, C4-061806, C4-061594,C4-061646	0.3.0	0.4.0
2006-11					Sent to CT#34 information	0.4.0	1.0.0
2007-02	CT4#34				Approval of the meeting TDs: C4-070282, C4-070285, C4-070357, C4-070246, C4-070290, C4-070056, C4-070291, C4070358	1.0.0	1.1.0
2007-03	CT#35	CP-070037			Sent to CT#35 for approval	1.1.0	2.0.0
2007-03	CT#35	CP-070261			Chapter numbering corrected	2.0.0	2.1.0
2007-03	CT#35				Approved as v7.0.0	2.1.0	7.0.0
2007-06	CT#36	CP-070472	0002	1	Clarify the TTS requirement	7.0.0	7.1.0
		CP-070472	0003	3	Alignment of procedures and normative text		
		CP-070472	0005	5	Clarify ASR function requirement		
		CP-070324	0004	1	Correction to DTMF handling		
		CP-070324	0007	1	Multimedia Play		
		CP-070324	0010	1	Remove editor notes		
		CP-070324	0011	1	Correction of Play Announcement		
		CP-070324	0012	1	Addition of Non-call Related procedures to chapter 8		
2007-09	CT#37	CP-070539	0013	1	Remove option to signal max number of participants in conference	7.1.0	7.2.0
		CP-070539	0014	2	Removal of floor control functions		
		CP-070539	0015	2	Correction of stop audio and multimedia record procedures		
		CP-070539	0017	2	Clarify recording requirement and procedure		

History

Document history		
V7.1.0	June 2007	Publication
V7.2.0	October 2007	Publication