INTERNATIONAL TELECOMMUNICATION UNION

ITU-T

TELECOMMUNICATION
STANDARDIZATION SECTOR
OF ITU

F.703

(11/2000)

SERIES F: NON-TELEPHONE TELECOMMUNICATION SERVICES

Audiovisual services

Multimedia conversational services

ITU-T Recommendation F.703

(Formerly CCITT Recommendation)

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ITU-T Recommendation F.703

Multimedia conversational services

Summary

The purpose of this ITU-T Recommendation is to define the Generic Multimedia Conversational Service and to describe their general features, regardless of the network environment in which these services are provided. These services allow conversational communication between two users in two different locations. The Generic Multimedia Conversational Services are one of the generic service types identified in ITU-T Recommendation F.700, and their description follows the methodology described therein. The user requirements for the various applications supported by the service are translated into generic service specifications, independent of the constraints of specific implementations. Thus this ITU-T Recommendation sets out the requirements that will satisfy the users' needs and allow proper intercommunication on an international basis of services offered by different providers and of equipments from different manufacturers.

Various instances (profiles) of this generic service are considered here with a network independent view. Specific service descriptions for each network will be issued in other Recommendations. The detailed technical specifications of the terminal, network and protocol aspects for each of them are described in dedicated ITU-T Recommendations of the H.200, H.300, H.400 series.

Along with the F.700 methodology, the description relies on the media components and the communication tasks described respectively in Annexes A and B of ITU-T Recommendation F.700 together with the middleware service elements in Annexes C for control and processing functions. These are service independent modular communication capabilities.

Source

ITU-T Recommendation F.703 was prepared by ITU-T Study Group 16 (2001-2004) and was approved under the World Telecommunication Standardization Assembly Resolution 1 procedure on 17 November 2000.

FOREWORD

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The World Telecommunication Standardization Assembly (WTSA), which meets every four years, establishes the topics for study by the ITU-T Study Groups which, in their turn, produce Recommendations on these topics.

The approval of Recommendations by the Members of the ITU-T is covered by the procedure laid down in WTSA Resolution 1.

In some areas of information technology which fall within ITU-T's purview, the necessary standards are prepared on a collaborative basis with ISO and IEC.

NOTE

In this Recommendation, the expression "Administration" is used for conciseness to indicate both a telecommunication administration and a recognized operating agency.

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Introduction

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ITU-T Recommendation F.703

Multimedia conversational services

1 Scope

The purpose of this ITU-T Recommendation is to define the Generic Multimedia Conversational Service and to describe their general features, regardless of the network environment in which these services are provided. These services allow conversational communication between two users in two different locations. The Generic Multimedia Conversational Services are one of the generic service types identified in ITU-T Recommendation F.700, and their description follows the methodology described therein. The user requirements for the various applications supported by the service are translated into generic service specifications, independent of the constraints of specific implementations. Thus this ITU-T Recommendation sets out the requirements that will satisfy the users' needs and allow proper intercommunication on an international basis of services offered by different providers and of equipments from different manufacturers.

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Along with the F.700 methodology, the description relies on the media components and the communication tasks described respectively in Annexes A and B of ITU-T Recommendation F.700. These are service independent modular communication capabilities.

2 Definition

The Multimedia Conversational Services provide real time transmission of voice together with motion video and/or various types of multimedia information between two users in two different locations. The information exchanged may include all information types. When moving pictures are present, their quality should be at least sufficient for the adequate representation of the fluid movements of a person displayed in head and shoulders view.

NOTE – The smoothness of the movements in the reproduced picture is essentially dependent on the amount of motion with respect to the transfer rate and compression scheme of transmitted picture information. The above requirements are supposed to be met under such conditions where the amount of motion is limited or the throughput is high enough not to impair the received picture. Degradation may appear as increased blurring, jerkiness and/or various artefacts in the reproduced picture.

The media components used are described in the Annexes A of ITU-T Recommendation F.700 on Audiovisual/Multimedia Services. Media component Audio (Annex A.1) is usually present, together with one or more of the media components Video (Annex A.2), Text (Annex A.3), Graphics (Annex A.4), Still Pictures (Annex A.5).

3 References and terminology

3.1 References

The following ITU-T Recommendations and other references contain provisions which, through reference in this text, constitute provisions of this Recommendation. At the time of publication, the editions indicated were valid. All Recommendations and other references are subject to revision; all users of this Recommendation are therefore encouraged to investigate the possibility of applying the

most recent edition of the Recommendations and other references listed below. A list of the currently valid ITU-T Recommendations is regularly published.

– ITU-T Recommendation F.700 (2000), *Framework Recommendation for audiovisual/multimedia services*.

– ITU-T Recommendation F.702 (1996), *Multimedia conference services*.

– ITU-T Recommendation G.114 (2000), *One-way transmission time.*

– CCITT Recommendation G.711 (1988), *Pulse code modulation (PCM) of voice frequencies.*

– CCITT Recommendation G.722 (1988), *7 kHz audio-coding within 64 kbit/s.*

– ITU-T Recommendation T.120 (1996), *Data protocols for multimedia conferencing.*

– ITU-T Recommendation T.140 (1998), *Protocol for multimedia application text conversation.*

– ITU-T H-series Recommendations – Supplement 1 (1999), *Application profile – Sign language and lip-reading real-time conversation using low bit-rate video communication.*

3.2 Terminology

3.2.1 Collaborative Document Handling service (CDH): A service that provides bidirectional transfer of data between two or more locations so that users are able to work on a common document, for drafting or amending it collectively.

3.2.2 communication modes: A communication mode is defined by the various channels supporting the media used for the service. Changes in communication mode may occur during the course of the call, in order to set up or eliminate one of the media, or to change its quality level and thus the bit-rate allocation. It may be used for instance to temporarily add a channel for transmitting still pictures.

3.2.3 Multipoint Conference Unit (MCU): Equipment that provides multipoint connections among three or more conference rooms.

3.2.4 muting: Preventing sound to be transmitted from a terminal equipment.

3.2.5 videoconference service: An audiovisual conference service providing bidirectional real-time transfer of voice and motion video between groups of users in two or more separate locations. Although the audio and motion video informations are the essential part of the service, other types of information, such as high resolution still pictures, text or graphics may also be exchanged.

3.2.6 videophone service: An audiovisual conversational service providing bidirectional symmetric real-time transfer of voice and motion video between two locations. The minimum requirement is that under normal conditions the picture information transmitted is sufficient for the adequate representation of fluid movements of a person displayed in head and shoulders view.

3.2.7 total conversation service: An audiovisual conversation service providing bidirectional symmetric real-time transfer of motion video, text and voice between users in two or more locations.

3.2.8 text telephone service: An audiovisual conversation service providing bidirectional real time transfer of text and optionally audio between users in two locations. Audio may be transmitted alternating with text or simultaneously with text.

4 Description

4.1 General description

A multimedia conversational service provides real time bidirectional communication via telecommunication networks between users in two different locations; it usually combines an audio facility with motion video of the users and/or transmission of multimedia informations; however the audio may not be present in some particular applications. The service is applicable to dedicated terminal equipments or to microcomputer based terminals.

Multimedia Conversational Services are essentially built around the communication task Conversing described in Annex A.1/F.700. Other communication tasks (receiving, sending) may optionally also be used. The control functions are described in Annex C.2/F.700 – Middlewaren service element Conversation control.

4.2 Functional model

In a multimedia conversational service, two terminals exchange multimedia informations through a telecommunication network (Figure 1).

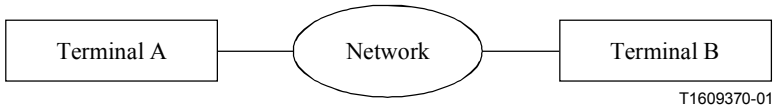

Figure 1/F.703 – Functional model

4.3 Configuration

The basic configuration is point to point between two terminals communicating through a bidirectional connection. This connection is usually symmetrical, but in special cases the media components present in each direction may be different, or they may be the same but with different bit rates and quality of service.

A conference call may be set up as a supplementary service in conformance with ITU-T Recommendation F.702, in which case the configuration is multipoint to multipoint; the terminals are then connected through a multipoint conference unit (MCU) that fulfils three functions:

a) managing the call, setting up and closing the connections;

b) managing the conference, through control and indication signals exchanged with the terminals;

c) handling the signals received and sent on each connection, switching, distributing, multiplexing and when necessary adapting and combining them as appropriate.

4.4 Terminal aspects

Audio is used for the service except in exceptional cases. Therefore in order to perform the basic functions necessary for multimedia conversational services, the terminal equipment should include the following units necessary for audio communication:

– a microphone;

– one (or more) loud-speaker(s);

– an audio codec;

– optionally some audio related controls.

The terminal must also include a network interface unit. The other types of information require specific equipments detailed below. The terminal should include the equipment(s) for at least one media component besides audio.

The equipment for handling multimedia documents includes one or more of the following functional units:

– a micro-computer with a screen and a modem;
– a still picture equipment with a camera or scanner, a screen and a modem;
– a telewriting equipment;
– optionally a printer.

The basic equipment for video includes:

– a camera;
– a screen;
– a video codec.

When video is present, means must be provided for displaying the outgoing picture, either permanently or by substituting it on the screen to the incoming picture.

NOTE – Testing of the outgoing picture: it should be possible for the user to put an off-line terminal into a self-test procedure, which includes the codec, in order to test and control the outgoing picture.

4.5 Applications

Some possible applications are indicated here as examples:

– various types of conversation between two distant parties, similar to a telephone conversation but enhanced with motion video, still pictures or text;
– conversation between two distant parties, where one of them at least has difficulty in hearing and uses another media, either because of a disability or because of a noisy environment; examples are conversation with sign language using a videophone, lip reading to help hearing impaired people, text conversation;
– elaboration of a document between two parties, with or without cooperative document handling.

4.6 Supplementary services

For further study.

5 Static aspects

5.1 Service level

5.1.1 General aspects of the service

Throughout the communication phase, the communication task Conversing is usually active with the media component audio and one or more other media components.

Exchange of various types of documents may optionally be available, using the communication task Sending with one or more media components.

The relationship between the three levels of the multimedia service reference model (service, communication tasks and media components) is shown on Figure 2.

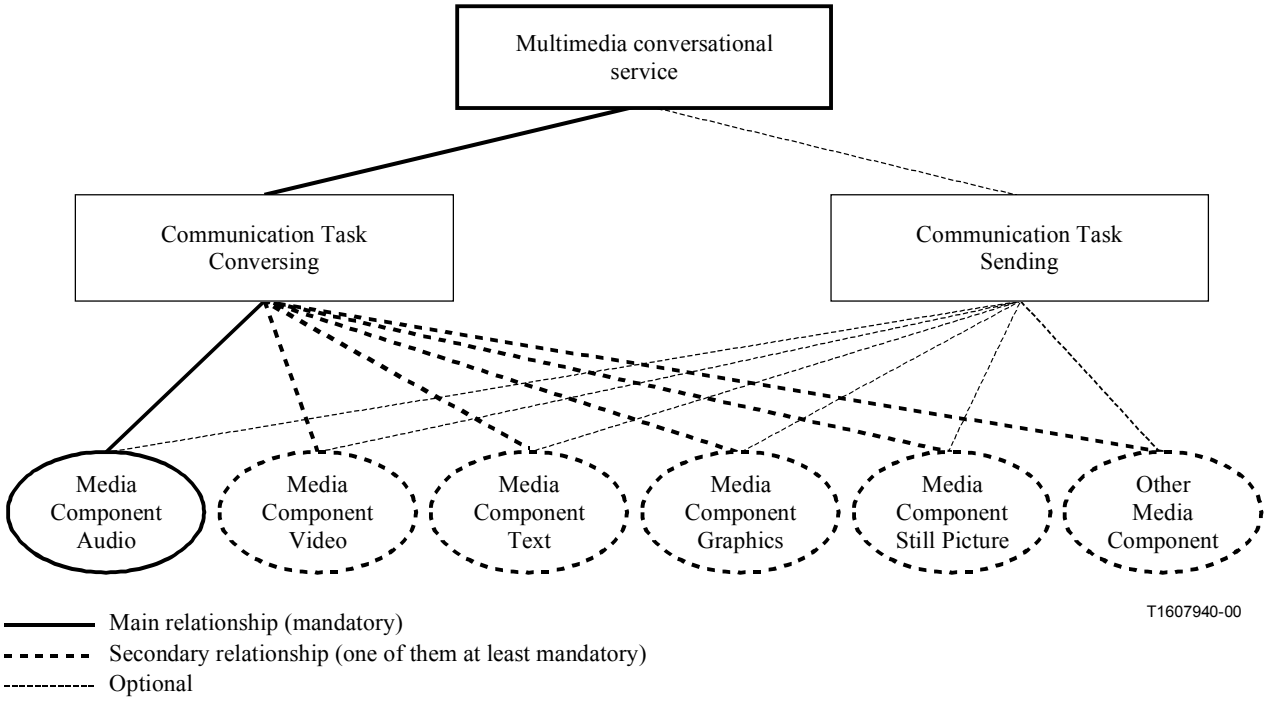

Figure 2/F.703 – Relationships between service level, communication tasks and media components

5.1.2 Quality of service

5.1.2.1 General considerations

The quality of service depends on the quality of each media component (see 5.3.1), of their association (e.g. synchronisation of sound and image), of the control and procedures. It also depends on the combined quality of the various parts of the system and its environment.

5.1.2.2 Overall delay

The nominal overall delay is defined as the sum of the transmission delay and the characteristic delay of the terminals (see Note). The subjective effect of this delay on the quality of service has to be taken into account because an excessive value may impair user acceptability.

Under normal conditions the overall delay should not exceed 400 ms, in conformance with ITU-T Recommendation G.114. Another Recommendation is expected for audiovisual services. However, when no means are available to fulfil this condition, the call should not be rejected.

NOTE – The characteristic delay of a terminal is the delay introduced by the terminal when the transmitted information contents for the various media is minimal; for the video, this means that there is no movement or only very small movements in the transmitted image, e.g. only lips and eyes of the users are moving.

5.1.3 Security aspects

No specific means for security are usually required. They may however be included for particular applications.

5.1.4 General charging principles

The same charging options should be offered as for telephony.

5.2 Communication task level

5.2.1 Communication tasks used for the service

Multimedia conversational services are built around the communication task Conversing (see Annex B.1/F.700). Other tasks such as Receiving and Sending may also be used for specific purposes.

5.2.2 Quality of service related to the communication tasks

Differential delay between sound and image

When video is present, the differential delay between sound and image should be kept low enough for lip synchronism to be subjectively insured. The differential delay should not be allowed to become more than 120 ms, and should preferably remain below 100 ms. ITU-T H-series Recommendations – Supplement 1 *(Application profile – Sign language and lip-reading real-time conversation using low bit-rate video communication)* reports that asynchronism under 100 ms is required.

5.3 Media component level

5.3.1 Media components used for the service

The Media component Audio (see Annex A.1/F.700) is normally set up at the beginning of the call and is usually present throughout, but it may be temporarily interrupted to increase the bit-rate available for other media components.

One other media component at least should also be present, permanently or not, i.e. one of the following components:

– Video (Annex A.2/F.700);
– Text (Annex A.3/F.700);
– Graphics (Annex A.4/F.700);
– Still Pictures (Annex A.5/F.700);
– others (for further study).

5.3.2 Quality of service related to the media components

5.3.2.1 Sound quality

The following two levels of sound quality are preferred:

– the basic quality is equivalent to that of the PCM telephony conforming to ITU-T Recommendation G.711 (level 0 of media component Audio);
– the high quality is 7 kHz bandwidth (conforming to ITU-T Recommendation G.722) equivalent to present broadcast TV sound (level 1 of media component Audio).

For the quality levels of the media component Audio, see Annex A.1/F.700.

Means for efficient echo control must be provided. When video is present, these means should have the capability to accommodate the large transmission delay that may be induced by the synchronisation of sound and image (see 5.2.2).

5.3.2.2 Image quality for the video

When video is present, its quality should be sufficient for reproducing the fluid movements of a person in head and shoulders view (see Note). Four grades of image quality may be offered:

– minimum videophone quality: one person with only very small movements can be viewed with a limited resolution; this is level 0 of the media component Video and is applicable to low bit-rate connections;

– basic videophone quality: one person with only small movements can be viewed; this is level 1 of the media component Video; it allows limited language perception;

– enhanced videophone quality: at least 2 persons with only small movements can be viewed; this is level 2 of the media component Video; it is equivalent to the basic videoconference quality; it allows a good language perception level, a good usability for sign language and lip-reading, and a comfortable intercommunication with the videoconference service;

– high quality videophone: the quality should be that of broadcast TV and possibly that of HD-TV; this is level 3 or 4 of the media component Video.

For the quality levels of the media component Video, see Annex A.2/F.700.

A factor of quality related to video is the recovery time for picture build-up when the video source is changed; it is important to keep it low in the case of conference calls, but may also apply when two or more cameras are used alternately, e.g. one showing the user and another one for documents.

Complete definition and methods of evaluation of the quality of motion pictures require further studies.

NOTE – When motion video is present, the smoothness of the movement in the displayed image depends on the ability of the system to convey rapid changes; the amount of information which has to be transmitted will of course increase with the affected area in the picture and the speed of the movement. It is generally considered that in a normal conversation, only part of the picture will be moving and that any fast movement will be limited to a small portion of the image. Some degradation of the picture quality such as blurring or other artefacts may be allowed to occur when these conditions are not met.

5.3.2.3 Text Quality

Text conversation is supposed to be supported according to the principles of T.140 [ITU-T Recommendation T.140, *Protocol for multimedia application text conversation*].

Preferred display areas and other requirements can be found in ETSI ETR333 [Human Factors: Text Telephony, User requirements and proposals].

Text quality is measured in corrupted characters, dropped characters and characters replaced by the missing text marker [see ITU-T Recommendation T.140].

Another factor of quality is the ability to use a complete set of characters for various languages.

For the quality levels of the media component Text, see Annex A.3/F.700.

6 Dynamic aspects

6.1 Activation phase

6.1.1 Provision, withdrawal

The multimedia conversational services may be provided after prior arrangement with a service provider, or they may be generally available.

6.1.2 Call establishment

Call establishment is on demand. Incoming calls shall be announced with means that is perceivable by the users, e.g. audible, visual or tactile alerting signals preferably selected by the user.

Call progress shall be announced to the caller with visible and audible signals.

6.2 Communication phase

6.2.1 Call set-up

The call is made according to the general procedure applicable to the network involved. If several modes are allowed, negotiation occurs between the terminals for the selection of the mode to be used. This is usually an automatic process relying on the general options of each user. When required, additional channels are established and aggregated to the initial channel.

6.2.2 Change of communication mode

Changes in user requirements arising during the course of the communication may require a change of communication mode, i.e. changes in the network connections or changes in the in-band channel that are transparent to the network. If the network supports it, then in-call change of mode should be allowed when both terminals have the capabilities for the new mode. A change of mode that entails an increased cost for the communication may only be initiated from the charged end.

6.2.3 Conference calls

A conference call is a supplementary service. It is established in conformance with ITU-T Recommendation F.702 and is made through a multipoint control unit (MCU). It uses the communication task Conferencing (Annex B.2/F.700), and the middleware service element Conference Control (Annex C.1/F.700).

6.2.4 Audio muting and video inhibition

Any participant may temporarily prevent his terminal from sending out audio or video signals. A suspended video should be replaced by an adequate notice. A terminal should provide a visual indication when its audio is muted or its video inhibited.

6.2.5 Access to other services

6.2.5.1 General

Access to other services may be made by one of the participants, who forwards the multimedia documents or informations received to the other participant in the call; this requires an additional access to the network, the appropriate rights of access to the service and possibly specific rights for forwarding documents to other users; the service may be public or private, e.g. retrieval of multimedia documents from a private server.

In the case of a conference call, access may also be made through the MCU, which then has to provide an access to the network, rights of access to the service (unless it can use the rights of one or several of the participants in the conference through some authentication procedure), and possibly conversion of protocols, of coding or of media.

6.2.5.2 Retrieval services

For further study.

6.3 Termination phase

Call termination may be initiated indifferently from the calling or from the called end.

7 Service profiles

7.1 Different types of Multimedia Conversational Services

Multimedia conversational services can be divided into different types of profiles according to the various kinds of information exchanged and to their quality levels. They usually have in common the capability for transmission of sound. The different types are:

– Videophone service, with audio and moving pictures and optionally various types of data;

– Voice and data services, with audio and various types of data;

– Text telephony, with real time text, optionally combined with audio;

– Total Conversation service, with moving pictures, real time text and audio;

– Collaborative Document Handling Service (CDH), with real time text, data and possibly graphics; this service is often used in multipoint configurations and is therefore described in ITU-T Recommendation F.702.

7.2 List of service profiles

The following profiles of the Generic Multimedia Conversational Services are defined. As stated in ITU-T Recommendation F.700, these profiles are references for the offering of services, but do not preclude any enhancement or additional functions. Additional profiles may be included in the future to respond to evolving user needs.

1) *Videophone service:*

   – Profile 1a, Low bit-rate videophony: low bit-rate audio, QCIF video or less with limited movements capability;

   – Profile 1b, Basic videophony: PCM telephony audio, QCIF video or CIF video with limited movements capability;

   – Profile 1c, Enhanced videophony: wideband audio, CIF video.

   – Profile 1d, High quality videophony: wideband audio, TV quality video or HD-TV quality video.

2) *Voice and data services:*

   These services may be offered with two levels of audio quality and with three types of exchanged data. The minimum audio quality is level A0, low bit-rate audio (profiles 2a); the basic audio quality is level A1, equivalent to PCM telephony audio. The three types of exchanged data are still pictures from a camera or equivalent system (profiles 2a1, 2b1), text (profiles 2a2, 2b2), and microcomputer files (profiles 2a3, 2b3).

   – Profile 2a1, low bit-rate audio with still pictures;

   – Profile 2a2, low bit-rate audio with text;

   – Profile 2a3, low bit-rate audio with file transfer;

   – Profile 2a1, basic audio with still pictures;

   – Profile 2a2, basic audio with text;

   – Profile 2a3, basic audio with file transfer.

3) *Text Telephone Service:*

- Profile 3a, Usable text conversation, with text only;
- Profile 3b, Usable text conversation alternating between text and audio (Introduced here for historical reasons, to describe existing services. There is no desire to limit new implementations to the alternating text/audio profile);
- Profile 3c, Good text conversation with simultaneous usable audio.

4) *Total Conversation Service:*

- Profile 4a, Minimum total conversation, with usable audio, usable text and perceivable video;
- Profile 4b, Standard total conversation : with usable audio, good text and good motion optimised video.

The following table recapitulates the requirements for the various types of profiles in terms of media components and their minimal levels of quality.

Service	**Profile**	**Audio**	**Video**	**Text**	**Graphics, and/or Still Pictures**	**File transfer**
VPS	P1a	A0	V0*	O	O	O
	P1b	A1	V1*	O	O	O
	P1c	A2	V2	O	O	O
	P1d	A3	V3 or V4	O	O	O
VDS	P2a	A0	O	O*	O*	O*
	P2b	A1	O	O*	O*	O*
TTS	P3a	-	-	T1	O	O
	P3b	A1*	-	T1*	O	O
	P3c	A1	-	T2	O	O
TCS	P4a	A1	V0	T2	O	O
	P4b	A1	V2	T2	O	O

A0, A1, ...	minimum mandatory audio quality level
A1*	minimum mandatory audio quality level alternating with text
V0, V1, ...	minimum mandatory video quality level
V0*, V1*, ...	minimum mandatory video quality level, with a limited amount of movement
T0, T1	minimum mandatory text quality level
T0*	minimum mandatory text alternating with audio
O	optional
O*	one at least of the media components mandatory

NOTE – Telephony and text only service are monomedia services, but apart from that difference they share the same specification as the above services.

8 Interworking and intercommunication

8.1 General

Terminals with different characteristics and capabilities may be connected in a multimedia conversation. They use a common mode that both terminals can handle. Any media that both terminals supports will be present with the lower of the two quality levels if these differ.

8.2 Intercommunication with a telephone terminal

The communication is made with sound only.

8.3 Videophone and other multimedia conference terminals

8.3.1 Audiographic conference and videophone terminals

These terminals can intercommunicate with sound only. Basic videophones have a lower quality level than audiographic conference terminals which will have to fall back to this lower level to establish communication. However, with broadband videophones, the situation may be the reverse. The ability to select one video picture in the video terminal (or in the MCU in the case of a multipoint call) for sending it as a still picture to the AGC terminal would be a desirable feature.

8.3.2 Videoconference and videophone terminals

If the video codecs have a common mode, then this can be used for intercommunication. However, with a basic videophone terminal, this may not be desirable in a multipoint call because of the limited image quality, insufficient to show several participants simultaneously. The other possibility is then for the videoconference rooms to communicate between themselves in their usual mode, while the videophone terminal participates with sound only.

8.3.3 Communication with a facsimile terminal

The communication is not possible unless the multimedia conversational terminal supports facsimile on its data channel.

8.3.4 Text telephone interworking

It may be of interest for users of multimedia conversation terminals to be able to conduct text conversations with text telephones. This interworking may be possible either if the terminal has text conversation capabilities and a gateway for interworking with the text telephones is available, or the terminal has capabilities for direct interworking with the actual type of text telephone.

8.3.5 Total Conversation interworking

Total Conversation terminals should be capable of interworking with Total Conversation terminals in other networks through gateways. They should also interwork with other multimedia terminals with a subset of their functionalities.

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18874

Printed in Switzerland
Geneva, 2001