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SERIES H: AUDIOVISUAL AND MULTIMEDIA SYSTEMS

Infrastructure of audiovisual services – Communication
procedures

Multipoint extension for broadband audiovisual communication systems and terminals

ITU-T Recommendation H.247

(Previously CCITT Recommendation)

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ITU-T RECOMMENDATION H.247

MULTIPOINT EXTENSION FOR BROADBAND AUDIOVISUAL COMMUNICATION SYSTEMS AND TERMINALS

Summary

This Recommendation describes and specifies the means by which three or more H.310 audiovisual communication terminals operating in the *native* mode may communicate simultaneously over B-ISDN and/or customer premises ATM network, such communication being designated a "multipoint call". It also covers conference configurations including other H-series terminals.

Source

ITU-T Recommendation H.247 was prepared by ITU-T Study Group 16 (1997-2000) and was approved under the WTSC Resolution No. 1 procedure on the 25th of September 1998.

FOREWORD

ITU (International Telecommunication Union) is the United Nations Specialized Agency in the field of telecommunications. The ITU Telecommunication Standardization Sector (ITU-T) is a permanent organ of the ITU. The ITU-T is responsible for studying technical, operating and tariff questions and issuing Recommendations on them with a view to standardizing telecommunications on a worldwide basis.

The World Telecommunication Standardization Conference (WTSC), 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 WTSC Resolution No. 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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As of the date of approval of this Recommendation, the ITU had not received notice of intellectual property, protected by patents, which may be required to implement this Recommendation. However, implementors are cautioned that this may not represent the latest information and are therefore strongly urged to consult the TSB patent database.

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Recommendation H.247**MULTIPOINT EXTENSION FOR BROADBAND AUDIOVISUAL
COMMUNICATION SYSTEMS AND TERMINALS***(Geneva, 1998)***1 Scope**

This Recommendation concerns the system operation for a conference call between three or more H.310 terminals operating in the native mode. It also covers conference configurations including other H-series terminals. It is applicable to a single Multipoint Control Unit (MCU) that multicasts the multiplexed stream without any audio mixing nor video switching, and to a single MCU containing audio mixers and video switches. It is also applicable to an MCU containing video mixers, and to multiple MCUs. Recommendation H.310 provides for communication between two audiovisual terminals connected point-to-point, using the multimedia multiplexer and network adaptation defined in Recommendations H.222.0 and H.222.1. Recommendation H.245 defines a number of Control and Indication signals, including those used in the multipoint communication procedures described in this Recommendation.

Three or more *native* H.310 terminals may be put into communication to form a conference call, by means of one or more MCUs. It should be noted that the physical realization of an MCU may be such that two or more independent conferences are set up within the same unit; logically, however, there is no relationship between these conferences; the text herein refers to an MCU only as a logical entity pertinent to the particular call of concern.

This Recommendation envisions providing:

- a simple protocol stack that can support various applications (e.g. high-quality videoconferencing, distance learning and corporate TV broadcasting);
- a support for various VC connection configurations (e.g. asymmetric bandwidth connection, mixture of bidirectional and multicast connections used in a panel discussion, and unidirectional connection like TV broadcasting);
- a conference configuration including other H-series terminals, i.e. H.320, H.321, H.322, H.323, H.324;
- an option supporting continuous presence video display (video mixing);
- a multicast capability that significantly reduces the network traffic.

For various VC connection configuration examples, the following are within the provision of this Recommendation:

- n-point tightly coupled connection (e.g. multipoint videoconference);
- a point-to-multipoint connection without return channels (e.g. broadcast conference);
- n1-point tightly coupled and n2-point loosely coupled connection (e.g. broadcast panel conference);
- a point-to-multipoint connection with some return channels (e.g. multipoint TV lecture).

**Documents**

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Figure 1 shows the general scope of H.247 conference configuration. There are two basic multipoint configurations: MCU-based multipoint vs. decentralized multi-party multipoint. In the interest of traffic load which is significant in the broadband environments, this Recommendation specifies MCU-based multipoint configurations. Decentralized multi-party multipoint is for future study.

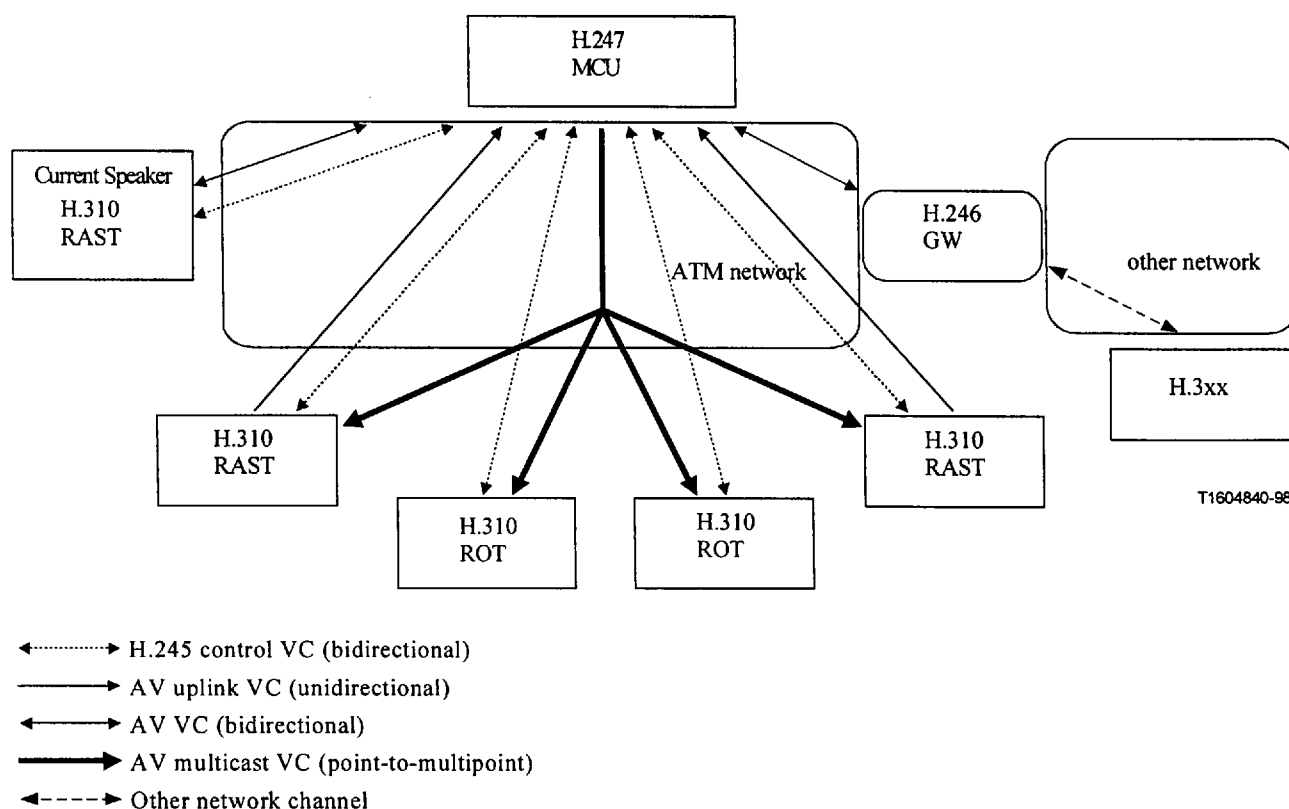


Figure 1/H.247 – General scope of H.247 conference configuration

This Recommendation concerns the flow of signals along ATM virtual channel of B-ISDN or customer premises ATM network. The flow consists of a multiplex of audio, video, control and indication signals, and optional user data as defined in Recommendation H.222.0 which should be handled by the MCU in a way which is satisfactory to the users.

The signal multiplex on each path is fully in accordance with Recommendation H.222.0. Likewise, the basic procedures for initialization and mode switching are fully in accordance with those defined in Recommendations H.310 and H.245 for point-to-point working. However, the composition of the multiplexed signal transmitted by each terminal and by the MCU is determined by terminal procedures and multipoint system procedures, as follows:

- a) terminal procedures are defined in service-specific system Recommendations, such as Recommendation H.310 for audiovisual communications systems and terminal equipment;
- b) multipoint system procedures are defined in this Recommendation, and are not of themselves service-specific;
- c) T.120/T.130: by making use of the T-series Recommendations, MCU and terminal procedures may be greatly enhanced, offering far more sophisticated specific applications to the user. Such enhancement is outside the scope of this Recommendation, although interactions with specific T.120/T.130 methods are described here.

The multipoint conferencing procedure and the MCU for H.320/H.321 interoperation mode of H.310 terminal are defined by Recommendations H.231 and H.243.

2 Normative 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.

- [1] CCITT Recommendation G.711 (1988), *Pulse Code Modulation (PCM) of voice frequencies*.
- [2] ITU-T Recommendation H.221 (1997), *Frame structure for a 64 to 1920 kbit/s channel in audiovisual teleservices*.
- [3] ITU-T Recommendation H.222.0 (1995) | ISO/IEC 13818-1:1996, *Information technology – Generic coding of moving pictures and associated audio information: Systems*.
- [4] ITU-T Recommendation H.222.1 (1996), *Multimedia multiplex and synchronization for audiovisual communication in ATM environments*.
- [5] ITU-T Recommendation H.231 (1997), *Multipoint control units for audiovisual systems using digital channels up to 1920 kbps*.
- [6] ITU-T Recommendation H.235 (1998), *Security and encryption for H-series (H.323 and other H.245 based) multimedia terminals*.
- [7] ITU-T Recommendation H.243 (1997), *Procedures for establishing communication between three or more audiovisual terminals using digital channels up to 1920 kbps*.
- [8] ITU-T Recommendation H.245 (1998), *Control protocol for multimedia communication*.
- [9] ITU-T Recommendation H.261 (1993), *Video codec for audiovisual services at $p \times 64$ kbit/s*.
- [10] ITU-T Recommendation H.262 (1995), | ISO/IEC 13818-2:1996, *Information technology – Generic coding of moving pictures and associated audio information: video*.
- [11] ITU-T Recommendation H.310 (1998), *Broadband audiovisual communication systems and terminals*.
- [12] ITU-T Recommendation H.320 (1997), *Narrow-band ISDN visual telephone systems and terminal equipment*.
- [13] ITU-T Recommendation H.321 (1998), *Adaptation of H.320 visual telephone terminals to B-ISDN environments*.
- [14] ITU-T Recommendation H.332 (1998), *H.323 extended for loosely coupled conferences*.
- [15] ITU-T Recommendation I.363.1 (1996), *B-ISDN ATM Adaptation Layer specification: Type 1 AAL*.
- [16] ITU-T Recommendation I.363.5 (1996), *B-ISDN ATM Adaptation Layer specification: Type 5 AAL*.
- [17] ITU-T Recommendation Q.2931 (1995), *Digital Subscriber Signalling System No. 2 – User-Network Interface (UNI) layer 3 specification for basic call/connection control*.

- [18] ITU-T Recommendation Q.2941.1 (1997), *Digital Subscriber Signalling System No. 2 – Generic identifier transport.*
- [19] ITU-T Recommendation Q.2961.1 (1995), *Digital Subscriber Signalling System No. 2 – Additional traffic parameters: Additional signalling capabilities to support traffic parameters for the tagging option and the sustainable cell rate parameter set.*
- [20] ITU-T Recommendation Q.2961.2 (1997), *Digital Subscriber Signalling System No. 2 – Additional traffic parameters: Support of ATM transfer capability in the broadband bearer capability information element.*
- [21] ITU-T Recommendation Q.2971 (1995), *Digital Subscriber Signalling System No. 2 – User-network interface layer 3 specification for point-to-multipoint call/connection control.*
- [22] ITU-T Recommendation T.120 (1996), *Data protocols for multimedia conferencing.*
- [23] ITU-T Recommendation T.122 (1998), *Multipoint communication service – Service definition.*
- [24] ITU-T Recommendation T.123 (1996), *Network specific data protocol stacks for multimedia conferencing.*
- [25] ITU-T Recommendation T.124 (1998), *Generic Conference Control.*
- [26] ITU-T Recommendation T.125 (1998), *Multipoint communication service protocol specification.*
- [27] ITU-T Recommendation T.130, *Audiovisual control for multimedia conferencing Architecture and overview.*
- [28] ISO/IEC 11172-3:1993, *Information Technology – Coding of moving pictures and associated audio for digital storage media at up to about 1.5 Mbit/s – Part 3: Audio.*
- [29] ISO/IEC 13818-3:1995, *Information Technology – Generic coding of moving pictures and associated audio – Part 3: Audio.*

3 Definitions

In this Recommendation, the word "shall" is used to indicate a mandatory requirement, while the word "should" is used to indicate an option or a suggestion. "May" indicates an optional course of action rather than a recommendation that something take place.

Control and signalling messages are indicated in **bold face**. Referred Recommendation is attached to the message.

3.1 active MC: An MC that has won the master/slave determination procedure and is currently providing the multipoint control function for the conference.

3.2 broadcast conference: A broadcast conference is one in which there is one transmitter of multiplex streams and many receivers. There is no bidirectional transmission of multiplexed streams. Such conferences should be implemented using network transport multicast facilities, if available. Also see Recommendation H.332.

3.3 broadcast panel conference: A broadcast panel conference is a combination of a multipoint conference and a broadcast conference. In this conference, several terminals are engaged in a multipoint conference while many other terminals are only receiving the multiplex streams. There is bidirectional transmission between the terminals in the multipoint portion of the conference and no bidirectional multiplex stream transmission between them and the listening terminals. Also see Recommendation H.332.