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LINE TRANSMISSION OF NON-TELEPHONE SIGNALS

BROADCASTING TYPE AUDIOVISUAL MULTIPOINT SYSTEMS AND TERMINAL EQUIPMENT

ITU-T Recommendation H.331

(Previously "CCITT Recommendation")

FOREWORD

The ITU Telecommunication Standardization Sector (ITU-T) is a permanent organ of the International Telecommunication Union. 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, established the topics for study by the ITU-T Study Groups which, in their turn, produce Recommendations on these topics.

ITU-T Recommendation H.331 was prepared by the ITU-T Study Group XV (1988-1993) and was approved by the WTSC (Helsinki, March 1-12, 1993).

NOTES

1 As a consequence of a reform process within the International Telecommunication Union (ITU), the CCITT ceased to exist as of 28 February 1993. In its place, the ITU Telecommunication Standardization Sector (ITU-T) was created as of 1 March 1993. Similarly, in this reform process, the CCIR and the IFRB have been replaced by the Radiocommunication Sector.

In order not to delay publication of this Recommendation, no change has been made in the text to references containing the acronyms "CCITT, CCIR or IFRB" or their associated entities such as Plenary Assembly, Secretariat, etc. Future editions of this Recommendation will contain the proper terminology related to the new ITU structure.

2 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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Recommendation H.331

BROADCASTING TYPE AUDIOVISUAL MULTIPOINT SYSTEMS AND TERMINAL EQUIPMENT

(Helsinki, 1993)

1 Scope

This Recommendation covers technical requirements for the broadcasting type multipoint system and terminal equipment which allow the audiovisual signal from a transmitting terminal to be distributed to multiple receiving terminals by utilizing signal distribution function of the ISDN digital switches. ISDN channels (B, H_0, multiples of them, or H_{11}/H_{12}) providing transmission capacity not exceeding 1920 kbit/s are used.

An essential technical feature in this system is that communication channels cannot be two-way between the information providing terminal and any information receiving terminal because the path from the receiving terminal to the transmitting one is terminated at the exchange. Communication procedures can not rely on-negotiation. This fact requires a Recommendation separate from Recommendation H.320, but based on it and catered for particular needs of the broadcasting type multipoint system so that terminals operating for both H.320 and this Recommendation are easily implemented.

2 Definitions

For the purpose of this Recommendation the following definitions apply:

bit-rate allocation signal (BAS): Bit position within the frame structure of H.221 to transmit e.g. commands, control and indication signals, capabilities.

control and indication (C&I): End-to-end signalling between terminals consisting of "control" which causes a state change in the receiver and "indication" which provides for information as to the functioning of the system. See also Recommendation H.230.

inband signalling: Signalling via HAS of the H.221 frame structure contained in the $B/H_0/H_{11}/H_{12}$ channel.

information providing terminal (IPT): Terminal which distributes audiovisual information to IRTs.

information receiving terminal (IRT): Terminal which receives audiovisual information from IPT.

outband signalling: Signalling via D channel which is separate from the $B/H_0/H_{11}/H_{12}$ channel (as per I.400-Series Recommendations).

3 System description

The broadcasting type multipoint system, as illustrated in Figure 1, consists of a single information providing terminal (IPT), multiple information receiving terminals (IRTs) and a communication network (ISDN) having multiconnect function in its digital exchanges.

A number of applications can be accommodated in this system; among others

- remote surveillance from multiple sites;
- remote lecturing;
- information provision.

The last example is similar to the telephone information service provided on the conventional analog telephone network.

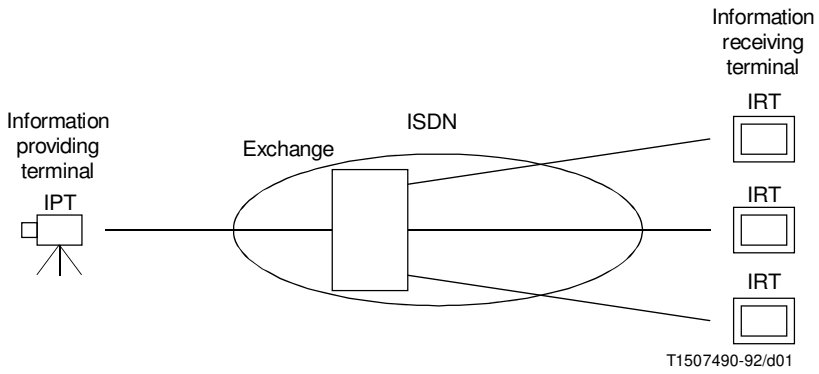

FIGURE 1/H.331

System configuration for Broadcasting multipoint service

4 Terminal description

4.1 Configuration

IPT and IRT configurations are similar to that of H.320 terminals, but IPT has only audiovisual signal transmitting capability while IRT has only audiovisual signal receiving capability (see Figure 2). Major difference from H.320 resides in the system control part.

4.2 Communication modes and terminal types

As per Tables 1/H.320 and 2/H.320.

4.3 Video coder and decoder

As per Recommendation H.261 or others identified in Annex A/H.221.

4.4 Audio coder and decoder

As per Recommendations G.711, G.722, G.728, H.200/AV253 or others identified in Annex A/H.221.

4.5 Frame structure

As per Recommendation H.221.

4.6 C&I signals

The following control and indication signals are relevant to the broadcasting type multipoint system.

- Picture format control defined in Recommendation H.261;
- Freeze picture request control “VCF” defined in Recommendation H.230;
- Freeze picture release control defined in Recommendation H.261;
- Split screen indication defined in Recommendation H.261;
- Document camera indication defined in Recommendation H.261;
- Audio active/muted indication “AIA/AIM” defined in Recommendation H.230;
- Video active indication “VIA/VIA2/VIA3” defined in Recommendation H.230;
- Video suppressed indication “VIS” defined in Recommendation H.230.

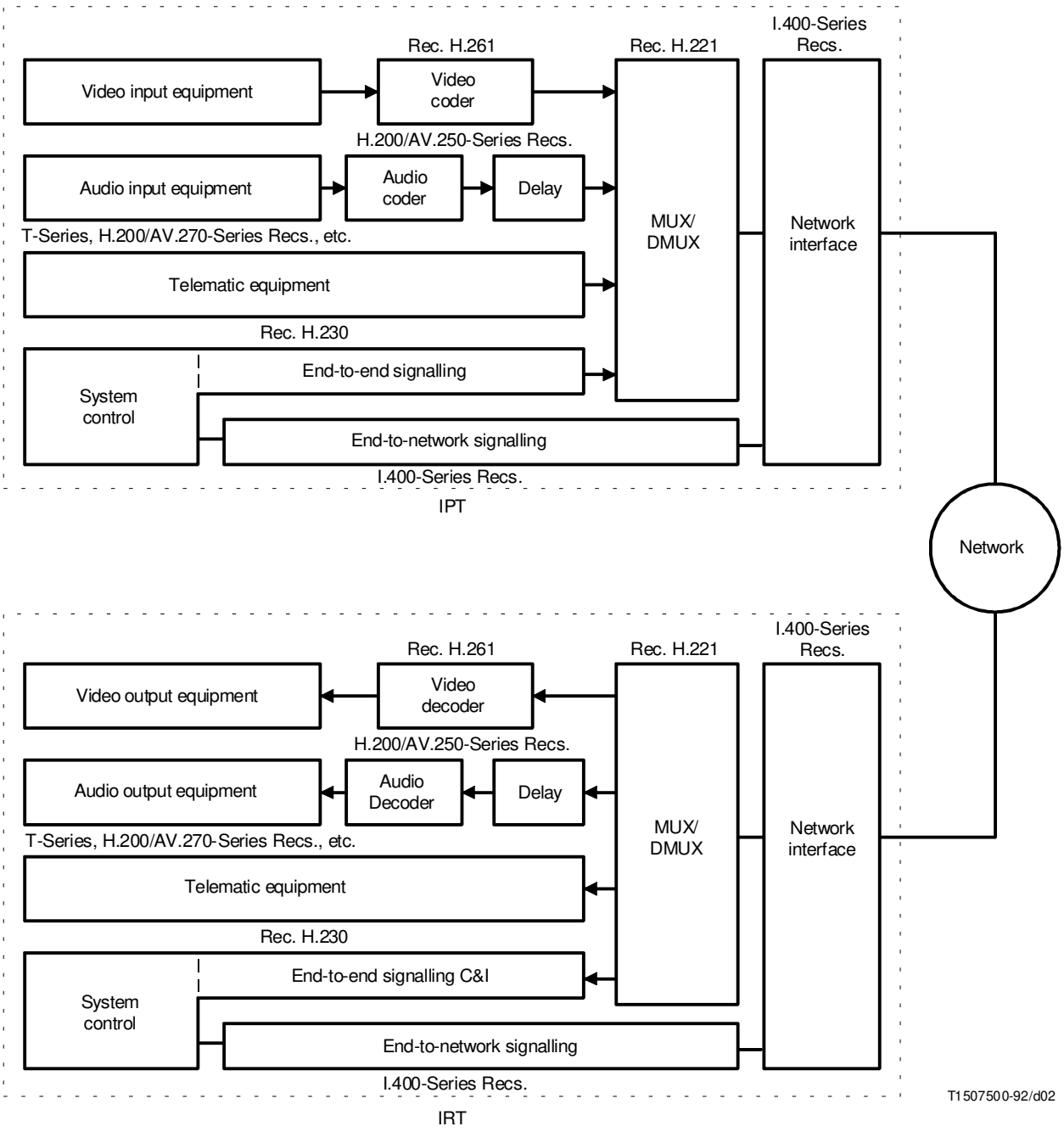

FIGURE 2/H.331

Terminal equipment configurations

The first control signal is continuously contained in the coded video signal, while the remaining control or indication signals are used according to the necessity of the information providing terminal.

Maintenance C&I (LCA, LCV, LCD, LCO) should be equipped on a mandatory or optional basis according to the definition of Table 1/H.230.

4.7 Communication procedures

4.7.1 Normal procedures

NOTE – Provision of the communication is generally made of Phase A (call set-up), Phase B (mode setting), Phase C (transfer of audiovisual signals), Phase D (termination) and Phase E (call release). In this broadcasting type multipoint system, Phases B and D are skipped.

Since inband capability exchanges between IPT and IRT, as defined in Recommendation H.242, can not be used in this system, all the transmission modes of IPT should be made known in advance to IRT as part of service specifications. Such a list should include the following which corresponds to Table 2/H.242:

- audio coding modes;
- video standards, format (CIF/QCIF), minimum picture intervals;
- transfer rates;
- restricted network if relevant;
- LSD, HSD, MLP, H-MLP if relevant;
- applications in data channel if relevant;
- multiple-byte extension if relevant.

IRT should include necessary functions required by IPT according to the service specifications.

After IRT has received a CONNECT message from the network through the outband channel, it searches H.221 framing in the inband channel and prepares to receive the incoming audiovisual signal including FAS and BAS from IPT through the network. The sending signal including FAS and BAS can be arbitrary.

After IPT has sent a CONNECT message and received a CONNECT ACKNOWLEDGE message from the network through the outband channel, it starts to send the H.221 framed audiovisual signal together with corresponding BAS commands through the inband channel, ignoring the received signal and inserting the following bits in FAS:

- A = 0 regardless of the received signal;
- E = 0 regardless of the received signal;
- Cl, C2, C3, C4 as calculated;
- Ll, L2, L3 as appropriate;
- N1, N2, N3, N4 as appropriate in case of multiple B or multiple H_0 communications.

IRTs except the first calling one may get access to the bitstream from IPT at an arbitrary point, thus it may be necessary for the IPT to insert INTRA pictures cyclically and for the IRT to mute audiovisual signals until they become clean at the output of the, decoders. The frequency of INTRA picture insertion and the timing to release muting are left to the designer's choice.

4.7.2 Exceptional procedures

Recovery from fault conditions, such as loss of H.221 framing, is in general left to the designer's choice. Guidance for some recovery procedures is for further study.

5 Call control arrangements

NOTE – This clause gives an example of a multipoint broadband network capability. It is not to be interpreted as a standardized service description of a multipoint broadcast service.

5.1 Network conditions

The network provides this broadcasting multipoint capability subject to the following conditions:

- IPTs using this service are appropriately pre-registered with the network.
- The IPT is assigned a general ISDN number in case of single B or H_0 channel communication. In case that multiple B or H_0 channels are used, each channel is assigned an independent number. This is necessary to distinguish constituent channels with each other. If an IRT wishes to connect to the IPT, it can call that general ISDN number(s). Therefore, no special network access protocol or special access number is required in the call initiation procedure from the IRT to the network.
- The calling procedure from the network to the IPT is the general calling procedure. There is also no need for special protocols that allow to distinguish multiconnection from general connection.

5.2 Call set-up

An IRT (IRT-1) calls the IPT by using the IPT's ISDN number. When the destination exchange accommodating the IPT can acknowledge that the destination user is a registered IPT, the network sends a setup signal to the IPT through the outband channel. After receiving the IPT's response, the network connects only the path from the IPT to the IRT. The path from the IRT to the IPT is not connected but terminated at the network. When the IPT connected to the IRT is called by other IRTs (IRT-2, 3, . . .), the destination exchange does not send a setup signal to the IPT. This is different from the first call procedure. Then the destination exchange connects only the paths from the IPT to the IRT. So the same information is distributed to each connected IRT.

5.3 Call release

When an IRT (IRT-a) sends a disconnect signal, the destination exchange releases the path from it to IRT-a but does not transmit this signal to the IPT. The IPT therefore doesn't know that the communication to the IRT-a has been finished. The destination exchange maintains the connection and path from the IPT to the other IRTs. When the last IRT sends its disconnect signal, the destination exchange sends this signal to IPT and releases the path as it releases the path for a general call.

5.4 Multiple channels

In case of multiple B or H_0 communications, the calling terminal may place multiple calls according to the terminal procedure

- sequentially from the initial channel, confirming the received channel number contained in FAS and BAS;
- simultaneously.

Coding rule for information elements in the call setup message follows that of audiovisual services defined in Recommendation Q.939. Particular setting of octet 4 of HLC for this broadcasting type multipoint service is for further study.

5.5 Authentication of the receiving terminals

When IPT is called by an IRT, it may be necessary to authenticate the caller by the IPT or the network. This is for further study.

6 Intercommunication

This terminal is not expected to intercommunicate with telephone terminals or visual telephone terminals defined in Recommendation H.320.