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ITU-T

TELECOMMUNICATION
STANDARDIZATION SECTOR
OF ITU

F.732

(10/96)

SERIES F: NON-TELEPHONE TELECOMMUNICATION
SERVICES

Audiovisual services

Multimedia conference services in the B-ISDN

ITU-T Recommendation F.732

(Previously CCITT Recommendation)

ITU-T F-SERIES RECOMMENDATIONS
NON-TELEPHONE TELECOMMUNICATION SERVICES

TELEGRAPH SERVICE	F.1–F.109
Operating methods for the international public telegram service	F.1–F.19
The gentex network	F.20–F.29
Message switching	F.30–F.39
The international telemesssage service	F.40–F.58
The international telex service	F.59–F.89
Statistics and publications on international telegraph services	F.90–F.99
Scheduled and leased communication services	F.100–F.104
Phototelegraph service	F.105–F.109
MOBILE SERVICE	F.110–F.159
Mobile services and multideestination satellite services	F.110–F.159
TELEMATIC SERVICES	F.160–F.399
Public facsimile service	F.160–F.199
Teletex service	F.200–F.299
Videotex service	F.300–F.349
General provisions for telematic services	F.350–F.399
MESSAGE HANDLING SERVICES	F.400–F.499
DIRECTORY SERVICES	F.500–F.549
DOCUMENT COMMUNICATION	F.550–F.599
Document communication	F.550–F.579
Programming communication interfaces	F.580–F.599
DATA TRANSMISSION SERVICES	F.600–F.699
AUDIOVISUAL SERVICES	F.700–F.799
ISDN SERVICES	F.800–F.849
UNIVERSAL PERSONAL TELECOMMUNICATION	F.850–F.899
HUMAN FACTORS	F.900–F.999

For further details, please refer to ITU-T List of Recommendations.

FOREWORD

The ITU-T (Telecommunication Standardization Sector) is a permanent organ of the International Telecommunication Union (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 (Helsinki, March 1-12, 1993).

ITU-T Recommendation F.732 was prepared by ITU-T Study Group 1 (1993-1996) and was approved by the WTSC (Geneva, October 9-18, 1996).

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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CONTENTS

	<i>Page</i>
1 Scope.....	1
2 Definition	1
3 Terminology	1
4 Description	1
4.1 General description.....	1
4.2 Functional model	1
4.3 Configuration.....	1
4.4 Roles of the participants	3
4.5 Terminal aspects	3
4.6 Applications.....	3
4.7 Supplementary services	3
5 Static aspects	3
5.1 Service level	3
5.2 Communication task level.....	4
5.3 Media component level.....	4
6 Dynamic aspects.....	4
6.1 Activation phase	4
6.2 Communication phase.....	4
6.3 Termination phase	5
6.4 Call termination	5
7 Service profiles	5
7.1 Different types of multimedia conference services	5
7.2 List of service profiles	5
8 Interworking/intercommunication.....	7
8.1 Interworking between narrow-band and broadband terminals.....	7
8.2 Access type 7	12
8.3 Hybrid MCU.....	15
8.4 Interworking with LANs.....	15
8.5 Intercommunication between services	18
9 Attribute table and values.....	18
9.1 Information transfer high layer attributes.....	18
9.2 Information transfer low layer attributes.....	19
9.3 Access attributes	19
Annex A – References.....	20

SUMMARY

This Recommendation encompasses a broad range of related services, including the videoconference service, and also the audiographic conference service, the videophone conference service and CDH (Collaborative Document Handling). It is part of a general framework for Recommendations on multimedia services.

This Recommendation refers to Recommendation F.702 (Multimedia conference services) and contains only those parts that require complements or choices between options in order to apply it specifically to B-ISDN and to take full advantage of its enhanced capabilities.

Because in the coming years the broadband conference rooms will have to interwork with the existing narrow-band systems, a large part of this Recommendation is devoted to the various possible configurations for interworking (see clause 8). Thus, when B-ISDN is interconnected with 64 kbit/s-based ISDN, it will also have to provide the services which are currently provided by this network, and insure interworking with existing narrow-band terminals.

MULTIMEDIA CONFERENCE SERVICES IN THE B-ISDN

(Geneva, 1996)

1 Scope

This Recommendation describes the multimedia conference services supported by a B-ISDN. It relies on Recommendation F.702 for the main body of the description, and only gives the specific complements relevant to the B-ISDN that derive from its capabilities and its limitations. Thus, when reading this Recommendation, it is necessary to refer back to Recommendation F.702. The numbers of the clauses are those of F.702, and thus they do not form a continuous sequence because only a few clauses need a specific complement for the B-ISDN. In addition, there is a new clause 9 on the attributes for the various profiles. Because interworking with the N-ISDN is a major requirement and will probably be a very frequent way of setting up conferences in the next few years, this is described in great detail in clause 8.

2 Definition

See Recommendation F.702.

3 Terminology

See Recommendation F.702.

4 Description

4.1 General description

See Recommendation F.702.

4.2 Functional model

See Recommendation F.702.

4.3 Configuration

4.3.1 Configuration at the network access

The following figures describe the possible basic scenarios corresponding to a multimedia conference offered at the network access.

4.3.1.1 Access type 1

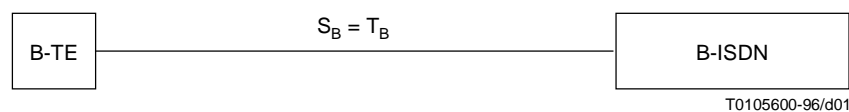


Figure 1/F.732 – Configuration

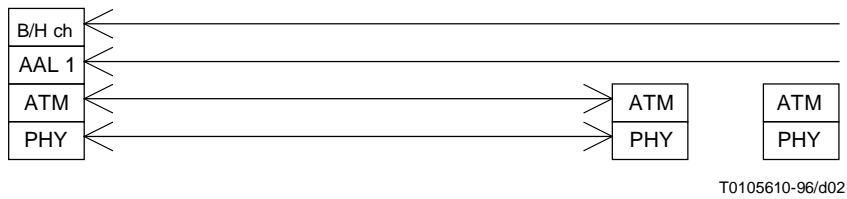


Figure 2/F.732 – U-plane

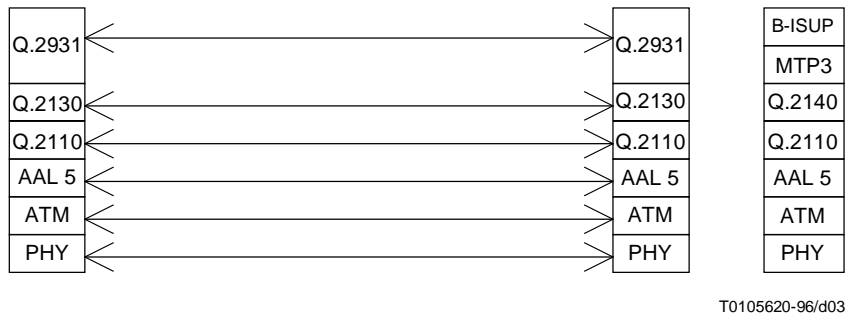


Figure 3/F.732 – C-Plane

4.3.1.2 Access type 2

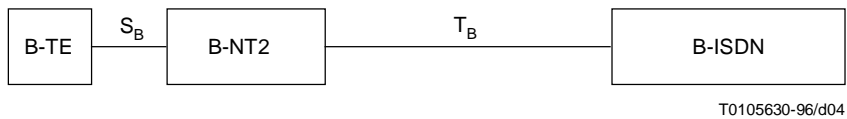


Figure 4/F.732 – Configuration

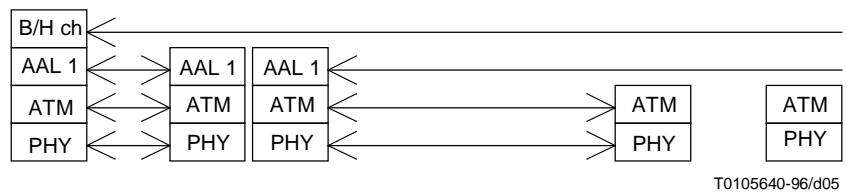
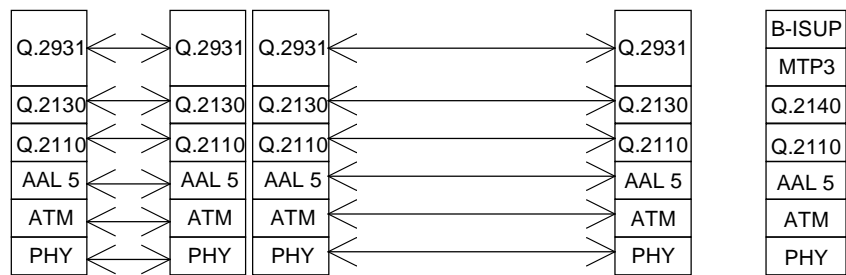


Figure 5/F.732 – U-plane



T0105650-96/d06

Figure 6/F.732 – C-Plane

4.4 Roles of the participants

See Recommendation F.702.

4.5 Terminal aspects

Two types of terminals may be used on the B-ISDN: those that are specifically designed for the B-ISDN and those that are adapted from the narrow-band terminals. When video is present (videoconference, videophone and some CDH terminals), the first kind of terminals conform to Recommendation H.310, while the second kind conforms to Recommendation H.321.

Audio

The normal audio mode for conferencing services is wideband audio conforming to Recommendation G.722. A G.711 codec should also be present for interworking purposes. G.728 coding may also be used in interworking or fall-back situations, or temporarily to leave a larger bandwidth to the video or to the data subchannels, e.g. while showing an object or transmitting a document.

The use of higher quality audio codecs is for further study.

Video (when applicable)

Video codecs shall conform to Recommendation H.262 or H.261; H.261 codecs shall always be present for interworking purposes.

4.6 Applications

See Recommendation F.702.

4.7 Supplementary services

For further study.

5 Static aspects

5.1 Service level

5.1.1 General aspects of the service

See Recommendation F.702.

5.1.2 Quality of service

See Recommendation F.702.

5.1.3 Security aspects

See Recommendation F.702.

5.1.4 General charging principles

See Recommendation F.702.

5.2 Communication task level

5.2.1 Communication tasks used for the service

See Recommendation F.702.

5.2.2 Quality of service

See Recommendation F.702.

5.3 Media component level

5.3.1 Media components used for the service

See Recommendation F.702.

5.3.2 Quality of service

See Recommendation F.702.

6 Dynamic aspects

6.1 Activation phase

See Recommendation F.702.

6.2 Communication phase

6.2.1 Call set-up

See Recommendation F.702.

6.2.2 Addition of another party during the call

See Recommendation F.702.

6.2.3 Conference splitting

See Recommendation F.702.

6.2.4 Change of communication mode

See Recommendation F.702.

6.2.5 Call prolongation in the case of reservation

See Recommendation F.702.

6.2.6 Call disconnection

See Recommendation F.702.

6.2.7 Conference management procedures

The procedures for multipoint broadband conference services are those of the T.120-Series of Recommendations. Audio and video control use the T.126 procedure. Other media components should be transmitted on the common data subchannel supporting the T.120-Series protocol and are controlled through that channel.

Interworking with narrow-band terminals requires the use of the procedures described in Recommendation H.242 and Recommendation H.243 for multipoint aspects.

6.3 Termination phase

6.4 Call termination

See Recommendation F.702.

7 Service profiles

7.1 Different types of multimedia conference services

See Recommendation F.702.

7.2 List of service profiles

The following Media Components (MCs) are defined for the broadband conferences services:

- MC 1: audio;
- MC 2: video;
- MC 3: synchronous signalling;
- MC 4: data.

B-ISDN is able to support all profiles of multimedia conference services. Thus, the following service profiles may be offered over a B-ISDN network:

1) *Videoconference services*

MC 1: mandatory, MC 2: mandatory, MC 3: mandatory, MC 4: optional

Profile 1a – Basic videoconference service, with a transfer rate of 128 kbit/s; terminals shall conform to Recommendations H.310 and H.321, or to H.321 only.

Profile 1b – Standard videoconference service, with a transfer rate of 384 kbit/s; terminals shall conform to Recommendation H.310 and H.321, or to H.321 only.

Profile 1c – Enhanced videoconference service; for further study.

Profile 1d – High quality videoconference service; for further study.

2) *Audiographic conference services*

MC 1: mandatory, MC 2: not applicable, MC 3: mandatory, MC 4: mandatory

Profile 2 – All audiographic conference services use wideband audio conforming to Recommendation G.722 and a data subchannel supporting the T.120-Series protocol.

3) *Cooperative document handling services*

MC 1: optional, MC 2: optional, MC 3: mandatory, MC 4: mandatory

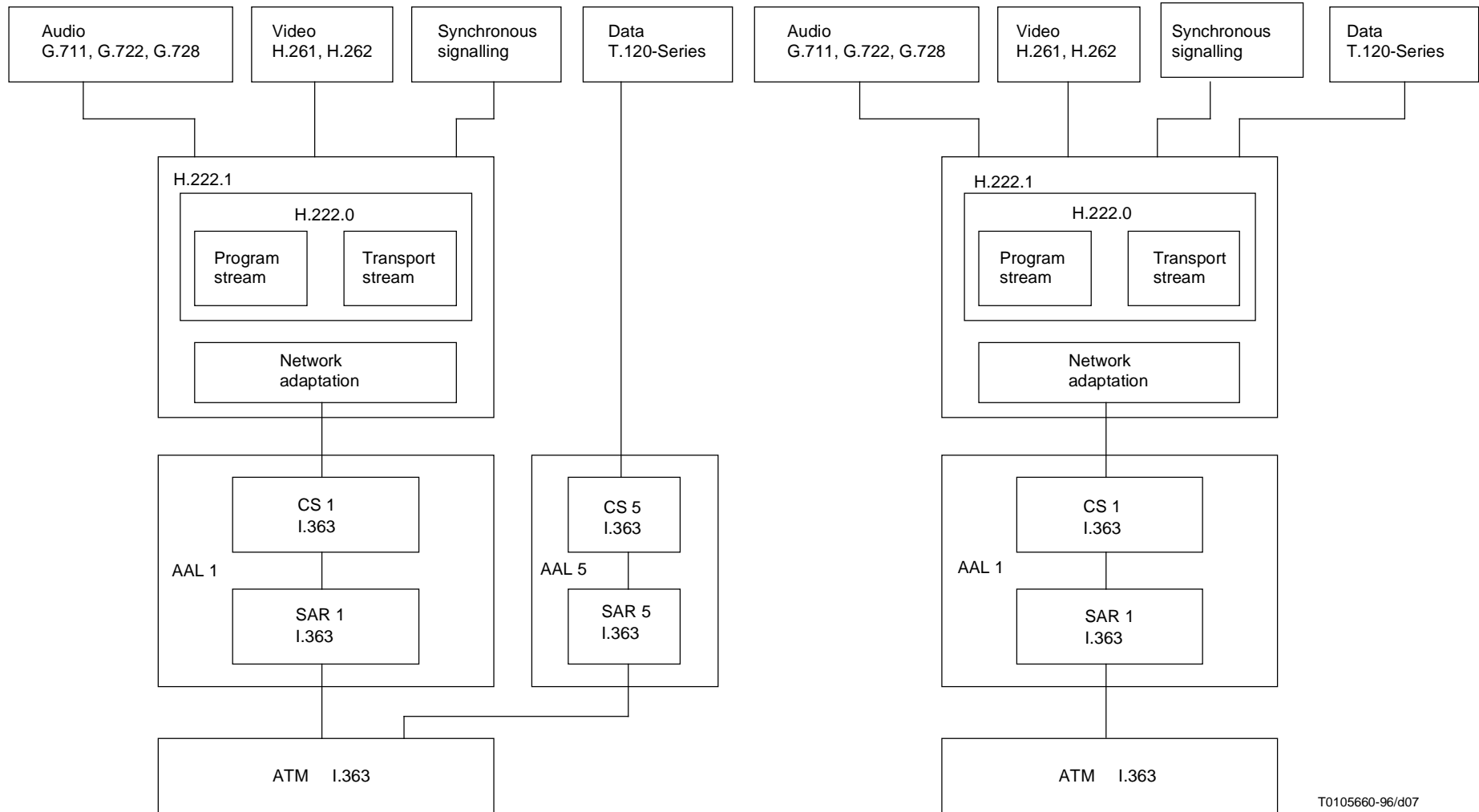
Profile 3 – All cooperative document handling services have audio to one or more of the Recommendations G.711, G.722, G.728; they have a data subchannel supporting the T.120-Series protocol, and in particular T.127 for file transfer; other data functions are for further study; video conforming to H.261 and/or H.262 is optional.

4) *Videophone conference supplementary services*

MC 1: mandatory, MC 2: mandatory, MC 3: optional, MC 4: optional

Profile 4b – Basic videophone conference service; this service applies to basic videophone terminals with a transfer rate of 128 kbit/s, and does not require any specific enhancement to the terminals; these terminals conform to Recommendations H.310 and H.321, or to H.321 only; they have G.728 and/or G.722 audio codecs (and G.711 for interworking purposes); they have H.261 and optionally H.262 video codecs; the profile is the same as Profile 1a except that G.722 coding is only optional instead of mandatory.

Figure 7 shows the support of audio, video, data and signalling over an ATM connection.



T0105660-96/d07

Figure 7/F.732 – Functional organization

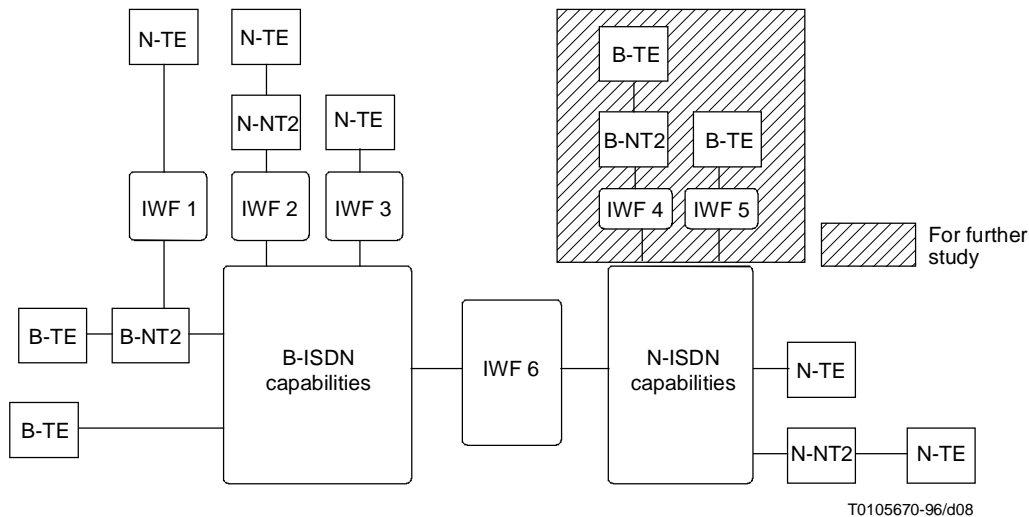
8 Interworking/intercommunication

8.1 Interworking between narrow-band and broadband terminals

8.1.1 Configurations

8.1.1.1 Reference configuration

The reference configuration illustrates the various possible connections between terminals and networks.



B-TE is a future broadband terminal
B-NT2 is a broadband NT2
N-TE is a narrow-band terminal
N-NT2 is a narrow-band NT2
IWF i ($1 \leq i \leq 6$) corresponds to the i^{th} specific group of interworking functions

Figure 8/F.732 – Scenarios for interworking

8.1.1.2 Standardized configurations

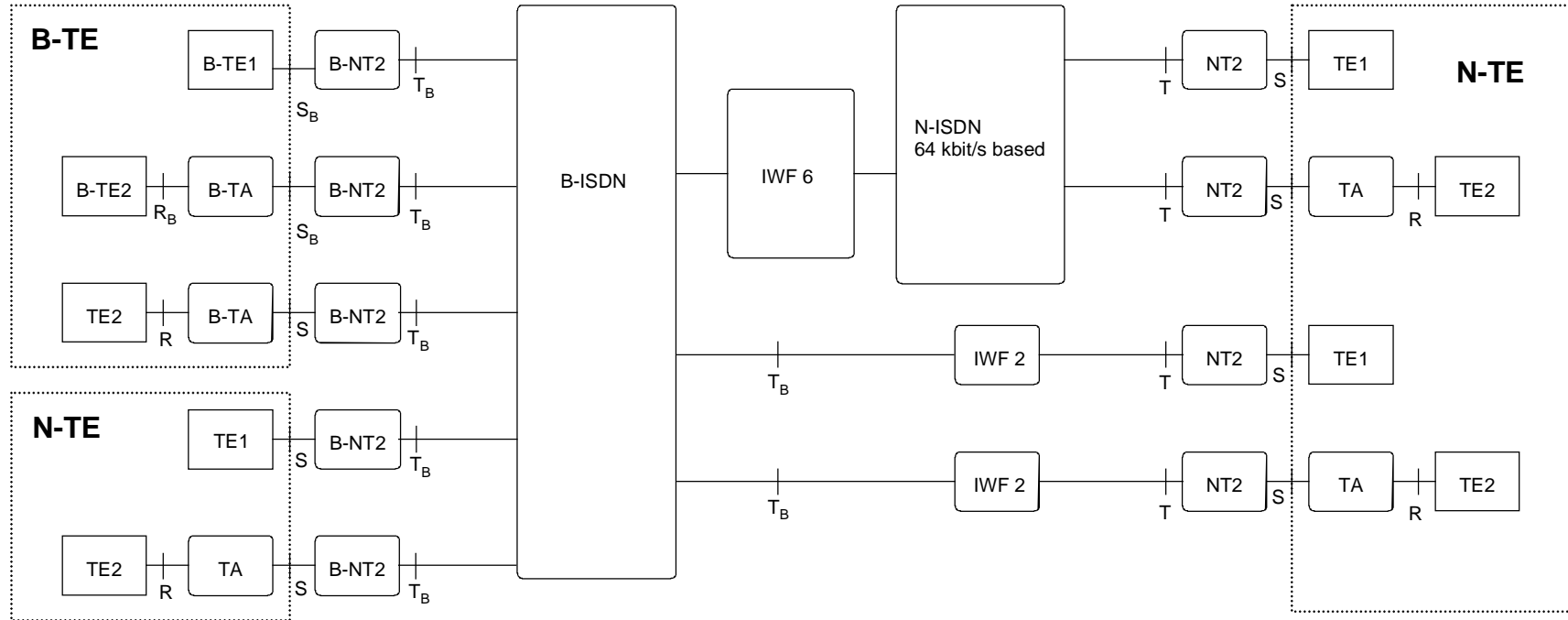
These configurations are extracted from I.413 and I.580.

8.1.1.3 Practical configuration

The general practical configuration is based on the standardized configurations for interworking, but also reflects the fact that a B-ISDN does not only support broadband capabilities but also 64 kbit/s-based ISDN capabilities. It implies that all 64 kbit/s-based ISDN services are integrated in B-ISDN with a broadband signalling protocol. The interworking uses the broadband signalling protocol and a B-NT2 is necessarily present to connect the N-TEs (64 kbit/s-based TEs) to the B-ISDN. Interworking between broadband services and 64 kbit/s-based ISDN services is performed by call control mapping. Several kinds of signalling interworking are possible depending on the network architecture and the communication configuration:

- 1) UNI signalling interworking between DSS 2 and DSS 1 (e.g. case of an IWF between an N-TE and a B-NT2);
- 2) NNI signalling interworking between B-ISUP and N-ISUP (e.g. case of an IWF between the B-ISDN and N-ISDN public networks);
- 3) UNI/NNI signalling interworking between DSS 1 and B-ISUP (e.g. case of an N-TE or N-NT2 attached to an integrated broadband/narrow-band local exchange, the IWF being done in the exchange);
- 4) UNI/NNI signalling interworking between DSS 2 and N-ISUP (e.g. case of a B-NT2 or B-TE attached to an integrated broadband/narrow-band local exchange, the IWF being done in the exchange).

NOTE – The support of N-ISDN supplementary services in B-ISDN is required.



T0105680-96/d09

NOTE – NT2 may be empty ($S = T$) and B-NT2 may also be empty ($S_B = T_B$). If NT2 is empty, relevant IWF is IWF 3 instead of IWF 2.

Figure 9/F.732 – Standardized configurations for interworking

8.1.2 Scenarios at the network access

The following figures describe the possible basic scenarios at the network access for a multimedia conference. There are seven possible types of accesses, depending on whether the terminal is broadband or narrow-band, whether it accesses a broadband or narrow-band network, and whether it is connected directly or through an NT2.

8.1.2.1 Access for a broadband terminal connected to the B-ISDN

Access types 1 and 2 are used in this case and have already been described in 3.3.1.

NOTE – The mapping of IWF (to be understood as generic) and TA is for further study.

8.1.2.2 Access type 3

This is an access for a narrow-band terminal to the B-ISDN.

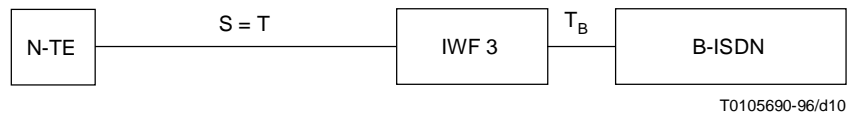


Figure 10/F.732 – Configuration

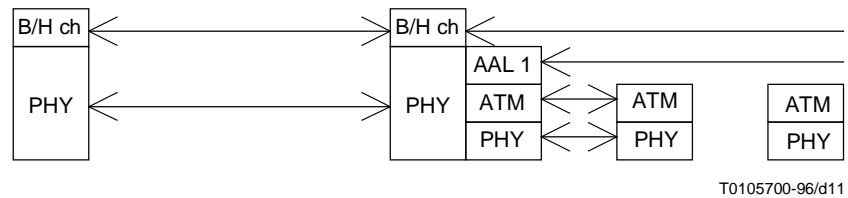


Figure 11/F.732 – U-Plane

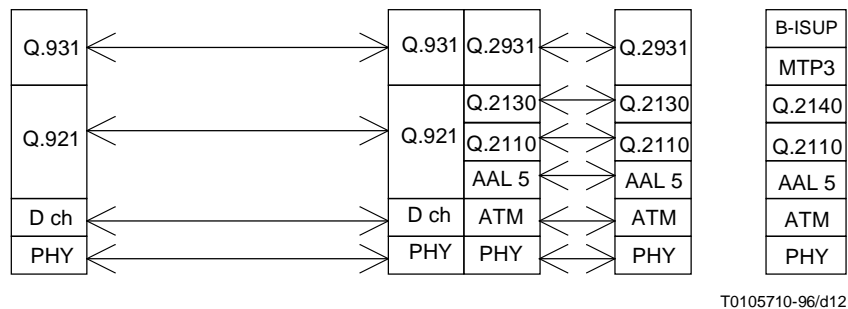


Figure 12/F.732 – C-Plane

8.1.2.3 Access type 4

This is another access for a narrow-band terminal to the B-ISDN.

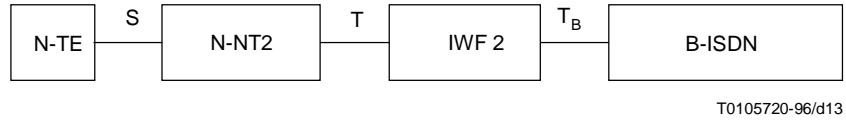


Figure 13/F.732 – Configuration

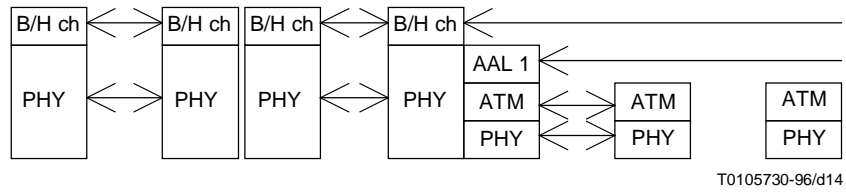


Figure 14/F.732 – U-Plane

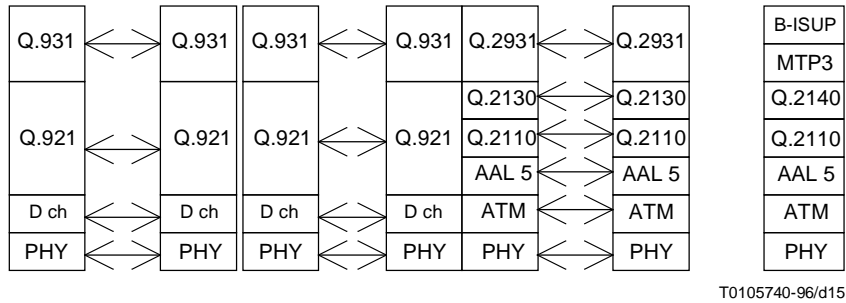


Figure 15/F.732 – C-Plane

8.1.2.4 Access type 5

This is another access for a narrow-band terminal to the N-ISDN.

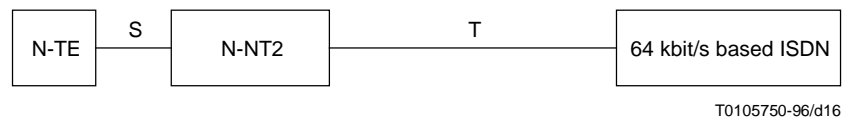


Figure 16/F.732 – Configuration

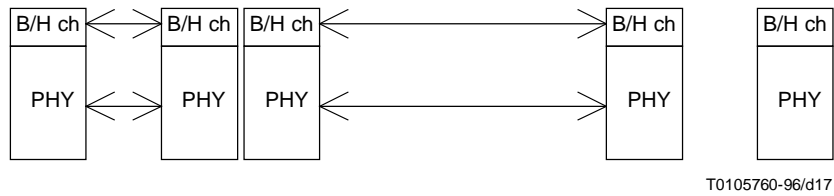


Figure 17/F.732 – U-Plane

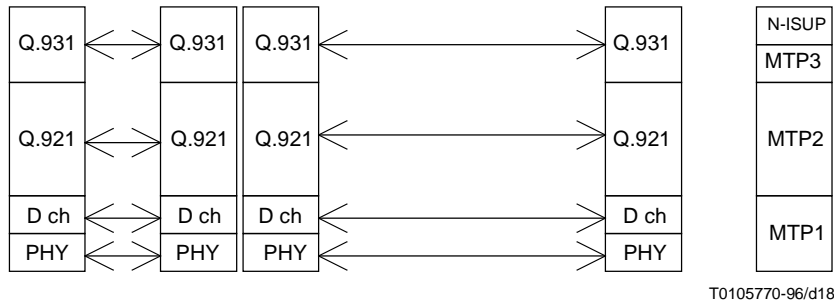


Figure 18/F.732 – C-plane

8.1.2.5 Access type 6

This is still another access for a narrow-band terminal to the B-ISDN.

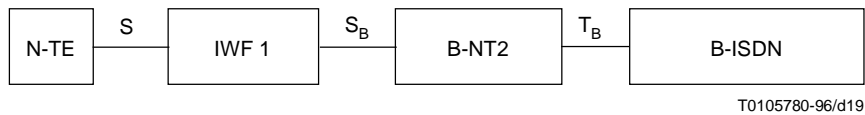


Figure 19/F.732 – Configuration

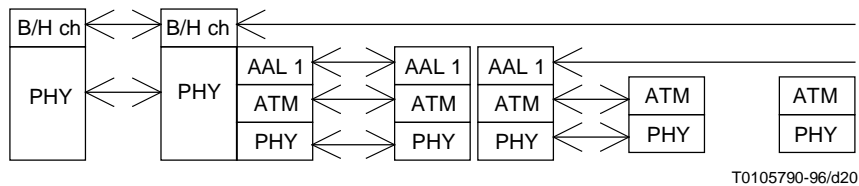
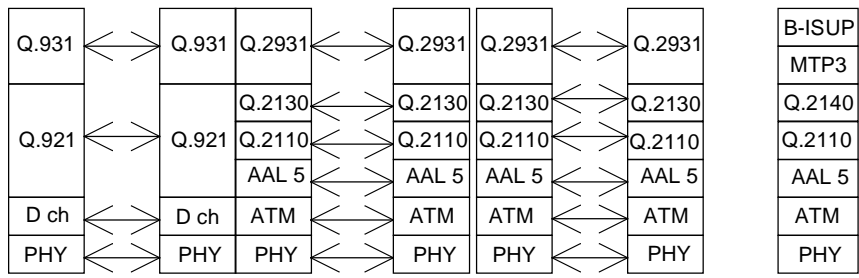


Figure 20/F.732 – U-Plane

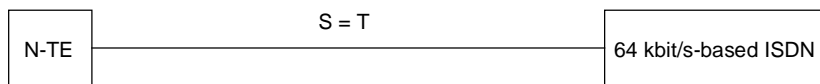


T0105800-96/d21

Figure 21/F.732 – C-Plane

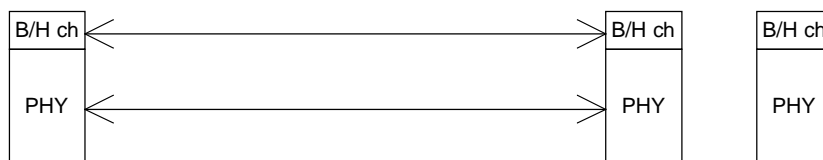
8.2 Access type 7

This is an access for a narrow-band terminal to the N-ISDN.



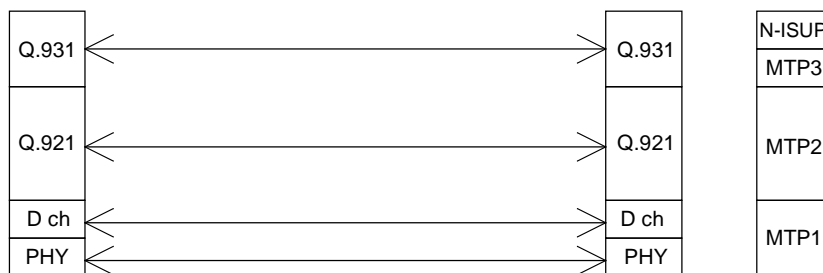
T0105810-96/d22

Figure 22/F.732 – Configuration



T0105820-96/d23

Figure 23/F.732 – U-Plane



T0105830-96/d24

Figure 24/F.732 – C-Plane

8.2.1 Scenarios for interworking between B-ISDN and N-ISDN

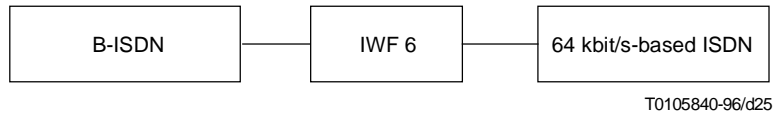


Figure 25/F.732 – Configuration

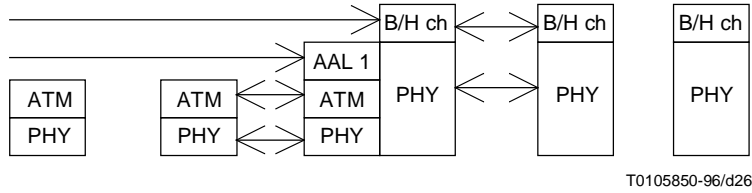


Figure 26/F.732 – U-Plane

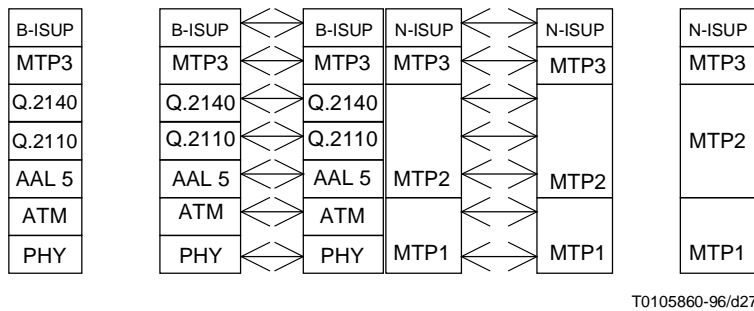


Figure 27/F.732 – C-plane if N-ISDN ↔ B-ISDN ↔ N-ISDN

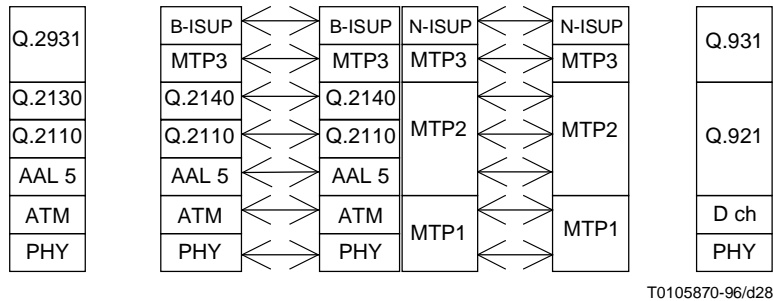


Figure 28/F.732 – C-plane if B-TE ↔ B-ISDN ↔ N-ISDN ↔ N-TE

8.2.1.1 Point-to-point scenarios

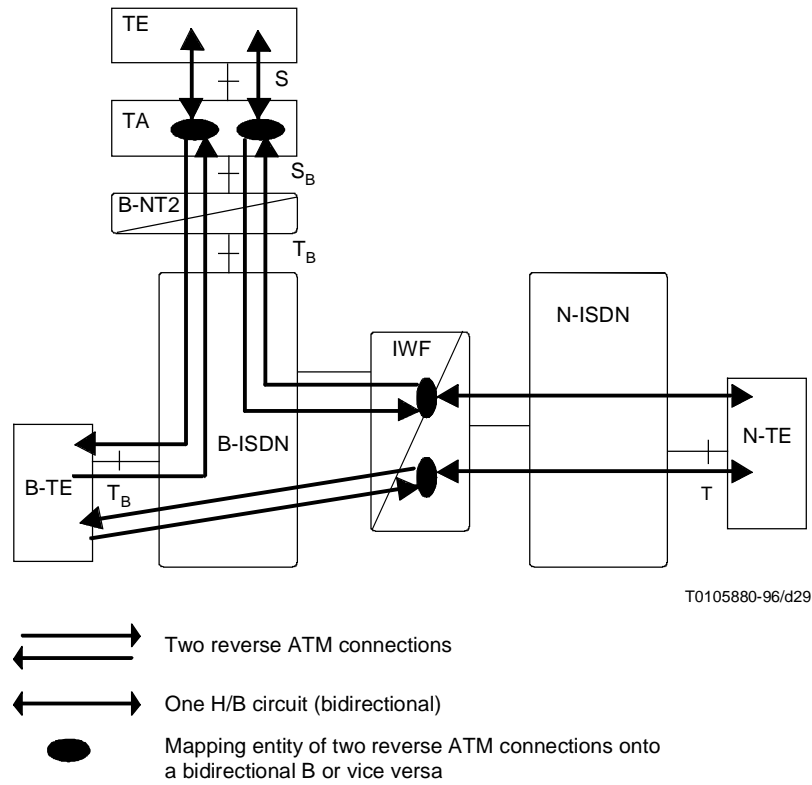
Any end-to-end point-to-point scenario is described by connecting two among all the relevant above figures.

8.2.1.2 Multipoint scenarios

8.2.1.2.1 General multipoint considerations

There are three kinds of scenarios which may possibly support a multipoint multimedia conference:

- 1) Every terminal establishes an end-to-end (unidirectional) connection to each of the other terminals. In this case, the interworking is covered by the paragraphs dealing with the point-to-point interworking.



T0105880-96/d29

NOTE – IWF 1 corresponds to TA.

Figure 29/F.732 – Example of a multipoint scenario using point-to-point connections

It should be noted that the B/H-channels are always bidirectional and the ATM connections are unidirectional. Thus, an interworking constraint is to map one onto the other and vice versa and to determine the associated protocols which are for further study.

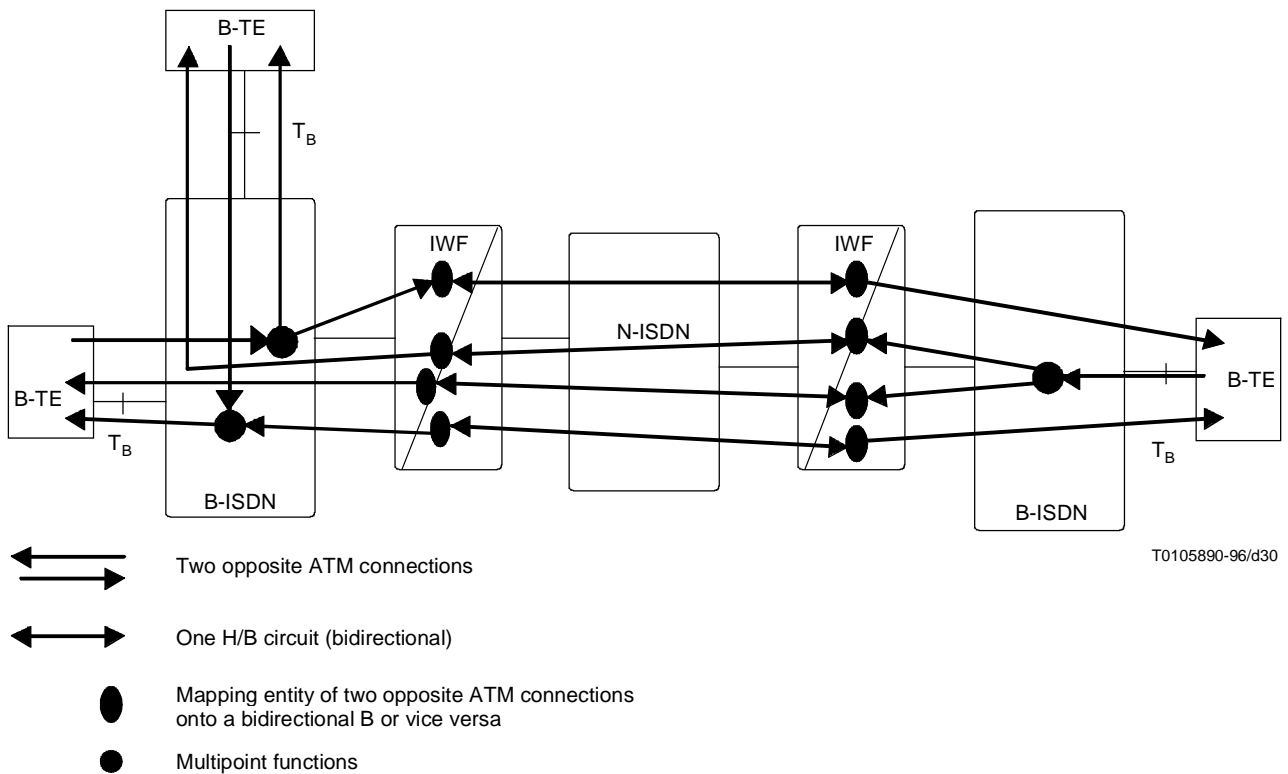
- 2) Every terminal establishes an end-to-end point-to-multipoint (unidirectional) connection to all other terminals.

It should be noted that an N-TE is not able to establish a point-to-multipoint connection and if there are N terminals, each terminal should have N – 1 decoders and one coder. In the case of the N-TE it does not seem a viable solution. Consequently, such scenarios including an N-TE are not considered realistic.

The way for establishing a multipoint connection in the B-ISDN from an endpoint in the N-ISDN is not defined. Thus, the multipoint aspects of the connection have to be treated in the B-ISDN and the MCU has to be directly connected to the B-ISDN.

For the same reason as in the first case, this scenario is for further study.

- 3) Every terminal establishes a couple of end-to-end point-to-point opposite (unidirectional) connections between itself and an MCU.



NOTE – IWF is IWF 6.

Figure 30/F.732 – Example of a multipoint scenario using point-to-point connections

For the time being, the initial scenario should be based on an MCU whose accesses are narrow-band. In a second phase, all MCU accesses should be broadband. Offering narrow-band and broadband access in the same MCU needs further considerations.

8.2.1.2.2 MCU connected to the N-ISDN

8.2.1.2.3 MCU connected to the B-ISDN

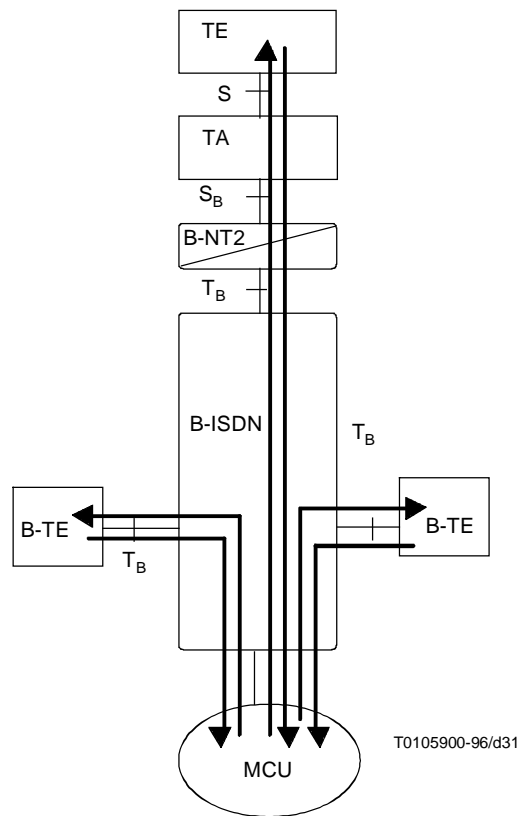
8.3 Hybrid MCU

The hybrid MCU has access to both the B-ISDN and N-ISDN, thus bridging the two networks for setting up a multimedia conference with terminals connected to each network.

8.4 Interworking with LANs

The same types of configurations and scenarios apply to interworking with LANs. If a terminal connected to a LAN supports one or more N-ISDN compatible modes (possibly through a terminal adapter), then it can be connected to an N-ISDN compatible terminal on the B-ISDN network; the gateway between the LAN and the B-ISDN ensures compatibility and continuity of the channels used on both networks.

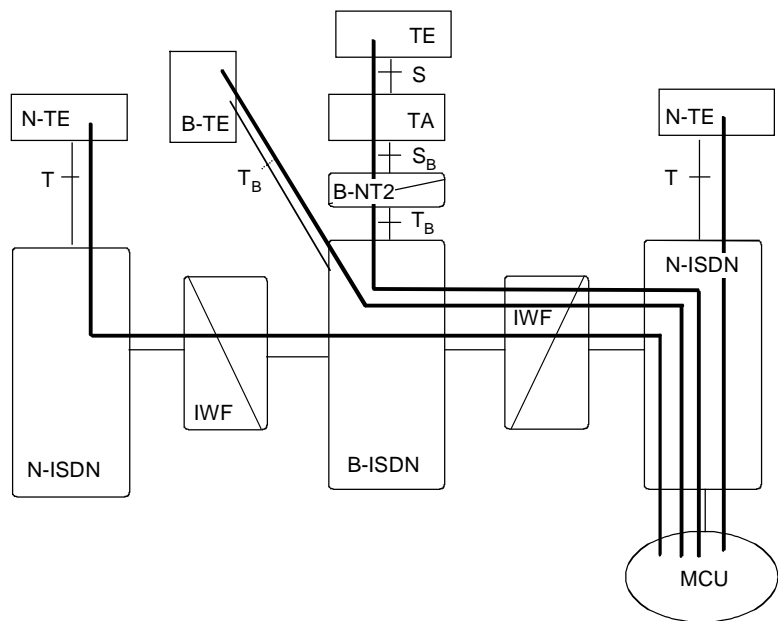
For instance, for terminals with video capability, conformance of a B-ISDN terminal with Recommendation H.321 ensures compatibility with LAN terminals conforming to Recommendation H.322 (for a LAN with guaranteed bandwidth) or to Recommendation H.323 (for an LAN without guaranteed bandwidth).



Two opposite point-to-point connections

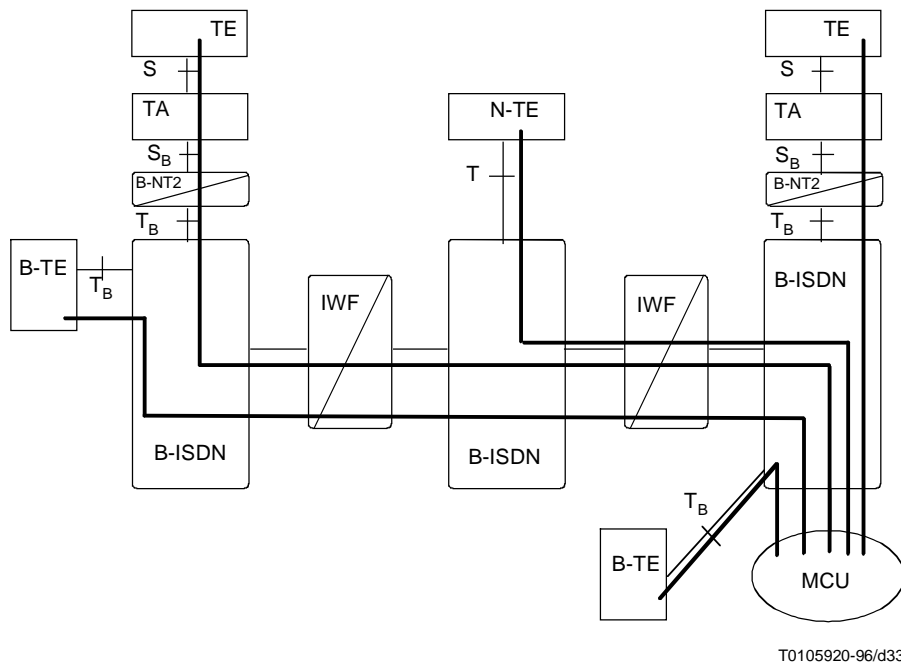
NOTE – IWF 1 corresponds to TA.

Figure 31/F.732 – Example of multipoint scenario using point-to-point connections



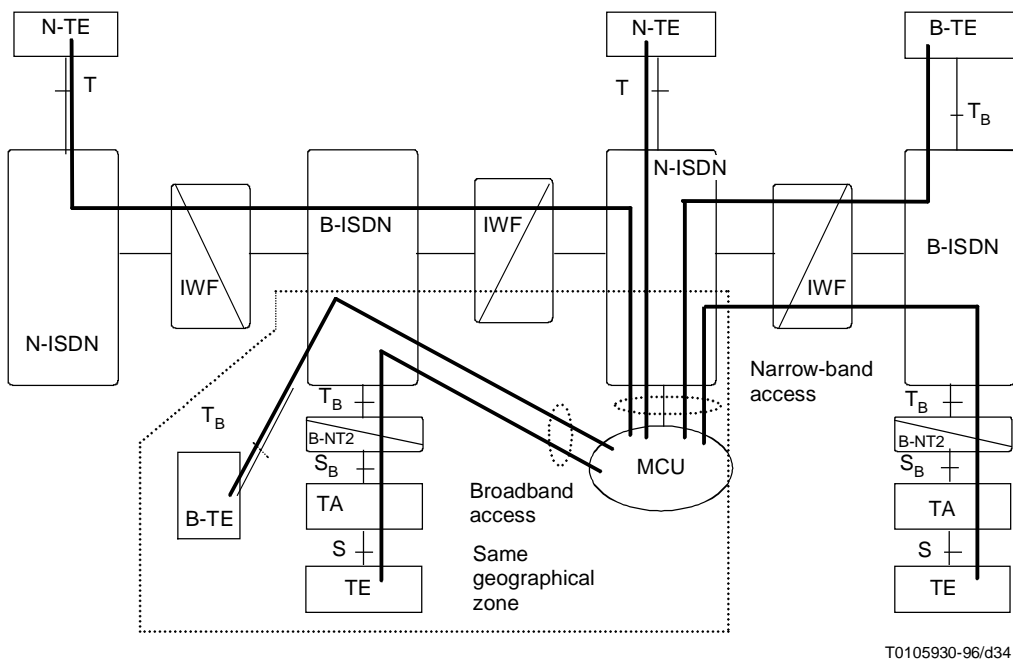
NOTE – IWF 1 corresponds to TA and IWF is IWF 6.

Figure 32/F.732 – Example of a scenario including a narrow-band MCU



NOTE – IWF 1 corresponds to TA and IWF is IWF 6.

Figure 33/F.732 – Scenario including a broadband MCU



NOTE – IWF 1 corresponds to TA and IWF is IWF 6.

Figure 34/F.732 – Scenario including a hybrid MCU

8.5 Intercommunication between services

All terminals have the media component audio. The basic common audio mode is G.722. However, some videophone terminals (and possibly some CDH terminals) may not have that capability; in that case G.711 is used, or alternately G.728 if all terminals in the conference have that capability.

For the media component video, all terminals which support it use H.262 coding, or H.261 for interworking with narrow-band systems. They will always be able to communicate with this coding algorithm, by aligning the bit rate of the video subchannel on the lowest bit rate. If the resulting quality is not sufficient, then a higher bit rate may be chosen, with some terminals relegated to secondary status and participating with sound (and possibly data) only.

For the other media components, all terminals using them have a common data subchannel with the T.120 protocol. The bit rate of the subchannel will be aligned on the terminal with the lowest bit rate capability. However, this does not imply that all terminals will have a common media component. For instance, a group of participants may be able to exchange facsimile while another group (overlapping or not) may exchange still pictures.

9 Attribute table and values

9.1 Information transfer high layer attributes

Table 1/F.732 – Information transfer high layer attributes for the broadband conference services

1	Name of the service	Broadband conference
2	Service type	May correspond to each of the different service profiles (see 7.2)
3	Connection mode	Connection oriented
4	Media Component(s) MC(s)	MC 1: audio MC 2: video MC 3: synchronous signalling MC 4: data Applicability of MC to service profile is specified in 7.2
5	Establishment of the service	Subscription Use on: either demand or reserved
6	Configuration of the service	Point-to-point Multipoint
7	Supplementary services provided	For further study
8	Quality of service	For further study
9	Interworking capabilities	With narrow-band videoconference and narrow-band videotelephony
10	Operational and commercial aspects	Outside of the scope
11	Protocol stack above ATM	
11.1	ATM Adaptation layer	MC 1: AAL 1 MC 2: AAL 1 MC 3: AAL 1 MC 4: AAL 1 or AAL 5
11.2	Information access protocols – Layer 2 above AAL	H.222.0, H.222.1

Table 1/F.732 – Information transfer high layer attributes for the broadband conference services (concluded)

11.3	Information access protocols – Layer 3 above AAL	H.245
11.4	Information access protocols – Layer 4	For further study
11.5	Information access protocols – Layer 5	For further study
11.6	Information access protocols – Layer 6	G.711, G.722 or G.728 for audio H.261 or H.262 for video (profiles 1, 4, optional for profile 3) T.120-Series for data (profiles 2, 3, optional for profiles 1, 4)
11.7	Information access protocols – Layer 7	For further study

9.2 Information transfer low layer attributes

Table 2/F.732 – Information transfer low layer attributes for the broadband conference service

1	Information transfer mode	ATM cell
2	Topology	
2.1	Symmetry of the communication	Bidirectional symmetric
2.2	Configuration of the ATM connections	Point-to-point or point-to-multipoint
3	Structure of the ATM connections	Cell sequence integrity

9.3 Access attributes

Table 3/F.732 – Access attributes for the broadband conference services

1	Access attributes for user information	
1.1	Type of connections supporting the MC(s)	VC 1 for the set of audio, video, data and synchronous signalling VC 1 for the set of audio, video and synchronous signalling and VC 2 for data
1.2	ATM transfer capability of the ATM connections	VC 1: DBR VC 2: DBR, SBR, ABR, ABT-DT, ABT-IT
1.3	Source traffic descriptor of the ATM connections	VC 1: The values are for further study taking I.371 into account VC 2: The values are for further study taking I.371 into account
1.4	QOS class of the ATM connections	VC 1: The values are for further study taking I.356 into account VC 2: The values are for further study taking I.356 into account

Table 3/F.732 – Access attributes for the broadband conference services (concluded)

2	Access attributes for signalling	
2.1	Type of signalling connection	VC
2.2	ATM transfer capability of ATM connection	DBR
2.3	Source traffic descriptor of ATM connection	Values are for further study
2.4	QOS class of ATM connection	Class 1
3	Access attributes for management	
3.1	Type of management connection	VC
3.2	ATM transfer capability of ATM connection	DBR
3.3	Source traffic descriptor of ATM connection	Values are for further study
3.4	QOS class of ATM connection	Class 1
4	Access attributes for fast allocation of resources	For further study
5	Access protocols	
5.1	Access protocol – Physical layer	See Rec. I.432
5.2	Access protocol – ATM layer	See Recs. I.150, I.361
5.3	Signalling access protocol – ATM Adaptation Layer (AAL)	Recommendations of the SAAL series Q.2100, Q.2110 and Q.2130
5.4	Signalling access protocol – Layer 3 (above AAL)	Recommendations of the Q.2900 (DSS 2) series Q.2931, Q.2961, Q.2962 and Q.2963
5.5	Management access protocol – ATM Adaptation Layer (AAL)	For further study
5.6	Management access protocol – Layer 3 (above AAL)	For further study
5.7	Access protocol for fast allocation of resources	For further study

Annex A

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