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**Integrated Services Digital Network (ISDN);
Syntax-based Videotex lower layers protocols for ISDN packet
mode (CCITT Recommendation X.31 Case A and Case B)**

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Foreword

This European Telecommunication Standard (ETS) has been produced by the Terminal Equipment (TE) Technical Committee of the European Telecommunications Standards Institute (ETSI).

This ETS contains five informative annexes (Annexes A to E).

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1 Scope

This ETS specifies the usage of all protocols and supplementary services up to and including layer 3 for Syntax-based Videotex (SBV) terminal equipment in the Integrated Services Digital Network (ISDN). The scope of this ETS is limited to virtual circuits using the three different DTE/DCE modes of connection, i.e.:

- a) the DTE/DCE connection to Public Switched Packet Data Network (PSPDN) services (CCITT Recommendation X.31 [4], Case A);
- b) the ISDN virtual circuit service through the B-channel (CCITT Recommendation X.31 [4], Case B);
- c) the ISDN virtual circuit service through the D-channel (CCITT Recommendation X.31 [4], Case B).

This ETS is applicable to terminal equipment supporting the Syntax-based Videotex using either basic access or primary rate access to the ISDN. In this context, a terminal equipment is either a Videotex Terminal, a Videotex Service Centre, a Videotex Access Point or a Videotex Host (cf. subclause 3.1).

This ETS is based on other ETSs, International Standards or CCITT Recommendations and, where necessary, it adds new or other requirements as application rules.

Conformance testing will be specified by reference to the individual Protocol Implementation Conformance Statement (PICS) proformas and the Abstract Test Suites (ATS).

2 Normative references

This ETS incorporates by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this ETS only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies.

- [1] CCITT Recommendation F.300 (1988): "Videotex service".
- [2] CCITT Recommendation I.333 (1988): "Terminal selection in ISDN".
- [3] CCITT Recommendation X.25 (1988): "Interface between data terminal equipment (DTE) and data circuit-terminating equipment (DCE) for terminals operating in the packet mode and connected to public data networks by dedicated circuit".
- [4] CCITT Recommendation X.31 (1988): "Support of packet mode terminal equipment by an ISDN".
- [5] CCITT Recommendation X.32 (1988): "Interface between Data Terminal Equipment (DTE) and Data Circuit-terminating Equipment (DCE) for terminals operating in the packet mode and accessing a packet switched public data network through a public switched telephone network or an integrated services digital network or a circuit switched public data network".
- [6] ETS 300 007 (1991): "Integrated Services Digital Network (ISDN); Support of packet mode terminal equipment by an ISDN".
- [7] ETS 300 011 (1992): "Integrated Services Digital Network (ISDN); Primary rate user-network interface, Layer 1 specification and test principles".
- [8] ETS 300 012 (1992): "Integrated Services Digital Network (ISDN); Basic user-network interface, Layer 1 specification and test principles".
- [9] ETS 300 102-1 (1990): "Integrated Services Digital Network (ISDN); User-network interface layer 3, Specifications for basic call control".

- [10] ETS 300 104 (1990): "Integrated Services Digital Network (ISDN); Attachment requirements for terminal equipment to connect to an ISDN using ISDN basic access; Layer 3 aspects (Candidate NET 3 Part 2)".
- [11] ETS 300 125 (1991): "Integrated Services Digital Network (ISDN); User-network interface data link layer specification, Application of CCITT Recommendations Q.920/I.440 and Q.921/I.441".
- [12] ETS 300 153 (1992): "Integrated Services Digital Network (ISDN); Attachment requirements for terminal equipment to connect to an ISDN using ISDN basic access (Candidate NET 3, Part 1)".
- [13] ETS 300 156 (1992): "Integrated Services Digital Network (ISDN); Attachment requirements for terminal equipment to connect to an ISDN using ISDN primary rate access (Candidate NET 5)".
- [14] prETS 300 195 (1992) [pre-Public Enquiry]: "Integrated Services Digital Network (ISDN); Digital Subscriber Signalling System No. one (DSS1), Supplementary service interactions protocol (T/S 46-33Z)".
- [15] prETS 300 196 (1992): "Integrated Services Digital Network (ISDN); Generic functional protocol for the support of supplementary services, Digital Subscriber Signalling System No. one (DSS1) protocol".
- [16] ETS 300 223 (1992): "Terminal Equipment (TE); Syntax-based Videotex, Common end-to-end protocols".
- [17] prI-ETS 300 236: "Terminal Equipment (TE); Syntax-based Videotex Protocol; Terminal Conformance Testing".
- [18] ETR 018 (1991): "Integrated Services Digital Network (ISDN); Application of the BC-, HLC-, LLC- information elements by terminals supporting ISDN services".
- [19] ENV 41 105 (1988): "Information Systems Interconnection; Packet Switched Data Network; Switched Access".
- [20] ISO 7498: "Information processing systems - Open Systems Interconnection - Basic Reference Model".
- [21] ISO 7776 (1986): "Information processing systems - Data communications - High-level data link control procedures - Description of the X.25 LAPB-compatible DTE data link procedures".
- [22] ISO 7776/DAM1 (1990): "Information processing systems - Data communications - High-level data link control procedures - Description of the X.25 LAPB-compatible DTE data link procedures. Draft Amendment 1: Conformance requirements; Annex A (Normative): PICS Proforma".
- [23] ISO/IEC 8208: "Information processing systems - Data communications - X.25 Packet Layer Protocol for Data Terminal Equipment".
- [24] ISO/IEC 8208/Addendum 3: "Information processing systems - Data communications - X.25 Packet layer protocol for Data Terminal Equipment. Addendum 3: Conformance requirements; Annex C (Normative): PICS Proforma".
- [25] ISO 8882-2 (1990): "Information technology - Telecommunications and information exchange between systems - X.25 DTE conformance testing part 2: data link layer test suite".
- [26] ISO 8882-3 (1991): "Information technology - Telecommunications and information exchange between systems - X.25 DTE conformance testing part 3: packet layer conformance test suite".

- [27] ISO/IEC TR 9577 (1990): "Information technology - Telecommunications and information exchange between systems - Protocol identification in the OSI Network Layer".
- [28] ISO/IEC TR 8509 (1987): "Information processing systems - Open Systems Interconnection - Service conventions".

3 Definitions and abbreviations

3.1 Definitions

For the purposes of this ETS, the following definitions apply:

Access Function: the functional entity which gives access to the Videotex Service. This entity is an integral part of the Videotex Service.

Access Network: the network which provides the link between the Terminal Function and the Access Function.

Bearer Independent Service Access Point: point in an end system where the user of the Bearer Independent Service (BIS) accesses the service.

Called BIS user: a BIS user with whom a calling BIS user wishes to establish a Network Connection.

Calling BIS user: a BIS user that initiates a Network Connection establishment request.

Data Circuit-terminating Equipment: see ISO/IEC 8208 [23] and CCITT Recommendation X.25 [3].

Data Terminal Equipment: see ISO/IEC 8208 [23] and CCITT Recommendation X.25 [3].

Host Function: the abstraction of the Videotex Applications available in a particular Videotex Service.

Logical Channel: see ISO/IEC 8208 [23] and CCITT Recommendation X.25 [3].

Network Connection: see OSI Reference Model ISO 7498 [20].

Network Layer: see OSI Reference Model ISO 7498 [20].

Network Service: see OSI Reference Model ISO 7498 [20].

Packet Layer: see ISO/IEC 8208 [23] and CCITT Recommendation X.25 [3].

Primitive: see Service Conventions Standard ISO/TR 8509 [28].

Terminal Function: the abstraction of a functional entity which acts as a Videotex Terminal.

Videotex Access Point: see CCITT Recommendation F.300 [1].

Videotex Host: this term describes a computer which offers one or more applications and/or facilities. It can be represented through a Videotex Host Computer, an External Videotex Host or a Videotex Service Centre.

Videotex Host Computer: see CCITT Recommendation F.300 [1].

Videotex Service: see CCITT Recommendation F.300 [1].

Videotex Service Centre: see CCITT Recommendation F.300 [1].

NOTE: According to CCITT Recommendation F.300 [1], a Videotex Service Centre provides host and/or access functions, i.e., it may also act as a Videotex Access Point.

Videotex Terminal: see CCITT Recommendation F.300 [1].

Virtual Call: see ISO/IEC 8208 [23] and CCITT Recommendation X.25 [3].

Virtual circuit: see ISO/IEC 8208 [23] and CCITT Recommendation X.25 [3].

3.2 Abbreviations

For the purposes of this ETS, the following abbreviations apply:

AU	Access Unit
BC	Bearer Capability
BIS	Bearer Independent Service
BRA	Basic Rate Access
CCITT	International Telegraph and Telephone Consultative Committee
CES	Connection Endpoint Suffix
D-bit	Delivery Confirmation bit
DCE	Data Circuit-terminating Equipment
DDI	Direct Dialling In
DTE	Data Terminal Equipment
DXE	either a DTE or a DCE
ETS	European Telecommunication Standard
ETSI	European Telecommunications Standards Institute
HLC	High Layer Compatibility
ISDN	Integrated Services Digital Network
ISO	International Organization for Standardization
LAPB	Link Access Procedure - Balanced
LAPD	Link Access Procedure on the D-Channel
LLC	Low Layer Compatibility
M-bit	More Data bit
MSN	Multiple Subscriber Number
NL	Network Layer
NS	Network Service
OSI	Open Systems Interconnection
PABX	Private Automatic Branch eXchange
PDN	Public Data Network
PH	Packet Handler
PICS	Protocol Implementation Conformance Statement
PIXIT	Protocol Implementation eXtra Information for Testing
PLP	Packet Layer Protocol
PRA	Primary Rate Access
PSPDN	Packet Switched Public Data Network
PSTN	Public Switched Telephone Network
PVC	Permanent Virtual Circuit
Q-bit	Qualifier bit
SBV	Syntax-Based Videotex
SUB	Subaddressing
TP	Terminal Portability
UUS	User-to-User Signalling
VC	Virtual Call
XID	eXchange Identification

4 Introduction

4.1 General

The following subclauses specify the additional requirements to those as specified in ETS 300 223 [16] to provide the Bearer Independent Service for syntax-based Videotex (SBV BIS).

ISDN end-systems conforming to this ETS present protocol stacks at the S or T reference point as indicated in subclause 4.3. Only virtual circuit services are within the scope of this ETS.

For outgoing calls, the requirements of subclause 7.1 in ETS 300 007 [6] shall apply.

For incoming calls, the requirements of subclause 7.2 in ETS 300 007 [6] shall apply.

The following subclauses consider the different cases of CCITT Recommendation X.25 [3] packet service access types (i.e., CCITT Recommendation X.31 [4] Case A, X.31 [4] Case B, B-channel or D-channel).

NOTE 1: Annex A (informative) gives an overview of all the different possible communication modes in an ISDN.

NOTE 2: Annex B (informative) summarises possibilities for accessing the CCITT Recommendation X.25 [3] packet services at the S/T reference point and gives the different parameters for case selection.

NOTE 3: In the following subclauses, the term "Semi-permanent" refers to both of the two access types as defined in Clause 7 of ETS 300 007 [6].

4.1.1 CCITT Recommendation X.31 Case A access

For the CCITT Recommendation X.31 [4] Case A "Switched" access of the B-channel, the requirements of Clauses 5 (Layer 1) and 6 shall apply.

For the CCITT Recommendation X.31 [4] Case A "Semi-permanent" access of the B-channel, the requirements of Clause 5 (Layer 1) and of subclauses 6.1.5 (error handling), 6.2.2 (Layer 2 of the B-channel) and 6.3.2 (Layer 3 of the B-channel) shall apply.

4.1.2 CCITT Recommendation X.31 Case B, B-channel access

For the CCITT Recommendation X.31 [4] Case B "Switched" access of the B-channel, the requirements of Clauses 5 (Layer 1) and 7 shall apply.

For the CCITT Recommendation X.31 [4] Case B "Semi-permanent" access of the B-channel, the requirements of Clause 5 (Layer 1) and of subclauses 7.1.5 (error handling), 7.2.2 (Layer 2 of the B-channel) and 7.3.2 (Layer 3 of the B-channel) shall apply.

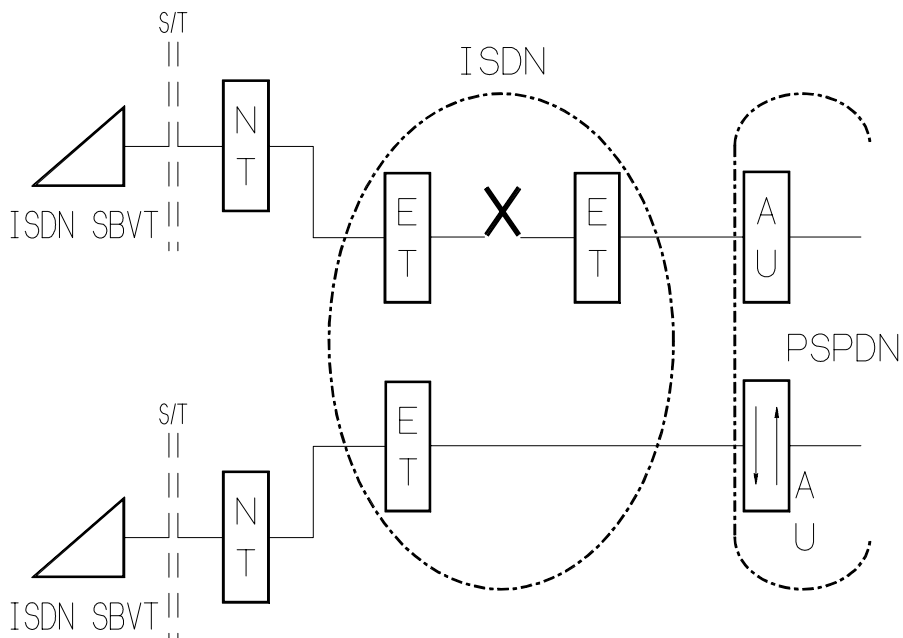
4.1.3 CCITT Recommendation X.31 Case B, D-channel access

The requirements of Clauses 5 (Layer 1) and 8 shall apply, except that subclause 8.2.2.4 (Incoming calls) shall not be applicable if the "No notification" class is used.

4.2 Reference configurations

This subclause illustrates the different scenarios as covered by this ETS. For a clarification of the resulting possible end-to-end configurations refer to Annex C (informative).

4.2.1 Using access to PSPDN services (CCITT Recommendation X.31 Case A)



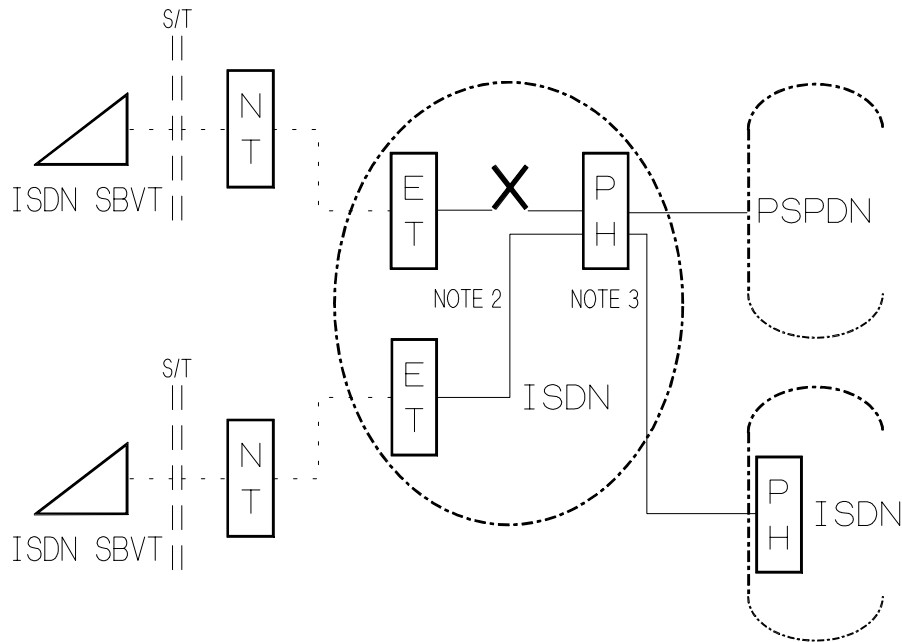
- B-channel is used
- S/T Coincident S and T reference point
- NT Network termination
- ET Exchange termination
- AU ISDN access unit ports
- SBVT Syntax-based Videotex terminal

NOTE : This figure is only an example of many possible configurations and is included as an aid to the text describing the various interface configurations.

Figure 1: Configuration based on ETS 300 007 [6] (CCITT Recommendation X.31 [4] Case A)

Figure 1 illustrates the scenario for the access via an Access Unit (AU) to a PSPDN which is conceptually not a part of the ISDN. For a detailed description refer to ETS 300 007 [6], subclause 3.1: "Configuration when accessing PSPDN services (CCITT Recommendation X.31 [4] Case A)".

4.2.2 Using the ISDN virtual circuit service (X.31 Case B) through the B-channel or the D-channel



- B-channel is used
- - - - D-channel or B-channel is used
- S/T Coincident S and T reference point
- NT Network termination
- ET Exchange termination
- PH ISDN packet handling function
- SBVT Syntax-based Videotex terminal

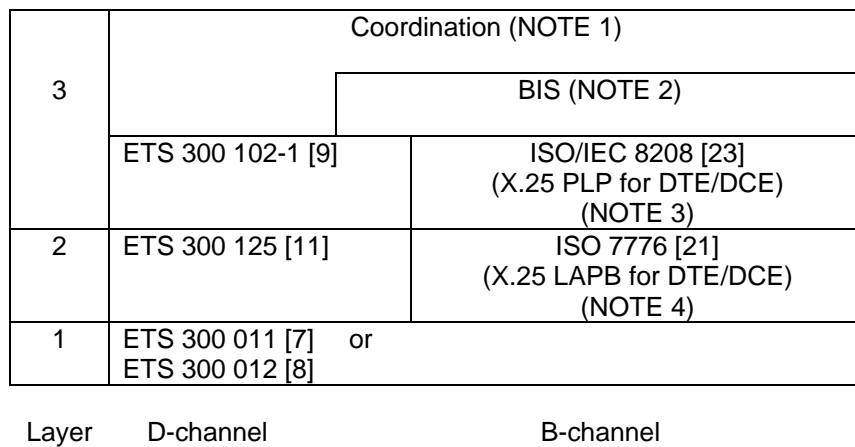
- NOTE 1: This figure is only an example of many possible configurations and is included as an aid to the text describing the various interface configurations.
- NOTE 2: For access over the D-channel, this connection is either on demand or semi-permanent. This fact has no relevance for the user-network procedures.
- NOTE 3: In some implementations, the PH belonging to the ISDN may reside physically in a node of the PSPDN. The service provided is still the ISDN virtual circuit service.

Figure 2: Configuration based on ETS 300 007 [6] (CCITT Recommendation X.31 [4] Case B)

Figure 2 shows the scenario for the case that a Packet Handler (PH) is an integral part of the ISDN. For a detailed description refer to ETS 300 007 [6], subclause 3.2: "Configuration for the ISDN virtual circuit service (CCITT Recommendation X.31 [4] Case B)".

4.3.2 Using the ISDN virtual circuit service (CCITT Recommendation X.31 Case B) through the B-channel

The protocol pillar in figure 4 is applicable for an access using ISDN virtual circuit services over the B-channel:



NOTE 1: The co-ordination function specifies the relationship between D-channel and B-channel protocol pillars and is consistent with ETS 300 007 [6].

NOTE 2: The syntax-based Videotex Bearer Independent Service (SBV BIS) is defined in Clause 11 of ETS 300 223 [16]. It covers also some aspects of the out-band signalling procedures.

NOTE 3: CCITT Recommendation X.25 [3] PLP may also be taken as the base standard. However, only ISO/IEC 8208 [23] is referred to explicitly throughout this ETS.

NOTE 4: CCITT Recommendation X.25 [3] LAPB may also be taken as the base standard. However, only ISO 7776 [21] is referred to explicitly throughout this ETS.

Figure 4: Protocol Pillar for the DTE/DCE connection using the ISDN virtual circuit service through the B-channel (ETS 300 007 [6] (CCITT Recommendation X.31 [4] Case B))

At layer 1, ETS 300 012 [8] is used for ISDN basic access and ETS 300 011 [7] is used for ISDN primary rate access. At layer 2, ETS 300 125 [11] provides for the LAPD Data link procedures on the D-channel and ISO 7776 [21] provides for the LAPB Data link procedures on the B-channel (additional application rules are given in subclause 7.2). At layer 3, ETS 300 102-1 [9] signalling procedures are used on the D-channel, and ISO/IEC 8208 [23] PLP is used in DTE/DCE operation on the B-channel (additional application rules are given in subclause 7.3).

The provisions of the SBV BIS as defined in Clause 11 of ETS 300 223 [16] apply with regard to the mappings of the BIS primitives and parameters to and from the elements of the ISO/IEC 8208 [23] PLP.

4.3.3 Using the ISDN virtual circuit service (CCITT Recommendation X.31 Case B) through the D-channel

The protocol pillar in figure 5 is applicable for an access using ISDN virtual circuit services over the D-channel:

3	Coordination (NOTE 1)	
	BIS (NOTE 2)	
	ETS 300 102-1 [9] (NOTE 3)	ISO/IEC 8208 [23] (X.25 PLP for DTE/DCE) (NOTE 4)
2	ETS 300 125 [11]	
1	ETS 300 011 [7] or ETS 300 012 [8]	

Layer D-channel

- NOTE 1: The coordination function specifies the relationship between the two layer 3 protocol pillars and is consistent with ETS 300 007 [6].
- NOTE 2: The syntax-based Videotex Bearer Independent Service (SBV BIS) is defined in Clause 11 of ETS 300 223 [16]. It covers also some aspects of the out-band signalling procedures.
- NOTE 3: ETS 300 102-1 [9] is applicable for incoming calls.
- NOTE 4: CCITT Recommendation X.25 [3] PLP may also be taken as the base standard. However, only ISO/IEC 8208 [23] is referred to explicitly throughout this ETS.

Figure 5: Protocol Pillar for the DTE/DCE connection using the ISDN virtual circuit service through the D-channel (ETS 300 007 [6] (X.31 [4] Case B))

At layer 1, ETS 300 012 [8] is used for ISDN basic access and ETS 300 011 [7] is used for ISDN primary rate access. At layer 2, ETS 300 125 [11] provides for the LAPD Data link procedures on the D-channel (additional application rules are given in subclause 8.1). At layer 3, ISO/IEC 8208 [23] PLP is used in DTE/DCE operation (additional application rules are given in subclause 8.2.3). In addition, ETS 300 102-1 [9] is used for the notification of incoming calls (additional application rules are given in subclause 8.2.2).

The provisions of the SBV BIS as defined in Clause 11 of ETS 300 223 [16] apply with regard to the mappings of the BIS primitives and parameters to and from the elements of the ISO/IEC 8208 [23] PLP.

5 Layer 1

5.1 Basic access

For terminals using the basic access to an ISDN, ETS 300 012 [8] is applicable without any additional rule.

5.2 Primary rate access

For terminals using the primary rate access to an ISDN, ETS 300 011 [7] is applicable without any additional rule.

6 Access to PSPDN services (CCITT Recommendation X.31 Case A)

6.1 Co-ordination between B-channel and D-channel

6.1.1 General

ISDN Videotex end-systems supporting access to PSPDN services over the B-channel (CCITT Recommendation X.31 [4] Case A) shall use a protocol stack at the S or T reference point in accordance with the standards as indicated in figure 3 (cf. subclause 4.3.1).

One stack is used to support signalling on the D-channel for circuit switched access to the Access Unit (AU) function of the PSPDN. In the case of the semi-permanent B-channel service, this stack is null. The other stack is used to support packet switched signalling and information transfer. The detailed protocols are given in subclauses 6.2.2 and 6.3.2.

Clause 11 in ETS 300 223 [16] provides the definition of a Bearer Independent Service for syntax-based Videotex (SBV BIS) and the mapping of its elements to the protocol and procedures of ISO/IEC 8208 [23]. Additional requirements for calls originated by or directed toward the ISDN end-system are specified below. Co-ordination is only required for switched B-channel ISDN connections between the end-system and the AU.

6.1.2 Outgoing calls

Additional procedures are required if a B-channel is not already established or if an additional B-channel is needed to support the additional traffic.

The reception by layer 3 of a BIS-N-CONNECT request primitive shall first cause the ISDN D-channel signalling procedure for demand access to be used to establish a B-channel as indicated in subclause 6.3.

NOTE 1: The "Called party number" information element of the SETUP message, as defined in ETS 300 102-1 [9], contains the ISDN address of the PSPDN Access Unit. The determination of the contents of this information element, and its derivation from the "Called Address" parameter of the BIS-N-CONNECT primitive are a local matter.

After a successful establishment of this B-channel connection, the procedures of Clause 11 in ETS 300 223 [16] shall apply.

NOTE 2: The called address in the CCITT Recommendation X.25 [3] CALL REQUEST packet (derived from the BIS-N-CONNECT request primitive) is used for routing from the AU through the Access Network to the Access Function.

Failure to establish the B-channel connection is indicated to the BIS user by means of an BIS-N-DISCONNECT indication primitive with the originator parameter indicating "ISDN" and the reason parameter filled as indicated in subclause 6.1.5.

6.1.3 Incoming calls

For the "No notification" class, no additional procedures are required.

If an ISDN end-system interface has subscribed to the "Conditional notification" class, and the AU needs to establish a B-channel (first B-channel or additional B-channel) for the incoming call packet which it has to send to this ISDN packet mode end-system, the following additional procedures are required.

The attempt to establish a B-channel shall cause the ISDN call offering procedures to be used at the ISDN end-system interfaces, as described in subclause 6.3.1.4 of this ETS and in subclause 7.2.1.2 of ETS 300 007 [6]. These procedures may offer the called ISDN end-system to determine which idle B-channel is to be used. These procedures are not visible to the BIS user (i.e., no BIS primitive shall be issued to this BIS user).

After the successful establishment of this B-channel connection, the procedures specified in subclauses 6.2.2 and 6.3.2 in this ETS, and Clause 11 in ETS 300 223 [16] shall apply.

6.1.4 Clearing virtual circuits

It is recommended that the Network Layer (NL) entity starts a timer T320 (cf. ETS 300 102-1 [9]) after the last SBV Network Connection has been released. This timer is cleared upon establishment of the next virtual circuit. Upon expiry of T320, clearing of the B-channel should be initiated.

These procedures are not visible to the BIS user.

6.1.5 Error handling

If one or more SBV Network Connections are established or in the process of being established on an established B-channel and that B-channel is disconnected, this disconnection shall be indicated to the BIS user by means of an BIS-N-DISCONNECT indication primitive with the originator parameter indicating "ISDN".

The reason parameter for each of the SBV Network Connections established or in the process of being established is equal to the ETS 300 102-1 [9] cause of the related clearing message. In case of the transmission or the receipt of a RESTART message, the reason parameter indicates "Temporary failure" (cause #41).

6.2 Layer 2 protocols

6.2.1 Layer 2 protocol for the D-channel

The base standard for the layer 2 protocol of the D-channel is ETS 300 125 [11]. The provisions of ETS 300 125 [11] applicable to Data Link Connections between SAPs used for call control procedures (SAPI=0) are valid without further application rules.

NOTE: The D-channel protocol is only applicable to switched ISDN connections between the terminal and the AU.

6.2.2 Layer 2 protocol for the B-channel

The base standard for the layer 2 protocol of the B-channel is ISO 7776 [21]. The conformance requirements for the Data Link Layer in the B-channel shall be in accordance with the base standard with respect to DTE/DCE operation and with CCITT Recommendation X.32 [5], subject to the provisions as detailed in the remainder of this subclause. The applicability of the CCITT Recommendation X.32 [5] service types is specified in ENV 41 105 [19].

NOTE: CCITT Recommendation X.25 [3] LAPB may also be taken as base standard, however explicit references to subclauses are only made with respect to ISO 7776 [21] in this ETS.

6.2.2.1 Application rules

The application rules of table 1 shall apply.

Table 1: Application rules for B-channel layer 2

N°	Item	Application Rule
a)	Single link procedure	Only the single link procedure shall be supported.
b)	Independence of LAPB protocols	An independent LAPB protocol shall operate over
c)	Data Link setup	The responsibility for Data Link setup depends on the notification class and on other agreements with the network provider. Table B.1 in Annex B
d)	Maximum frame length N1	Parameter N1 (maximum number of bits in an I-frame) shall be such that the Data Link layer is capable of carrying the maximum packet size negotiated at the packet level, plus the related packet level and Data Link level control information. Guidance on the derivation of the value of N1 can be found in Appendix II of CCITT Recommendation X.25 [3].
e)	Link setup in FRMR condition	The DTE shall support the procedure of transmitting an FRMR response frame up to N2 times, if necessary, in order to get the DCE to reset the link.
f)	Address assignment	The Data Link Layer address assignment shall be according to one of the methods described in section 5.2 of CCITT Recommendation X.32 [5].
g)	Modes of operation	Basic (modulo 8) operation shall be supported. Extended mode of operation (modulo 128) may be supported in addition.
h)	Default window size k	The default window sizes shall be: 7 for basic mode of operation; The default window size for extended mode of operation is for further study.
i)	Selection of mode of operation and window size	In case of demand access of the PSPDN: If no negotiation of the mode of operation is performed, the basic mode shall be used. If no negotiation of the window size k is performed, the default window size shall be taken. The use of out-band signalling employing LLC information elements to negotiate the mode of operation and/or window size is for further study. The use of XID procedures to negotiate the mode of operation and/or window size is for further study. In case of semi-permanent access of PSPDN: Operational agreements between the user and the provider of the PSPDN services apply.
j)	Disconnection order	In the normal procedure for disconnection, the Data Link shall be disconnected before disconnecting the B-channel.
k)	Identification	When an exchange of identification information between DTE and DCE is needed, the method of exchange shall be one of the methods given in CCITT X.32 [5]. The requirements of the PSPDN govern, which method is used.

NOTE 1: The different draft functional standards specify the use of basic mode. However, extended mode is not ruled out explicitly and is for further study.

NOTE 2: CCITT Recommendation T.90 (1992) specifies procedures for B-channel negotiation of layer 2 parameters using the "Exchange Identification (XID) Frame" mechanism. The use of this is for further study.

6.2.2.2 Implementation recommendations

The implementation recommendations for layer 2 of the B-channel are contained in table 2.

Table 2: Implementation recommendations for B-channel layer 2

N°	Item	Implementation recommendation
a)	Address assignment	It is strongly recommended, that both methods of Data Link Layer address assignment, as described in section 5.2 of CCITT X.32 [5], are implemented. Which method is used, depends on the operational requirements of the PSPDN.
b)	Parameter N2	For parameter N2 (maximum number of attempts) the value 10 is recommended.
c)	Timer T1	It is recommended that the value of Timer T1 (retransmission) is tuneable in the range from 100 ms to 15 s.
d)	I-frame acknowledgement	It is recommended that an RR frame be used as an acknowledgement of received I-frames, unless an outgoing I-frame is available.
e)	Timer T3	If implemented, Timer T3 (disconnected) is recommended to be greater than or equal to T1 x 10.
f)	Timer T4	It is recommended to implement Timer T4.

6.3 Layer 3 protocols

6.3.1 Layer 3 protocol for the D-channel

6.3.1.1 The access protocol

The base standard for the layer 3 protocol of the D-channel is ETS 300 102-1 [9]. The requirements of the base standard shall apply, subject to the provisions of ETS 300 007 [6] (as far as applicable to terminals accessing the PSPDN service), and subject to the provisions of the subsequent subclauses.

NOTE: The D-channel protocol is only applicable to switched ISDN connections between the terminal and the AU.

6.3.1.2 Terminal addresses

Subclause 5.1 of ETS 300 007 [6] shall apply. For the use of addressing supplementary services, see subclause 6.3.1.6 below.

6.3.1.3 Outgoing calls

The requirements of subclauses 5.2 and 7.1.1 of ETS 300 007 [6] apply without modification.

The Bearer Capability information element shall be coded as indicated in table 3. Fields not shown in the table shall be omitted.

Table 3: Coding of the Bearer Capability (BC) information element

Oct.	information element field	field value
1	information element identifier	Bearer Capability
2	length of contents of information element	00000010
3	coding standard	CCITT standardized coding
	information transfer capability	unrestricted digital information
4	transfer mode	circuit mode
	information transfer rate	64 kbit/s

The Low Layer Compatibility information element shall be coded as indicated in table 4. Fields not shown in the table shall be omitted.

Table 4: Coding of the Low Layer Compatibility (LLC) information element

Oct.	information element field	field value
1	information element identifier	Low Layer Compatibility
2	length of contents of information element	00000101
3	coding standard	CCITT standardized coding
	information transfer capability	unrestricted digital information
4	transfer mode	circuit mode
	information transfer rate	64 kbit/s
5	user information layer 1 protocol	CCITT standardized rate adaption X.31 HDLC flag stuffing (NOTE)
6	user information layer 2 protocol	CCITT Recommendation X.25 link layer
7	user information layer 3 protocol	CCITT Recommendation X.25 packet layer

NOTE: Octet 5 is not mandatory in CCITT Recommendation T.90 (1992). When used, it should be coded like above.

The High Layer Compatibility information element shall not be included in the SETUP message.

6.3.1.4 Incoming calls

To select a called terminal correctly, the terminal(s) at the user/network interface shall be served with information generated by the calling terminal and the intermediate network(s).

The terminal selection functions and procedures are specified in CCITT Recommendation I.333 [2]. Compatibility checking for terminals supporting specific basic services is described in ETR 018 [18].

ETS 300 102-1 [9], Annex B, specifies the procedure of compatibility checking as part of the access protocol. The information elements to be considered are those containing address information, the Bearer Capability information element and the Low Layer Compatibility information element.

The requirements of ETS 300 102-1 [9], Annex B shall apply. The following rules specify further details on terminal selection and compatibility checking and add requirements for Syntax-based Videotex terminals.

The result of this procedure is to decide whether to ignore, to reject or to accept the incoming call.

- a) ETS 300 102-1 [9], Annex B, subclause B.3.1:
If a call is offered with address information, this information shall be checked against the local address before network-to-user and user-to-user compatibility checking. In this context, ETS 300 102-1 [9], Annex B, subclause B.3.1, NOTE 1 is not applicable.

In the case of mismatch of any presented address information, no further compatibility checking is required and the call shall be ignored.

If no address information is offered, or the offered address information is not complete with respect to the local address (e.g. because the Subaddressing supplementary service is subscribed, but the called subaddress is not offered), the terminal shall continue with network-to-user and user-to-user compatibility checking. It shall not be allowed to ignore a call for missing address information only.

- b) ETS 300 102-1 [9], Annex B, subclause B.3.2:
A terminal matches the received network-to-user information, if the information in the received Bearer Capability information element offered in the SETUP message is exactly as specified in table 3 (i.e., fields not indicated in this table shall not be present).

If a mismatch is detected while checking the Bearer Capability information element, the terminal shall reject the call in accordance with subclause 5.2.5.1 in ETS 300 102-1 [9]. It shall not be permitted to ignore the call.

- c) ETS 300 102-1 [9], Annex B, subclause B.3.3:
All offered user-to-user compatibility information shall be checked.

The user-to-user compatibility information may not be presented in some interworking cases with non-ISDNs, private ISDNs, and non-pan-European ISDNs. Not all of these interworking cases will be indicated by means of a progress indicator information element. Therefore, a terminal need not reject an incoming call due to missing user-to-user information elements, independently of the information possibly provided by progress indicators.

If user-to-user compatibility information (contained in the LLC information element) is offered in the SETUP message, a terminal matches this information if this information is as specified in table 4 of this ETS.

If the user-to-user compatibility information is not offered or not offered completely, a terminal may act as a compatible terminal independently of whether the progress indicator is present or not.

If a mismatch is detected, the terminal shall reject the call in accordance with ETS 300 102-1 [9], subclause 5.2.5.1. It is not permitted to ignore the call.

- d) ETS 300 102-1 [9], Annex B, subclause B.3.4:
This annex requires user actions to be carried out as result of compatibility checking. It is superseded by this ETS.

If a terminal has not rejected or ignored the call while following the procedures a), b), c) and d), it shall accept the call or reject it for other reasons (see below).

If a terminal is obliged to reject the call while following the procedures a) to d), the cause code to be used is defined in Annex B, Clause B.3 of ETS 300 102-1 [9].

If a terminal rejects the call for different reasons, it should indicate a cause from the following list:

- a) cause code #17: User busy (already involved in another call);
- b) cause code #47: Resources unavailable, unspecified;
- c) cause code #21: Call rejected (e.g., other local reasons apply).

If the terminal accepts the incoming call, the co-ordination function initiates the appropriate Link Layer and Network Layer functions in the B-channel as detailed in subclause 6.1.

6.3.1.5 Release of the switched connection

Subclause 7.4.1 of ETS 300 007 [6] applies, however the terminal shall not release the switched connection while a virtual call is established or in the process of being established over the related B-channel.

NOTE: Further requirements on the handling of failures or premature clearing of the switched connection can be found in the description of the co-ordination function in subclause 6.1.

6.3.1.6 Supplementary services

The use of supplementary services of the pan-European ISDN depends on provisions and requirements of the network.

The procedures required for the use of supplementary services except for User-User Signalling (UUS) are specified in prETS 300 196 [15] and prETS 300 195 [14]. The procedures for UUS are specified in ETS 300 102-1 [9]. The requirements of these ETSs shall apply without modification.

The addressing supplementary services: Direct Dialling In (DDI), Multiple Subscriber Number (MSN) or Subaddressing (SUB), or a combination of them, may be useful or even required by the network, if multiple terminals have been attached to the same ISDN address.

The Terminal Portability (TP) supplementary service shall not be used.

6.3.2 Layer 3 protocol for the B-channel

The base standard for the Network Layer in the B-channel is ISO/IEC 8208 [23]. The conformance requirements for the Network Layer in the B-channel shall be in accordance with the base standard with respect to DTE/DCE operation and with CCITT Recommendation X.32 [5], subject to the additional requirements as detailed in the remainder of this subclause.

NOTE: CCITT Recommendation X.25 [3] PLP may also be taken as a base standard, however explicit references to subclauses are only made with respect to ISO/IEC 8208 [23] in this ETS.

6.3.2.1 Bearer Independent Service (BIS)

The service that the Network Layer entity provides to the Videotex application with respect to setup, clear, reset of Network Connections and data transfer over established Network Connections, shall be as described in Clause 11 of ETS 300 223 [16].

6.3.2.2 Operation over multiple B-channels

If a terminal operates more than one B-channel, the Network Layer of each B-channel connection shall be processed independently from the Network Layer of each other B-channel connection.

6.3.2.3 DTE role

The Network Layer entity shall adopt the role of a DTE.

6.3.2.4 Logical channels to be used

The logical channel ranges (LIC, HIC, LTC, HTC, LOC and HOC) to be used are determined by local knowledge. If local knowledge is not available, then by default only a single two-way logical channel shall be used (i.e. LTC and HTC shall be set to 1, while LIC, HIC, LOC and HOC shall be set to zero). If more than one logical channel is available, a higher value of HTC may be negotiated using the On-line Facility Registration facility.

If a DTE is capable of initiating a REGISTRATION request packet, then the registration parameters shall be set as follows:

The LIC, HIC, LOC and HOC parameter shall be set to zero. The LTC shall be set to the value of 1. The value in the "total number of logical channels" parameter field shall be set equal to the value in the HTC parameter field.

6.3.2.5 Packet sizes

The Network Layer entity shall be capable of supporting the standard default packet size of 128 octets. The only permitted maximum data packet sizes are 128, 256, 512, 1 024 and 2 048 octets. Packet sizes other than the standard default packet size may be negotiated on a per call basis using the "Flow Control Parameter Negotiation" facility.

6.3.2.6 Default packet level window size

The Network Layer entity shall be capable of supporting the standard default window size of 2. Other window sizes may be negotiated on a per call basis using the "Flow Control Parameter Negotiation" facility.

6.3.2.7 Default throughput class

The default throughput class assigned to each direction of transmission shall be 64 kbit/s. Other default throughput class values may be agreed on a subscription basis. Other throughput classes may be negotiated on a per call basis using the "Throughput Class Negotiation" facility.

6.3.2.8 D-bit

The D-bit shall always be set to 0.

The Network Layer entity shall either ignore the D-bit in a received data packet, or treat as an error the occurrence of the D-bit set to 1 in a received data packet. If the Network Layer entity chooses to treat it as an error, it shall reset the logical channel indicating the cause "DTE originated" and the diagnostics "D-bit procedure not supported" (value = 166).

6.3.2.9 Q-bit

The Q-bit shall be set to the same value in all data packets of a complete data packet sequence to be transmitted.

The user data of a received complete data packet sequence shall be passed to the higher layers, if the Q-bit setting is the same in all packets of the sequence. Otherwise the Network Layer entity shall reset the logical channel indicating the cause "DTE originated" and the diagnostics "Inconsistent Q-bit settings" (value = 83).

6.3.2.10 Protocol identifier

The protocol identification in the Network Layer is described in the ISO/IEC TR 9577 [27]. In ISO/IEC 8208 [23], the first octet of the call user data field within a CALL REQUEST/INCOMING CALL packet contains the "Subsequent Protocol Identifier" (SPI) used to identify the higher layer protocols.

For the application of Videotex the bit pattern of the SPI is:

```
bit 8 7 6 5 4 3 2 1
-----
0 0 0 0 0 0 0 1
```

This bit pattern corresponds to "CCITT Recommendation X.29" in table 4 of ISO/IEC TR 9577 [27].

In outgoing calls, the call user data field of the CALL REQUEST packet shall contain the above bit pattern as the first octet.

In incoming calls, the above bit pattern shall be interpreted by the Network Layer entity that the Videotex application is requested.

The contents of remaining octets (besides the first octet) of the call user data field within an INCOMING CALL packet shall be ignored by the Network Layer entity.

6.3.2.11 Address fields

The CALL REQUEST packet shall contain the called DTE address. The encoding depends on the requirements of the PSPDN (see also subclause 6.1.2). The use of the calling DTE address field is dependent on the requirements of the PSPDN.

6.3.2.12 Data Link Disconnection Request

In the normal procedure for clearing, all calls should be cleared before requesting the disconnection of the Data Link.

6.3.2.13 Optional user facilities that shall be supported

The packet level optional user facilities that shall be supported by the terminal are shown in table 5.

NOTE: For switched B-channel access, PSPDNs/ISDNs might offer only a restricted set of facilities (default profile). Thus, if a DTE (Videotex terminal) requests a specific facility, this might not be available or even cause the call to be cleared (e.g., flow control parameter negotiation is not allowed by the network).

Table 5: Supported packet level optional user facilities

Facility	§ in ISO/IEC 8208 [23]
Default Throughput Classes Assignment	13.11
Flow Control Parameter Negotiation	13.12
Throughput Class Negotiation	13.13

6.3.2.14 Recommended optional user facilities and CCITT specified DTE facilities

The packet level optional user facilities and CCITT specified DTE facilities that are shown in table 6 are those for which implementation is recommended for greater flexibility. The use of the optional user facilities depends on operational requirements of the PSPDN.

Table 6: Recommended facilities

Facility	§ in ISO/IEC 8208 [23]
On-line Facility Registration	13.1
Fast Select Acceptance	13.17 (NOTE)
Network User Identification (NUI) related facilities	13.21
Calling Address Extension	14.1
Called Address Extension	14.2
NOTE:	ETS 300 223 [16] allows the use and non-use of the Fast Select facility in an outgoing call. If the Fast Select Acceptance facility is not required from a Videotex terminal, then the interworking between terminals that use and terminals that do not use the FS facility is not generally possible.

6.3.2.15 Excluded Optional user facilities

The packet level optional user facilities shown in table 7 shall not be used.

Table 7: Excluded facilities

Facility	§ in ISO/IEC 8208 [23]
Extended Packet Sequence Numbering	13.2
Packet Retransmission	13.4
Nonstandard Default Packet sizes	13.9
Nonstandard Default Window sizes	13.10
Bilateral Closed User Group related facilities	13.15
RPOA Selection related facilities	13.23

7 Access to the ISDN virtual circuit service (CCITT Recommendation X.31 Case B) through the B-channel

7.1 Co-ordination between B-channel and D-channel

7.1.1 General

ISDN Videotex end-systems supporting access to ISDN virtual circuit services over the B-channel (CCITT Recommendation X.31 [4] Case B) shall use a protocol stack at the S or T reference point in accordance with the standards as indicated in figure 4 (cf. subclause 4.3.2).

One stack is used to support signalling on the D-channel for circuit switched access to the packet handling function (PH) of the ISDN. In the case of the semi-permanent B-channel service, this stack is null. The other stack is used to support packet switched signalling and information transfer. The detailed protocols are given in subclauses 7.2.2 and 7.3.2.

Clause 11 of ETS 300 223 [16] provides the definition of a Bearer Independent Service for syntax-based Videotex (SBV BIS) and the mapping of its elements to the protocol and procedures of ISO/IEC 8208 [23]. Additional requirements for calls originated by or directed toward the ISDN end-system are specified below. Co-ordination is only required for switched B-channel ISDN connections between the end-system and the PH.

7.1.2 Outgoing calls

Additional procedures are required if a B-channel is not already established or if an additional B-channel is needed to support the additional traffic.

The reception by layer 3 of an BIS-N-CONNECT request primitive shall first cause the ISDN D-channel signalling procedure for demand access to be used to establish a B-channel as indicated in subclause 7.3.

NOTE 1: The "Called party number" information element of the SETUP message as defined in ETS 300 102-1 [9] is not used.

After a successful establishment of this B-channel connection, the procedures of Clause 11 in ETS 300 223 [16] shall apply.

NOTE 2: The called address in the X.25 CALL REQUEST packet (derived from the BIS-N-CONNECT request primitive) is used for routing from the AU through the Access Network to the Access Function.

Failure to establish the B-channel connection is indicated to the BIS user by means of a BIS-N-DISCONNECT indication primitive with the originator parameter indicating "ISDN" and the reason parameter filled as indicated in subclause 7.1.5.

7.1.3 Incoming calls

Additional procedures are required if an ISDN end-system interface has subscribed to the "Conditional notification" class, and the network uses the call offering procedures as described in subclause 7.3.1.4 of this ETS and subclause 7.2.2.3.1 of ETS 300 007 [6].

The ISDN call offering procedures determine which B-channel is to be used. If the network does not indicate an exclusive channel, the ISDN end-system may select an already established B-channel (see NOTES). These procedures are not visible to the BIS user.

NOTE 1: Either the "point-to-point" configuration or the "point-to-multi-point" configuration support this B-channel negotiation.

NOTE 2: It is not recommended that the terminal chooses an already established B-channel if the network indicates "preferred Bi channel" (cf. table 4, subclause 7.2.2.3.1, in ETS 300 007 [6]) in the SETUP message.

NOTE 3: A negotiation between idle B-channel and established B-channel presents technical difficulties from the network point of view. Nevertheless, in case of the "No notification" class, the network will have to use an already established B-channel to send an INCOMING CALL packet to the user (cf. subclause 7.2.2 in ETS 300 007 [6]). This seems to present similar technical difficulties for the network.

After the successful establishment of this B-channel connection, or successful selection of an already established B-channel, the procedures specified in subclauses 7.2.2 and 7.3.2 in this ETS, and Clause 11 of ETS 300 223 [16] shall apply.

7.1.4 Clearing virtual circuits

It is recommended that the NL entity starts a timer T320 (cf. ETS 300 102-1 [9]) after the last SBV Network Connection has been released. This timer is cleared upon establishment of the next virtual circuit. Upon expiry of T320, clearing of the B-channel should be initiated.

These procedures are not visible to the BIS user.

7.1.5 Error handling

If one or more SBV Network Connections are established or in the process of being established on an established B-channel and that B-channel is disconnected, this disconnection shall be indicated to the BIS user by means of an BIS-N-DISCONNECT indication primitive with the originator parameter indicating "ISDN".

The reason parameter is as given in subclause 6.1.5 for each of the SBV Network Connections established or in the process of being established.

7.2 Layer 2 protocols

7.2.1 Layer 2 protocol for the D-channel

The base standard for the layer 2 protocol of the D-channel is ETS 300 125 [11]. The provisions of ETS 300 125 [11] applicable to Data Link Connections between SAPs used for call control procedures (SAPI=0) are valid without further application rules.

NOTE: The D-channel protocol is only applicable to switched ISDN connections between the terminal and the PH.

7.2.2 Layer 2 protocol for the B-channel

The base standard for the layer 2 protocol in the B-channel is ISO 7776 [21]. The conformance requirements for the Data Link Layer in the B-channel shall be in accordance with the base standard with respect to DTE/DCE operation, and subject to the additional requirements as detailed in the remainder of this subclause.

NOTE: CCITT Recommendation X.25 [3] LAPB may also be taken as a base standard, however explicit references to subclauses are only made with respect to ISO 7776 [21] in this ETS.

7.2.2.1 Application rules

The application rules of table 8 shall apply.

Table 8: Application rules for B-channel layer 2

N°	Item	Application Rule
a)	Single link procedure	Only the single link procedure shall be supported.
b)	Independence of LAPB protocols	An independent LAPB protocol shall operate over each B-channel.
c)	Data Link setup	The responsibility for Data Link setup depends on the notification class and on other agreements with the network provider. Table B.2 in Annex B (informative) shows the different possibilities.
d)	Maximum frame length N1	Parameter N1 (maximum number of bits in an I-frame) shall be such that the Data Link layer is capable of carrying the maximum packet size negotiated at the packet level, plus the related packet level and Data Link level control information. Guidance on the derivation of the value of N1 can be found in Appendix II of CCITT Recommendation X.25 [3].
e)	Link setup in FRMR condition	The DTE shall support the procedure of transmitting an FRMR response frame up to N2 times, if necessary, in order to get the DCE to reset the link.
f)	Address assignment	The address assignment shall be as defined in subclause 5.1 of ISO 7776 [21].
g)	Modes of operation	Basic (modulo 8) operation shall be supported.
h)	Window size k	For parameter k (window size), the support of the value 7 is mandatory for basic operation.
i)	Disconnection order	In the normal procedure for disconnection, the Data Link shall be disconnected before disconnecting the B-channel.

NOTE: The different draft functional standards specify the use of basic mode only. However, extended mode is not ruled out explicitly and is for further study.

7.2.2.2 Implementation recommendations

The implementation recommendations for layer 2 of the B-channel are contained in table 9 below.

Table 9: Implementation recommendations for B-channel layer 2

N°	Item	Application Rule
a)	Parameter N2	For parameter N2 (maximum number of attempts) the value 10 is recommended.
b)	Timer T1	It is recommended that the value of Timer T1 (retransmission) is tuneable in the range from 100 ms to 15 s.
c)	I-frame acknowledgement	It is recommended that an RR frame be used as an acknowledgement of received I-frames, unless an outgoing I-frame is available.
d)	Timer T3	If implemented, Timer T3 (disconnected) is recommended to be greater than or equal to T1 x 10.
e)	Timer T4	It is recommended to implement Timer T4.

7.3 Layer 3 protocols

7.3.1 Layer 3 protocol for the D-channel

7.3.1.1 The access protocol

The base standard for the layer 3 protocol of the D-channel is ETS 300 102-1 [9]. The requirements of the base standards shall apply, subject to the provisions of ETS 300 007 [6] (as far as applicable to terminals accessing the ISDN virtual circuit service over the B-channel), and subject to the provisions of the subsequent subclauses.

NOTE 1: The D-channel protocol is only applicable to switched ISDN connections between the terminal and the PH.

NOTE 2: The normative Annexes B and C of ETS 300 007 [6] define messages for the control of packet-mode access connections and the coding of their information elements.

7.3.1.2 Terminal addresses

Subclause 5.1 of ETS 300 007 [6] shall apply. For the use of addressing supplementary services, refer to subclause 7.3.1.6 in this ETS.

7.3.1.3 Outgoing calls

The requirements of subclauses 5.3.2 and 7.1.2.1 of ETS 300 007 [6] apply without modification.

NOTE: No called party number and no called party subaddress is contained in the SETUP message. Some networks may require the inclusion of the calling party number and/or calling party subaddress in the SETUP message.

Table 10: Coding of the Bearer Capability (BC) information element

Oct.	information element field	field value
1	information element identifier	bearer capability
2	length of contents of information element	00000100
3	coding standard	CCITT standardized coding
	information transfer capability	unrestricted digital information
4	transfer mode	packet mode
	information transfer rate	00000: packet
6	user information layer 2 protocol	CCITT Recommendation X.25 link layer
7	user information layer 3 protocol	CCITT Recommendation X.25 packet layer

The Bearer Capability information element shall be coded as indicated in table 10. Fields not shown in the table shall be omitted.

Low Layer Compatibility (LLC) and High Layer Compatibility information elements shall not be included in the SETUP message.

7.3.1.4 Incoming calls

To select a called terminal correctly, the terminal(s) at the user/network interface shall be served with information generated by the calling terminal and the intermediate network(s).

The terminal selection functions and procedures are specified in CCITT Recommendation I.333 [2]. Compatibility checking for terminals supporting specific basic services is described in ETR 018 [18].

ETS 300 102-1 [9], Annex B, specifies the procedure of compatibility checking as part of the access protocol. The information elements to be considered are those containing address information and the Bearer Capability information element.

The requirements of ETS 300 102-1 [9], Annex B, shall apply. The following rules specify further details on terminal selection and compatibility checking and add requirements for Syntax-based Videotex terminals.

The result of this procedure is to decide, whether to ignore, to reject or to accept the incoming call.

- a) ETS 300 102-1 [9], Annex B, subclause B.3.1.
If a call is offered with address information, this information shall be checked against the local address before network-to-user compatibility checking. In this context, ETS 300 102-1 [9], Annex B, subclause B.3.1, NOTE 1 is not applicable.

In case of a mismatch of any presented address information, no further compatibility checking is required and the call shall be ignored.

If no address information is offered, or the offered address information is not complete with respect to the local address (e.g. because the Subaddressing supplementary service is subscribed, but the called subaddress is not offered), the terminal shall continue with network-to-user compatibility checking. It shall not be allowed to ignore a call for missing address information only.

- b) ETS 300 102-1 [9], Annex B, subclause B.3.2.
A terminal matches the received network-to-user information, if the information in the received Bearer Capability information element offered in the SETUP message is exactly as specified in table 10 (i.e., fields not indicated in this table shall not be present).

If a mismatch is detected while checking the Bearer Capability information element, the terminal shall reject the call in accordance to subclause 5.2.5.1 in ETS 300 102-1 [9]. It shall not be permitted to ignore the call.

- c) ETS 300 102-1 [9], Annex B, subclause B.3.3.
Received Low Layer Compatibility and High Layer Compatibility information elements shall be ignored.
- d) ETS 300 102-1 [9], Annex B, subclause B.3.4.
This annex requires user actions to be carried out as result of compatibility checking. It is superseded by this ETS.

If a terminal has not rejected or ignored the call while following the procedures a), b), c) and d), it shall accept the call or reject it for other reasons (see below).

If a terminal is obliged to reject the call while following the procedures a) to d), the cause code to be used is defined in Annex B, Clause B.3 of ETS 300 102-1 [9].

If a terminal rejects the call for different reasons, it should indicate a cause from the following list:

- a) cause code #17: User busy (already involved in another call);
- b) cause code #47: Resources unavailable, unspecified;
- c) cause code #21: Call rejected (e.g. other local reasons apply).

If the terminal accepts the incoming call, the co-ordination function initiates the appropriate Link Layer and Network Layer functions in the B-channel as detailed in subclause 7.1.

7.3.1.5 Release of the switched connection

Subclause 7.4.1 of ETS 300 007 [6] applies, however the terminal shall not release the switched connection while a virtual call is established or in the process of being established over the related B-channel.

NOTE: Further requirements on handling of failures or premature clearing of the switched connection can be found in the description of the co-ordination function in subclause 7.1.

7.3.1.6 Supplementary services

The use of supplementary services of the pan-European ISDN depends on provisions and requirements of the network.

The procedures required for the use of supplementary services except for UUS are specified in prETS 300 196 [15] and prETS 300 195 [14]. The procedures for UUS are specified in ETS 300 102-1 [9]. The requirements of these ETSS apply without modification.

The addressing supplementary services: DDI, MSN or SUB, or a combination of them, may be useful or even required by the network, if multiple terminals have been attached to the same ISDN address.

The TP supplementary service shall not be used.

7.3.2 Layer 3 protocol for the B-channel

The base standard for the Network Layer in the B-channel is ISO/IEC 8208 [23]. The conformance requirements for the Network Layer in the B-channel shall be in accordance with the base standard with respect to DTE/DCE operation, and subject to the additional requirements as detailed in the remainder of this subclause.

NOTE: CCITT Recommendation X.25 [3] PLP may also be taken as base standard, however explicit references to subclauses are only made with respect to ISO/IEC 8208 [23] in this ETS.

7.3.2.1 Bearer Independent Service (BIS)

The service that the Network Layer entity provides to the Videotex application with respect to setup, clear, reset of Network Connections and data transfer over established Network Connections, shall be as described in Clause 11 of ETS 300 223 [16].

7.3.2.2 Operation over multiple B-channels

If a terminal operates more than one B-channel, the Network Layer of each B-channel connection shall be processed independently from the Network Layer of each other B-channel connection.

7.3.2.3 DTE role

The Network Layer entity shall adopt the role of a DTE.

7.3.2.4 Logical channels to be used

The logical channel ranges (LIC, HIC, LTC, HTC, LOC and HOC) to be used are determined by local knowledge. If local knowledge is not available, then, by default, only a single two-way logical channel shall be used. (i.e. LTC and HTC shall be set to 1, while LIC, HIC, LOC and HOC shall be set to zero). If more than one logical channel is available, a higher value of HTC may be negotiated using the On-line Facility Registration facility.

If a DTE is capable of initiating a REGISTRATION request packet, then the registration parameters shall be set as given below.

The LIC, HIC, LOC and HOC parameter shall be set to zero. The LTC shall be set to the value of 1. The value in the "total number of logical channels" parameter field shall be set equal to the value in the HTC parameter field.

7.3.2.5 Packet sizes

The Network Layer entity shall be capable of supporting the standard default packet size of 128 octets. The only permitted maximum data packet sizes are 128, 256, 512, 1 024 and 2 048 octets. Packet sizes other than the standard default packet size may be negotiated on a per call basis using the "Flow Control Parameter Negotiation" facility.

7.3.2.6 Default packet level window size

The Network Layer entity shall be capable of supporting the standard default window size of 2. Other window sizes may be negotiated on a per call basis using the "Flow Control Parameter Negotiation" facility.

7.3.2.7 Default throughput class

The default throughput class assigned to each direction of transmission shall be 64 kbit/s. Other default throughput class values may be agreed on a subscription basis. Other throughput classes may be negotiated on a per call basis using the "Throughput Class Negotiation" facility.

7.3.2.8 D-bit

The D-bit shall always be set to 0.

The Network Layer entity shall either ignore the D-bit in a received data packet, or treat as an error the occurrence of the D-bit set to 1 in a received data packet. If the Network Layer entity chooses to treat it as an error, it shall reset the logical channel indicating the cause "DTE originated" and the diagnostics "D-bit procedure not supported" (value = 166).

7.3.2.9 Q-bit

The Q-bit shall be set to the same value in all data packets of a complete data packet sequence to be transmitted.

The user data of a received complete data packet sequence shall be passed to the higher layers, if the Q-bit setting is the same in all packets of the sequence. Otherwise the Network Layer entity shall reset the logical channel indicating the cause "DTE originated" and the diagnostics "Inconsistent Q-bit settings" (value = 83).

7.3.2.10 Protocol identifier

The protocol identification in the Network Layer is described in the ISO/IEC TR 9577 [27]. In ISO/IEC 8208 [23], the first octet of the call user data field within a CALL REQUEST/INCOMING CALL packet contains the "Subsequent Protocol Identifier" (SPI) used to identify the higher layer protocols.

For the application of Videotex the bit pattern of the SPI is:

```

bit 8 7 6 5 4 3 2 1
-----
0 0 0 0 0 0 0 1
    
```

This bit pattern corresponds to "CCITT Recommendation X.29" in table 4 of ISO/IEC TR 9577 [27].

In outgoing calls, the call user data field of the CALL REQUEST packet shall contain the above bit pattern as first octet.

In incoming calls, the above bit pattern shall be interpreted by the Network Layer entity that the Videotex application is requested.

The contents of remaining octets (besides the first octet) of the call user data field within an INCOMING CALL packet shall be ignored by the Network Layer entity.

7.3.2.11 Address fields

The CALL REQUEST packet shall contain the called DTE address. The encoding depends on the requirements of the PSPDN/ISDN. The use of the calling DTE address field is dependent on the requirements of the PSPDN/ISDN.

7.3.2.12 Data Link Disconnection Request

In the normal procedure for clearing, all calls should be cleared before requesting the disconnection of the Data Link.

7.3.2.13 Optional user facilities that shall be supported

The packet level optional user facilities that shall be supported by the terminal are shown in table 11.

NOTE: For switched B-channel access, PSPDNs/ISDNs might offer only a restricted set of facilities (default profile). Thus, if a DTE (Videotex terminal) requests a specific facility, this might not be available or even cause the call to be cleared (e.g., flow control parameter negotiation is not allowed by the network).

Table 11: Supported packet level optional user facilities

Facility	§ in ISO/IEC 8208 [23]
Default Throughput Classes Assignment	13.11
Flow Control Parameter Negotiation	13.12
Throughput Class Negotiation	13.13

7.3.2.14 Recommended optional user facilities and CCITT specified DTE facilities

The packet level optional user facilities and CCITT specified DTE facilities that are shown in table 12 are those for which implementation is recommended for greater flexibility. The use of the optional user facilities depends on operational requirements of the PSPDN/ISDN.

Table 12: Recommended facilities

Facility	§ in ISO/IEC 8208 [23]
On-line Facility Registration	13.1
Fast Select Acceptance	13.17 (NOTE)
Network User Identification (NUI) related facilities	13.21
Calling Address Extension	14.1
Called Address Extension	14.2
NOTE:	ETS 300 223 [16] allows the use and non-use of the Fast Select facility in an outgoing call. If the Fast Select Acceptance facility is not required from a Videotex terminal, then the interworking between terminals that use and terminals that do not use the Fast Select facility is not generally possible.

7.3.2.15 Excluded optional user facilities

The packet level optional user facilities shown in table 13 shall not be used.

Table 13: Excluded facilities

Facility	§ in ISO/IEC 8208 [23]
Extended Packet Sequence Numbering	13.2
Packet Retransmission	13.4
Bilateral Closed User Group related facilities	13.15
Charging Information	13.22
RPOA Selection related facilities	13.23

8 Access to the ISDN virtual circuit service (CCITT Recommendation X.31 Case B) through the D-channel

8.1 Layer 2 protocol

8.1.1 The base Standard

The base Standard for the layer 2 protocol in the D-channel is ETS 300 125 [11].

If call offering procedures including channel selection are implemented (cf. Clause 4), the provisions of ETS 300 125 [11] applicable to Data Link Connections between SAPs used for call control procedures (SAPI=0) shall apply, with additional requirements indicated in the subsequent subclauses.

NOTE: Call offering over ISDN layer 2 procedures using SAPI=16 are not supported.

A single Data Link Connection with SAPI=16 shall be used to carry the packets of the Network Layer in numbered I-frames. The provisions of ETS 300 125 [11] shall apply with additional requirements as indicated in the subsequent subclauses.

8.1.2 Same Connection Endpoint Suffix (CES)

If call offering procedures are used, the CES shall be the same in the signalling phase and in the data transfer phase for a given communication.

8.1.3 Responsibility for Data Link setup

The responsibility for Data Link setup depends on the notification class and is agreed with the network. Table B.3 in Annex B (informative) shows the different possibilities.

8.2 Layer 3 protocols

8.2.1 General

Two different protocols are applicable to Network Layer operations over the D-channel:

- 1) the protocol used to notify the Network Layer entity of an incoming call.

Additional procedures are required, if the ISDN end-system has subscribed to the "Conditional notification" class, and the network uses the call offering procedures as described in subclauses 8.2.2.4 and 8.2.2.5. These procedures are not visible to the BIS user;

- 2) the protocol used for packet data communications over the D-channel as described in subclause 8.2.3.

8.2.2 Layer 3 ISDN signalling protocols

8.2.2.1 The base standard

The base standard for the layer 3 protocol of the D-channel used for notification of an incoming call is ETS 300 102-1 [9]. The requirements of the base standards shall apply, subject to the provisions of ETS 300 007 [6] (as far as applicable to terminals accessing the ISDN virtual circuit service over the D-channel), and subject to the provisions of the subsequent subclauses.

NOTE: The normative Annexes B and C of ETS 300 007 [6] define messages for the control of packet-mode access connections and the coding of their information elements.

8.2.2.2 Terminal addresses

Subclause 5.1 of ETS 300 007 [6] shall apply. For the use of addressing supplementary services see subclause 8.2.2.6 below.

8.2.2.3 Outgoing calls

The protocol is not applicable for outgoing calls on the D-channel.

8.2.2.4 Incoming calls

To select a called terminal correctly, the terminal(s) at the user/network interface shall be served with information generated by the calling terminal and the intermediate network(s).

The terminal selection functions and procedures are specified in CCITT Recommendation I.333 [2]. Compatibility checking for terminals supporting specific basic services is described in ETR 018 [18].

ETS 300 102-1 [9], Annex B, specifies the procedure of compatibility checking as part of the access protocol. The information elements to be considered are those containing address information and the Bearer Capability information element.

The requirements of ETS 300 102-1 [9], Annex B, shall apply. The following rules specify further details on terminal selection and compatibility checking and add requirements for Syntax-based Videotex terminals.

The result of this procedure is to decide, whether to ignore, to reject or to accept the incoming call.

- a) ETS 300 102-1 [9], Annex B, subclause B.3.1.
If a call is offered with address information, this information shall be checked against the local address before network-to-user compatibility checking. In this context, ETS 300 102-1 [9], Annex B, subclause B.3.1, NOTE 1 is not applicable.

In case of mismatch of any presented address information, no further compatibility checking is required and the call shall be ignored.

If no address information is offered, or the offered address information is not complete with respect to the local address (e.g. because the Subaddressing supplementary service is subscribed, but the called subaddress is not offered), the terminal shall continue with network-to-user compatibility checking. It shall not be allowed to ignore a call for missing address information only.

- b) ETS 300 102-1 [9], Annex B, subclause B.3.2.
A terminal matches the received network-to-user information, if the information in the received Bearer Capability information element offered in the SETUP message is exactly as specified in table 14 (i.e., fields not indicated in this table shall not be present).

If a mismatch is detected while checking the Bearer Capability information element, the terminal shall reject the call in accordance to subclause 5.2.5.1 in ETS 300 102-1 [9]. It shall not be permitted to ignore the call.

- c) ETS 300 102-1 [9], Annex B, subclause B.3.3.
Received Low Layer Compatibility and High Layer Compatibility information elements shall be ignored.

- d) ETS 300 102-1 [9], Annex B, subclause B.3.4.
This annex requires user actions to be carried out as result of compatibility checking. It is superseded by this ETS.

Table 14: Coding of the Bearer Capability information element

Oct.	information element field	field value
1	information element identifier	bearer capability
2	length of contents of information element	00000100
3	coding standard	CCITT standardized coding
	information transfer capability	unrestricted digital information
4	transfer mode	packet mode
	information transfer rate	00000: packet
6	user information layer 2 protocol	CCITT Recommendation Q.921 (I.441)
7	user information layer 3 protocol	CCITT Recommendation X.25 packet level

If a terminal has not rejected or ignored the call while following the procedures a), b), c) and d), it shall accept the call or reject it for other reasons (see below).

If a terminal is obliged to reject the call while following the procedures a) to d), the cause code to be used is defined in Annex B, Clause B.3 of ETS 300 102-1 [9].

If a terminal rejects the call for different reasons, it should indicate a cause from the following list:

- a) cause code #17: User busy (already involved in another call);
b) cause code #47: Resources unavailable, unspecified;
c) cause code #21: Call rejected (e.g. other local reasons apply).

If the terminal accepts the incoming call, the terminal initiates the appropriate Link Layer and Network Layer functions in the D-channel as detailed in subclauses 8.1 and 8.2.3.

8.2.2.5 Release of the call

Subclause 7.2.2.3.1 of ETS 300 007 [6] applies with respect to selection of the D-channel.

NOTE: After having received the CONNECT message from the accepting terminal, the network releases the call with a RELEASE message containing cause code #7 "call awarded and being delivered in an established channel".

8.2.2.6 Supplementary services

The use of supplementary services of the pan-European ISDN depends on provisions and requirements of the network.

The procedures required for the use of supplementary services except for UUS are specified in prETS 300 196 [15] and prETS 300 195 [14]. The procedures for UUS are specified in ETS 300 102-1 [9]. The requirements of these ETSs apply without modification.

The addressing supplementary services: DDI, MSN or SUB, or a combination of them, may be useful or even required by the network, if multiple terminals have been attached to the same ISDN address.

The TP supplementary service shall not be used.

8.2.3 Layer 3 data communication protocol

The base standard for the Network Layer in the D-channel is ISO/IEC 8208 [23]. The conformance requirements for the Network Layer in the D-channel shall be in accordance with the base standard with respect to DTE/DCE operation, and subject to the additional requirements as detailed in the remainder of this subclause.

NOTE: CCITT Recommendation X.25 [3] PLP may also be taken as the base standard, however explicit references to subclauses are made in this ETS only with respect to ISO/IEC 8208 [23].

8.2.3.1 Bearer Independent Service

The service that the Network Layer entity provides to the Videotex application with respect to setup, clear, reset of Network Connections and data transfer over established Network Connections, shall be as described in Clause 11 of ETS 300 223 [16].

8.2.3.2 Operation over p-Data Link Connections

The Network Layer entity shall operate over a single p-Data Link Connection (SAPI = 16).

If a terminal supports more than one TEI, the Network Layer entity of each p-Data Link Connection shall be processed independently from the Network Layer entities of the other p-Data Link Connections.

8.2.3.3 DTE role

The Network Layer entity shall adopt the role of a DTE.

8.2.3.4 Logical channels to be used

The logical channel ranges (LIC, HIC, LTC, HTC, LOC and HOC) to be used are determined by local knowledge. If local knowledge is not available, then by default only a single two-way logical channel shall be used. (i.e. LTC and HTC shall be set to 1, while LIC, HIC, LOC and HOC shall be set to zero). If more than one logical channel is available, a higher value of HTC may be negotiated using the On-line Facility Registration facility.

If a DTE is capable of initiating a REGISTRATION request packet, then the registration parameters shall be set as follows.

The LIC, HIC, LOC and HOC parameter shall be set to zero. The LTC shall be set to the value of 1. The value in the "total number of logical channels" parameter field shall be set equal to the value in the HTC parameter field.

8.2.3.5 Packet sizes

The Network Layer entity shall be capable of supporting the standard default packet size of 128 octets. The only permitted maximum data packet sizes are 128 and 256 octets. Packet sizes other than the standard default packet size may be negotiated on a per call basis using the "Flow Control Parameter Negotiation" facility.

8.2.3.6 Default packet level window size

The Network Layer entity shall be capable of supporting the standard default window size of 2. Other window sizes may be negotiated on a per call basis using the "Flow Control Parameter Negotiation" facility.

8.2.3.7 Default throughput class

The default throughput class assigned to each direction of transmission shall be 9,6 kbit/s. Other default throughput class values may be agreed on a subscription basis.

Other throughput classes may be negotiated on a per call basis using the "Throughput Class Negotiation" facility. The maximum negotiable throughput class shall be 9,6 kbit/s at the Basic Rate Interface, and 64 kbit/s at the Primary Rate Interface.

8.2.3.8 D-bit

The D-bit shall always be set to 0.

The Network Layer entity shall either ignore the D-bit in a received data packet, or treat as an error the occurrence of the D-bit set to 1 in a received data packet. If the Network Layer entity chooses to treat it as an error, it shall reset the logical channel indicating the cause "DTE originated" and the diagnostics "D-bit procedure not supported" (value = 166).

8.2.3.9 Q-bit

The Q-bit shall be set to the same value in all data packets of a complete data packet sequence to be transmitted.

The user data of a received complete data packet sequence shall be passed to the higher layers, if the Q-bit setting is the same in all packets of the sequence. Otherwise the Network Layer entity shall reset the logical channel indicating the cause "DTE originated" and the diagnostics "Inconsistent Q-bit settings" (value = 83).

8.2.3.10 Protocol identifier

The protocol identification in the Network Layer is described in the ISO/IEC TR 9577 [27]. In ISO/IEC 8208 [23], the first octet of the call user data field within a CALL REQUEST/INCOMING CALL packet contains the "Subsequent Protocol Identifier" (SPI) used to identify the higher layer protocols.

For the application of Videotex the bit pattern of the SPI is:

```
bit 8 7 6 5 4 3 2 1  
-----  
0 0 0 0 0 0 0 1
```

This bit pattern corresponds to "CCITT Recommendation X.29" in table 4 of ISO/IEC TR 9577 [27].

In outgoing calls, the call user data field of the CALL REQUEST packet shall contain the above bit pattern as first octet.

In incoming calls, the above bit pattern shall be interpreted by the Network Layer entity that the Videotex application is requested.

The contents of remaining octets (besides the first octet) of the call user data field within an INCOMING CALL packet shall be ignored by the Network Layer entity.

8.2.3.11 Address fields

The CALL REQUEST packet shall contain the called DTE address. The encoding depends on the requirements of the PSPDN/ISDN. The use of the calling DTE address field is dependent on the requirements of the PSPDN/ISDN.

8.2.3.12 Data Link Disconnection Request

In the normal procedure for clearing, all calls should be cleared before requesting the disconnection of the Data Link.

8.2.3.13 Optional user facilities that shall be supported

The packet level optional user facilities that shall be supported by the terminal are shown in table 15.

NOTE: For switched B-channel access, PSPDNs/ISDNs might offer only a restricted set of facilities (default profile). Thus, if a DTE (Videotex terminal) requests a specific facility, this might not be available or even cause the call to be cleared (e.g., flow control parameter negotiation is not allowed by the network).

Table 15: Supported packet level optional user facilities

Facility	§ in ISO/IEC 8208 [23]
Default Throughput Classes Assignment	13.11
Flow Control Parameter Negotiation	13.12
Throughput Class Negotiation	13.13

8.2.3.14 Recommended optional user facilities and CCITT specified DTE facilities

The packet level optional user facilities and CCITT specified DTE facilities that are shown in table 16 are those for which implementation is recommended for greater flexibility. The use of the optional user facilities depends on operational requirements of the PSPDN/ISDN.

Table 16: Recommended facilities

Facility	§ in ISO/IEC 8208 [23]
On-line Facility Registration	13.1
Fast Select Acceptance	13.17 (NOTE)
Network User Identification (NUI) related facilities	13.21
Calling Address Extension	14.1
Called Address Extension	14.2
NOTE:	ETS 300 223 [16] allows the use and non-use of the Fast Select facility in an outgoing call. If the Fast Select Acceptance facility is not required from a Videotex terminal, then the interworking between terminals that use and terminals that do not use the Fast Select facility is not generally possible.

8.2.3.15 Excluded Optional user facilities

The packet level optional user facilities shown in table 17 shall not be used.

Table 17: Excluded facilities

Facility	§ in ISO/IEC 8208 [23]
Extended Packet Sequence Numbering	13.2
Packet Retransmission	13.4
Bilateral Closed User Group related facilities	13.15
Charging Information	13.22
RPOA Selection related facilities	13.23

9 Conformance testing requirements

9.1 General

9.1.1 Types of end systems

All testing requirements described below apply to testing at the S/T reference point. The referenced testing standards do not contain any specific provisions for the testing of end systems using an external terminal adapter i.e., the test suites do not allow testing the functionality of the terminal adapter separately.

NOTE 1: When TE2 type terminals providing a CCITT Recommendation X.25 [3] interface are connected to an ISDN terminal adapter using flag stuffing for bit rate adaptation and providing in-band layer 2 and layer 3 transparency, they cannot be distinguished from a TE1 type terminal by observation of the S/T interface alone, except possibly for throughput and reaction speed. The considerations made in the remainder of this Clause are expected to apply without further restrictions to such an arrangement.

NOTE 2: It requires further study to decide whether the remainder of this Clause applies without further restrictions when other types of terminal adapters are used.

Videotex Access Functions are also covered by this standard when they are identical to a TE1 in terms of the user network interface, i.e. when they connect to the ISDN at a S/T reference point and use the same lower layer protocols as an ISDN Videotex terminal.

The implications of using the bearer services of a NT2 are not considered in this ETS. In particular, the multiplexing of user data packets at individual S reference points into a single access channel at the T reference point is not considered. The same is true for the switching of B-channels inside an ISDN PABX.

NOTE 3: The testing at a T reference point towards a composite system made of a NT2 serving a multiplicity of Videotex terminals or Videotex access functions requires further study. Such a study could take place in the scope of conformance testing of packet mode bearer services provided by business communication systems.

9.1.2 Type approval testing standards

For type approval testing of Videotex end systems to be connected to the public ISDN network, the following attachment requirements are applicable (access NETs):

Equipment using basic access: ETS 300 153 (NET 3, Part 1) [12]
ETS 300 104 (NET 3, Part 2) [10]

Equipment using primary rate access: ETS 300 156 (NET 5) [13]

These three ETSs cover essential requirements for ISDN terminal equipment, including minimum requirements for out of band access protocols to public ISDN but excluding in-band access protocols to public data networks or ISDN packet handlers.

In-band protocols for TE1 type of equipment are currently not covered by access NETs.

NOTE 1: For CCITT Recommendation X.31 [4] based Terminal Adapters (TA), ETS 300 077 (Candidate NET 7) exists, but this ETS is applicable to the case where there is an explicit R interface. For exact bibliographical reference, see Annex E (informative).

End-to-end interworking aspects of Videotex end systems, whether in-band or out of band, are not subject to common technical regulations (or terminal NETs). Such aspects are dealt with in protocol conformance testing standards applied on a voluntary basis.

NOTE 2: Some minimum requirements for end-to-end compatibility may be imposed in the future before participation/subscription to selected regulated Videotex services. Testing specifications for such cases are outside the scope of the present standard, but subsets of conformance testing standards may be used. This may encompass aspects of Lower Layer compatibility e.g between terminals using different access networks or different access cases within the same network. Most interworking aspects however are related to Higher Layer compatibility.

NOTE 3: The conformance testing standard for higher layer Videotex protocols is draft prI-ETS 300 236 [17].

9.1.3 Protocol Conformance Testing Standards

For Conformance Testing in relation to the present standard, reference is made to Test Standard DE/SPS-5003 covering protocol conformance testing for ETS 300 007 [6]. It should be observed that the latter essentially addresses the application of layer 2 and layer 3 out of band protocols to packet mode bearer services.

For conformance testing of in-band protocols (i.e. layer 2 and layer 3 of CCITT Recommendation X.25 [3] protocols), reference is made to test standards ISO 8882-2 [25] and ISO 8882-3 [26]. PICS proforma are specified in ISO 7776/DAM1 [22] and ISO 8208/Addendum 3 [24].

For layer 1 testing of basic access, reference is made to ETS 300 012 [8] and ETS 300 153 [12].

For layer 1 testing of Primary Rate Access (PRA), reference is made to ETS 300 011 [7] and ETS 300 156 [13].

A number of supplementary services are mentioned in subclauses 6.3.1.6, 7.3.1.6 and 8.3.2.6 of this ETS. Conformance testing standards for these services belong to the series of ETSs covering the Digital Subscriber Signalling No. 1 (DSS1) supplementary services for ISDN. Supplementary services, if used, shall be tested in combination with the relevant basic services.

NOTE 1: The Test Standard DE/SPS-5003 is to be created by ETSI STC SPS 5. As an interim solution, the present ETS goes back directly to the individual in-band and out of band protocol test standards. Annex D (informative) provides additional guidance on how to deal with conformance testing in relation to the present ETS using existing test specification material.

NOTE 2: Annex E (informative) provides a list of available references for conformance testing of supplementary services.

9.1.4 Testing configurations and environmental conditions

Details on the configurations applicable to the various tests can be found in ETS 300 153 [12], subclauses 4.2, 4.4.1 and 4.6.1 and Annex A (informative), subclause A.1.1.2. Environmental conditions for the tests are specified in subclause 4.7 of that same standard.

9.1.5 Abstract test methods

The minimum testability constraints imposed on an ISDN Videotex end system shall not exceed those required by the Remote Single Layer (RS) method for layer 3 and the Remote Single Layer Embedded (RSE) method for layer 2. This is valid for both the in-band and the out of band protocols (see also ISO 9646-2; reference can be found in Annex E (informative)). This does not preclude the support of other abstract test methods.

Local means shall be provided to invoke actions at the different layers of the in-band and out of band protocols. Such actions are presently not subject to standardization. For the remote test method, these local means shall at least include man-machine commands also used for normal Videotex applications.

Additional means may be optionally provided such as:

- man-machine commands for use in test mode only;
- execution of higher layer processes, including loadable test packages;
- use of manufacturer provided test access interfaces;
- use of optional test management protocols.

NOTE: The considerations above do not apply to layer 1 tests, for which mandatory test access requirements are imposed to the manufacturer. These are described in ETS 300 153 [12], subclause 4.6.

9.1.6 Real time aspects

As a rule, tests shall complete within the running time of the timers provided in the Videotex terminal or Videotex access function, unless the purpose of the test is to provoke and observe time out.

When immediate reaction of the terminal to a stimulus of the tester is monitored, the time out value shall be set to 2 seconds. The same value shall be applicable to the monitoring of absence of reaction in cases where no response is expected.

When response of the terminal requires human action (e.g. pressing a button), time out specified in the standard for the supervision of this action shall apply. If no value is specified, a default value of 30 seconds is suggested.

Precautions may have to be taken to prevent the system under test from premature clearing of connections by means of out of band signals. This may be the case if the test requires the system to stay in an active call state for long periods of time while timers exist in the higher layers for supervision of absence of in-band activity. In such cases, means shall be provided for disabling these supervision timers or for sending specific in-band information to maintain the connection.

9.2 Testing requirements resulting from application rules for lower layer protocols

The application rules described in Clauses 6, 7 and 8 of this ETS generate additional testing requirements or restrictions for the use of the referenced Test Standards. In particular, they modify the status, values and ranges in a number of entries of the various requirements lists (PICS and PIXITS) associated to individual protocol standards. Such modifications are studied in Annex D (informative).

For further discussion, the standards are grouped below as follows:

- physical layers;
- out of band protocols;
- in-band protocols.

These categories are addressed individually in the following subclauses.

9.2.1 Physical layers testing

Annex D of ETS 300 012 [8] and ETS 300 153 [12] contain layer 1 testing requirements for terminal equipment using ISDN basic access. Annex C of ETS 300 011 [7] and ETS 300 156 [13] contain layer 1 testing requirements for terminal equipment using ISDN primary rate access. Reference is made to these standards for layer 1 conformance testing of ISDN Videotex terminals. No additional constraints are imposed by the present ETS.

9.2.2 Out of band protocol testing

I-ETS 300 305, DE/SPS-5007, I-ETS 300 309 and DE/SPS-5009 cover PICS and PIXITS for the layers 2 and 3 of the ISDN D-channel at the user side of a basic access interface. Abstract test suites are specified in I-ETS 300 313 and I-ETS 300 322 respectively.

NOTE: Additional constraints applicable to the individual PICS for out of band protocols when applied in the scope of the present ETS are addressed in subclause D.5.1 of Annex D (informative).

9.2.3 In-band protocol testing

ISO standards 8208/Addendum 3 [24], 7776/DAM1 [22], 8882-3 [26] and 8882-2 [25] cover PICS, PIXIT and ATS for the layers 3 and 2 of the in-band protocol which is used for Syntax-based Videotex terminals.

NOTE: Additional constraints applicable to the individual PICS for in-band protocols when applied in the scope of the present standard are addressed in subclause D.5.2 of Annex D (informative).

9.3 Testing requirements related to Bearer Independent Services for ISDN syntax-based Videotex terminals

ETS 300 223 [16] introduces a Bearer Independent Service for Syntax-based Videotex in terms of common layer 3 abstract service primitives (BIS primitives). These primitives are used to describe interactions between adjacent layers 3 and 7 within the same Videotex end system and are independent from the access network. They map to the PLPs defined in ISO/IEC 8208 [23]. Service definition is derived from ISO standards.

Since abstract service primitives are conceptual representations of system internal communication they shall not constrain implementation. In other words the primitives need not be implemented as described as long as the sequence of events observable at the S/T reference point is the same as if primitives were implemented as described.

Abstract service primitives cannot be tested in isolation. Only effects implied by their execution and which are visible at the S/T reference point can be tested. Reference is made to the PICS proforma of the Bearer Independent Service and to the test specifications of the in-band (and, when applicable, out of band) layer 3 protocols.

NOTE: Further considerations on testing implications of the Bearer Independent Service can be found in Clause D.6 of Annex D (informative).

9.4 Testing requirements related to access case selection and to co-ordination functions

When using ISDN Syntax-based Videotex, a number of packet mode access cases are possible, from which a selection has to be made. In addition, the lower layer protocols for ISDN syntax-based Videotex are based on two protocol pillars, one providing out of band protocols for connection control and the other providing in-band protocols for virtual connection control and user data transfer. These protocols may run concurrently.

Access case selection is addressed in subclause 4.3 of this ETS while protocol co-ordination and synchronization aspects are addressed in subclauses 6.1, 7.1 and 8.1.

NOTE: The requirements for PICS entries are addressed in Clause D.7 of Annex D (informative).

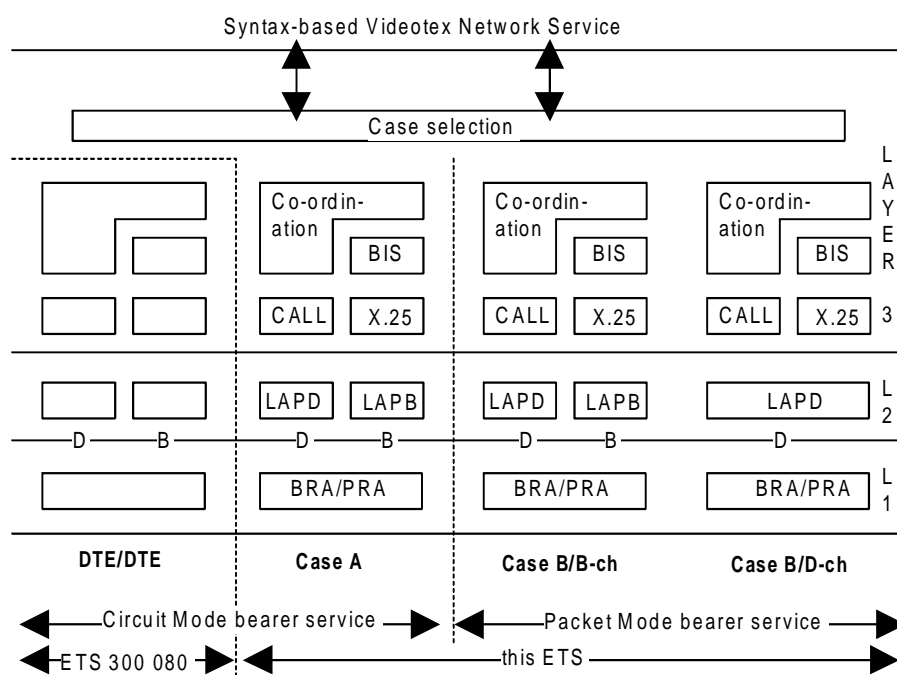
Annex A (informative): ISDN lower layer communication modes for syntax-based Videotex

The CCITT Recommendation X.25-based [3] ISDN end-system may have one or several possibilities to establish a communication with another end-system: DTE/DTE mode of communication, CCITT Recommendation X.31 [4] Case A access, X.31 Case B/B-channel access, or X.31 Case B/D-channel access.

For Videotex end-systems, establishment and release of channel connections and data transfer on these connections is provided by the SBV Bearer Independent Service (SBV BIS) defined in ETS 300 223 [16] through the use of Virtual Circuit services of the CCITT Recommendation X.25 [3] PLP (X.25/PLP).

Moreover, the ISDN interface may require some co-ordination between the signalling ISDN protocol (the out-of-band protocol) and the CCITT Recommendation X.25 [3] protocol (the in-band protocol). The procedures for this co-ordination depend on the communication case selected.

Figure A.1 presents the structure of the lower layers for the four cases considered above:



- Co-ordination: Refer to the co-ordination function described in subclauses 6.1, 7.1 and 8 of this ETS
- BIS: Refer to the Syntax-based Videotex Independent Bearer Service defined in ETS 300 223 [16]
- CALL: Refer to the basic call control procedures defined in ETS 300 102-1 [9]
- X.25: Refer to the network layer protocol defined in ISO/IEC 8208 [23]
- LAPD: Refer to the ISDN data link layer defined in ETS 300 125 [11]
- LAPB: Refer to the HDLC procedures defined in ISO 7776 [21]
- BRA/PRA: Refer to the physical network-user interfaces for either Basic Rate Access (BRA) or Primary Rate Interface (PRA) as defined in ETS 300 012 [8] or ETS 300 011 [7], respectively

Figure A.1: ISDN lower layers for ISDN syntax-based Videotex

Upon the reception of a BIS-N-CONNECT request primitive from the higher layers, or in the case of incoming calls, the Network Layer entity may have to choose among the possibilities for case selection implemented in the ISDN end-system, or may at least have to check the compatibility between the request and these possibilities.

In the case of simultaneous multiple network connections, different modes of communication may be used for each of them, e.g., the D-channel for alphamosaic data and a B-channel for photographic data.

Annex B (informative) describes the parameters which may influence the access to CCITT Recommendation X.25 [3] packet services and the selection of a particular mode of communication.

Annex B (informative): Overview on communication establishment parameters

B.1 General

A terminal equipment (acting as a Videotex terminal or a Videotex access function) may have several possibilities to access the CCITT Recommendation X.25 [3] packet service at the S/T reference point. These possibilities are determined by parameters which have to be fixed either at subscription time or dynamically when using the access.

Clause B.2 presents the parameters involved and their possible usage.

Clause B.3 presents the parameters involved in the case selection and highlight when a co-ordination is needed between the two protocol stacks of out-band signalling (ETS 300 102-1 [9] protocol) and in-band signalling (CCITT Recommendation X.25 [3] protocol).

B.2 CCITT Recommendation X.25 packet service access

B.2.1 CCITT Recommendation X.25 packet service access parameters

ETS 300 007 [6] allows several possibilities to access the CCITT Recommendation X.25 [3] packet services. The options applicable to this ETS are listed below. These options depend on several parameters indicated in table B.1. The values of these parameters may be combined as detailed in tables B.2 and B.3. Only virtual circuit services are within the scope of this ETS.

Table B.1: Parameters influencing the access of CCITT Recommendation X.25 [3] packet services over an ISDN

Parameter	Values	Comment
B-channel access type	- semi-permanent - switched	B-channel connection is set up at subscription time and the Physical Layer is kept activated by the network in case of a basic rate interface. ETS 300 102-1 [9] procedures are used to set up and to disconnect a B-channel.
Notification class	- no notification - conditional notification	As defined in ETS 300 007 [6].
In band Layer 2 activation type (B- or D-channel)	- semi-permanent - user demand - originator demand	Layer 2 is activated at subscription time and held activated by the network. The user is responsible to setup the Data Link (the PH will clear an INCOMING CALL if the Data Link is not activated). The responsibility for the Data Link setup depends on the direction of the first virtual call.
TEI assignment	- fixed - dynamic	TEI fixed at subscription time. Dynamic TEI assignment using ETS 300 125 [11] procedures.
X.25 packet service type	- customized - identified - non-identified	As defined in CCITT Recommendation X.32

B.2.2 Access of CCITT Recommendation X.25 packet services over the B-channel (CCITT Recommendation X.31 Case A or Case B)

Table B.2 shows the valid parameter combinations to access CCITT Recommendation X.25 [3] packet services over the B-channel:

Table B.2: Parameter combinations for B-channel services

Notification class	B-channel access type	Layer 2 activation	X.25 packet service types
No notification (NOTE)	Semi-permanent	User demand	Customized, Identified
		Semi-permanent	Customized, Identified
	Switched	User or Network, after Layer 1 activation by the user	Customized, Identified, Non-identified
Conditional notification	Semi-permanent	Originator demand	Customized, Identified
	Switched	Originator demand	Customized, Identified, Non-identified
NOTE: The definition of notification classes given in ETS 300 007 [6] does not precise whether semi-permanent B-channels are concerned in combination with the "conditional notification" class. However, the three possibilities of B-channel layer 2 activation have to be considered.			

B.2.3 Access of CCITT Recommendation X.25 service over the D-channel (CCITT Recommendation X.31 Case B)

Table B.3 shows the valid parameter combinations to access CCITT Recommendation X.25 [3] packet services over the B-channel.

Table B.3: Parameter combinations for D-channel services

Notification class	Layer 2 activation	TEI allocation	X.25 packet service types
No notification (NOTE 1)	Semi-permanent	Fixed TEI	Customized, Identified
	Originator demand	Fixed TEI	Customized, Identified
	Originator demand	Dynamic TEI	Customized, Identified, Non-identified
Conditional notification (NOTE 2)	Originator demand	Dynamic TEI	Customized, Identified, Non-identified
NOTE 1: The three cases of the "No notification" class correspond to method 1, 2 and 3, respectively, as defined in ETS 300 049.			
NOTE 2: This case also corresponds to method 3 as defined in ETS 300 049.			

B.3 Case selection for communication establishment

B.3.1 Outgoing calls

The different parameters that may influence the choice of an access case among the three possibilities of ETS 300 007 [6] are summarized in table B.4 below.

NOTE: Where relevant, the access DTE/DTE case is also indicated for information.

The reception of an BIS-N-CONNECT request primitive by layer 3 requires a channel selection.

This selection is performed by the user. Nevertheless, the user may offer the network to select a B-channel among the idle ones when using the ETS 300 102-1 [9] procedures to establish this B-channel.

When using the ETS 300 102-1 [9] procedures, a co-ordination function is required to establish a layer 1 B-channel before using the CCITT Recommendation X.25 [3] protocols.

When an already established B-channel (either semi-permanent or on demand) is selected, or when the D-channel is selected, the type of interface is determined by the parameters associated to this channel.

Whereas, when establishing a new B-channel, the mode of operation depends on the network bearer service requested, i.e., circuit mode or packet mode. If circuit mode bearer service is selected, the ISDN end-system needs to know the characteristics of the ISDN end-system to be called: Access Unit (Case A).

When requesting a bearer service on a B-channel, the network, even if it does not support this bearer service, shall reply using the ETS 300 102-1 [9] procedures to indicate whether the operation is successful or not. Whereas, when requesting the packet mode bearer service on the D-channel, the network may not reply.

The method, by which the access type is determined is a local matter and is outside the scope of this ETS.

Table B.4: Selection of the access type for outgoing calls

Bearer Service	Case selection		X.25 packet service access		
	Selected channel		Called Address	Access case	Co-ordination Function
	Type	Selected by			
Circuit mode	Semi-Perm. B-channel (NOTE 1)	User	X.25	X.31 Case A (NOTE 2)	None
Packet mode	Semi-Perm. B-channel (NOTE 1)	User	X.25	X.31 Case B B-channel	None
Circuit mode	Idle B-channel	User or Network (NOTE 3)	ISDN and X.25 (NOTE 4)	X.31 Case A or DTE/DTE (NOTE 5)	subclause 6.1 or ETS 300 080
Packet mode	Idle B-channel (NOTE 3)	User or Network	X.25 (NOTE 6)	X.31 Case B B-channel	subclause 7.1
Circuit mode	On demand established B-channel	User	ISDN and X.25 (NOTES 4 & 7)	X.31 Case A or DTE/DTE (NOTE 58)	None
Packet mode	On demand established B-channel	User	X.25	X.31 Case B B-channel	None
Packet mode	D-channel (NOTE 8)	User	X.25	X.31 Case B D-channel	None

NOTE 1: The two semi-permanent B-channel types as defined in Clause 7 of ETS 300 007 [6] are included here. If the B-channel is not established at this moment, the BIS provider responds with an BIS-N-DISCONNECT indication to the BIS user.

NOTE 2: Semi-permanent B-channels are excluded in the DTE/DTE case.

NOTE 3: The call procedures used by the co-ordination function allow B-channel negotiation with the network.

NOTE 4: The ISDN address is the one of the AU or the remote ISDN DTE. This address may be absent in case of a hot line (direct call). The X.25 address may be absent if the B-channel is connected to a remote ISDN DTE.

NOTE 5: More parameters may be required to determine which interface can be used.

NOTE 6: Although ETS 300 102-1 [9] call procedures are used, there is no need for an ISDN address.

NOTE 7: The ISDN address has been used to establish the B-channel and is not required for a new virtual circuit establishment.

NOTE 8: "On demand" or "semi-permanent" D-channels as defined in ETS 300 049 are included here.

B.3.2 Incoming calls

Tables B.5 and B.6 summarize the possible selections of interface types in case of incoming calls when the user has subscribed to the "No notification" class or the "Conditional notification" class, respectively.

These tables take into account the three possible interfaces as given in ETS 300 007 [6] and the DTE/DTE interface.

Table B.5: Selection of the access type for incoming calls in the "No notification" class

Bearer Service	Case selection		X.25 packet service access	
	Selected Channel		Interface type	Co-ordination function
	Type	Originator		
Circuit mode	Semi-permanent B-channel (NOTES 1 & 2)	AU	X.31 Case A (NOTE 3)	none
Packet mode	Semi-permanent B-channel (NOTES 1 & 2)	Network	X.31 Case B B-channel	none
Circuit mode	On demand established B-channel	Network or AU	X.31 Case A or DTE/DTE (NOTE 4)	none
Packet mode	On demand established B-channel	Network or AU	X.31 Case B B-channel	none
Circuit mode	Idle B-channel	Network or user (NOTE 5)	DTE/DTE	ETS 300 080
Packet mode	D-channel (NOTE 6)	Network	X.31 Case B D-channel	none
<p>NOTE 1: The two semi-permanent B-channel types defined in Clause 7 of ETS 300 007 [6] are included here.</p> <p>NOTE 2: The ISDN shall maintain the physical layer of the B-channel. If not established when the incoming call arrives, the AU/PH may clear this incoming call. Activation of layer 2 on the B-channel is made as indicated in table B.2.</p> <p>NOTE 3: Semi-permanent B-channels are excluded in the DTE/DTE case.</p> <p>NOTE 4: The interface type of this B-channel has been determined when establishing it for the first outgoing/incoming call.</p> <p>NOTE 5: The call procedures of ETS 300 102-1 [9] allow a B-channel negotiation between the network and the user only for "point-to-point" configurations, either basic or primary rate access. For a basic rate access in "multi-point" configuration, the network only selects the B-channel.</p> <p>NOTE 6: "On demand" or "semi-permanent" D-channels as defined in ETS 300 049 are included here. Activation of layer 2 with SAPI=16 to support CCITT Recommendation X.25 [3] is initiated as indicated in table B.3.</p>				

Table B.6: Selection of the access type for incoming calls in the "Conditional notification" class

Bearer Service	Case selection		X.25 packet service access	
	Selected Channel		Interface type	Co-ordination function
	Type	Originator		
Circuit mode	Semi-permanent B-channel (NOTE 1)	AU	X.31 Case A (NOTE 2)	none
Packet mode	Semi-permanent B-channel (NOTE 1)	Network	X.31 Case B B-channel	none (NOTE 3)
Circuit mode	On demand established B-channel	Network or AU	X.31 Case A or DTE/DTE (NOTE 4)	none
Packet mode	On demand established B-channel	Network or user (NOTE 5)	X.31 Case B B-channel (NOTE 4)	subclause 7.1 (NOTE 2)
Circuit mode	Idle B-channel	Network or user (NOTE 6)	X.31 Case A or DTE/DTE (NOTE 7)	subclause 6.1 or ETS 300 080
Packet mode	Idle B-channel	Network or user (NOTE 6)	X.31 Case B B-channel (NOTE 7)	subclause 7.1
Packet mode	D-channel (NOTE 8)	Network or user (NOTES 5 & 9)	X.31 Case B D-channel	none (NOTES 5 & 9)
<p>NOTE 1: The two semi-permanent B-channel types defined in Clause 7 of ETS 300 007 [6] are included here, but the definition of the "Conditional notification" class may not concern semi-permanent B-channel. Activation of layer 2 on the B-channel is made as indicated in table B.2.</p> <p>NOTE 2: Semi-permanent B-channels are excluded in ETS 300 080.</p> <p>NOTE 3: Networks conforming to ETS 300 007 [6] do not offer the possibility of selecting a semi-permanent B-channel with the signalling procedures of the D-channel. This possibility is under study within CCITT study groups.</p> <p>NOTE 4: The interface type of this B-channel has been determined when establishing it for the first outgoing/incoming call.</p> <p>NOTE 5: Call offering procedures allow the user to select an already established B-channel or the D-channel, even in "multi-point configuration". If no call offering procedures are used, then the network only shall select the channel, and no co-ordination function is required.</p> <p>NOTE 6: The call procedures of ETS 300 102-1 [9] allow a B-channel negotiation between the network and the user only for "point to point" configurations, either basic or primary rate access. For a basic rate access in "multi-point" configuration, the network only selects the B-channel.</p> <p>NOTE 7: The call setup message may give some informations on the calling ISDN system (i.e., AU or remote DTE).</p> <p>NOTE 8: On demand or semi-permanent D-channel as defined in ETS 300 049 are included here. Activation of layer 2 with SAPI=16 to support CCITT Recommendation X.25 [3] data packet is initiated as indicated in table B.3.</p> <p>NOTE 9: The call offering procedures described in subclause 7.2.2.3.1 of ETS 300 007 [6] allow a B/D-channel negotiation although NOTE 2 in this subclause forbids it.</p>				

The BIS-N-CONNECT indication is always issued to the BIS user on the reception of an incoming call packet.

When no co-ordination function is required to receive the incoming call packet, the interface type is selected by the ISDN or the remote ISDN end-system (AU or DTE) and is already available within the called ISDN end-system.

If the ISDN end-system does not support D-channel packet handling, it may not respond to a network request (SABME with SAPI=16).

When the ISDN requires co-ordination with call procedures of ETS 300 102-1 [9] or ETS 300 007 [6], the following steps have to be performed:

Compatibility checking of the SETUP message: the ETS 300 102-1 [9] NL entity shall check the contents of the information elements in the SETUP message (especially Called party number or Called party subaddress, BC and LLC) with the possibilities of the ISDN end-system.

NOTE: The ISDN uses this compatibility checking to select a TE1 in a "multi-point configuration".

Interface type selection: once the SETUP is acceptable, further investigations may be required to be able to send the CONNECT message to the network. These may include channel selection between B-channel or D-channel, between idle or established B-channels, or the determination whether the SETUP has been sent by an AU or a remote ISDN DTE. This selection, which may use the contents of information elements such as called/calling party number/subaddress, is however a local matter and is outside the scope of this ETS.

NOTE: Under certain conditions (e.g., interworking with PSTN), the ISDN called system may confuse a remote ISDN calling DTE with a calling AU, and, as a consequence, accept the incoming call as a CCITT Recommendation X.31 [4] Case A interface. Since data link addresses (A/B) are not compatible, the layer 2 activation on the B-channel will not succeed in this case.

Co-ordination between ETS 300 102-1 [9] procedures and CCITT Recommendation X.25 [3] procedures: after successful completion of ETS 300 102-1 [9] procedures, the procedures for CCITT Recommendation X.25 [3] layers 2 and 3 shall apply.

When an ISDN end-system has subscribed to the "No notification" class, a co-ordination function is never required, except for the case that a SETUP message has been received from a remote DTE.

When an ISDN end-system has subscribed to the "Conditional notification" class, a co-ordination function shall be required by the network to select a channel or a TE1 among those of a multi-point configuration, or shall be required by a remote DTE to establish a new B-channel.

If the network cannot transmit the incoming call packet while using the call offering procedures of ETS 300 102-1 [9] or ETS 300 007 [6], because no B-channel is available, the BIS user of the called ISDN end-system is not informed of this attempt to establish a communication.

Annex C (informative): End-to-end system configurations

C.1 Introduction

The protocols and usage of supplementary services as specified in this ETS shall satisfy the requirements of ETS 300 223 [16] defining the end-to-end protocols for the syntax-based Videotex service.

The purpose of this annex is to clarify possible end-to-end environments in terms of the networks and the different types of end-systems concerned.

C.2 Network configurations

The scope of this ETS implies that at least one end of the communication is on an ISDN. The usage of packet mode may involve PSPDN in many communications.

An ISDN may interwork with a PSPDN in different ways:

- via an Access Unit (AU) to the PSPDN;
- via an interworking function between the packet mode bearer service in the ISDN and a PSPDN.

Figures C.1 to C.7 illustrate some different configurations that may be used between two end-to-end Videotex systems:

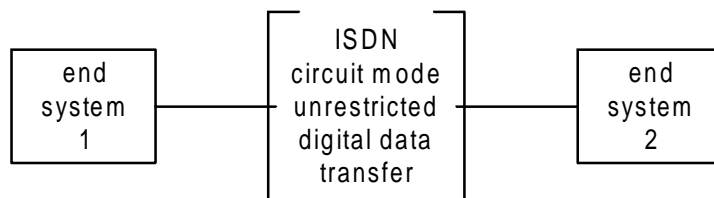


Figure C.1: Circuit mode ISDN

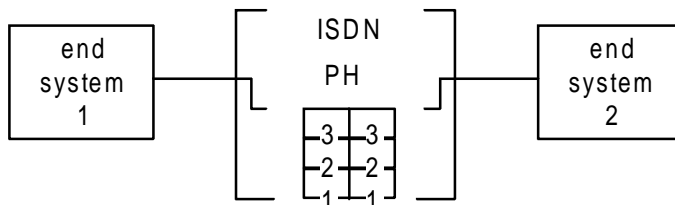


Figure C.2: Packet mode ISDN

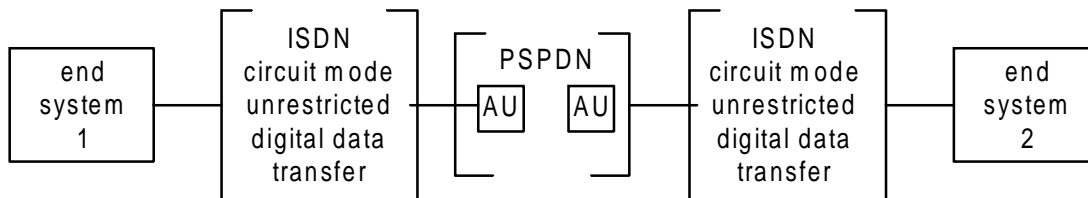


Figure C.3: Circuit mode ISDN to Circuit mode ISDN

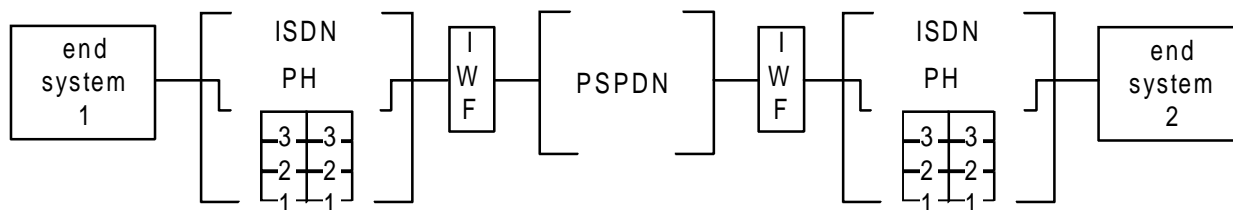


Figure C.4: Packet mode ISDN to packet mode ISDN:

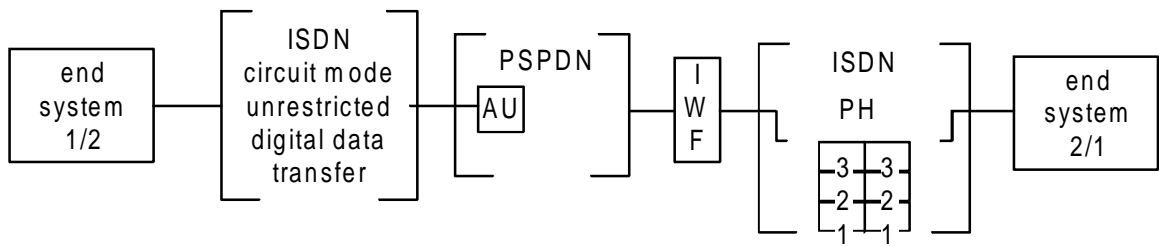


Figure C.5: Circuit mode ISDN to packet mode ISDN or vice-versa

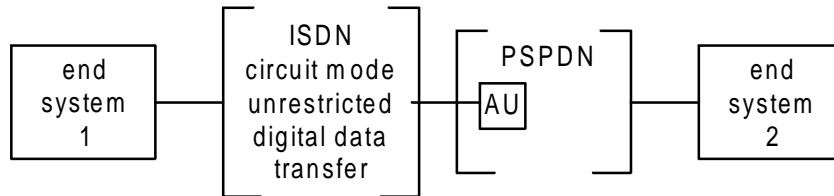


Figure C.6: Circuit mode ISDN to PSPDN

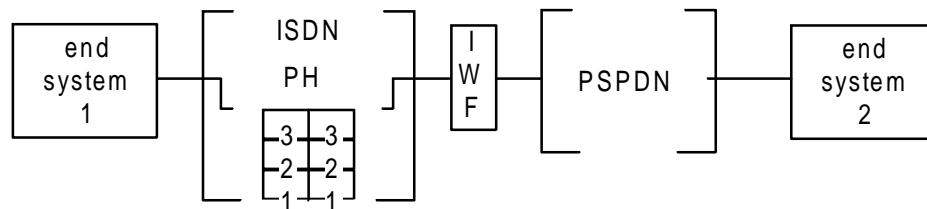


Figure C.7: Packet mode ISDN to PSPDN

C.3 Types of interfaces at the two end-systems

In the network configurations described in Clause C.2, several types of interfaces have to be used by end-systems:

- X.25:
The system has a permanent connection to a PSPDN.
- DTE/DTE:
The system is connected to the ISDN and uses DTE/DTE protocols on the B-channel for packet data transfer. The B-channel is established on demand.
- X.31 Case A:
The system is connected to the ISDN and uses DTE/DCE protocols on the B-channel for packet data transfer. The DCE is outside the ISDN. The B-channel is established permanently or on demand.
- X.31 Case B/B-channel:
The system is connected to the ISDN and uses DTE/DCE protocols on the B-channel for packet data transfer. The DCE is inside the ISDN. The B-channel is established permanently or on demand.

- X.31 Case B/D-channel:
The system is connected to the ISDN and uses DTE/DCE protocols on the D-channel for packet data transfer. The DCE is inside the ISDN. The link layer over the D-channel is established permanently or on demand.

Table C.1 illustrates the interfaces which may be used at the two ends of a packet mode communication and the corresponding network configurations available.

Table C.1: Interfaces at the two Videotex end-systems

End-System 1	End-System 2	DTE/DTE B-channel	X.31 Case A B-channel	X.31 Case B B-channel	X.31 Case B D-channel	X.25
DTE/DTE B-channel	Figure C.1 NOTE	-- --	-- --	-- --	-- --	-- --
X.31 Case A B-channel	-- --	Figure C.3	Figure C.5	Figure C.5	Figure C.6	
X.31 Case B B-channel	-- --	Figure C.5	Figure C.2 Figure C.4	Figure C.2 Figure C.4	Figure C.7	
X.31 Case B D-channel	-- --	Figure C.5 Figure C.4	Figure C.2 Figure C.4	Figure C.2	Figure C.7	
NOTE: This case is outside the scope of this ETS, and is treated in ETS 300 080.						

Except for the case of DTE/DTE, each side of the communication in table C.1 handles the channel establishment (permanent or on demand) independently from the other side.

C.4 End system characteristics

The layer 7 protocol defined in ETS 300 223 [16] has identified several entities to describe a communication model:

- the terminal is connected to the Access Network via the Terminal Function (TF);
- the Videotex Service is connected to the Access Network via the Access Function (AF).

As the Videotex protocol on layer 7 is not symmetrical, an end-system can work as a TF or an AF. If two terminals want to communicate, one should act as an AF. The structure of the Videotex service - Access Function and Host Function in the same place, Access Function within a Videotex Access Point, etc. - has no influence on the characteristics of the end-system.

An end-system, whenever it acts as a TF or AF, can initiate the communication (calling) or respond to a call (called).

Table C.2 illustrates the different possibilities of the end-systems, and, for each case, its preferred use.

Table C.2: End system characteristics

Characteristics		Possibilities				Preferences			
Interface	Channel Establishment	TF		AF		TF		AF	
		Callin g	Called	Callin g	Called	Callin g	Called	Callin g	Called
DTE/DTE B-channel	On demand	X	X	X	X	1			1
X.31 Case A B-channel	On demand Permanent	X X	X X	X X	X X	2			1 1
X.31 Case B B-channel	On demand Permanent	X X	X X	X X	X X	1 2			1
X.31 Case B D-channel	On demand Permanent	X X	X X	X X	X X	1 1			2
X.25		X			X				1
Abbreviations: TF Terminal Function AF Access Function X Possible 1 Higher preference 2 Lower preference									

Annex D (informative): Lower layer conformance testing for syntax-based Videotex

D.1 Introduction

The present annex provides interim guidelines on how to make best use of existing testing standards to cover conformance testing requirements for lower layer protocols used in ISDN syntax-based Videotex terminals. In the long term, this annex will be superseded by new material which will take advantage of test standard ETS DE/SPS-5003 directly covering protocol conformance testing for ETS 300 007 [6]. It is to be expected that this future test standard will make reference to four other test standards: I-ETS 300 313 and I-ETS 300 322 covering abstract test suites for layer 2 and layer 3 of basic access out of band protocols, and ISO 8882-2 [25] and ISO 8882-3 [26] covering abstract test suites for layer 2 and layer 3 of the in-band protocols.

While the two ISO standards have been published, none of the three ETSs mentioned above are available to date. To acknowledge the potential impact of these, as yet, non-existing standards on the present ETS, it is decided to make this annex an informative annex only.

This annex is applicable to the case of a Videotex terminal operating in packet mode when at least one packet handling node exists between the terminal and the Videotex access function or the other Videotex terminal. Such configurations are described in ETS 300 007 [6]. Strictly speaking, the annex is not applicable to the case in which circuit mode bearer service is used end-to-end, which is a case covered by a separate standard, ETS 300 080 (see Annex E, Bibliography).

D.2 References

D.2.1 Basic references

The following documents shown in table D.1 are basic references for protocol conformance testing:

Table D.1

Scope of standard	Base Standard	PICS	PIXIT	ATS
ISDN support of packet mode	ETS 300 007 [6]	DE/SPS-5003	DE/SPS-5003	DE/SPS-5003
Out of band protocols	ETS 300 125 [11] ETS 300 102-1 [9]	I-ETS 300 305 DE/SPS-5007	I-ETS 300 309 DE/SPS-5009	I-ETS 300 313 I-ETS 300 322
In-band protocols	ISO 7776 [21] ISO/IEC 8208 [23]	ISO 7776/DAM1 [22] ISO/IEC 8208/AM3 [24]	ISO 8882-2 [25] ISO 8882-3 [26]	ISO 8882-2 [25] ISO 8882-3 [26]

NOTE: For ISDN support of packet mode, the DE document is in preparation. No draft is available yet. For out of band protocols, all DE documents are in preparation. PICS and PIXIT are available as final drafts. For the abstract test suites, no drafts are available yet.

D.2.2 Additional references

Further documents for information can be found in Annex E (informative) "Bibliography".

D.3 Terminology

For the purpose of this annex, the definitions and abbreviations given in CCITT Recommendation I.112 and ETR 022 are applicable.

D.4 Elements of the test specifications

D.4.1 PICS proforma

PICS proforma tables (see references in subclause D.2.1 of this annex) itemise all the normative elements of a protocol standard in a systematic way. PICS entries are provided with a reference field pointing to the relevant subclauses of the applicable standards.

In Clauses D.5, D.6 and D.7, this annex makes use of the PICS of the in-band and out of band protocols for impact analysis of the application rules given in the main part of this ETS.

D.4.2 PIXIT proforma

PIXIT proforma tables (see references in subclause D.2.1 of this annex) itemise all the implementation dependent elements of the protocol whose knowledge is necessary for the set up of the test environment. In particular, this includes the actual values of addresses and timers.

D.4.3 Test suites

Abstract test suites have been standardised for the in-band protocols and similar standards are planned for out of band protocols (see references in subclause D.2.1 of this annex). These test suites comprise hundreds of individual test cases. The assumption made in this annex is that these test cases need not be modified or augmented for Videotex end systems, i.e. adequate coverage can be achieved by test case selection and parametrization alone within the available ISO and ETSI test suites for base protocol standards. In other words, it is assumed that lower layer testing aspects specific to Videotex end systems can be entirely covered by suitable filling in of PICS proforma (possibly modified/augmented for Videotex) and by production of XREF tables to map these PICS entries to standard ISO/ETSI test cases.

NOTE: The generation of ad hoc test suites which would re-use existing ISO/ETSI test cases under new identifiers is strongly deprecated. If ad hoc test suites cannot be avoided, at least the identifiers of re-used test cases should be kept unchanged or should be exactly cross referenced to avoid excessive overhead in checking coverage of the protocol standard and in generating XREF matrices.

D.4.4 Test case selection and parametrization

Several methods are used in the referenced test specifications for selecting the test cases covering a specific PICS/PIXIT entry:

- 1) provide the PICS/PIXIT entries with a forward reference to the test cases to be selected;
- 2) provide the test cases with a backward reference to the relevant subclauses of the base standard or application standard;
- 3) use of a separate cross reference table which maps the PICS entries to the test cases to be selected. The appropriate cross reference table is globally referenced in the abstract test suite overview section;
- 4) use of logical expressions to predicate the selection or deselection of test cases (these expressions can be integrated in the specifications of the individual test cases).

Documents produced by conformance testing projects use method 3. Some ETSI conformance testing specifications for supplementary services (see Bibliography in Annex E) already use method 3 but don't provide the XREF table proper, which is to be completed.

Attachment requirement standards use a combination of methods 1 and 2.

Method 4 is in principle the most accurate and the most flexible one, since it allows a "rule driven" approach. However, it is not used by any of the referenced testing documents.

No separate standards which specify test case selection rules are currently planned by ETSI for conformance testing of packet mode ISDN terminals.

Full coverage of test case selection for Videotex end systems is outside the scope of this annex.

D.4.5 Test notation

The recommended test notation for abstract test suites is the Tree and Tabular Combined Notation (TTCN) described in ISO 9646-3. However, in most test standards and test specification documents referred in this annex, including ETSI documents, various other notations are used, e.g. message sequence diagrams ("arrow diagrams"). Some ETSI test specifications for supplementary services (see Bibliography in Annex E) have started using TTCN but maintain other modes of representation in parallel.

D.5 Modification to PICS resulting from application rules constraining lower layer protocols

Clauses 6, 7 and 8 of this ETS describe a number of application rules for using the four base protocols in a syntax-based Videotex terminal.

D.5.1 Out of band protocols

D.5.1.1 Layer 2 protocol

No additions/modifications apply to the PICS proforma of I-ETS 300 309.

For case B, D-channel access mode, the following additional requirements apply to data link connections over SAPI 16:

NOTE: Such connections convey in-band information and logically belong to subclause D.5.2.1.

Table D.2

Index	Protocol feature	Status	Reference 1	Reference 2	Comment
1	Single data link connection over SAPI 16	C		8.1.1	NOTE 1
2	Same connection endpoint suffix for signalling and data transfer	C		8.1.2	NOTE 2
3	Responsibility for data link set up agreed with the network	C		8.1.3	NOTE 1
4	Call offering over SAPI 16	P		8.1.1	NOTE 3
Reference 1 is to ETS 300 125 [11] Reference 2 is to the main part of this ETS Status: C: conditional on implementation of case B D-channel P: prohibited NOTE 1: These items should be regarded as layer 2 in-band connection constraints. NOTE 2: This is a static constraint between in-band and out of band data link connections. NOTE 3: This is a dependency between adjacent layer 2 and layer 3 protocol entities.					

D.5.1.2 Layer 3 protocol

The following additions/modifications apply to the PICS proforma of ETS DE/SPS-5009:

Table D.3

Index	Protocol feature	Status	Reference 1	Reference 2	Comment
	Addressing for supplementary services	O		6.3.1.2 6.3.1.6	
	Coding of bearer capability for outgoing calls	-		6.3.1.3	TITLE ITEM
	Coding standard: CCITT standard	M		6.3.1.3	
	Info transfer cap.: Unrestricted digital	M		6.3.1.3	
	Transfer mode : circuit mode	C		6.3.1.3	
	Info transfer rate : 64 kbit/s	C		6.3.1.3	
	Coding of lower layer compatibility for outgoing calls	-		6.3.1.3	TITLE ITEM
	Coding standard: CCITT standard	M		6.3.1.3	
	Info transfer cap.: Unrestricted digital	M		6.3.1.3	
	Transfer mode: Circuit mode	C		6.3.1.3	
	Info transfer rate: 64 kbit/s	C		6.3.1.3	
	In-band layer 2 protocol: X.25 link layer	C		6.3.1.3	
	In-band layer 3 protocol: X.25 packet layer	M		6.3.1.3	

Table D.3 (concluded)

Index	Protocol feature	Status	Reference 1	Reference 2	Comment
	Incoming calls	-			TITLE ITEM
	Checking out of band dest. address	M		6.3.1.4 a)	
Reference 1 is to ETS 300 102-1 [9] Reference 2 is to the main part of this ETS Status: O: optional M: mandatory C: conditional depending on access case selected -: this row is a title item					

D.5.2 In-band protocols

D.5.2.1 Layer 2 protocol

The following additions/modifications apply to the PICS proforma of ISO 7776/DAM1 [22]:

NOTE: These modifications are not applicable to case B, D-channel. For in-band layer 2 connection constraints in that case, see subclause D.5.1.1.

Table D.4

Index	Protocol feature	Status	Reference 1	Reference 2	Comment
Lm *	Multilink	P	6	6.2.2.1 a)	
Li *	Independence of LAPB protocols	M	-	6.2.2.1 b)	
M8	Modulo 8	M	3, 4.1.1	6.2.2.1 g)	
M128	Modulo 128	O	3, 4.1.1	6.2.2.1 g)	
LS2	<s> Send DM to request SABM/SABME	P	5.3.1	6.2.2.1.d)	
LDsq *	Disconnection sequence (normal)	M	-	6.2.2.1 j)	
XID *	Support of identification (X.32 [5])	O	-	6.2.2.1 k)	
NRR	RR_RSP	O.4	5.4.2	6.2.2.2 d)	NOTE
Reference 1 is to ISO 7776 [21] Reference 2 is to the main part of this ETS Status: P: prohibited M: mandatory O: optional Index: same symbol as in ISO 7776/DAM1 [22] PICS proforma, unless an asterisk is used (interpolated new item) NOTE: I-frames shall be acknowledged without delay using RR if no outgoing I-frame is available for sending.					

D.5.2.2 Layer 3 protocol

The following additions/modifications apply to the PICS proforma of ISO/IEC 8208/AM3 [24]:

Table D.5

Index	Protocol feature	Status	Reference 1	Reference 2	Comment
Ec/x	DTE/DCE	M	3, 3.2	6.3.2, 6.3.2.3	NOTE
Et/x	DTE/DTE	N/A	3, 3.2	6.3.2, 6.3.2.3	
Mb *	Multiple B-channels NL independence	M	-	6.3.2.2	
L2sq *	Data link disconnection sequence (normal)	M	-	6.3.2.12	
Pid *	Higher layer protocol identifier	M	?	6.3.2.10	
DR5e*	Inconsistent Q-bit settings	M	?	6.3.2.9	
Reference 1 is to ISO/IEC 8208 [23] Reference 2 is to the main part of this ETS Status: P: prohibited M: mandatory O: optional N/A not applicable Index: same symbol as in ISO 8208/AM3 [24] PICS proforma, unless an asterisk is used (interpolated new item) NOTE: Versions 1984 or later are globally meant here. At least one of these versions shall be provided.					

D.6 Mapping of PICS related to SBV Bearer Independent services to protocol test suites

ETS 300 223 [16] introduces a Bearer Independent Service for Syntax-based Videotex in terms of abstract service primitives. These primitives are used to describe interactions between adjacent layers 3 and 7 within the same end system.

These primitives cannot be tested in isolation. Only effects implied by their execution and which are visible at the S/T reference point can be tested.

The approach taken is to consider PICS entries related to the Videotex Bearer Independent Service described in ETS 300 223 [16]. These entries can then be mapped on the test cases of the ATS for individual base protocols and can thus influence test case selection and parametrization.

NOTE: The feasibility of such a mapping and the test coverage it provides requires further study, which is outside the remit of this annex.

D.7 New PICS entries related to access case selection and coordination functions

Co-ordination and synchronisation aspects are addressed in subclause 4.3 and subclauses 6.1, 7.1 and 8.2 of the main document.

D.7.1 CCITT Recommendation X.31 access case selection

The corresponding PICS proforma are described in table D.6:

Table D.6

Index	Protocol feature	Status	Reference 1	Reference 2	Comment
	X.31 outgoing calls	O.2	7.1	4.3.1	NOTE 1
	X.31 incoming calls	O.2	7.2	4.3.1	NOTE 2
	X.31 case A, on demand access	O.1		4.3.2, 6	
	X.31 case A, semi-permanent access	O.1		4.3.2, 6.1.5, 6.2.2, 6.3.2	NOTE 3
	X.31 case B, B-channel, on-demand access	O.1		4.3.3, 7	
	X.31 case B, B-channel, semi-permanent access	O.1		4.3.3, 7.1.5 7.2.2, 7.3.2	NOTE 3
	X.31, case B, D-channel	O.1		4.3.4, 8	
Reference 1 is to ETS 300 007 [6] Reference 2 is to the main part of this ETS Status: O.n: optional. At least one of the options with the same value of n shall be implemented NOTE 1: In informative Annex B, table B.4 summarises the access case selection criteria for outgoing calls. NOTE 2: In informative Annex B, tables B.5 and B.6 summarise the access case selection criteria for incoming calls. NOTE 3: Access via semi-permanent B-channel appears as one access case from an end system viewpoint. Distinguishing between a case A and a case B seems to be a network issue only.					

D.7.2 Co-ordination between protocol pillars

The corresponding PICS proforma are described in table D.7:

Table D.7

Index	Protocol feature	Status	Reference 1	Reference 2	Comment
	Conditional outgoing on-demand B-channel estab. following CONNECT request (case A)	C	7.1.1.	6.1.2.2	
	Conditional outgoing on-demand B-channel estab. following CONNECT request (case B)	C	7.1.2.1	7.1.2.2	
	Local DISCONNECT indication on failure of B-channel set up procedure (cases A & B)	C	7.4.3	6.1.2.2 7.1.2.2	
	Incoming on-demand B-channel establishment (case A)	C	7.2.1	6.1.3.2 6.3.1.4	
	Incoming on-demand B-channel establishment (case B)	C	7.2.2.1	7.1.3.2 7.3.1.4	
	Call offering procedure (case A)	C	7.2.1.2	6.1.3.2 6.3.1.4	NOTE 1
	Call offering procedure (case B, B-chan)	C	7.2.2.3.1	7.1.3.2 7.3.1.4	NOTE 1
	Call offering procedure (case B, D-chan)	C	7.2.2.3.1	8.2.2 8.2.2.4, 8.2.2.5	NOTE 1
	Call offering procedure (semi-permanent B-channel)	C	7.2.2.3.1	7.1.3.1 7.3.1.4	NOTE 1 NOTE 3
	Clearing B-channel on T320 time out in the end system (cases A & B)	O	7.3.2	6.1.4.2 7.1.4.2	NOTE 2
	DISCONNECT ind. for each VC on loss of B-channel connection (cases A & B)	C	7.4.1	6.1.5.2 7.1.5.2	
<p>Reference 1 is to ETS 300 007 [6] Reference 2 is to the main part of this ETS Status: O: optional C: conditional, depending on the options implemented from table D.6</p> <p>NOTE 1: Used by the network in case of conditional notification. NOTE 2: This option is recommended in the end system. ETS 300 007 [6] foresees this timer in the network only and limits its applicability to case B. NOTE 3: This is not applicable to case A. In addition is not certain that conditional notification will be used at all in conjunction with semi-permanent B-channels. NOTE 4: Informative Annex B summarises the criteria for applying co-ordination functions to outgoing (table B.4) and incoming calls (tables B.5 and B.6).</p>					

Annex E (informative): Bibliography

These publications serve for information. Some of them are cited at informative places in the text of this ETS.

- CCITT Recommendation I.112 (1988) "Vocabulary of terms for ISDN".
- CCITT Recommendation T.51 (1988) "Coded character sets for telematic services".
- CCITT Recommendation T.90 "Characteristics and protocols for terminals for telematic services in ISDN".
- CCITT Recommendation X.29 "Procedures for the exchange of control information and user data between a packet assembly/disassembly (PAD) facility and a packet mode DTE or another PAD".
- CCITT Recommendation X.75 (1984) "Packet-switched signalling system between public networks providing data transmission services".
- ETS 300 048 "Integrated Services Digital Network (ISDN); ISDN Packet Mode Bearer Services (PMBS); ISDN Virtual Call (VC) and Permanent Virtual Circuit (PVC) bearer services provided on the B-channel of the user access: basic and primary rate".
- ETS 300 049 "Integrated Services Digital Network (ISDN); ISDN Packet Mode Bearer Services (PMBS); ISDN Virtual Call (VC) and Permanent Virtual Circuit (PVC) bearer services provided by the D-channel of the user access: basic and primary rate".
- ETS 300 050 "Integrated Services Digital Network (ISDN); Multiple Subscriber Number (MSN) supplementary service, Service description".
- ETS 300 051 "Integrated Services Digital Network (ISDN); Multiple Subscriber Number (MSN) supplementary service, Functional capabilities and information flows".
- ETS 300 052 "Integrated Services Digital Network (ISDN); Multiple Subscriber Number (MSN) supplementary service, Digital Subscriber Signalling No. one (DSS1) protocol".
- ETS 300 059 "Integrated Services Digital Network (ISDN); Subaddressing (SUB) supplementary service, Service description".
- ETS 300 060 "Integrated Services Digital Network (ISDN); Subaddressing (SUB) supplementary service, Functional capabilities and information flows".
- ETS 300 061 "Integrated Services Digital Network (ISDN); Subaddressing (SUB) supplementary service, Digital Subscriber Signalling No. one (DSS1) protocol".
- ETS 300 062 "Integrated Services Digital Network (ISDN); Direct Dialling In (DDI) supplementary service, Service description".
- ETS 300 063 "Integrated Services Digital Network (ISDN); Direct Dialling In (DDI) supplementary service, Functional capabilities and information flows".
- ETS 300 064 "Integrated Services Digital Network (ISDN); Direct Dialling In (DDI) supplementary service, Digital Subscriber Signalling No. one (DSS1) protocol".
- prETS 300 077 "Integrated Services Digital Network (ISDN); Attachment requirements for terminal adaptors to connect to an ISDN at the S/T reference point (T/TE 04-10) (Candidate NET 7)".

ETS 300 079	"Integrated Services Digital Network (ISDN); Syntax-based Videotex; End-to-end protocols".
ETS 300 080	"Integrated Services Digital Network (ISDN); ISDN lower layer protocols for telematic terminals (T/TE 12-04)".
ETS 300 089	"Integrated Services Digital Network (ISDN); Calling Line Identification Presentation (CLIP) supplementary service, Service description".
ETS 300 090	"Integrated Services Digital Network (ISDN); Calling Line Identification Restriction (CLIR) supplementary service, Service description".
ETS 300 091	"Integrated Services Digital Network (ISDN); Calling Line Identification Presentation (CLIP) and Calling Line Restriction (CLIR) supplementary service, Functional capabilities and information flows".
ETS 300 092	"Integrated Services Digital Network (ISDN); Calling Line Identification Presentation (CLIP) supplementary service, Digital Subscriber Signalling No. one (DSS1) protocol".
ETS 300 093	"Integrated Services Digital Network (ISDN); Calling Line Identification Restriction (CLIR) supplementary service, Digital Subscriber Signalling No. one (DSS1) protocol".
ETS 300 099	"Integrated Services Digital Network (ISDN); Specification of the Packet Handler Access Point Interface (PHI)".
prETS 300 202	"Integrated Services Digital Network (ISDN); Call Deflection (CD) supplementary service, Service description".
prETS 300 206	"Integrated Services Digital Network (ISDN); Call Deflection (CD) supplementary service, Functional capabilities and information flows".
prETS 300 207	"Integrated Services Digital Network (ISDN); Call Deflection (CD) supplementary service, Digital Subscriber Signalling No. one (DSS1) protocol".
ETR 021 (1991)	"Advanced Testing Methods (ATM); Tutorial on protocol conformance testing (Especially OSI standards and profiles)".
ETR 022 (1993)	"Advanced Testing Methods (ATM); Vocabulary of terms used in communication protocols conformance testing".
prETS 300 284	"Integrated Services Digital Network (ISDN); User to User Signalling (UUS) supplementary service, Service description".
prETS 300 285	"Integrated Services Digital Network (ISDN); User to User Signalling (UUS) supplementary service, Functional capabilities and information flows".
T/S 46-34A	"Integrated Services Digital Network (ISDN); Access Conformance Assessment Process (CAP) for Terminal Equipment supporting the Digital Subscriber Signalling No. one (DSS1); Direct Dialling In (DDI) supplementary service".
T/S 46-34B	"Integrated Services Digital Network (ISDN); Access Conformance Assessment Process (CAP) for Terminal Equipment supporting the Digital Subscriber Signalling No. one (DSS1); Multiple Subscriber Number (MSN) supplementary service".

T/S 46-34C	"Integrated Services Digital Network (ISDN); Access Conformance Assessment Process (CAP) for Terminal Equipment supporting the Digital Subscriber Signalling No. one (DSS1); Calling Line Identification Presentation (CLIP) supplementary service".
T/S 46-34I	"Integrated Services Digital Network (ISDN); Access Conformance Assessment Process (CAP) for Terminal Equipment supporting the Digital Subscriber Signalling No. one (DSS1); Subaddressing (SUB) supplementary service".
I-ETS 300 313	"Conformance tests specification for ETS 300 125/L2 (in preparation)".
I-ETS 300 322	"Conformance tests specification for ETS 300 102/L3 (in preparation)".
DE/SPS-5003	"Conformance test specification for ETS 300 007 (working draft)".
prl-ETS 300 305	"PICS proforma for ETS 300 125 (working draft)".
DE/SPS-5007	"PICS proforma for ETS 300 102 (working draft)".
prl-ETS 300 309	"PIXIT proforma for ETS 300 125 (working draft)".
DE/SPS-5009	"PIXIT proforma for ETS 300 102 (working document)".
Draft FS T/1212	"Provision of OSI Connection-mode Transport Service over the OSI Connection-mode Network Service by using the ISDN Packet Mode Bearer Service on the B-channel: Demand case".
Draft FS T/1221	"Provision of OSI Connection-mode Transport Service over the OSI Connection-mode Network Service by using the ISDN Packet Mode Bearer Service on the D-channel: No notification class".
Draft FS T/1312	"Provision of OSI Connection-mode Transport Service over the OSI Connection-mode Network Service by using the ISDN Circuit Mode 64 kbit/s Unrestricted Bearer Service to access a PSDN: Demand case".
ISO 8348	"Information processing systems - Data Communications - Network service definition".
ISO/IEC 8878	"Information processing systems - Data communications - Use of X.25 to provide the OSI connection-mode network service".
ISO/IEC TR 9574	"Information technology - Telecommunications and information exchange between systems - Provisions of the OSI connection-mode network service by packet mode terminal equipment connected to an integrated services digital network (ISDN)".
ISO 9646-1 (1990)	"OSI Conformance Testing Methodology and Framework. Part 1: General concepts".
ISO 9646-2 (1990)	"OSI Conformance Testing Methodology and Framework. Part 2: Abstract Test suite specification".
ISO 9646-3 (1990)	"OSI Conformance Testing Methodology and Framework. Part 3: Tree and Tabular Combined Notation (TTCN)".

History

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